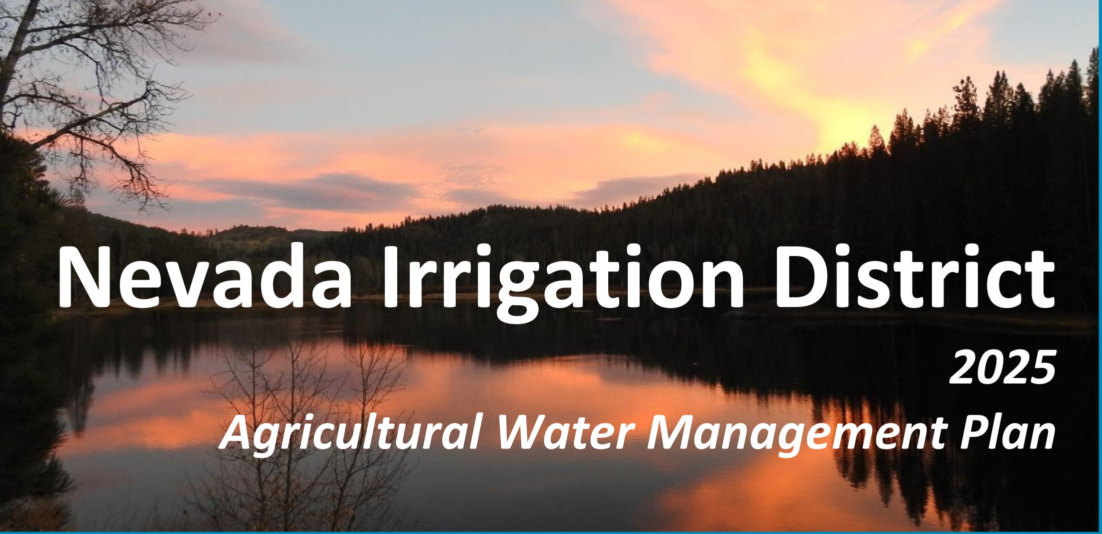

Nevada Irrigation District

2025

Agricultural Water Management Plan

3/25/2026

Prepared For:

Nevada Irrigation District
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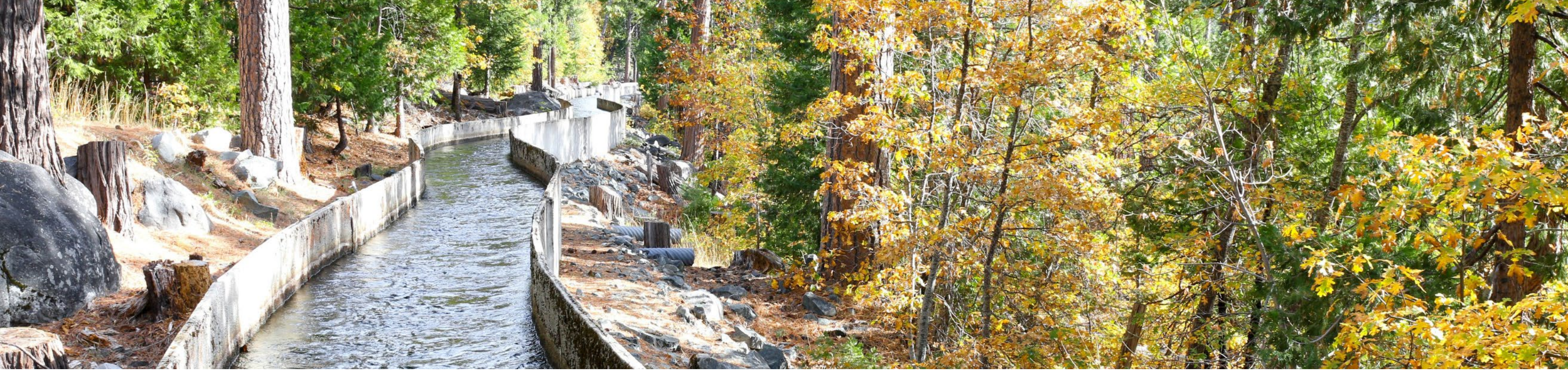

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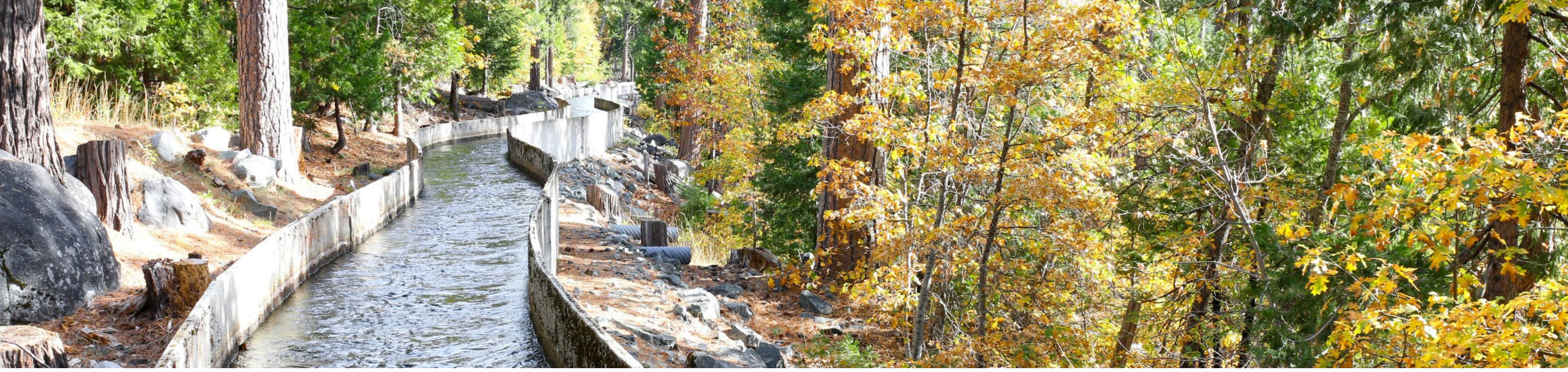
LIST OF ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
Act	Agricultural Water Management Planning Act
AF	Acre-foot/-feet
AFY	Acre-foot/-feet per year
ASCE	American Society of Civil Engineers
AW	Applied Water
AWMP	Agricultural Water Management Plan
BMP	Best Management Practice
CABY	Cosumnes, American, Bear, Yuba Integrated Regional Water Management Group
CCU	Crop Consumptive Use
CDFW	California Department of Fish and Wildlife
CIMIS	California Irrigation Management Information System
CMIP	Coupled Model Intercomparison Project
CWC	California Water Code
District	Nevada Irrigation District
DWR	California Department of Water Resources
EP	Effective Precipitation
EQIP	Environmental Quality Incentives Program
ET	Evapotranspiration
ETAW	Evapotranspiration of Applied Water
ETo	Reference Evapotranspiration
EWMP	Efficient Water Management Practice
FERC	Federal Energy Regulatory Commission
ft	Foot/Feet
GCM	Global Climate Models
GIS	Geographical Information System
HEC	Hydrologic Engineering Center
HMS	Hydrologic Modeling System
hp	Horsepower
IDC	Integrated Water Flow Model Demand Calculator
M&I	Municipal and Industrial
ml	Milliliter
N/A	Not Applicable
NID	Nevada Irrigation District
NRCS	Natural Resource Conservation Service
PCWA	Placer County Water Agency
PFW	Plan for Water
PG&E	Pacific Gas and Electric
Plan	Agricultural Water Management Plan
PRISM	Parameter-elevation Regressions on Independent Slopes Model
RCD	Resource Conservation District
SSURGO	Soil Survey Geographic Database
SVI	Sacramento Valley Index
SVWQC	Sacramento Valley Water Quality Coalition
SWP	State Water Project
SWRCB	California State Water Resource Control Board
TAF	Thousand Acre-feet
TOC	Total Organic Carbon
UC	University of California
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WRCC	Western Regional Climate Center
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
WY	Water Year



1 INTRODUCTION AND DESCRIPTION OF PREVIOUS WATER MANAGEMENT ACTIVITIES

This Agricultural Water Management Plan (AWMP or Plan) is the year 2025 AWMP as required by the Agricultural Water Management Planning Act (Act), pursuant to California Water Code (CWC) Section 10820(a). The Act requires all agricultural water suppliers that provide water to 25,000 or more irrigated acres within their service area to prepare an AWMP. This AWMP was prepared in coordination with the Nevada Irrigation District (NID or District).

This AWMP addresses the District's water system and includes a description of the service area, water uses, water resources, and a comparison of water supply and water demands during the planning cycle (2021 through 2025). Also described are the District's water supply reliability, water use efficiency information, and drought plan. The Plan presents NID's past data and current operations, rules, and regulations as provided to develop the document.

The organization of this 2025 AWMP generally follows the outline presented in the Final California Department of Water Resources (DWR) (2025b) Agricultural Water Management Plan Guidebook. This 2025 AWMP solely addresses the legislative requirements.

1.1 Agricultural Water Management Planning Act

NID is defined as an agricultural supplier per CWC Section 10608.12(a), and therefore, is required to update the AWMP per CWC Section 10820(a)(2)(A). The Act describes the contents of the AWMP as well as how agricultural water suppliers should adopt and implement the AWMP. The current version of the Act requires an AWMP to include:

- Description of agricultural water supplier and service area.
- Information on quantity of water uses.
- Description of quantity and quality of water supplies.
- Analysis of water supply reliability.
- Annual water budget based on quantification of all inflow and outflow components for the service area.
- Identification of water management objectives aimed at improving system efficiency or to meet other water management objectives.
- Quantification of agricultural water use efficiency using the methods(s) presented in DWR's 2012 report to the legislature, "A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use." The quantification of agricultural water use efficiency must account for all water uses, including crop water use, agronomic water use, environmental water use, and recoverable surface flows.
- Analysis of the effect of climate change on future water supplies.

- Information regarding efficient water management practices required pursuant to Section 10608.48.
- Inclusion of a drought plan for periods of limited water supplies available to the supplier. The drought plan describes actions for resilience and response planning.

In addition to the general requirements above, the Act includes submittal requirements:

- AWMP is to be adopted on or before April 1, 2021 (and every five years following).
- AWMP must be submitted electronically to DWR no later than 30 days after adoption.

1.2 Description of Previous Water Management Activities

The District maintains an active and ongoing water resources planning program. Policy and strategic efforts are set by the Board of Directors through the Board's Strategic Plan, specific resolutions, and directions to staff. Previous planning efforts include: AWMPs; Urban Water Management Plans; Integrated Regional Water Resource Management Plans through the Cosumnes, American, Bear, Yuba (CABY) group; Federal Energy Regulatory Commission (FERC) license, and the Raw Water Master Plan. The most recent Board of Directors' District Goals identified the importance of developing and managing the District's resources in a self-determining manner to protect and provide local control of the water supply. The District is implementing this goal through the Plan for Water (PFW) Program. The PFW is an overarching effort to evaluate all the District's natural resources, evaluate the community's need for the resources, and develop strategies to match resources with the needs. The PFW was completed in 2024, and the Final Technical Memorandum was released on August 20, 2024. The PFW is thoroughly discussed in Chapter 6.

1.3 Coordination Activities

The following subsections describe the District's actions to comply with the coordination requirements, including notification and public participation.

1.3.1 Notification of AWMP Preparation

The District notified cities and counties within the service area that this AWMP was being updated. The notification was sent December 2, 2025, and January 20, 2026, to the cities and counties as well as other stakeholders as listed in Appendix A. Table 1-1 provides a summary of the AWMP coordination, adoption, and submittal activities.

Table 1-1. (Worksheet 1) Summary of Coordination, Adoption, and Submittal Activities

Potential Interested Parties	Notified of AWMP	Notified of Public Meetings	Attended Public Hearing	Copy of Adopted AWMP/ Amendment Sent
City of Grass Valley	12/2/2025			4/15/2026
City of Nevada City	12/2/2025			4/15/2026
City of Lincoln	12/2/2025			4/15/2026
Nevada County	12/2/2025			4/15/2026
Placer County	12/2/2025			4/15/2026
Yuba County	12/2/2025			4/15/2026
West Placer GSA				4/15/2026
Yuba Water Agency GSA – North/South Yuba				4/15/2026
Yuba Water Agency	12/2/2025			4/15/2026
Placer County Water Agency	12/2/2025			4/15/2026
Placer County Agricultural Commissioner	1/20/2026			4/15/2026
Nevada County Agricultural Commissioner	1/20/2026			4/15/2026
Placer County Farm Bureau	1/20/2026			4/15/2026
Nevada County Farm Bureau	1/20/2026			4/15/2026
Local Newspaper (YubaNet.com)	1/20/2026	3/11/2026, 3/18/2026		4/15/2026
Local Newspaper (The Union)	1/20/2026	3/11/2026, 3/18/2026		4/15/2026
Local Newspaper (Lincoln News Messenger)	1/20/2026	3/11/2026, 3/18/2026		4/15/2026
California State Library				4/15/2026
DWR				4/17/2026
General Public	1/28/2026	X		
District Website	1/20/2026	X		4/15/2026

1.3.2 Public Participation

NID conducted public outreach through a variety of efforts. A news release as well as a website posting were released on and around 1/20/2026, announcing the District's efforts to update the AWMP and the Urban Water Management Plan.

A public hearing was conducted on 3/25/2026, to present the draft Plan and receive public input. The draft Plan was provided to the public through the District's website for download prior to the public hearing with reference to its location provided in public hearing notice. The public hearing was noticed in the Union Newspaper, Auburn Journal, and Lincoln News Messenger, pursuant to Section 6066 of the Government Code.

The District received public comment at the meeting as included in Appendix A. The District updated and edited the draft Plan per corrections and clarifications.

A copy of the published Notice of Public Hearing is included in Appendix A. The public review comments received are also provided in Appendix A.

1.4 AWMP Adoption and Submittal

This 2025 AWMP was adopted by resolution of the District's Board of Directors on 3/25/2026. A copy of Board Resolution No. 2026-11 is included in Appendix B.

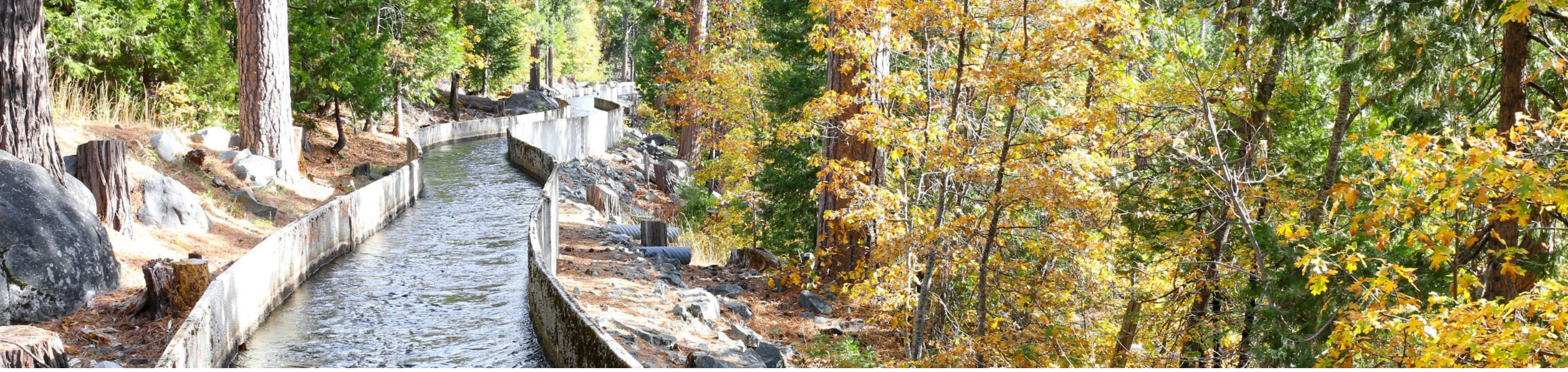
The District submitted this AWMP electronically to DWR for review within 30 days of adoption. The DWR Plan review checklist is presented in Appendix C. In addition, this AWMP will be sent to the Cities of Grass Valley, Nevada City, and Lincoln, as well as the Counties of Placer, Nevada, and Yuba, and the California State Library within 30 days of adoption, per DWR requirements.

The District has also made this adopted AWMP publicly available at the following locations (within 30 days after adoption):

- District Administration building
- District website (www.nidwater.com)

1.5 AWMP Implementation Schedule

The District will use the findings in this AWMP and the recently completed PFW to inform its ongoing water management programs. The District will continue to implement the efficient water management programs, water measurement practices, and water supply management practices described in this AWMP.



2 DESCRIPTION OF THE AGRICULTURAL WATER SUPPLIER AND SERVICE AREA

The District was organized in 1921 under the California Irrigation District Act of 1897 as a nonprofit water agency, and operates under Division 11 of the State Water Code. NID is governed by a five-member Board of Directors who are elected by qualified District voters. Each Board member, representing a division with the District, serves a four-year term.

2.1 Physical Characteristics

NID supplies agricultural water deliveries (raw water) as well as treated water for municipal, domestic, and industrial purposes. Many parcels within the District service area are supplied by low producing domestic wells (USGS, 1984). NID does not manage any groundwater wells and does not track any private wells that may be used for agricultural irrigation within the District.

The District also owns and operates hydroelectric generation and recreational facilities. The hydroelectric facilities have a capacity of 87.9 megawatts and generation ranged between 129 and 453 million kilowatt hours per year between the years 2015 and 2025. NID began producing power in 1966 with the completion of the Yuba-Bear Power Project, which includes Chicago Park, Dutch Flat, Bowman, and Rollins powerhouses. Recreational facilities owned by the District provide camping, fishing, and boating at Rollins Lake, Scotts Flat Reservoir, and Jackson Meadows – Bowman Lake areas.

2.1.1 Size of the Service Area

Table 2-1 summarizes the District's history and size, which is further detailed below. Service area gross acreage is determined through geographic information system (GIS) mapping. Irrigated area acreage is determined from the annual customer self-reported surveys used to develop the crop reports.

Table 2-1. (Worksheet 2) District History and Size

Date of Formation	August 15, 1921
Source of Water	
Local Surface Water	X
Local Groundwater	
Recycled Water	X
Wholesaler	X (PG&E)
USBR	
SWP	
Service Area Gross Acreage[1]	287,000
Service Area Irrigated Acreage[2]	31,947
[1]Gross Acreage represents 2025 total area within service area boundary. [2]Irrigated Acreage from 2025 Crop Report.	

2.1.2 Location of the Service Area and Water Management Facilities

Located on the western slope of the Sierra Nevada mountain range, the District encompasses 287,000 acres and covers portions of three counties: Nevada, Placer, and Yuba as shown on Figure 2-1. The District's watershed is located on the upper reaches of the Yuba River, Bear River, and Deer Creek. The District's highest point is English Mountain, at an elevation of 8,373 feet (ft). Ground elevations within the District service area generally range from approximately 3,900 ft on Banner Mountain above Nevada City at the eastern edge of the District, down to about 200 ft near the City of Lincoln. The District transports raw water from high elevation mountain reservoirs to the lower elevation foothills and into portions of the northern Sacramento valley near the City of Lincoln. The District provides raw water to its agricultural customers and some other municipal providers, and treated water to its treated water customers and some other municipal providers.

There have been no changes to the service area boundaries since the 2020 AWMP. The District considers service area expansion requests on a case-by-case basis. The District also receives new service request from parcels within its service area. The previous 2020 Plan calculated an average increase of 20 new agricultural customers per year. Over the past five years, the District saw a reduction of 315 raw water customers, partially due to a water supply emergency that froze all new accounts in 2024 and 2025. Once this water supply emergency is resolved, the District expects the rate of new agricultural customers to increase. In the District's PFW, future raw water connections were projected based on projected increases in irrigated agricultural land served by NID, rather than projected increases in the number of raw water customers. The baseline demand scenario in the District's PFW estimated an average rate (approximately 20 acre/year of developed land) based off the historical average growth of NID's raw water customers (WEST Consultants, Inc. et al., 2024). The parcel and customer dataset used in this analysis yields an average of 2.8 acre/customer, leading the District to estimate an average increase of 8 new agricultural customers per year. Table 2-2 summarizes the expected changes to NID's service area.

Table 2-2. Expected Changes to Service Area

Change to Service Area	Estimate of Magnitude	Effect on the Water Supplier
Reduced Service Area Size	0	None
Increased Service Area Size	0	None
New Governmental Entity	--	None
New Ag Customers Within Service Area	8 customers/year	Increased irrigated acreage, increased demand that must be met with District's supplies

NID's water management facilities include storage, treatment, and conveyance facilities. The District operates and maintains nine storage reservoirs with a combined storage total of 280,085 acre-feet (AF).

Capacities of the reservoirs are shown in Table 2-3. The two major distribution and storage systems within the District are the Deer Creek System and the Bear River System. These systems are a mixture of canals, siphons, pipelines, and other water conveyance structures. The locations of the reservoirs are shown on Figure 2-1. Table 2-4 presents a summary of conveyance and delivery infrastructure.

The systems are supplied by diverting water per NID's surface water rights into the canals at either reservoirs or other diversion facilities located on the streams. Typical canal operations divert enough flow to supply the purchased deliveries to each customer on the canal, which are measured in miner's inches. To maintain proper flow rates through customer delivery points, the water surface in the canal is maintained at certain levels, as is typical for miner's inch delivery systems. However, this also results in water exiting the canal at the downstream terminus. Many of these spills are then captured again at the next downstream diversion point for another canal.

Table 2-3. Water Supplier Reservoirs

Reservoir	Capacity, AF
Jackson Meadows	69,205
Bowman	68,510
Jackson Lake	1,330
Sawmill	3,030
Faucherie	3,980
French	13,940
Rollins	65,988
Scotts Flat	48,547
Combie	5,555
Total Capacity	280,085
Source: NID website – accessed December 11, 2025	

Table 2-4. Water Conveyance and Delivery System

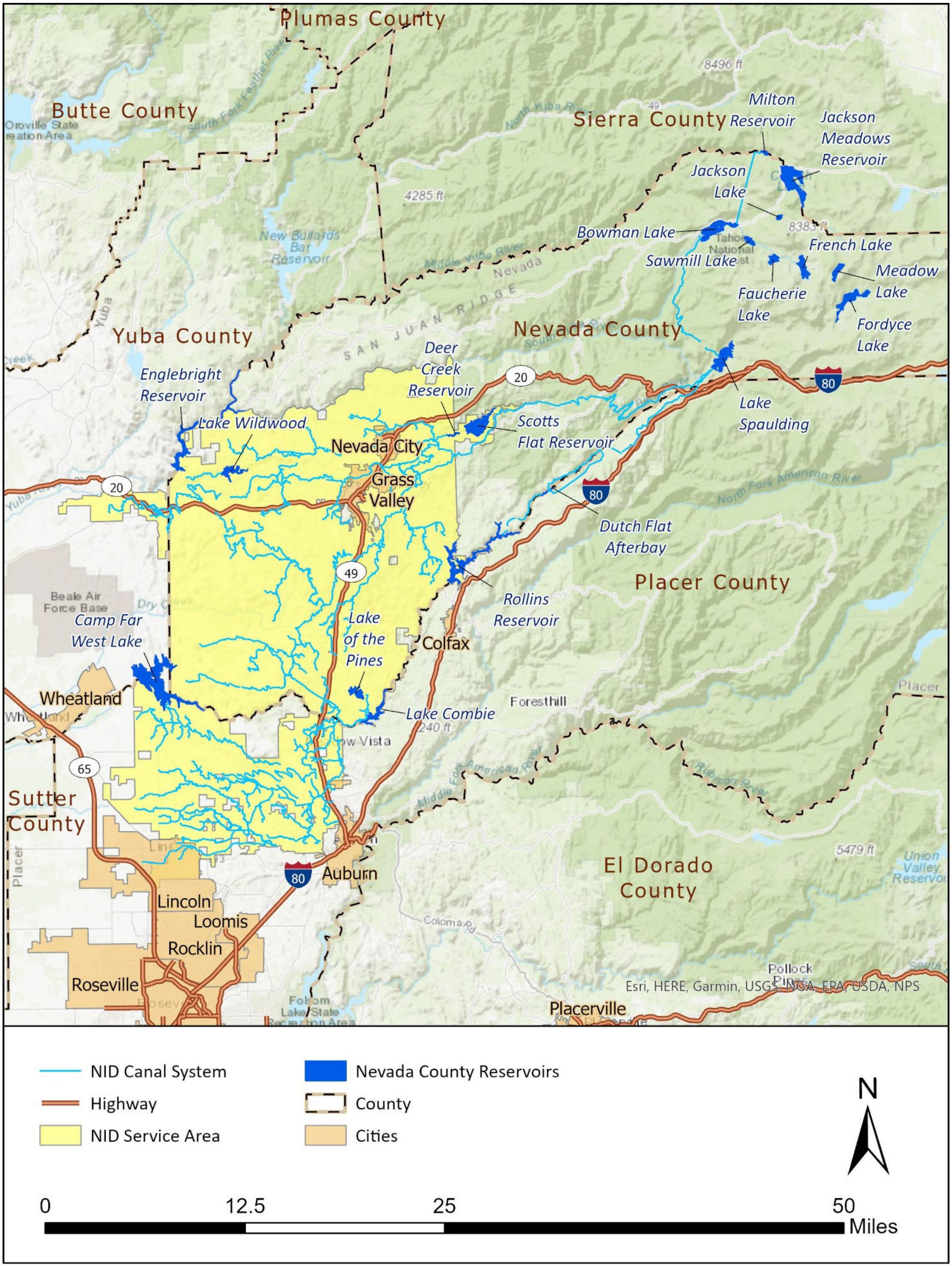
System Used	Number of Miles
Canal	349
Flume	14
Penstock	2
Other/Creek	35
Siphon/Pipe	95
Tunnel	8
Source: NID GIS	

The District does not have a formal tailwater recovery system with respect to capture of on-farm and field runoff. Since 2021, the District has added five gaging stations at canal ends, one station with real time telemetry and three with continuously logged data. The District continues to identify opportunities to install spill measurement as funding becomes available. This District is not aware of any grower operated tailwater systems. Tailwater status is summarized in Table 2-5.

Table 2-5. Tailwater/Spill Recovery System

System	Yes/No
District Operated tailwater/spill recovery	No
Grower Operated tailwater/spill recovery	No

Figure 2-1. NID Service Area and Raw Water System



2.1.3 Terrain and Soils

The service area covers the Sierra Nevada foothills, which is very different than agricultural areas in the Sacramento and San Joaquin Valleys. The service area topography contains many sloped areas with rock outcroppings, as well as less sloped areas better suited for pasture, orchards, and row crops. The foothill area contains numerous fractured rock systems that allow for private wells, but also complicate the ability to understand and quantify percolation and subsurface systems. Soil types, infiltration rates, and water holding capacities vary widely from a clay dominant soil type to a sandy, alluvial soil type in valley areas. Assumptions regarding percolation and other soil parameters are further discussed in Chapter 5. A summary of the soil types within the District service area is provided in Table 2-6.

Table 2-6. Landscape Characteristics

Topography Characteristic (slope percent)	% of the District
<5	19
5 to 10	15
10 to 20	27
20 to 40	33
40 to 60	4
>60	1
Unknown	1
Soil Characteristic/Classification	**% of the District**
Complex	21
Gravelly Loam	5
Loam	16
Outcrop Complex	6
Rock Outcrop Complex	16
Sandy Loam	12
Source: NID 2015 AWMP based on the Soil Survey Geographic Database (SSURGO) provided by the National Cooperative Soil Survey.	

2.1.4 Climate

Summers are generally dry with mild to hot temperatures. Winters are relatively wet, especially in the upper elevations around Nevada City and Grass Valley, with snow levels usually around 3,500 ft and occasionally as low as 1,000 ft. Based on the historical data obtained from the California Irrigation Management Information System (CIMIS) and the Western Regional Climate Center (WRCC), the District service area's average minimum and maximum monthly temperatures range from 26.6 to 93.1 degrees Fahrenheit (°F). Table 2-7 summarizes the District's climate conditions in representative areas based on the CIMIS and WRCC databases of monthly averages of historic information.

Table 2-7. District Service Area Climate Characteristics

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.	Wet Season Nov–Mar	Dry Season Apr–Oct
Auburn (CIMIS Station No. 195, WRCC Station No. 040383), 935' elev.															
Avg. ETo[1], in	1.27	1.93	3.17	4.78	6.41	7.56	8.29	7.53	5.58	3.76	1.75	0.99	53.02	9.11	43.91
Avg. max temp[2], °F	54.1	58.2	62.4	68.3	76.5	85.5	93.1	91.9	86.2	76.5	63.9	55.6	72.7	58.8	82.6
Avg. min temp[2], °F	36.0	38.7	41.2	44.4	49.9	56.2	61.4	60.6	56.4	50.0	42.5	36.7	47.7	39.0	54.1
Avg. rainfall[2], in	6.80	5.73	5.24	2.63	1.23	0.37	0.05	0.06	0.43	1.70	3.95	5.65	35.05	27.37	6.47
Avg. snowfall[2], in	0.6	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	1.1	1.5	0.2
Grass Valley No. 2 (WRCC Station No. 043573)[3], 2,400' elev.															
Avg. ETo, in	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg. max temp, °F	53.9	55.5	57.6	62.8	71.4	80.4	88.2	87.0	82.2	72.3	59.9	53.0	68.7	56.0	77.8
Avg min temp, °F	32.3	33.5	36.2	39.2	45.8	52.1	57.2	55.8	51.2	43.4	36.4	32.0	42.9	34.1	49.2
Avg rainfall, in	9.45	8.49	8.17	3.86	1.82	0.58	0.09	0.10	0.76	2.76	6.52	9.64	52.35	42.27	9.97
Avg snowfall, in	1.7	2.3	2.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9	8.4	8.4	0.6
Nevada City (WRCC Station No. 046136)[4], 2,780' elev.															
Avg. ETo, in	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg. max temp, °F	51.2	53.8	57.3	63.5	71.2	80.2	88.5	87.6	81.7	71.4	59.4	51.8	68.0	54.7	77.7
Avg. min temp, °F	30.5	31.0	33.7	36.9	42.5	48.3	52.8	51.5	47.3	41.2	34.7	30.8	40.0	32.1	45.8
Avg. rainfall, in	10.13	9.26	8.27	4.28	2.12	0.64	0.04	0.14	0.77	2.90	6.36	9.45	55.76	43.47	10.89
Avg. snowfall, in	7.4	5.8	5.4	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.6	3.7	21.2	22.9	1.0
Bowman Dam (WRCC Station No. 041018)[5], 5,390' elev.															
Avg. ETo, in	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg. max temp, °F	45.2	46.7	49.1	55.2	63.4	72.1	79.8	79.8	74.4	64.3	52.7	46	60.7	48.0	69.9
Avg. min temp, °F	26.6	26.7	28.5	32.5	39.0	47.0	53.5	53.2	48.4	41.3	33.7	28.7	38.4	28.8	45.0
Avg. rainfall, in	11.92	10.38	9.17	4.88	3.42	1.18	0.19	0.37	0.99	3.98	8.27	10.81	64.94	50.55	15.01
Avg. snowfall, in	49.5	49.8	48.7	22.1	6.7	0.2	0.0	0.0	0.3	24	18.3	38.8	235.5	205.1	31.7

N/A = not available

[1]Period of record is 2/16/2005 through 12/15/2025.

[2]Period of record is 1/1/1905 through 12/11/2025.

[3]Period of record is 10/1/1966 through 12/11/2025.

[4]Period of record is 2/1/1893 through 12/10/2025.

[5]Period of record is 6/1/1896 through 10/31/2025.

2.2 Operational Characteristics

This subsection describes the operating rules and regulations for water delivery and billing, and allocation policies during water shortages.

2.2.1 Operating Rules and Regulations

The Board establishes and adopts the policies of the District and the Water Service Regulations. The Water Service Regulations provide for the equitable distribution and use of water within the service area. The Board reviews and makes revisions or amendments to the regulations as necessary. The most recent version of the District's Water Service Regulations (dated December 14, 2022) is included as Appendix D.

Water customers receive raw water through a variety of delivery systems and periods, as summarized in Table 2-8. The majority of raw water use occurs in the irrigation season (typically April 15-October 14), referred to as "seasonal irrigation service." Raw water may also be purchased during fall/winter water service periods, as available, which often correspond with dry fall and winter periods. NID provides a small percentage of raw water as wholesale water to other municipal water agencies. At times, as available and as needed, NID will also provide raw water to other local or regional water providers on a case-by-case basis. The District also provides raw water intermittently through the other minor delivery methods as identified in Table 2-8.

The District sells raw water on a flow and/or volume basis, depending on customer type, as identified in Table 2-9. The majority of irrigation customers are provided water based on miner's inch deliveries. Some of the wholesale sales to other agencies are based on volume and flow values per the purchase contracts.

Purchase and ordering are also dependent on customer type and water type. Seasonal irrigation use is ordered by customers with at least a 48-hour lead time. Wholesale customers have annual water contracts that identify maximum flows and/or volumes over time. Other types of water orders also require a 48-hour lead time. Similarly, water shutoffs require at least a 24-hour lead time. Ordering times are summarized in Table 2-10.

Table 2-8. Supplier Delivery System (2025)

Type	Checked if Used
Seasonal Irrigation Service	X
Fall/Winter Water Service	X
Annual Raw Water Service	X
Intermittent Flow Service	X
Demand Water Service	X
Tank or Temporary Construction Water Service	X
Surplus Water Service (outside the District Service Area Boundaries)	X
Rotation	X

Table 2-9. Water Allocation Policy

Basis of Water Allocation	Checked if Used			Allocation	
	Flow	Volume	Seasonal Allocations	Normal Year	% of Water Deliveries
Area within the Service Area	X	X	X[1]	100%	100%
Amount of Land Owned					
Riparian Rights					
Other					

[1]When appropriate, NID exercises its authority to limit water allocations when the requested purchase amount exceeds the beneficial use of the irrigated area it would serve.

Table 2-10. Actual Lead Times

Operations	Hour/Days
Water Orders	48 Hours
Water Shutoff	24 Hours

2.2.2 Water Delivery Measurement or Calculations

The majority of the District's irrigation customers purchase raw water during the irrigation season (i.e., seasonal irrigation service, typically April 15 through October 14) based on miner's inches. The standard measurement for a miner's inch requires a six-inch head of water over the center of the orifice and the water to free-flow through the delivery point. For customers that purchase 40 miner's inches or less, the amount of water is delivered through a standard water box and measured through an orifice sized for the amount of water purchased and the available head pressure. For purchases greater than 40 miner's inches, the measurement may be by any industry standard device, such as a weir or Parshall flume, that will give the most accurate measurement for the situation. Orifices used for customer delivery are checked at a minimum of twice a year for proper sizing, adequate head pressure, and condition of the service point. Flowmeters are included in a maintenance management program and are inspected annually and calibrated according to manufacturer recommendations. Records are kept stating when customer services are turned on and off to assist in calculating the volume of water delivered.

Field checks on canal measuring stations occur three to four times per year. This continual verification allows the District to maintain proper and accurate measurement records (Teledyne, 2016 and USBR, rev. 2001). Open channel flow sites are inspected to ensure structures are plumb, staff gages are level with flume floors and weir crests, approach flows are laminar, and that no backwater conditions exist in the tailrace of the structures. Current meters are used as a secondary verification to confirm the volume of flow.

Table 2-11 summarizes the measurement devices used by the District to measure water in the canals and deliveries to agricultural water customers, frequency of calibration and maintenance, and the estimated level of accuracy of the measurement devices. Additional water measurement information per the AWMP code requirements is provided in Chapter 8 and Appendix G.

Table 2-11. Water Delivery Measurements

Measurement Device	Frequency of Calibration, months	Frequency of Maintenance, months	Estimated Level of Accuracy, Error %
Orifice	Bi-Annual	Annual	5-12
Flow meter	Bi-Annual	Annual	2-5
Parshall Flume	Annual	Annual	5-12
Uncontrolled flume sections	Annual	Annual	5-12

While accuracy for weirs and flumes is likely better in laboratory-controlled environments, field conditions likely degrade accuracies. Due to the frequency of inspections and site management, District weirs, flumes, and orifices have an estimated accuracy of 5–12 percent while flowmeter estimated accuracy is 2–5 percent. These values represent the District's best estimate with the existing facilities and information available.

2.2.3 Water Rate Schedules and Billing

This District's current rate schedule is provided in Appendix D. Raw water rates are a uniform volumetric charge, consisting of a combination of fixed charge (a constant fee assessed to customer) and a water rate (a price per unit of water delivered). Raw water is sold by quantity in increments of either miner's inches or AF. The District has several rate schedules for raw water depending on the type of service provided. All water rates are determined on a cost of service basis, consistent with Proposition 218.

Similar to rates, the District also has several billing frequencies depending on the type of service. For a seasonal irrigation service, the customer has the choice of paying the amount in full or making payments in three installments. Most of the raw water customers purchase water for the summer irrigation season (typically April 15 to October 14). Tables 2-12, 2-13, and 2-14 describe relevant information from the District's current agricultural water rates.

Table 2-12. Water Rate Basis

Water Charge Basis	Check if Used	% of Water Deliveries	Description
Volume of Water Delivered	X	100%	Based on water volume ordered in miners inch
Rate and Duration of Water Delivered			
Acre			
Crop			
Land Assessment			
Other			

Table 2-13. Rate Structure

Type of Billing	Check if Used	Description
Declining		
Uniform	X	Based on volume ordered
Increasing Block Rate		
Other	X	Fixed fee

Table 2-14. Frequency of Billing

Frequency	Check if Used
Weekly	
Biweekly	
Monthly	X
Bimonthly	X
Tri-Annually	
Annually	X

2.2.4 Water Shortage Allocation Policies and Drought Plan

The purpose of NID's drought plan is to provide guidance to staff and customers to help minimize drought or water supply shortage impacts. The plan identifies drought action levels, appropriate District responses, water demand reduction goals, and provides recommended demand management measures to assist customers in water conservation. The following drought plan is presented in accordance with the Urban Water Management Plan water shortage contingency plan requirements in order to maintain consistency across both documents.

Vulnerability to Drought

As described in Chapters 4 and 6, the District's water supplies are vulnerable to drought and are expected to be further impacted by climate change. The supply system relies on spring and summer snow melt runoff, as well as capture and storage in reservoirs to release during the irrigation season. During droughts and periods of warmer winters when there is less snowpack, runoff is reduced, and the District must manage its storage and customer demands to meet requirements. The supply availability reduction is dependent on the severity and length of the drought. In addition to the hydrologic impacts on NID's supplies, there can also be regulatory reductions as well. For instance, during prior droughts, the State mandated supply curtailments and NID was not able to access its available supply.

Resiliency Planning

NID conducts ongoing analysis of its supply reliability and reports on current understanding through its various planning efforts including the Urban Water Management Plan, PFW, Staff Reports to Board, Raw Water Master Plan, Watershed Sanitary Survey, and others.

The NID PFW is a decision-support tool designed to guide development of a long-term, sustainable strategy for managing NID's water resources under projected changes in climate, runoff patterns, water demands, and regulatory conditions. The PFW process included comprehensive analyses of NID's hydrology, climate change scenarios, projected water demands, regulatory context, and reservoir operations.

The PFW provides a flexible, adaptive framework to evaluate these risks and identify operational, infrastructure, and policy responses under a wide range of future climate conditions. The PFW provides invaluable long-term resiliency planning. For the short-term, NID will continue to implement its current drought and water shortage contingency efforts as described below.

Annual Water Supply and Demand Assessment Procedures

NID conducts an annual analysis of supply and demand projections to help inform water resources management decisions for the coming year. The analysis incorporates various data sources used as evaluation criteria to project probable demands and supply availability for the coming year. Data sources to consider include:

- Projected weather conditions
    - Precipitation versus historical on a monthly basis
    - Snow survey results
- Projected Unconstrained Demand
    - Production versus historic on a monthly basis
    - New customer growth
    - Water use objective monthly tracking versus goal
- Projected Supply Availability (assuming no constraints)
    - Reservoir storage
    - Forecasted runoff
    - PGE contract water
    - Recycled water

The general procedure is listed below. NID may modify this process based on available data, significant events, process restrictions, or other external factors that may impact the process.

1. **Dry Year Projection**

   Compile existing weather data to characterize conditions in the past 12 months. Considering recent conditions and available forecasts, select a projected dry year scenario from the historical precipitation record. Dry year scenario to be at least 60 percent of normal precipitation at the Bowman Lake Reporting Station.

2. **Demand Projection**

   Project unconstrained monthly demand for the next 12 months factoring in existing demands, water use budgets, weather projections, and growth projections.

3. **Project Supply Availability**

   Use the existing conditions coupled with historic availability and other known conditions to project probable monthly availability. Summarize the current supply availability over the next 12 months assuming no supply restrictions. Project next year supply availability over the next 12 months assuming the next year is a dry year as selected in Step 1.

4. **Supply Infrastructure Restraints**

   Identify and describe any projected infrastructure restrictions to delivering supply in the next 12 months.

5. **Project Next Year Supply Deliverability**

   Using results from Steps 3 and 4, identify the current conditions normal year and dry year projected supply delivery for the next 12 months.

6. **Projected Dry Year Supply to Demand Comparison**

   Compare the projected next year unconstrained demand to the next year dry year projected supply deliverability. Identify any projected seasonal shortfall in supply to meet the unconstrained demand, cross referencing the condition to one of the six water shortage levels identified below in this plan.

7. **Develop/Propose Water Resources Management Strategies**

   Develop and propose water resource management strategies to address the projected demand to supply comparison, including reference to the one of the water shortage stages identified in this section below.

8. **Present Annual Water Supply Demand Assessment to Board**

   The annual water supply demand assessment is presented to the Board of Directors for discussion and questions. Staff will modify/update the assessment per direction from the Board. The Board will approve the assessment and its findings, and can also provide direction to implement specific management strategies at that time. The general proposed timeline is as follows:

   - Begin assessment by staff – February
   - Present assessment to Board – typically by March, no later than April
   - Submit to State per CWC Section 10632.1 – by July 1

Water Shortage Stages and Responses

NID maintains this drought plan to identify and respond to potential and actual water shortage conditions. Six water shortage levels (stages 1 through 6) are presented below per CWC Section 10632(a)(3). Proposed alternative response actions for each stage are identified with each respective projected impact on demand reduction or supply augmentation listed. NID will evaluate each specific shortage condition and select the appropriate response action(s) for implementation.

The District maintains a water conservation program that is ongoing, even during periods of normal water supply. The District has found this program to be effective in reducing overall water consumption and managing demands during periods of normal water supply and water shortage conditions. The District will rely on its regular conservation program as well as additional measures to respond to the range of water supply shortages that may arise.

Stage 1 – 10% Supply Shortage
Forecast April 1 Available Supply: 234,999 to 211,500 AF Actions include normal rules and regulations plus those listed below.
Treated Water and Municipal Water Customers – Actions to Reduce Demand up to 10 Percent • Communicate conservation regulations as identified in Section 3.05 of District Rules and Regulations. • Encourage customers to limit outdoor irrigation to every other day. • Request fire department limit practices drills and hydrant flow testing.
Ag Water Customers – Actions to Reduce Demand up to 10 Percent • Allow Ag customers to voluntarily reduce purchase allotment for the year while reserving their right to return to their previous allotment in the following year if water supply is available.
District Actions • Declare no new or increased surplus water availability. • Leak repair receives higher priority. • Increase drought awareness through additional public outreach measures that notify public and customers for declared stage, requirements, and available conservation program support. • Standard rates in effect.
Enforcement Measures • Standard measures per District Rules and Regulations.

Stage 2 – 20% Supply Shortage
Forecast April 1 Available Supply: 211,499 to 188,000 AF Actions include Stage 1 plus those listed below.
Treated Water and Municipal Water Customers – Actions to Reduce Demand up to 20 Percent • Outdoor irrigation limited to every other day and maximum three days per week. • Odd address number can irrigate outdoors on Tuesday, Thursday, and Saturday. • Even address number can irrigate outdoors on Wednesday, Friday, and Sunday. • Customers shall adjust irrigation controllers to reduce usage for each zone by 20 percent. • Corresponding to fall daylight saving time, customers shall strive to limit outdoor irrigation to only once per week.
Ag Water Customers – Actions to Reduce Demand up to 20 Percent • Limit new water sales and increases to 1 miners inch. • Impose changes to delivery schedules to achieve 20 percent demand reductions.
District Actions • Declare no new or increased surplus water availability. • Declare no new or increase in Fall/Winter deliveries. • Communicate mandatory reduction targets to customers. • Inform Municipal customers of mandatory 20 percent reduction requirement. • Distribution system flushing only for public health & safety. • Appoint members to the Drought Hardship Committee. • Purchase available Contract water to achieve a target carryover of 110,000 AF. • Implement Stage 2 conservation rates.
Enforcement Measures • A written warning will be issued for a first violation. • A District imposed fine of $250 for a second violation, and any subsequent violation, and doubling with each subsequent violation up to a maximum of $1,000 for any single violation. • Upon a fourth violation, or upon an earlier violation the General Manager determines to create a significant threat to the goals of the stage, the General Manager may order the installation of a flow restrictor on service lines in question. • Similar penalties, fines, and charges may be implemented by the District as needed to enforce the restrictions on specific prohibited water uses.

Stage 3 – 30% Supply Shortage
Forecast April 1 Available Supply: 187,999 to 164,500 AF Actions include Stage 2 plus those listed below.
Treated Water and Municipal Water Customers – Actions to Reduce Demand up to 30 Percent • Outdoor irrigation limited to two days per week. • Odd address number can irrigate outdoors on Thursday and Sunday. • Even address number can irrigate outdoors on Wednesday and Saturday. • Customers shall adjust irrigation controllers to reduce usage for each zone by 30 percent. • Irrigation of ornamental turf in public street medians with treated water prohibited.
Ag Water Customers – Actions to Reduce Demand up to 30 Percent • Limit new water sale and increases to ½ miners inch. • Impose changes to delivery schedules to achieve 30 percent demand reductions.
District Actions • Declare no surplus water availability for exterior boundary customers. • Declare no fall water availability. • Communicate mandatory reduction targets to customers. • Inform Municipal customers of mandatory 30 percent reduction requirement. • Purchase available Contract water to achieve a target carryover of 100,000 AF. • Convene the Drought Hardship Committee. • Implement Stage 3 conservation rates. • Dedicate additional staff for increased water waste patrols.
Enforcement Measures • A written warning will be issued for a first violation. • A District imposed fine of $250 for a second violation, and any subsequent violation, and doubling with each subsequent violation up to a maximum of $1,000 for any single violation. • Upon a fourth violation, or upon an earlier violation the General Manager determines to create a significant threat to the goals of the stage, the General Manager may order the installation of a flow restrictor on service lines in question. • Similar penalties, fines, and charges may be implemented by the District as needed to enforce the restrictions on specific prohibited water uses.

Stage 4 – 40% Supply Shortage
Forecast April 1 Available Supply: 163,499 to 141,000 AF Actions include Stage 3 plus those listed below.
Treated Water and Municipal Water Customers – Actions to Reduce Demand up to 40 Percent • Outdoor irrigation limited to one day per week. • Customers shall adjust irrigation controllers to reduce usage for each zone by 40 percent.
Ag Water Customers – Actions to Reduce Demand up to 40 Percent • Impose changes to delivery schedules to achieve 40 percent demand reductions.
District Actions • Declare no new or increased Ag sales. • Communicate mandatory reduction targets to customers. • Inform Municipal customers of mandatory 40 percent reduction requirement. • Purchase available Contract water to achieve a target carryover of 90,000 AF. • Implement Stage 4 conservation rates.
Enforcement Measures • A written warning will be issued for a first violation. • A District imposed fine of $250 for a second violation, and any subsequent violation, and doubling with each subsequent violation up to a maximum of $1,000 for any single violation. • Upon a fourth violation, or upon an earlier violation the General Manager determines to create a significant threat to the goals of the stage, the General Manager may order the installation of a flow restrictor on service lines in question. • Similar penalties, fines, and charges may be implemented by the District as needed to enforce the restrictions on specific prohibited water uses.

Stage 5 – 50% Supply Shortage
Forecast April 1 Available Supply: 140,999 to 117,500 AF Actions include Stage 4 plus those listed below.
Treated Water and Municipal Water Customers – Actions to Reduce Demand up to 50 Percent • Outdoor irrigation prohibited.
Ag Water Customers – Actions to Reduce Demand up to 50 Percent • Impose changes to delivery schedules to achieve 50 percent demand reductions.
District Actions • Communicate mandatory reduction targets to customers. • Inform Municipal customers of mandatory 50 percent reduction requirement. • Purchase available Contract water to achieve a target carryover of 80,000 AF. • Implement Stage 4 conservation rates.
Enforcement Measures • A written warning will be issued for a first violation. • A District imposed fine of $250 for a second violation, and any subsequent violation, and doubling with each subsequent violation up to a maximum of $1,000 for any single violation. • Upon a fourth violation, or upon an earlier violation the General Manager determines to create a significant threat to the goals of the stage, the General Manager may order the installation of a flow restrictor on service lines in question. • Similar penalties, fines, and charges may be implemented by the District as needed to enforce the restrictions on specific prohibited water uses.

Stage 6 – Over 50% Supply Shortage
Forecast April 1 Available Supply: less than 117,500 AF Actions include Stage 5 plus those listed below.
Treated Water and Municipal Water Customers – Actions to Reduce Demand greater than 50 Percent • Health and safety use of water only.
Ag Water Customers – Actions to Reduce Demand greater than 50 Percent • Impose changes to delivery schedules to achieve target demand reductions.
District Actions • Communicate mandatory reduction targets to customers. • Inform Municipal customers of mandatory health and safety use only. • Purchase available Contract water to achieve a target carryover of 75,000 AF. • Implement Stage 4 conservation rates. • Other actions as identified specific to the shortage condition.
Enforcement Measures • A written warning will be issued for a first violation. • A District imposed fine of $250 for a second violation, and any subsequent violation, and doubling with each subsequent violation up to a maximum of $1,000 for any single violation. • Upon a fourth violation, or upon an earlier violation the General Manager determines to create a significant threat to the goals of the stage, the General Manager may order the installation of a flow restrictor on service lines in question. • Similar penalties, fines, and charges may be implemented by the District as needed to enforce the restrictions on specific prohibited water uses.

Communications

NID maintains an established and effective communications program to inform its customers, neighbors, and other stakeholders of issues, updates, and policies. Implementation of the drought plan will use the existing communication program structure to inform customers and others of the declared shortage stage and respective actions and restrictions in place.

The Board meetings addressing the Annual Water Supply and Demand Assessment and/or a potential water shortage declaration will be noticed per normal Board meeting public notification procedures. The meeting will also be announced through regular press release protocols.

Once a shortage stage has been declared by the Board of Directors, NID will notify its customers and others through a range of efforts. The stage and restrictions will be identified in a press release, as well as customer billing statements. Additionally, the District has provided direct mailings to inform customers of a shortage and to encourage conservation. The District's website will be updated to feature the shortage declaration, restrictions, and resources available to customers from the District and other entities to help meet the restrictions. Subsequent Board of Directors meetings will include a review of the shortage condition, customer response results, and discussion and recommendations for potential modifications.

Compliance and Enforcement

NID was formed as an irrigation district under the CWC and therefore is granted the authority to enforce its rules and regulations, as well as levy and collect fines. NID will declare a water shortage emergency within its service area boundaries when it determines through its best judgment that normal demands and requirements of its customers cannot be met with the projected supplies.

Once a water shortage stage has been declared, NID will enforce compliance through a multitude of measures commensurate with each reduction goal. The District will either implement measures per this plan or will provide further discrete requirements through ordinances.

Measures will be enforced through the following procedures, in addition to any enforcement measures identified in ordinances. NID will modify and adjust the compliance strategy as necessary for each respective situation.

- A written warning will be issued for a first violation.
- A District imposed fine of $250 for a second violation, and any subsequent violation, and doubling with each subsequent violation up to a maximum of $1,000 for any single violation.
- Upon a fourth violation, or upon an earlier violation the General Manager determines to create a significant threat to the goals of the ordinance, the General Manager may order the installation of a flow restrictor on service lines in question.
- Similar penalties, fines, and charges may be implemented by the District as needed to enforce the restrictions on specific prohibition water uses.

Upon declaration of a Stage 2 shortage, NID will appoint members to the Drought Hardship Committee. Upon declaration of a Stage 3 shortage, NID will convene the Drought Hardship Committee. The Drought Hardship Committee is an advisory body and shall consist of one appointee from each director's division and the Board Workshop Committee. District Operation's staff will work closely with the committee.

The Drought Hardship Committee's purpose is to review the applications and determine whether additional water can be provided to the applicant. Before any appeal for a variance can be heard by the Drought Hardship Committee, the customer must submit a Drought Hardship Application and provide proof the water is being used for commercial agricultural purposes.

For the purposes of this Plan, the definition of commercial agriculture is an agricultural producer engaged in a for profit operation with a minimum gross annual sales of $3,000 and a minimum capital investment of $15,000. Commercial agricultural producers file a Schedule F with the Internal Revenue Service for their farming or ranching operation.

Preference will be given to applicants with an economic hardship and/or those using Best Management Practices (BMPs) and with efficient irrigation practices in place. Variances may be approved for increases in water deliveries, seasonal variances or other protocols as determined by the Drought Hardship Committee. No such variance or appeal, however, shall be granted if the Board of Directors finds that the variance or appeal will adversely affect the public health or safety of others and is not in the public's best interest.

Under the CWC, in critical water supply situations, there is a priority that shall be allocated as follows:

1. Human Consumption
2. Livestock and Animals
3. Perennial Crops
4. Annual Crops

Upon granting a Drought Hardship Variance or appeal, the Board may impose any other conditions it deems to be just and proper.

Financial Considerations for Drought Conditions

Implementing any stage of the drought plan is expected to impact the District's financial status. As experienced during previous droughts, it is expected that revenues will decrease with decreasing usage, and expenses will increase with additional monitoring and enforcement responsibilities, as well as additional costs for replacement supplies if needed.

The District maintains a rate structure that includes a fixed meter charge plus increasing volumetric block rates for residential customers and volumetric rates for irrigation customers. Volumetric revenue is approximately 53 percent of total revenue. In previous year, the District has implemented a drought rate structure. The drought rate structure is set to offset revenue loss from mandatory demand reduction up to 40 percent. Demand reduction above 40 percent will reduce revenue accordingly. Actual impacts will vary depending on customer response. However, the District is restructuring the water rates, and a drought rate structure may not be included in the future.

Enforcement, enhanced outreach, and increase of customer data tracking can add to the District's costs around a water shortage condition. Often times, these additional efforts are prioritized for current staff, and other normal work efforts are delayed or reassigned. If conditions warrant, the District will seek assistance through additional staffing or third-party service providers. These costs depend on the level of support and will be evaluated on a case-by-case basis. Increase in costs can also be associated with additional equipment obtained to support the District's outreach, enforcement, tracking, and management efforts.

Depending on the situation, the District may also be able to obtain supplemental water supplies to mitigate the water shortage condition. These supplies are expected to be more costly than regular supplies, and will be evaluated for each specific opportunity.

It is reasonable to expect financial impacts or changes in cash flow during a prolonged water shortage condition. The District will enact a range of management and financial resources depending on the specific situation that include:

- Drought rate surcharge (drought rate structure may not continue in future rate development)
- Using financial reserves
- Capital project deferment
- Operational and maintenance expense deferment
- Increased revenue from penalties
- And others as identified

Monitoring, Reporting, and Refinement

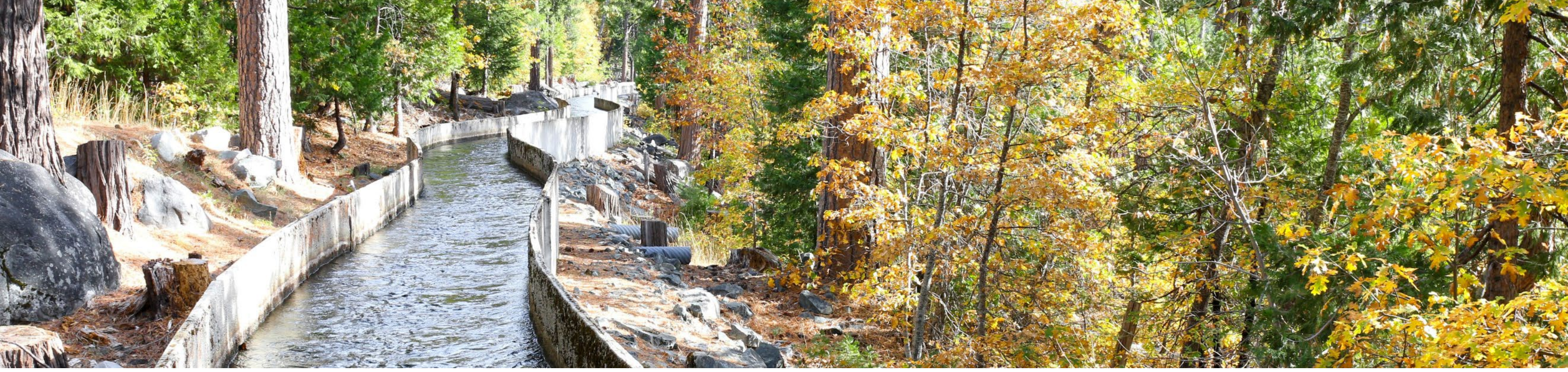
The drought plan aims to ensure demands are reduced and/or supply is augmented to balance supply and demand. The District will enact various actions commensurate with each respective stage. The District will then monitor results to maintain the supply/demand balance. Similar to the supply and demand projections used to establish a shortage condition in the annual assessment procedure, the District will monitor the same data to determine effectiveness and efficacy. District staff will report to the Board of Directors at least monthly on status and results. Data reporting will include:

- Actual demands to projected demands per customer class and on total
- Actual supply availability and used to projected availability per each supply source

- Projected supply availability for next 12 months per supply source
- Any specific requirements identified by the State in the future

Data will also be submitted to the State per any future reporting requirements.

Progress and efficacy will be summarized from the results data. The District will evaluate the need for any changes or modifications to the declared water shortage stage or actions based on the results. The District may determine to enact additional measures, develop ordinances, or update the drought plan as a whole. Any drought plan update or modification will be conducted through the Board of Directors meeting process unless specific conditions require otherwise.



3 DESCRIPTION OF QUANTITY OF WATER USES

Water uses within the District's service area are agricultural, environmental, recreational, and municipal. The District does not use water for groundwater recharge. The District is currently not participating in any transfers and/or exchanges, but has in the past.

3.1 Agricultural Water Use

The District's agricultural water deliveries for the planning period are presented in Table 3-1. The District characterizes agricultural sales as applied water that does not include precipitation and distribution losses. Table 3-1 presents the applied water measured by the District.

The District service area does not overlay a DWR-defined groundwater basin (except for the far southwestern section of the service area by Lincoln). Limited amounts of groundwater are available throughout the service area through fractured rock groundwater systems (CABY, 2020 and USGS, 1984). The District does not use groundwater as a supply source. The District does not monitor or track private groundwater usage. As stated in Chapter 5, the District will coordinate with the counties in the future to better understand private groundwater use.

Table 3-1. Annual Agricultural Water Use, AF

Source	Planning Cycle				
	2021	2022	2023	2024	2025
Agricultural Water Supplier Delivered					
Surface Water[1]	108,617	111,087	111,065	103,438	106,104
Groundwater	0	0	0	0	0
Other (Define)					
Other Water Supplies Used					
Surface Water					
Groundwater					
Other (Define)					
Total	108,617	111,087	111,329	103,173	106,104

[1]Ordered amount.
Data are in water years.

There are multiple crops within the District's service area that vary due to topographical, geological, climatic, and soil condition differences. NID surveys its agriculture customers annually to inventory the type and approximate acreage of crops they cultivate. NID checks the reported value against past reports, but does not verify and validate every report. The customer-provided crop data are tabulated into crop reports. Information from the reports is provided to the California State Water Resources Control Board (SWRCB) with the District's annual water rights filings.

The District currently does not collect or maintain detailed independent cropping information. The District relies on the self-reported surveys provided by customers. The District also does not collect or maintain detailed parcel-level soil information, irrigation system information, or specific agronomic water requirements for individual customers. As such, the District uses the types of crops and acreages in the self-reported survey to estimate water use components (for example, evapotranspiration (ET)) in the water budget calculation as described in Chapter 5.

Data from the crop reports are summarized in Table 3-2 for 2021–2025. The largest crops by acreage for 2025 are irrigated pasture and family gardens/orchards (61 and 19 percent, respectively). Many of the District's irrigation customers have 10 acres or less of irrigated land. Table 3-2 lists the total miner's inches sold in 2025, as reported on the customer survey. The customer survey values, including actual crop types and acreage, are not verified by NID. Water sold cannot be used to calculate crop duty factor as they do not represent each individual user's irrigation patterns, strategies, or actual application

Table 3-2. Agricultural Crop Data for 2021–2025, acres

Crop	Irrigated Acres					2025 Miner's Inch Sold[2]
	2021	2022	2023	2024	2025	
Cereals – Corn	29	36	39	34	34	11.93
Cereals – Rice	110	110	110	110	109	45.4
Cereals – Wheat	2	2	2	2	2	0.41
Cereals – Other	30	33	30	28	28	12.42
Forage – Alfalfa Hay	159	156	156	156	155	41.01
Forage – Hay Other	810	835	837	827	825	255.23
Forage – Irrigated Pasture	19,808	20,166	20,234	19,821	19,548	6,828.41
Forage – Silage	19	23	23	23	23	5.55
Forage – Other	227	228	230	227	227	49.26
Fruits – Apples	269	285	289	284	276	110.98
Fruits – Berries – All	126	122	118	114	114	35.67
Fruits – Cherries	58	61	62	61	60	21.61
Fruits – Citrus – All	189	198	201	202	198	60.7
Fruits – Grapes – Table	56	56	59	58	59	16.79
Fruits – Grapes – Other	672	700	695	683	672	160.98
Fruits – Kiwi	22	22	22	22	22	11.58
Fruits – Peaches	118	126	129	128	125	38.35
Fruits – Pears	137	127	120	119	117	34.8
Fruits – Plums	161	162	156	156	154	50.83
Fruits – Other	250	193	199	203	202	71.2
Fruits – Persimmons	2	2	2	2	2	0.73
Fruits – Apricots	1	1	1	1	1	0.23
Nursery	357	357	349	340	335	201.66
Cannabis	18	15	14	14	11	4.84
Nuts	204	208	208	207	207	35.97
Nuts – Walnuts	9	9	9	9	8	1.86
Nuts – Chestnuts	12	12	12	12	12	6.43
Nuts – Pistachios	0	-	-	-	-	-
Nuts – Almonds	13	13	10	13	13	4.36
Other	743	757	752	746	748	71.9
Golf Course	986	986	985	985	788	579.9
Other – Parks	224	228	226	225	225	46.33
Other – Exempt	0	-	-	-	-	-
Family Garden, Orchard, YD.	6,447	6,444	6,410	6,300	6,216	3,055.16
No Report .5MI / A[3]	791	425	432	431	431	215.3
Pond	2	3	2	2	2	1.01
Total Irrigated Acres[1]	33,060	33,099	33,124	32,544	31,947	12,089

[1]Totals may not add due to rounding. Data from NID agricultural customer survey and are in calendar years.
[2]Water sold cannot be used to calculate crop duty factor as they do not represent each individual user's irrigation patterns, strategies, or actual application.
[3]No annual report available for the ½-mile service area.

3.2 Environmental Water Use

A portion of the District's water is used for environmental benefit, which includes non-recoverable instream flows and environmental water sales to other agencies such as the California Department of Fish and Wildlife (CDFW) for the Spenceville Wildlife Area. The non-recoverable instream flows are located in the Middle Yuba River below Milton Diversion, Canyon Creek below Bowman Reservoir, and the Bear River below Combie Reservoir. Under the 1963 California Department of Fish and Game (now CDFW) Agreement, the Yuba-Bear FERC License, and from terms in water right permits and licenses, the District releases water to maintain environmental conditions in creeks and rivers downstream of District facilities. The total amount for non-recoverable instream flow and environmental water use for the period 2021 through 2025 is shown in Table 3-3. The values reported for streams in Table 3-3 are estimated values for 2021 through 2025. As a matter of conservative operational strategy, NID releases more environmental water than required to ensure flows remain above the minimum permit requirements. Future environmental flows due to pending Federal and State regulatory requirements are expected to increase (HDR, 2020).

Table 3-3. Environmental Water Use, AF

Environmental Resource	Water Use, AF				
	2021	2022	2023	2024	2025
Vernal Pools	-	-	-	-	-
Streams	9,410	9,410	9,410	9,410	9,410
CDFW Purchase	1,270	1,270	1,270	1,270	1,270
Lakes or Reservoirs	-	-	-	-	-
Riparian Vegetation	-	-	-	-	-
Ponds	-	-	-	-	-
Total	10,680	10,680	10,680	10,680	10,680
Data are in water years.					

3.3 Recreational Water Use

The District owns and operates reservoirs in the Yuba and Bear River watersheds, which also provide recreational opportunities in addition to functioning as storage reservoirs. In the Mountain Division, the District owns and operates campgrounds at Faucherie, Bowman, and Jackson Meadows reservoirs. The Mountain Division campgrounds are normally snowed in during the winter and opened for recreation from Memorial Day through Labor Day.

In the Lower Division in the Sierra foothills at both Rollins and Scotts Flat Lake reservoirs, camping, fishing, swimming, sunning, boating, water skiing, sailing, board sailing, and other activities are popular. Day use parks, campgrounds, and beaches are operated by the District and in some cases by private operators under contract with the District.

The District sells water to homeowner associations, which use raw water for recreational lakes and golf courses such as Lake of the Pines, Dark Horse Golf Course, Lake Wildwood, Alta Sierra, Nevada County Country Club, as well as Auburn Recreation District sports fields, Turkey Creek Golf Course, and Lincoln Hills, Sun City. Table 3-4 summarizes the recreational water use for golf courses and parks in calendar year.

Table 3-4. Recreational Water Use

Recreational Facility	Water Use, AF				
	2021	2022	2023	2024	2025
Golf Courses	6,101	5,835	5,849	5,829	5,256
Parks	438	435	432	424	420
Total	6,540	6,270	6,281	6,254	5,676
Data are in calendar years.					

3.4 Municipal and Industrial Water Use

The District has retail and wholesale municipal and industrial (M&I) customers. The District sells both treated and raw wholesale water to the City of Grass Valley, Nevada City, Nevada City School of the Arts, Lake Vera Mutual, and Placer County Water Agency (PCWA). The water sold to PCWA is for use in NID's service area in the City of Lincoln. The total municipal water sales for 2021 through 2025 are provided in Table 3-5.

Table 3-5. Municipal/Industrial Water Use

Municipal/Industrial Entity	Water Use, AF				
	2021	2022	2023	2024	2025
NID Retail Customers - Treated Water	9,242	7,668	7,597	7,980	8,323
City of Grass Valley - Treated Water	50	2	51	96	27
Lake Vera Mutual Water Company - Treated Water	31	20	22	24	26
City of Grass Valley Broadview Heights - Treated Water	34	31	31	31	35
Total Treated (customer meters)	9,357	7,721	7,701	8,131	8,411
Total Treated (WTP inflow[1])	10,678	9,171	9,364	9,640	9,855
City of Grass Valley – Raw Water	1,010	975	933	939	1,019
Nevada City – Raw Water	425	158	178	198	246
Nevada City School of Arts – Raw Water	4	6	8	8	9
Placer County Water Agency – Raw Water	1,632	1,434	1,480	1,418	1,424
Total Raw	3,071	2,574	2,599	2,563	2,697
Total Municipal/Industrial	13,750	11,745	11,963	12,203	12,553
[1]WTP inflow is total raw water to NID treatment plants. Data are in water years.					

3.5 Groundwater Recharge Use

The majority of the District has no groundwater aquifer per DWR Bulletin 118 (2025a) with the exception of a very small portion of the District's service area in Lincoln, which is on the eastern boundary of the Sacramento River Basin, North American Sub-Basin. The District does not use groundwater as an existing or planned source of water supply for agricultural customers or recharge due to limited groundwater availability. The District has no groundwater facilities. The District is aware that many private users draw groundwater for domestic purposes. NID does not manage any groundwater wells for any purpose and does not track any private wells that may be used for agricultural irrigation within the District.

The Act requires an estimate of seepage and deep percolation to be presented in the AWMP. Estimating such values is extremely difficult in a fractured rock system ranging from shallow bedrock to deeper alluvium areas.

Until more detailed data are collected, and more substrate information is known, NID is estimating seepage and percolation as the water loss detailed below.

3.6 Water Loss

Water losses in the agricultural distribution system consist of evaporation and canal leakage, seepage, spillage, stock usage, construction water, and other unauthorized usages. NID has assumed a 15 percent loss in its previous Raw Water Master Plan, canal analysis efforts, and PFW. This loss factor is applied to the total raw water diversions as an estimate of water loss in the canal system. Future improvements and enhancements in canal flow and customer purchase measurement will improve water loss estimation. The water loss estimate is summarized in Table 3-6.

Table 3-6. Other Water Uses

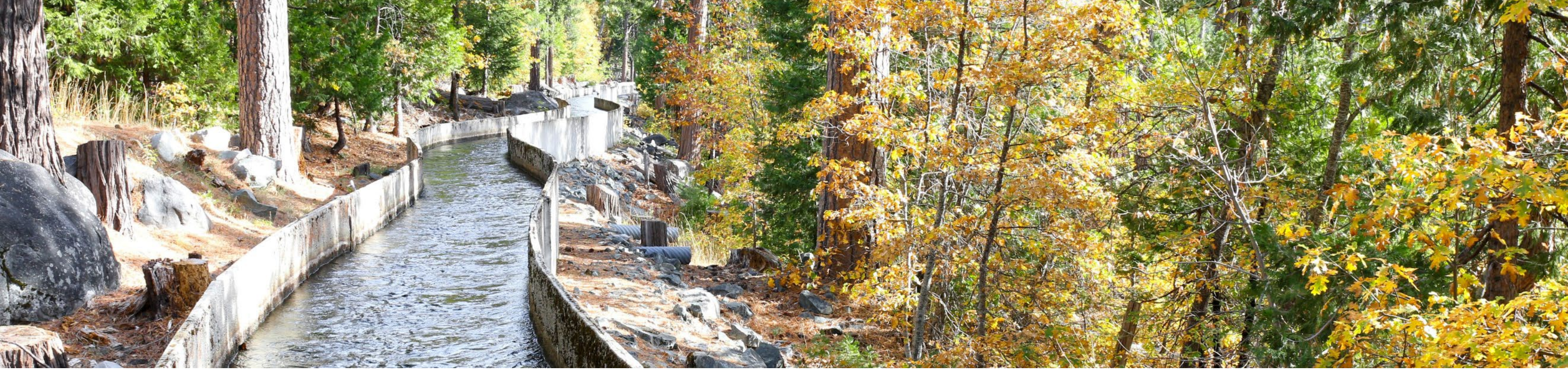
Water Use	Water Use, AF				
	2021	2022	2023	2024	2025
Total Canal Diversions	144,303	134,728	135,593	137,369	131,389
Loss Factor	15%	15%	15%	15%	15%
Water Loss – Distribution, seepage, evaporation, spills[1]	21,645	20,209	20,339	20,605	19,708
[1]15 percent loss applied to total diverted into canal system. Data are in calendar years.					

3.7 Total Water Use

Total water use is summarized in Table 3-7.

Table 3-7. Total Water Uses

Use	Water Use, AF				
	2021	**2022**	**2023**	**2024**	**2025**
Agricultural (ordered)[1]	108,617	111,087	111,065	103,438	106,104
Environmental[1]	10,680	10,680	10,680	10,680	10,680
Recreational[2]	6,540	6,270	6,281	6,254	5,676
Municipal[1]	13,750	11,745	11,963	12,203	12,553
Groundwater Recharge[1]	0	0	0	0	0
Canal water loss to deep percolation and other unmeasured uses[1]	21,645	20,209	20,339	20,605	19,708
Total	164,467	163,077	163,302	155,890	157,386
[1] Data are in water years. [2] Data are in calendar years.					



4 DESCRIPTION OF QUANTITY AND QUALITY OF SUPPLIES

This chapter describes the quantity and quality of water resources available to the District and includes a description of water quality monitoring programs.

4.1 Water Supply Quantity

4.1.1 Surface Water Supply

The District's primary source of supply is local surface water derived principally from the Yuba River, Bear River, and Deer Creek watersheds that is diverted and stored under the District's pre-1914 and post-1914 appropriative water rights. The water rights allow for diversion and/or storage of an approximate maximum 450,000 AF per year (AFY). However, water supply limitations, infrastructure, and water right terms impose limits on how much water is actually diverted. The District has an extensive system of storage reservoirs that provides surface water supply to the District's six water treatment plants (WTPs) as well as to the raw water customers.

The District also maintains a contract with PG&E to purchase surface water that originates from the same supply sources as the District's water rights supply.

Water Rights

The District was originally organized for the purpose of storing and delivering irrigation water to farmers and ranchers. In the early 1920s, the District acquired storage and regulating facilities in the upper reaches of the Middle and South Yuba Rivers. In 1926, the District acquired most of its Canyon Creek holdings including the Bowman, Sawmill, French, and Faucherie Reservoirs. Associated water rights were also obtained. Deer Creek water rights were obtained in the 1920s for the development of Scott's Flat Reservoir. The District's surface water supply water rights are divided into two main categories:

- Watershed runoff
- Carryover storage in surface reservoirs

Watershed Runoff. This supply includes water rights to runoff from the District's watershed.

Watershed runoff is the District's primary water supply. The amount of runoff and the manner in which it is used depends upon the amount of water contained in the snowpack and the rate at which the snowpack melts. District water rights include 24 pre-1914 rights acquired from mining interests, along with 28 post-1914 rights filed with the State of California to provide for domestic, municipal, industrial, recreational, power, and irrigation uses, and 3 riparian rights. These include rights for both consumptive and power purposes. The total water right volumes consist of storage rights, direct diversion rights, and some are a combination of both. The total quantity estimated for diversion and/or storage under current consumptive water rights totals approximately 450,000 AF on an annual basis.

The most prominent and obvious cause for the fluctuation in natural runoff is the variability in hydrologic conditions, as seen in the wide variations in annual rainfall/snowpack accumulations. Over the last 30 years runoff has fluctuated from 89,800 AF in a dry calendar year (2013) to 541,100 AF in a wet calendar year (2017). Runoff has fluctuated from 64,200 AF in a dry water year (2021) to 582,800 AF in a wet water year (2017).

Due to provisions in the PG&E Coordinated Operations Agreement, hydrologic variability, and the fact that the District is not the senior water right holder, the historical runoff data evaluated to estimate the District's range in runoff supply does not include supplies from the Bear River and the South Yuba River. The District is likely to receive some water from the Bear River and South Yuba River sources in dry years. Due to the uncertainty of the amount of supply available from these two sources, it has not been quantified in this AWMP.

The system of storage reservoirs and conduits used to transport water to the District's service area boundary is referred to as the Upper Division. The Upper Division is operated in conjunction with PG&E under the terms of a joint agreement.

The District's Yuba-Bear Project's FERC license (No. 2266) expired in July 2013. The project is presently undergoing relicensing with no determined timeline for completion. The current proposed license includes increased environmental flow requirements, which reduces supply available to meet customer demands.

Carryover Storage. The second largest component of District's supply is carryover storage, which is the volume of water left in storage reservoirs at the end of the irrigation season, usually at the end of September. The District's main storage reservoirs can contain a maximum of 280,085 AF of water. Per the District's Drought Contingency Plan, carryover storage should be held at a level not less than 85,000 AF. This includes a total 41,800 AF of minimum pool requirements reserved for environmental needs and dead storage volume (includes siltation estimates) that cannot be counted upon as a supply, resulting in an available storage capacity of 195,085 AF. As with most reservoirs, the District's reservoirs are slowly being filled with sediment. The District is currently studying removal of this material.

The water supply is dependent on snowmelt and rain to fill storage reservoirs, and the District manages its system based on the timing of those events. While there is some natural runoff during normal summer months, the irrigation season (April 15–October 14) demand is met primarily with withdrawals from storage reservoirs. Careful management and operation of the storage reservoirs is required to capture the maximum amount of runoff, minimize spillage from the reservoirs, yet ensure there is sufficient volume available in the reservoirs to accommodate runoff during the spring snow melt and storm events.

Carryover storage is also affected by fall/winter customer demands. Fall/Winter effectively uses carryover storage, meaning less water could be available for the following irrigation season.

Contracted Purchases

The hydropower potential of its water led the District to enter into an agreement with PG&E in 1924 to use a portion of the District's water through PG&E facilities. At the same time the District secured the option to purchase PG&E water to augment its own supply. Over the years, this agreement has been modified to meet the changing conditions and requirements of both organizations. In 1963, the District and PG&E agreed to develop additional storage capacity on both Middle Yuba and the Bear River.

Additional water was also made available by improved and new facilities in the upper Yuba Basin.

The PG&E contract has recently been renewed. The maximum amount available for District purchase is 60,148 AF with reductions based on the Sacramento Valley Index (SVI).

Summary of Surface Water Supply Quantity

The District's use of each surface water supply over the past five years is summarized in Table 4-1. The District's watershed runoff water supply sources are covered by a combination of pre-1914 water rights, post 1914-water rights, and riparian water rights. In some California watersheds, including the Sacramento River watershed, the recent drought has resulted in diversion curtailment orders being issued in 2014, 2015, and 2016 on water rights going back to a 1903 priority date. Additionally, 2021 and 2022 yielded diversional curtailments going back to an 1850 priority date. NID assumes the Governor's Office and the State will also attempt to impose restrictions in the future, regardless of water right priority. There are many other potential regulatory and legal restrictions that could affect the District's water supplies. The legislative and regulatory environment at the State level has been trending toward increased water usage restrictions recently, with increased focus on managing to a water budget limit, as well as efforts to increase instream flow values. The District views these efforts as having significant impacts to its current supply and reliability assumptions and could greatly restrict supplies the District is allowed to use. The precipitation from 2021–2025 as measured at the NID Bowman Lake precipitation gage is presented in Table 4-2. Other characteristics, including restrictions, of the District's surface water supplies are summarized in Table 4-3.

Table 4-1. Surface Water Supplies

Source Water Supply	Diversion Restriction	Supply, AF				
		2021	2022	2023	2024	2025
Contract Supply - PG&E	60,148	15,678	0	0	6,558	4,873
Watershed Runoff	450,000[2]	110,150	165,783	341,465	211,537	255,911
Carryover Storage	280,085	82,475	148,612	163,981	143,248	147,214
Total[1]		208,303	314,395	450,000	361,343	407,998

[1] Total does not represent actual supply available due to temporal differences between runoff and water rights. In actuality, the District only supplies the necessary amount of water to meet total demand, which over the past five years has always been less than the supply totaled above.
[2] Total limited to NID water rights upper limit of approximately 450,000 AFY.
Data are in calendar years.

Table 4-2. 2021–2025 Annual Precipitation – Bowman Lake Rain Gage

2021	2022	2023	2024	2025
65.11	54.72	76.54	77.76	73.97

Data are in calendar years.

Table 4-3. Restrictions on Water Sources

Source	Restrictions	Name of Agency Imposing Restrictions	Operational Constraints
Contract Purchase (PG&E)	Climatic	PG&E	Flow and volume availability
Watershed Runoff	Legal, environmental, climatic	SWRCB, FERC, other State/Federal Resource Agencies	Flow and volume availability, temporal availability,
Carryover Storage	Legal, environmental, climatic	District	Volume availability
Recycled Water	Legal, environmental	SWRCB	Treatment Capacity

4.1.2 Groundwater Supply

Most of the Sierra Nevada foothills located in the District's service area have a fractured rock groundwater system (CABY, 2020), including granitic and metavolcanic (USGS, 1984). NID views the fractured rock groundwater system as low yielding and unreliable for a District supply source. The District does not use groundwater as an existing or planned source of water supply or recharge due to limited groundwater availability. The majority of the District's service area has no groundwater aquifer per DWR Bulletin 118 with the exception of the very small portion of the District's service area in Lincoln, which is on the eastern boundary of the Sacramento River Basin, North American Sub-Basin.

The District has no groundwater facilities and does not use groundwater. The District is aware that many private users draw groundwater for domestic purposes. NID does not manage any groundwater wells for any purpose and does not track any private wells that may be used for agricultural irrigation within the District.

4.1.3 Stormwater

The District currently has a policy to not divert stormwater runoff as presented in the current stormwater policy (District Policy #6655), provided in Appendix E.

4.1.4 Recycled Water

Wastewater collection, treatment, and discharge in the District's service area is the responsibility of Nevada City, Grass Valley, and Auburn. The District has no authority or control over wastewater management in the District's service area. The District understands that reuse is an important element of integrated water supply planning and is open to investigations with any of the wastewater utilities to support further development of a reuse supply component.

All wastewater treated within the District service area is discharged to local watercourses. Once discharged, the flow is available for appropriation. Recycled water discharge comingles with the District's water right supply being transported in the creeks. The combined waters are then diverted from creeks into canals as described below. Thus, recycled water augments the District's overall water supply.

Nevada City: The District uses effluent from the Nevada City wastewater treatment plant (WWTP) discharged into Deer Creek. The effluent is comingled with Deer Creek flows and is diverted for reuse as agricultural irrigation water.

Grass Valley: The District uses effluent from the Grass Valley WWTP discharged into Wolf Creek. The effluent is comingled with Wolf Creek flows and is diverted for reuse as agricultural irrigation water.

City of Auburn: The District uses effluent from the Auburn WWTP discharged into Auburn Ravine Creek. The effluent is comingled with Auburn Ravine Creek flows and is diverted for reuse as agricultural irrigation water.

Table 4-4 lists the District's recycled water use from 2021–2025. Recycled water use is estimated based on the WWTP-provided effluent flows during the April 15–October 14 irrigation season. The quality and volume of wastewater effluent discharged is outside of the District's control. However, if effluent volumes were decreased, NID would need to adjust its operations to divert more supply into the affected canal system. There would also be a large impact if water quality became degraded and NID was unable to divert flows due to contamination. Each respective WWTP is regulated by the State through a discharge permit that addresses actions and requirements to maintain effluent water quality.

Table 4-4. Recycled Water Supplies

Source	Restrictions/ Constraints	Supply, AF				
		2021	2022	2023	2024	2025
Recycled Water	Environmental/ treatment capacity	1,342	1,326	1,426	1,390	1,341
Total		1,342	1,326	1,426	1,390	1,341
Note: As reported to the SWRCB based on the irrigation system. Data are in calendar years.						

4.1.5 Drainage from Service Area

The District's agricultural water distribution system is different than typical valley-floor systems. While the District's canals supply water to customers for irrigation, most drainage or runoff from customer's parcels are collected and transported downstream through the natural drainage system. The District does not operate or manage drainage canals. Often times the runoff in streams and creeks is re-diverted at a lower point, but NID does not measure runoff individually. Since 2021, NID has added five gaging stations at canal ends, including one station with real time telemetry and three with continuously logged data. In total, NID currently monitors canal end losses at 10 stations. NID continues to identify opportunities for additional monitoring as funding becomes available. However, there are over 30 canal end spill points throughout the system as well as thousands of individual customer parcels, and therefore NID is unable to measure all drainage at this time.

Table 4-5 summarizes the total volume measured at the 10 stations used to monitor canal end losses (i.e., water leaving the service area) from 2021–2025.

Table 4-5. Drainage Discharge

Discharge Type	Discharge, AF				
	2021	2022	2023	2024	2025
Water Leaving Service Area	2,857	5,138	7,712	5,161	5,588
Total	2,857	5,138	7,712	5,161	5,588
Data are in calendar years.					

4.2 Water Supply Quality

The District's source water quality and monitoring practices are described in the following subsections.

4.2.1 Surface Water Supply

The District identifies and monitors surface water quality through regular updates of the required Watershed Sanitary Survey. The most recent Survey was completed in 2021 and covers the District's watersheds. The 2021 Watershed Sanitary Survey Update concludes:

- Areas in the upper watersheds are, in general, minimally impacted by current human activities. However, previous mining era activities have had an impact.
- Current and historic mining operations distributed over large areas in the watersheds have a combined high potential to impact raw water quality. There is one new and one pending gold mine operating in the Bear River watershed. The intensity of mining activity has decreased remarkably over time. While mining-related constituents have been detected in sediment and organic material, constituents in source water taken into NID canals and delivered to WTPs have not been detected at levels of human health concern.
- During summer months, recreation in the upper watersheds, including body contact recreation, motorized recreation, camping and hiking, bring large numbers of visitors into the area. This increases the potential for source water contamination. There is widespread but stable activity through the watersheds.
- Major highways, local access roads, and railroads are located throughout the watersheds, increasing the risks to source water quality.
- Various licensed pesticides and herbicides are used for weed control around the District's canals. Additionally, outdoor cannabis cultivation has grown exponentially in the watershed in the past five years and each county in the watershed has independent ordinances and regulations to manage any potential impacts, including impacts from pesticides and herbicides, from outdoor cultivation.
- Most canals are open; they receive untreated drainage from uphill slopes and are not protected from vandalism or other potential sources of contamination.
- The median turbidity of raw water influent varies by WTP, ranging from 2.5 Nephelometric turbidity unit (NTU) to 9.5 NTU with the highest values occurring during winter months. All treated turbidity standards were met.

Natural disasters can also impact water quality. The quality of water supplies can be dramatically affected by fire. Fire and storm damage to the District's conveyance facilities may include:

- Damage to parts of canal intakes,
- Collapse or weakening of some sections of canal flumes,
- Erosion and sedimentation of, and landslides into, sections of the canals.

The above-listed damages can cause some temporary adverse water quality effects, and some short-term losses of the District's water supplies in extreme cases. Of greater concern to overall water quality are flood and precipitation related damage occurrences. These could cause longer term adverse water quality impacts such as excessive runoff and loading of surface contaminants (such as livestock manure, petroleum products, pesticides, and mineral wastes).

The District does not monitor runoff from pastureland or rangeland for pesticides in the watershed. The District has in the past monitored the raw water influent into its potable WTPs, which is representative of supply used for agricultural irrigation. A review of the treated water monitoring at the District's WTPs shows that there were no detections of the herbicides or pesticides tested for in the Yuba/Bear River water supply. Annual ranges for raw water quality monitoring (coliform and E.coli) at the District's WTP intakes are summarized in Table 4-6.

Table 4-6. Surface Water Supply Quality

Parameter	Units	2021		2022		2023		2024		2025	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Coliform	MPN/100 ml	20.1	2,420.0	20.9	2,420.0	6.3	2,420.0	25.3	2,420.0	7.4	2,420.0
E.coli	MPN/100 ml	0	686.7	0	133.3	1	198.9	0	1,410.0	1	172.0
Source: NID Treated Water Superintendent. Data are in calendar years.											

Table 4-7 lists the 303(d) listed water bodies in the watershed per the State Water Board 2024 listing. As expected from the region’s mining history, mercury and copper constitute the majority of the listed pollutants.

Table 4-7. 303(d) Listed Water Bodies

Name	Pollutant
Bear River, Upper (from Combie Lake to Camp Far West Reservoir, Nevada, and Placer Counties)	Mercury
Camp Far West Reservoir	Mercury
Castle Creek, Lower (Nevada County)	pH
Clear Creek (Nevada County)	Indicator Bacteria
Combie, Lake	Mercury
Deer Creek (from Deer Creek Reservoir to Lake Wildwood, Nevada County)	Mercury, pH
Deer Creek (Nevada County, Above Scotts Flat Reservoir to the Confluence of Deer Creek North and South Forks)	pH
Englebright Lake	Mercury
French Ravine	Indicator Bacteria
Gold Run (Nevada County)	Mercury
Humbug Creek (Diggins Creek to Yuba River, South Fork)	Mercury, Copper, Zinc, Chromium, Iron, pH, Sedimentation/Siltation
Kentucky Creek (Nevada County)	Iron, Dissolved Oxygen, pH
Little Deer Creek	Mercury, pH
Poorman Creek (Nevada County)	Copper
Rock Creek (Nevada County)	pH
Rollins Reservoir	Mercury
Scotchman Creek (Nevada County)	Copper, Iron, pH
Scotts Flat Reservoir	Mercury
Shady Creek (Nevada County)	Copper, Iron
Spaulding, Lake	Mercury
Spring Creek (Nevada County)	Copper, Iron
Squirrel Creek (Nevada County)	Indicator Bacteria
Wildwood, Lake (Nevada County)	Mercury
Wolf Creek (Nevada County)	Indicator Bacteria
Yuba River, South Fork (Headwaters to Spaulding, Lake)	Mercury, Copper, Dissolved Oxygen
Yuba River, South Fork (Spaulding Reservoir to Englebright Reservoir)	Mercury, Copper, Iron, Chromium, Water Temperature
Zayak (Swan) Lake	Mercury

4.2.2 Groundwater Supply

The District does not use groundwater as an existing or planned source of water due to limited groundwater availability and no groundwater aquifer per DWR Bulletin 118. The District does not monitor groundwater quality.

4.2.3 Recycled Water

All wastewater treated within the District service area is treated under the State discharge permit system. Wastewater treatment is the responsibility of each respective wastewater treatment agency, as NID does not provide wastewater services. Assuming the treatment agencies are meeting their permit requirements, the effluent water quality is sufficient to be comingled with NID's supplies in the respective creeks and diverted for use in NID's agricultural irrigation system. NID maintains close coordination with each wastewater agency as well as local Environmental Health agencies so that NID can be notified of any potential effluent water quality issues.

4.2.4 Drainage from Service Area

Drainages near agricultural lands and at points above the Sacramento River Basin are monitored for water quality parameters by the local agricultural water coalitions under the Sacramento Valley Water Quality Coalition (SVWQC). SVWQC reports the water quality data and analysis directly to the Irrigated Lands Regulatory Program of the Region 5 Central Valley Regional Water Quality Control Board. The Placer/Nevada/South Sutter/North Sacramento Watershed Coalition is the local agricultural organization that monitors water quality as it relates to agricultural production and discharges in the District's service area. The District does not monitor the water quality of outflow from the service area as the SVWQC is the responsible reporting entity under the Irrigated Land Regulatory Program

4.2.5 Source Water Quality Monitoring Practices

As summarized in the 2021 Watershed Sanitary Survey, NID's source water quality is extremely good as the watershed is relatively remote and at low risk of extensive contamination. However, there are emergency events that could impact source water quality. NID does conduct site-specific monitoring in response to known contamination events.

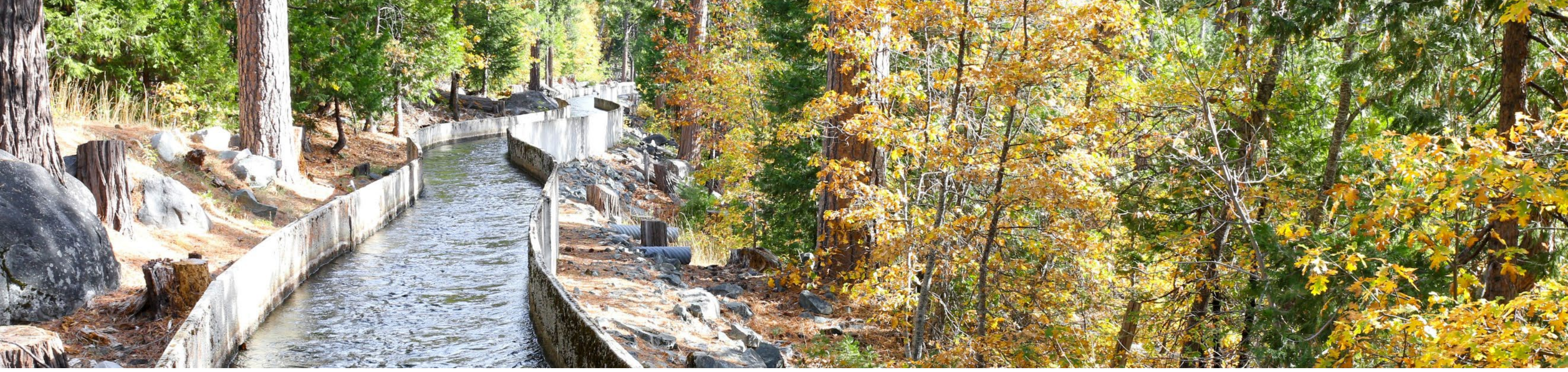
The source water is regularly sampled as part of the Watershed Sanitary Survey. The 2021 Survey raw water monitoring program was aimed at assessing the Yuba and Bear Rivers' source water quality (Starr Consulting et al., 2022). Source water quality samples were monitored at various locations and frequencies. Parameters included turbidity, E. coli, Total Organic Carbon (TOC), and daily temperature (limited to Loma Rica WTP). Table 4-8 presents the District's source water quality monitoring practices.

The District also uses the raw water supply used for irrigation to supply its potable WTPs. NID regularly conducts treated water quality monitoring for a host of parameters at all treatment plants, consistent with applicable requirements. These monitoring results are reported in NID's treated water quality reports (https://www.nidwater.com/water-quality).

Table 4-8. Source Water Quality Monitoring Practices

Water Source	Monitoring Location	Measurement/Monitoring Method or Practice	Frequency
Various throughout the watershed	Various throughout the watershed	Determined by the Watershed Sanitary Survey monitoring program	The Watershed Sanitary Survey is updated every 5 years
Various, as needed (if contamination incident occurs)	Determined by location of contamination incident	Determined by type of contamination incident	Determined per event
Lake Spaulding[1] (via Banner Cascade Pipeline)	Loma Rica WTP E. George WTP	Turbidity, E. coli, TOC, Temp.[2]	Quarterly, Monthly, Bimonthly, Daily[2]
Deer Creek [1] (downstream of Scotts Flat Reservoir)	Lake Wildwood WTP Smartsville WTP	Turbidity, E. coli, TOC	Quarterly, Monthly
Rollins Reservoir[1] (via Bear River Canal)	N. Auburn WTP	Turbidity, E. coli, TOC, Temp.	Quarterly, Monthly
Bear River[1] (downstream of Rollins Reservoir)	Lake of the Pines WTP	Turbidity, E. coli, TOC, Temp.	Quarterly, Monthly

[1]Watershed Sanitary Survey (Starr Consulting et al., 2022).
[2]Loma Rica WTP only.



5 WATER BUDGET

This chapter presents information on the development of the District's water budget. For each component included in the annual water budget, a description is provided of the methods and data sources used to quantify annual volumes. This chapter also presents NID's Water Management Objectives and an estimate of the agricultural water use efficiency in the District.

The purpose of this chapter is to summarize water use and water supply to provide an overall picture of the agricultural water used within NID's service area and the ability of NID's water supplies to meet water demands

5.1 Quantifying the Water Supplier's Water Supplies

Inflows to the water budget include water supplies that are used to meet demands within NID. Inflow components include surface water inflow, groundwater inflow, and effective precipitation. Each subsection below presents the development and assumptions for each inflow component.

5.1.1 Surface Water Inflow

Surface water inflow is the raw water supply diverted into the raw water distribution system. The District measures each diversion point. The majority of the raw water is then delivered to irrigation customers. The District measures diversion volumes and submits annual reports to the SWRCB. The majority of the District's irrigation customers are supplied with surface water through a service box with an orifice set to deliver based on the miner's inch. The District's canal operation strategy emphasizes maintaining constant head in the canals to maintain consistent flow rates through the delivery boxes. The volume of agricultural water delivered is calculated using the flow rate (miner's inch) and delivery duration period. It is recognized that orifice-based metered delivery systems are less accurate than other turbine or ultrasonic type metering systems when used to measure and quantify deliveries. Converting the agricultural farm-gate delivery mechanism to a metering system that uses enclosed, pressure pipe methods would be an extensive and costly process, which would drive the price for water out of reach for many customers. NID has yet to implement such conversions for these reasons.

Surface water inflow to the District's canal system (also referred to as water supplier surface water diversions) is presented in Table 5-1 included in Section 5.3.

5.1.2 Groundwater Inflow

As indicated throughout this document, NID does not provide groundwater supply. There is no groundwater basin underlying the District, as identified in DWR Bulletin 118, but there is a fractured rock groundwater system. This fractured groundwater system is used for low producing domestic wells in the service area (USGS, 1984). NID does not manage any groundwater wells for any purpose and does not track any private wells that may be used for agricultural irrigation within the District. For this analysis, it is assumed that any groundwater that may be used for agricultural irrigation is negligible compared to the total raw water supplied, and therefore groundwater inflow is estimated to be zero for the water budget.

5.1.3 Effective Precipitation

The AWMP Guidebook defines effective precipitation (EP) as the estimated amount of precipitation consumed by crops, or in other words, the portion of precipitation that is available to meet crop ET. For this AWMP, EP within NID has been quantified as part of the demand model initially developed to support the NID PFW process. As described in Chapter 4 of the PFW (WEST Consultants, Inc. et al., 2024) report, the demand model was developed to estimate the demand of NID's customers by creating water budgets for areas within NID under historical and projected conditions. The historical demand model was extended through water year 2025 for this AWMP using the data sources described in the PFW report.

EP, in particular, was quantified through the Integrated Water Flow Model Demand Calculator (IDC) model that formed the backbone of the demand model. IDC is the demand-modeling module of DWR's broader Integrated Water Flow Model. The IDC model adapted for NID uses data and information about climate, land use, soil properties, agricultural and irrigation practices, and urban and residential water use parameters within NID to physically simulate inflows and outflows of water through the landscape over time. For more details on the IDC model, see Section 4.2.3 of the PFW report or visit DWR's page at https://water.ca.gov/Library/Modeling-and-Analysis/Modeling-Platforms/Integrated-Water-Flow-Model.

Within the IDC model, EP is quantified as a fraction of the total crop consumptive use (CCU), or ET, based on the ratio of stored precipitation within the soil and infiltration of precipitation into the soil. ET within the IDC model is quantified from OpenET data as described in Section 5.2.1. Precipitation within the IDC model is quantified using the Parameter-elevation Regressions on Independent Slopes Model (PRISM) results developed by the PRISM Climate Group at Oregon State University (https://prism.oregonstate.edu). PRISM quantifies spatial precipitation estimates, among other climate parameters, based on available weather station data and modeled spatial relationships with topography and other factors influencing weather and climate. Monthly precipitation rasters from PRISM were evaluated at a spatial resolution of 4 km x 4 km for the demand model. The IDC model reports EP results on a per-acre basis for crops grown within NID, which are then converted to volumetric results for this AWMP based on annual NID crop report data.

EP results are reported in Table 5-1. The estimated accuracy of this calculation is +/- 10 percent, which represents the typical estimated accuracy of an IDC root zone water budget based on monthly OpenET ET data, monthly PRISM precipitation, and annual land use.

5.2 Quantifying Water Uses

Outflows from the water budget include CCU, surface outflows, deep percolations, M&I (raw) water deliveries, treated system deliveries, and other outflows. Each subsection below presents the development and assumptions for each outflow component.

5.2.1 Crop Consumptive Use (CCU)

Otherwise referred to as ET, CCU is the major driver of agricultural water use. ET is impacted by a host of factors, including: the types of crops or vegetation that are grown; the quality of crops, vegetation, or land use, including water availability, nutrients, pest management, and other factors; and environmental demand for evaporation related to weather and climate parameters, as a function of temperature, solar radiation, wind speed, and humidity (ASCE 2016). Each of these factors are accounted for in the methods used to quantify ET.

ET was quantified as part of IDC, described above, for different land uses and different climate zones in NID based on an evaluation of satellite-based remote sensing analyses available from OpenET. OpenET is a multi-agency web-based geospatial utility that quantifies ET over time with a spatial resolution of approximately 0.22 acres (https://openetdata.org/). While OpenET is a relatively new utility, the underlying methodologies used to quantify ET apply a variety of well-established modeling approaches that are widely used in local, State, and Federal government and research applications.

OpenET data were used to observe recent historical ET trends and quantify representative ET rates on a per-acre basis for crops grown within NID. ET rates were then converted to volumetric results for this AWMP based on annual NID crop report data.

ET (CCU) results are reported in Table 5-2. The estimated accuracy of this calculation is +/- 10 percent, which represents the typical estimated accuracy of an IDC root zone water budget based on monthly OpenET ET data, monthly PRISM precipitation, and annual land use.

5.2.2 Surface Outflows

As presented in Section 4.2, drainage and outflow within the NID service area is not entirely measured. NID does not maintain a drainage collection system and any surface runoff flows into the natural drainage waterways. The gravity canal delivery system is designed to spill at the end points in order to maintain proper water elevation at customer service boxes. Most of these spills are upstream of another NID diversion structure, and therefore assumed to be diverted back into the canal system.

As described in Section 4.1.5, NID does measure canal spills at 10 stations located at the end of the system, where spills flow out of the service area. These measured spills are the surface outflow volumes reported by NID. Therefore, these surface outflow volumes do not include other drainage or rainfall event drainage during the non-irrigation season. The measured surface outflows are presented in Table 5-2 included in Section 5-3.

5.2.3 Deep Percolations

The subsurface characteristics throughout the service area can vary from bedrock to shallow alluvium (USGS, 1984), creating varying conditions of direct runoff, percolation into rock fractures, and subsurface drainage to watercourses. The District does not measure or track agricultural field runoff, nor maintain detailed field subsurface conditions or irrigation practices for each customer, complicating development of irrigation percolation estimates.

As the purpose of quantifying percolation in this AWMP is to differentiate and identity water volumes necessary to serve irrigation water to meet irrigation requirements, the District includes canal seepage in this category. It is assumed the water lost from the canals due to seepage either percolates into fractured rock fissures or into nearby shallow alluvium, and is lost from the canal system. As described in Section 3.6, the District has estimated canal seepage in the PFW at 15 percent of total canal flow. Estimated deep percolation outflows are presented in Table 5-2.

5.2.4 Municipal and Industrial (Raw)

As indicated in Section 3.4, NID provides M&I raw water to other entities. The M&I raw water deliveries from the canal system are presented in Table 3-5 and are quantified as an outflow in the water budget. The M&I raw water is diverted by the District for subsequent delivery to the City of Grass Valley, Nevada City, Nevada City School of Arts, and PCWA. M&I raw water deliveries are included in Table 5-2.

5.2.5 Treated System

Portions of the raw water flows are diverted from the distribution system into NID's WTPs. These diversions are metered at the treatment plants' raw water intakes and are included as an outflow in the water budget. Raw water deliveries to the District WTPs are included in Table 5-2.

5.2.6 Other Outflows

As described above, drainage and outflow from the NID service area are not entirely measured. As a result, the total quantified inflows to the water budget slightly exceed the quantified outflows in recent years. Other outflows from the water budget are quantified as the water budget "closure" term, or the difference between all other quantified inflows and outflows. This represents the residual, unmeasured outflows that are not otherwise captured in other outflow components, and may include additional unmeasured seepage, surface water outflows, or other outflows. The uncertainty of these other outflows is calculated as approximately 56%, based on the uncertainties of all other water budget components, assuming those uncertainties approximately represent a 95% confidence interval for each component, and assuming random, normally-distributed error.

5.3 Annual Water Budget

Water supply and water use data (Sections 5.1 and 5.2) were used to prepare an annual water budget for NID that quantifies water supplies, uses, and losses within the District. Table 5-1 summarizes the overall amount of water supplies and Table 5-2 summarizes how much water is used for all purposes. In most years, more surface water runoff has been available than the District needs to divert for uses within NID.

Table 5-1. (DWR Table V-1) Inflows

Inflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	WY[1] 20/21	WY 21/22	WY 22/23	WY 23/24	WY 24/25
Effective Precipitation	Appendix H	Modeled	10%	14,394	15,066	20,093	23,437	19,596
Water Supplier surface water diversions	Table 3-6	Measured	5%	144,303	134,728	135,593	137,369	131,389
Water supplier groundwater pumping	-	Measured	0%	0	0	0	0	0
Private groundwater pumping	-	Estimated	10%	0	0	0	0	0
Total				158,697	149,794	155,686	160,806	150,985

[1]Water year (WY) represents the period between October 1 of the first year and September 30 of the second year.

Table 5-2. (DWR Table V-2) Outflows

Outflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	WY 20/21[3]	WY 21/22	WY 22/23	WY 23/24	WY 24/25
Evapo-transpiration (CCU)	Appendix H	Modeled	10%	87,319	98,939	96,349	98,471	91,909
Surface Outflows[1]	Table 4-5	Measured	5%	2,857	5,138	7,712	5,161	5,588
Deep Percolations	Table 3-6	Estimated	20%	21,645	20,209	20,339	20,605	19,708
M&I (raw)	Table 3-5	Measured	12%	3,071	2,574	2,599	2,563	2,697
Treated System	Table 3-5	Measured	5%	10,678	9,171	9,364	9,640	9,855
Other Outflows[2]	Section 5.2.6	Calculated	56%	33,127	13,763	19,323	24,367	21,228
Total				158,697	149,794	155,686	160,806	150,985

[1]For measured sites only.
[2]Estimated as closure term.
[3]Water year (WY) represents the period between October 1 of the first year and September 30 of the second year.

5.4 Identify Water Management Objectives

The District is at the crossroads of a unique opportunity. Water management throughout the State of California is shifting, with urban, agricultural, environmental, and social interests all working to reimagine water resources management priorities and responsibilities. Being situated at the headwaters of the watershed that supplies the majority of the State, NID's water resources are highly valuable to downstream interests statewide. As stated in the District's adopted Strategic Plan Goal #3, NID will develop and manage its resources in a self-determining manner that protects and provides local control of the water supply. NID is taking this opportunity in water management shifts to locally develop the vision and water resource needs for its community.

The PFW represents NID's effort to develop this community-focused vision that identifies the community's water resource needs and informs strategies for supporting those needs into the future. There are also new or pending regulations that will require enhanced data analytics such as water budget assignment by State and FERC license monitoring requirements. The following lists efforts NID will implement in the near future to enhance its water management capabilities:

1. Continue to evaluate and implement, as feasible, options to increase understanding of agricultural irrigation customer water uses and field characteristics. Crop type and irrigation area are currently self-reported. NID will investigate means and methods to improve accuracy and validation of irrigation customer practices, including available aerial imagery.
2. Continue to evaluate and implement, as feasible, options to increase measurement accuracy. NID irrigation customers are mostly served through miner's inch-based orifice distribution boxes. NID will investigate methods to improve the measurement accuracy and temporal patterns to better quantify individual customer use.

3. Continue to evaluate and implement, as feasible, options to increase canal water balance accuracy. NID will investigate options to increase flow measurement throughout its distribution system to allow refined understanding of system inflows, system outflows, and seepage.
4. Continue to investigate land use and latent water demands within the service area, continuing efforts initiated as part of the PFW process. NID only serves a portion of the parcels within its service area. Many unserved parcels are either undeveloped or use private domestic groundwater wells. Should wells fail, or parcels be developed, NID may be asked to provide service. This latent demand needs better quantification in order to improve understanding of potential future demands.
5. Reduce water demands. NID will continue to implement its conservation programs and demand management measures for agricultural and treated water customers. NID will investigate new programs, as identified, and modify the conservation program offerings as selected. On the treated water side, DWR and the SWRCB is now enforcing water budgets for indoor use and landscape irrigation. NID will develop the necessary data analytics to support the management and water demand reporting requirements.
6. Resource Stewardship. NID will continue its watershed management program and practices. NID will investigate new programs, as identified, and modify the watershed program offerings as selected.
7. Modify water system in step with changing hydrology. The State of California is projecting hydrologic scenarios that portend warmer conditions resulting in less snowpack and more rain. NID’s current system relies on the slow melting of the snowpack over the spring and summer to supply irrigation demands. If there is less snow and more rain in the future, NID will need to make operational, facility, and/or watershed changes to store more of the winter rainfall for use during the irrigation season. The District will continue its efforts to identify future potential changes and evaluate alternatives to address these climate impacts.
8. Fractured rock groundwater system investigations. NID will investigate options to partner with the respective counties in the service area to better understand private well groundwater use and trends to support water accounting and future demand needs.

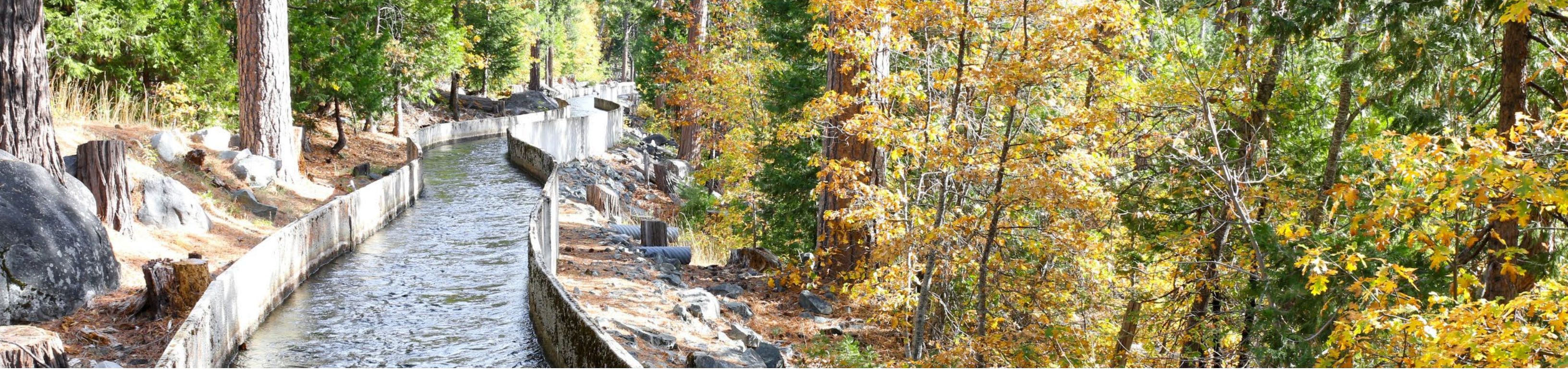
5.5 Quantify the Efficiency of Agricultural Water Use

The quantification of NID’s agricultural water use efficiency employs Method 1 (Crop Consumptive Use Fraction) from DWR’s report to the legislature entitled, “A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use” (DWR, 2012). Specifically, Method 1 compares the evapotranspiration of applied water (ETAW) with the total applied water (AW) for the reported irrigated acres during 2025. Values for AW are reported as the amount purchased by agricultural customers, including fall/winter customers. Values for ETAW are summarized from the demand model based on the difference between ET (CCU) and EP. Calculations of ETAW are presented in Appendix H, and results are presented in the following Table 5-3.

Table 5-3. (DWR Table D.1) Crop Consumptive Use Fraction (2025)

Evapotranspiration of Applied Water (ETAW)[1] AFY	Applied Water (AW)[2] AFY	Crop Consumptive Use Fraction No units
72,312	106,104	0.68

[1]Equal to evapotranspiration (Table 5-2) minus effective precipitation (Table 5-1).
[2]From Table 3-1.
Both ETAW and AW are estimated. Accuracy of crop consumption ratio is unknown.



6 CLIMATE CHANGE

Climate change is increasingly at the forefront of water resource management discussions. The NID PFW is a decision-support tool designed to guide development of a long-term, sustainable strategy for managing NID's water resources under projected changes in climate, runoff patterns, water demands, and regulatory conditions. The PFW process included comprehensive analyses of NID's hydrology, climate change scenarios, projected water demands, regulatory context, and reservoir operations. Figure 6-1 illustrates the technical framework of NID PFW, highlighting two modeling periods: historical and projected. Because NID's snowpack-based supply and delivery system is sensitive to changes in temperature and precipitation, the PFW investigated potential impacts to water supplies under a warming climate. This analysis involved projecting future temperature and precipitation patterns and assessing their effects on watershed runoff and water demand.

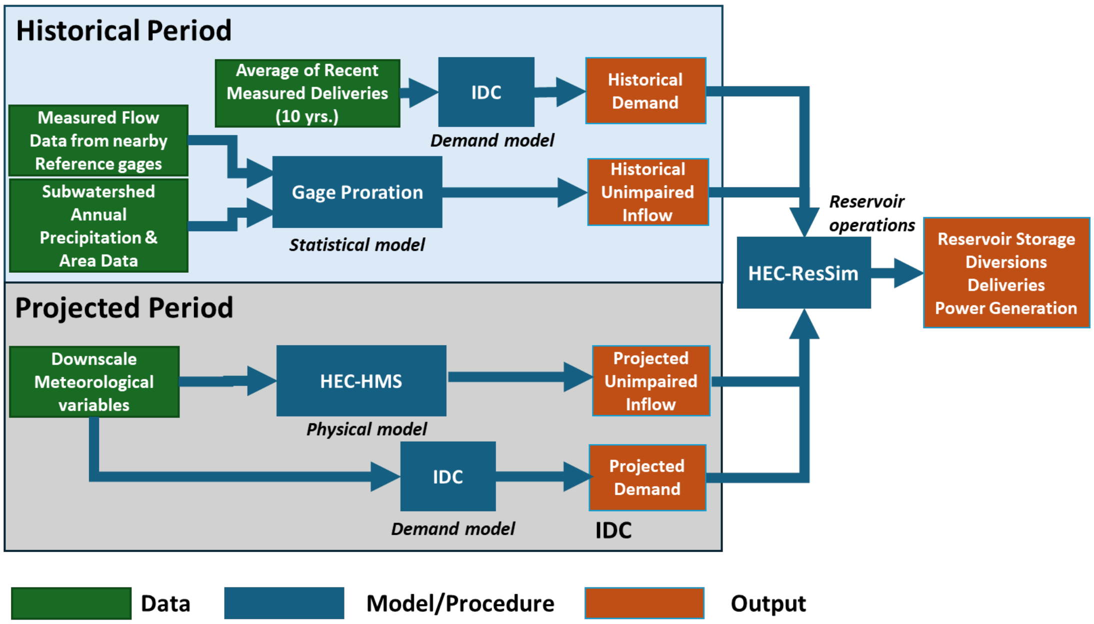


Figure 6-1. NID Plan for Water Technical Framework

A physically based hydrological model was used to estimate projected unimpaired flows based on projected precipitation and temperature data from Global Climate Models. The Hydrologic Engineering Center (HEC) – Hydrologic Modeling System (HMS), a physically based hydrologic model developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center, was used to simulate projected unimpaired flows. Historical flow data was used to calibrate HEC-HMS. Chapter 2 of the technical memorandum *Nevada Irrigation District Plan for Water* (WEST Consultants, Inc. et al., 2024) describes the HMS model development, calibration, and validation for the PFW.

The following section summarizes the historical and projected unimpaired hydrology; detailed methodologies and results are provided in Chapter 3 of the technical memorandum *Nevada Irrigation District Plan for Water* (WEST Consultants, Inc. et al., 2024).

6.1 Climate Scenario Selection

The 2021 Global Climate Model (GCM) projections, Coupled Model Intercomparison Project Phase 6 (CMIP6, Li et al. 2021) were used in the PFW analysis. CMIP6 represents an evolution from previous CMIP phases, featuring generally higher spatial resolution, improved representation of physical processes, and updated emissions scenarios based on the Shared Socioeconomic Pathways (SSPs) framework for future climate projections (Li et al. 2021, O'Neill et al. 2016). For the PFW analysis, publicly available downscaled meteorological datasets from Krantz et al. (2021) were used to provide 50 years of projected temperature and precipitation time series at each grid location within the NID basin.

CMIP6 includes over 100 distinct climate models, but not all models are equally appropriate for the area of interest. To determine which GCMs perform better for the State of California climate, Krantz et al. (2021) evaluated the performance of CMIP5 and CMIP6 models. Based on the result, seven downscaled GCMs with 3 emission scenarios (SSP245, SSP370, and SSP585) listed in Table 6-1 were chosen for this project. Out of the 21 climate scenarios (7 GCMs for each of 3 emissions scenarios), 18 scenarios with available downscaled temperature and precipitation at the time of the development of the project (indicated with "√" in Table 6-1) were used for NID projected hydrology simulations.

Table 6-1. Climate Change Scenarios

GCMS	Emissions		
	SSP245	SSP370	SSP585
ACCESS-CM2	√	√	√
EC-Earth3	√	√	√
EC-Earth3-Veg	√	√	√
CNRM-ESM2-1	√	√	√
FGOALS-g3	√	√	√
HadGEM3-GC31-LL	√	-	√
CESM2-LENS	-	√	-

6.2 Historical Hydrology

To assess the overall bias in (1) the calibrated NID HEC-HMS model (described in Chapter 2 of WEST Consultants, Inc. et al., 2024) and (2) the selected global climate models, the authors evaluated climatological mean over the historical period. Model bias refers to the presence of systematic errors in a model resulting in consistent deviations from observed or expected values, leading to inaccurate predictions.

To evaluate the bias in the calibrated NID' HEC-HMS model, a comparison was conducted for the observed and simulated average annual local inflow in the NID basin. This assessment focused on the historical period from 1976 to 2021 and involved three independent methods:

1. **Gage Proration:** The local inflows from the gage proration method from the unimpaired hydrology study by HDR (2020).
2. **Water Balance:** The average annual local inflow for the NID basin was estimated from the equation:

   Annual runoff = Streamflow at the basin outlet + Losses + Diversions

   Streamflow at the basin outlet = Sum (USGS gages at outlet)
3. **HEC-HMS:** The calibrated NID HEC-HMS model using the Livneh precipitation and temperature data as input for simulating local inflows within the NID basin (Pierce et al., 2021).

Table 6-2 presents the average annual local inflows estimated using the three independent methods for the historical period (1976–2021). Results indicate that all three methods yield very similar estimates of average annual inflow for the area of interest, increasing confidence in the accuracy of the inflow estimates and indicating that the calibrated HEC-HMS model is not biased.

Table 6-2. Comparison of Average Annual Inflow (1976–2021) for NID Basin

GCMS	Average Annual Inflow (Thousands of Acre-Feet)
Gage Proration	1,509
Water Balance	1,444
HEC-HMS	1,547

To evaluate potential bias in the climate models, the downscaled precipitation and temperature data from the selected climate models and scenarios (Table 6-1) were used as inputs to the calibrated NID HEC-HMS model. This was done to generate local inflow simulations for the entire NID basin during the historical period 1976–2021. Figure 6-2 compares average annual inflows for the NID basin during 1976–2021 as simulated by HEC-HMS using climate model inputs. Average historical inflows derived from the gage proration method are shown for reference (green dashed line) and serve as the validation benchmark. The x-axis represents each climate model–scenario combination; For example, “HadGEM3-GC31-LL_ssp585” denotes the HadGEM3-GC31-LL model paired with the SSP585 emissions scenario. The close agreement between average annual inflow obtained from the climate models with the average historical inflow indicates minimal bias in the selected climate models and demonstrates that, on average and at the basin scale, the simulated historical inflows are consistent with observed conditions.

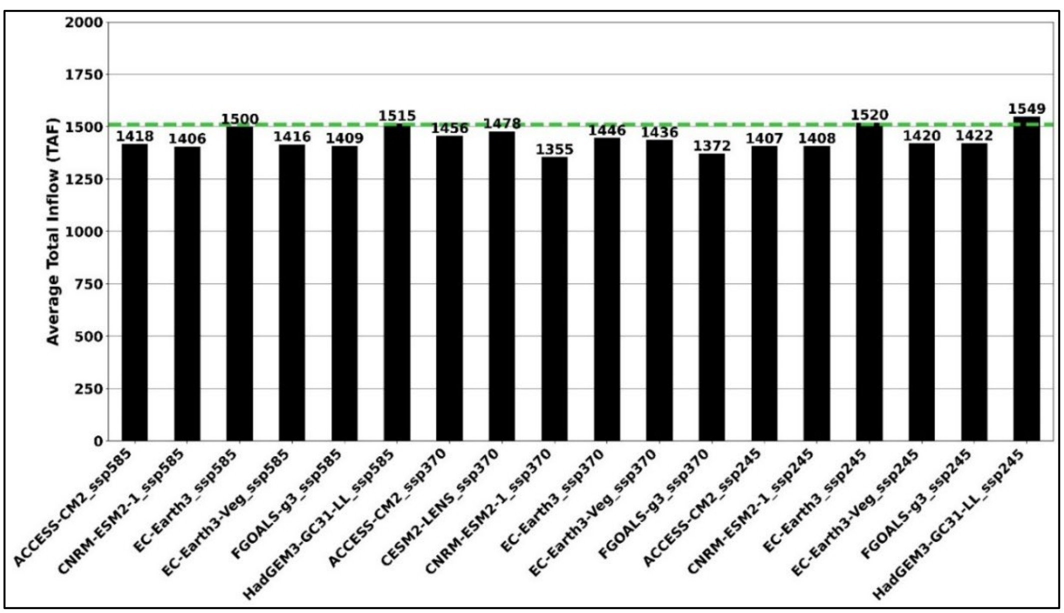


Figure 6-2. Comparison of Average Annual Inflow (1976–2021) for NID Basin

6.3 Projected Hydrology

The downscaled precipitation and temperature dataset from the selected climate models and scenarios (refer to Table 6-1) were used as inputs in the calibrated NID HEC-HMS model to obtain the local inflows for the entire NID basin for the projected period (2022–2071). Figure 6-3 presents the 50-year average total inflow for 5-year duration across the 18 climate model scenarios. Results for additional durations are provided in Chapter 3 of WEST Consultants, Inc. et al. (2024). Based on the analysis, three representative hydrology scenarios were selected to characterize a range of potential future conditions: a high (wet) bookend, a median, and a low (dry) bookend scenario, and they are outlined as follows:

High Bookend (Wet) Scenario: This scenario implies conditions characterized by higher-than-average precipitation, increased temperature, and/or more frequent and intense rainfall events. The climate model EC-Earth3-Veg_ssp370 has been selected to represent the high bookend (wet) scenario. Among all evaluated climate scenarios, this model produces the highest 50-year average total inflow across all durations, as well as the highest median annual inflows for the 5- and 10-year durations. In Figure 6-3, this scenario is shown by the blue bar, indicating a wet 50-year runoff pattern.

Median Scenario: This scenario typically reflects moderate changes or trends, neither excessively optimistic nor pessimistic. The climate model CNRM-ESM2-1_ssp245 has been chosen to represent the median scenario. In Figure 6-3, this scenario is depicted by the green bar, indicating a median 50-year runoff pattern.

Low Bookend (Dry) Scenario: This scenario reflects conditions characterized by lower-than-average precipitation, reduced humidity, and/or more prolonged drought periods. The climate model CESM2-LENS_ssp370 scenario has been chosen as the representative for low bookend (dry) scenario. This model yields the lowest 50-year average total inflow across all durations. In Figure 6-3, this scenario is shown by the red bar, indicating a dry 50-year runoff pattern.

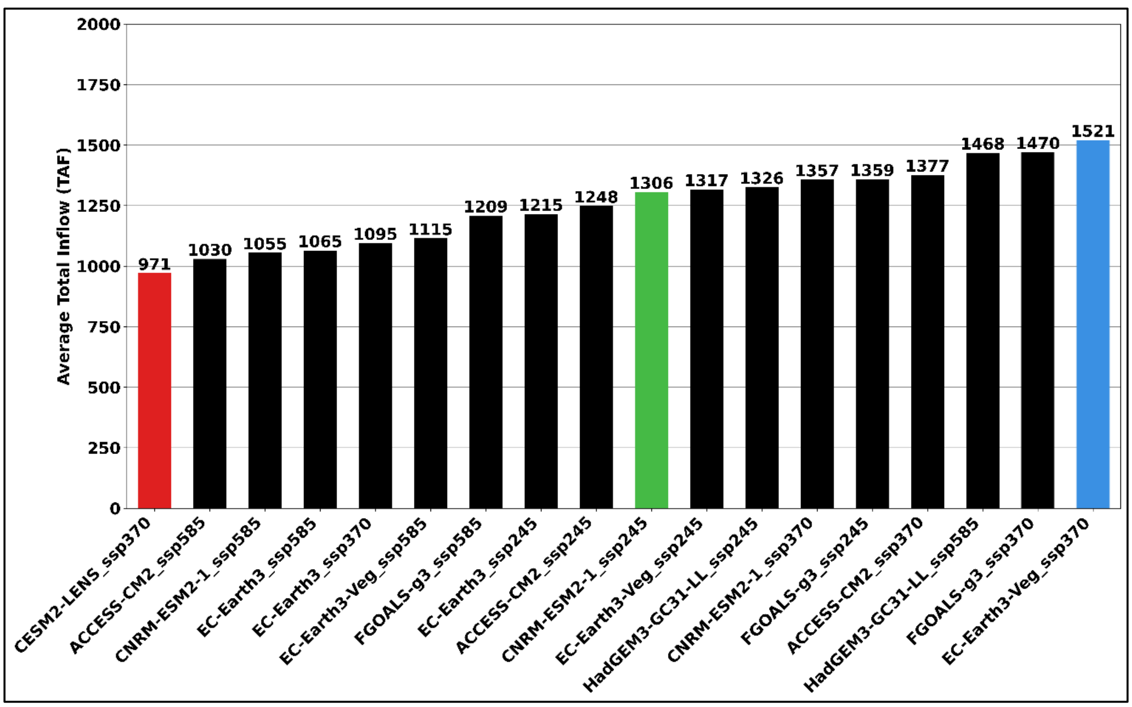


Figure 6-3. 50-Year Average Total Inflow for 5-Year Duration highlighting the dry (red), median (green) and wet (blue) scenarios

Figure 6-4 illustrates the simulated total annual inflow for the entire NID basin from 2022–2071 under the three representative hydrology scenarios. The wet bookend scenario (blue line) exhibits the greatest frequency of high inflow events, while also including periods of drought. The dry bookend scenario (red line) shows the highest frequency of drought conditions, with only occasional high inflow events. The median scenario (green line) includes both high inflow and drought events, but with less severity and variability than either bookend scenario.

Figure 6-5 presents the cumulative total annual inflow over the 50-year projected period (2022–2071) for the three representative scenarios. The cumulative inflows follow the expected ordering, with the wet, median, and dry scenarios consistently separating over time. For reference, the black dashed line represents a cumulative inflow trend based on the historical average annual inflow of 1,509 thousand acre-feet (TAF) derived from the 1976–2021 record and is included for comparison only. Notably, the wet bookend scenario produces a cumulative inflow over the projected period that is comparable to historical conditions.

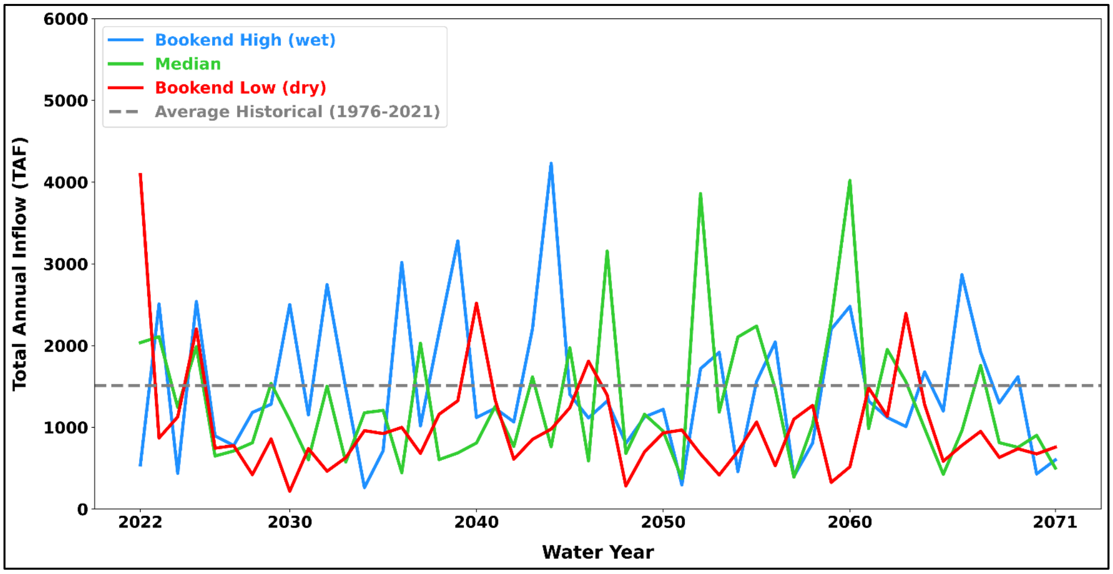


Figure 6-4. Total Annual Inflow Time Series for NID Basin, 2022–2071

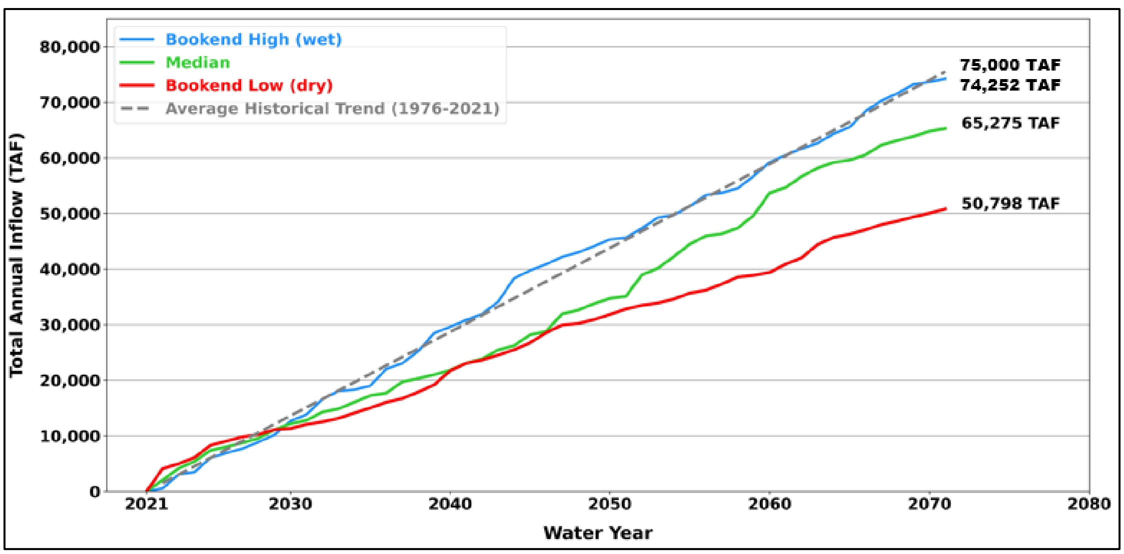


Figure 6-5. 50-Year Cumulative Total Annual Inflow for NID Basin

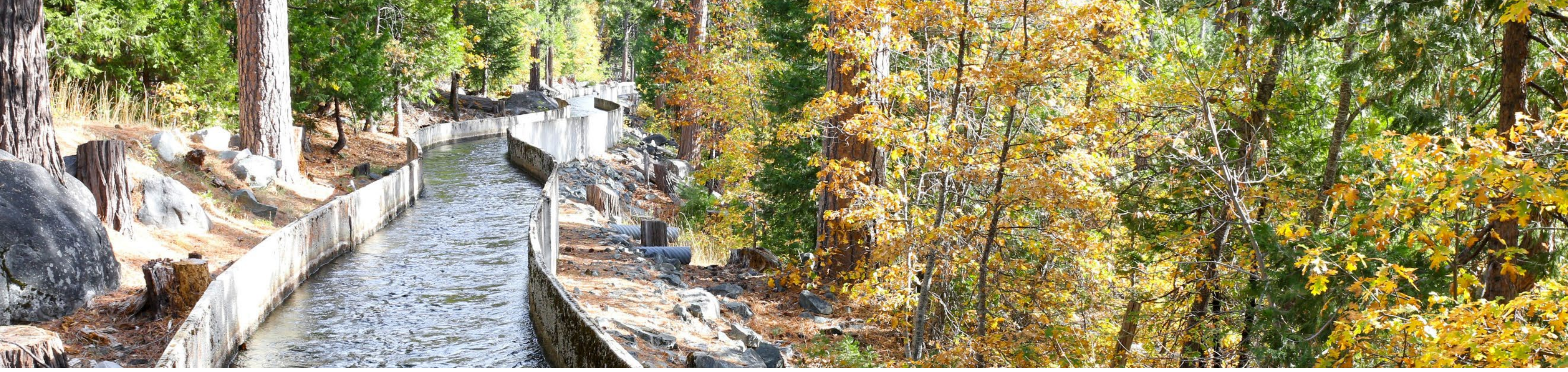
6.4 Climate Change Impacts

Modeling results indicate that NID should expect changes to the existing runoff patterns. In addition to direct impacts on NID's water supply and demand, climate change could also affect NID through broader statewide water management needs and impacts to local agriculture.

As demonstrated by the modeling results, runoff characteristics are projected to change under future climate conditions. Because California's water management strategies rely heavily on snowpack, similar changes are expected to affect statewide water supplies and operations. Earlier snowmelt, increased winter runoff, and a higher frequency of rain-on-snow events may complicate reservoir operations and flood management statewide. Resulting policy, regulatory, and legal responses could, in turn, influence NID's water supply availability for local use.

Beyond water supply and demand considerations, NID also expects climate change to potentially impact forest management practices, implementation of the FERC license requirements, and the risk of catastrophic wildfire. More intense precipitation events and post-fire conditions may also increase erosion, sediment transport, and debris flows, potentially affecting water quality and infrastructure operations. Recreational opportunities may be reduced or unavailable under certain conditions. Hydropower generation, which provides significant revenue to the District, may be shifted into less beneficial market pricing periods or decline overall if reduced summertime water availability limits generation during traditionally high-value periods.

Enhancing climate change resilience is a critical component of water resources planning at all levels statewide. California is pursuing multiple efforts to quantify climate risks and develop mitigation alternatives. NID will follow these efforts and participate as available. Regionally, agencies and stakeholders are collaborating on climate resilience initiative, including CABY, the American River Basin Study, the Association of California Water Agencies Headwaters initiatives, and others. Locally, NID is committed to controlling its own water resources in a self-determining manner per its strategic plan. The PFW provides a flexible, adaptive framework to evaluate these risks and to identify optimal operational, infrastructure, and policy responses under a wide range of future climate conditions. Based on the 2024 PFW (WEST Consultants, Inc. et al., 2024), the NID Board decided to withdraw the water right application for the proposed Centennial Dam. The District will instead pursue other alternatives, including but not limited to raising existing dams, revising carryover targets, extending the irrigation season.



7 WATER USE EFFICIENCY INFORMATION

The AWMP Act calls for agricultural water suppliers to report on the efficient water management practices (EWMPs) they have implemented and plan to implement, and to describe the associated water use efficiency improvements. The District's EWMP implementation is described in this chapter.

7.1 EWMP Implementation and Reporting

The following subsections report on the EWMPs planned or implemented, and improvements that have occurred since the 2020 AWMP. There are two Critical EWMPs that every supplier must implement. There are an additional 14 Conditionally Required EWMPs that should be implemented if locally cost-effective or technically feasible. NID has implemented and plans to continue implementing both Critical EWMPs as well as all Conditional EWMPs that are technically feasible and locally cost-effective. Table 7-1 describes each EWMP and summarizes the efforts that NID has implemented or plans to implement.

Table 7-1. (DWR Table VII.A.1) Report of EWMPs Implemented/Planned

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
Critical EWMPs		
1 **Water Measurement**	All of the District's customer delivery points are measured. Service outlets are checked numerous times per year for accuracy of water delivery. Orifice plates, screens, and boards are replaced as necessary. All measurement structures are installed to professional engineering design standards. All structures are checked prior to the irrigation season and numerous times during the season, as necessary for accuracy, by inspecting the levelness and verifying that the staff gages are set to the appropriate level. A standard AA current meter measurement is used to compute flow when necessary. In addition, locking of all irrigation boxes to prevent theft is currently being employed. Implementation of this EWMP is complete and NID will continue to maintain the measuring devices.	Completed
2 **Volume-Based Pricing**	The District's water rates are shown in Appendix D. The uniform water rates are based in part on quantity delivered. The District approves water rates annually based on the cost of service, and consistent with Proposition 218. Implementation of this EWMP is complete, and water rate structures are updated on a regular basis per Board direction.	Completed
Conditionally Required EWMPs (locally cost-effective and technically feasible EWMPs)		
1 **Facilitate Alternate Land Use Changes**	The District is not aware of customers with lands that have an exceptionally high water duty or whose irrigation contributes to significant problems. Some irrigation customers are required by the Central Valley Regional Water Quality Control Board to participate in a water coalition to protect water quality and minimize runoff through EWMPs. The District employs a water waste policy that prohibits excess runoff from a parcel. If a site is identified that is contributing to significant problems, the District will investigate solution options per the EWMP. Budget for implementation of this EWMP over the next 10 years is included in the regular budget for staff costs.	Ongoing
2 **Recycled Water Use**	The District currently uses recycled water from urban WWTPs that is discharge to creeks per discharge permit requirements. The discharge is comingled with the District's water and diverted into the canal system. A total of 6,825 AF of water supply was conserved from 2021 through 2025 (Table 4-4). Pending continued acceptable water quality, the District will continue to use recycled water for agricultural deliveries over the next 10 years. Budget for implementation of this EWMP over the next 10 years is included in the regular budget for staff costs.	Ongoing

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
3 **Finance On-Farm Irrigation Capital Improvements**	The District provides information and resources to customers for local, State, and Federal cost-share and technical assistance programs such as the USDA NRCS Environmental Quality Incentives Program (EQIP), local RCDs, and UC Cooperative Extension Farm Advisors. NID recently began a rebate program for agricultural water customers to help offset the cost of a water storage tank. The District offers a small rebate check to help reduce the cost of the tank.	Ongoing
4 **Incentive Pricing Structure**	The District currently has incentive pricing with volumetric uniform water rates that provide motivation to use water efficiently. The District's pricing consists of a combination of a fixed charge (a constant fee assessed to customer) and a water rate (a price per unit of water delivered). The District's pricing structure promotes more efficient use of water at the farm level. Implementation of this EWMP is ongoing, with rates updated as determined by the Board.	Ongoing
5 **Infrastructure Improvements**	The District lines and encases canal sections annually. The District also applies for grant funding when applicable. The benefit-cost ratio for this EWMP is low due to the cost per mile to gunite canals (a minimum of $125,000/mile). Even though some herbicide and soil erosion control costs may decrease by canal lining, cleaning silt and debris costs increase. In the last five years, the District has spent over $40 million on encasement and realignment of distribution lines and canals. Recent budgets have allocated over $1 million per year in raw water infrastructure and system improvements. Implementation of this EWMP is ongoing. The District anticipates continued funding for infrastructure improvements for the next 10 years. Staff costs for capital projected implementation are included in the regular budget for staff costs.	Ongoing
6 **Order/Delivery Flexibility**	The District's licensed distribution operators work with customers on an individual basis for canal rotations and delivery flexibility. In addition, the District allows for proration of an account if service is impacted or for requested demand water. Implementation of this EWMP is ongoing and is expected to continue for the next 10 years. Staff costs for this practice are included in the regular budget for staff costs.	Ongoing

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
7 **Supplier Spill and Tailwater Systems**	Tail water from higher elevation canals is recaptured in lower elevation canals due to the change in elevation of the extensive distribution system. The District has the right to resell return flows within the District boundaries. Therefore, this water is being recovered and used during the irrigation season. The District uses 40 automated gaging and telemetry stations within the canal system to increase efficiency and minimize spills. Implementation of this EWMP is ongoing. The District plans on increasing the measurement sites at non-recapturable end points, adding up to 10 sites over the next 10 years, assuming budget availability. The costs for these sites are included in the infrastructure improvement EWMP budget (Conditional EWMP No. 5).	Ongoing
8 **Conjunctive Use**	This EWMP is not applicable as only fracture-rock groundwater is present in the service area.	Not applicable
9 **Automated Canal Controls**	The District researched automation of canal structures, where applicable, for design, efficiency, and feasibility. Automatic gate control devices were installed at two of the District's large capacity canals. If feasible, the District will incorporate automation and/or telemetry into canal structures at the time of replacement. Implementation of this EWMP is ongoing. The District has added 3 automated and 21 telemetered stations since the beginning of 2021. The costs for these stations are included in the total infrastructure improvement EWMP budget (Conditional EWMP No. 5).	Ongoing
10 **Customer Pump Test/Evaluation**	This EWMP is not applicable as only fracture-rock groundwater is present in the service area and private groundwater production is considered negligible (see Sections 4.1.2 and 5.1.2).	Not applicable
11 **Water Conservation Coordinator**	Since 2011, a full-time water efficiency coordinator develops and coordinates educational programs, including fairs and events, irrigation workshops, customer surveys, newsletters, website information, demonstration gardens, and landowner site visits. The coordinator also provides customers with information on local cost-share and technical assistance programs. In addition, the District offers multiple programs including rebates, irrigation water storage tanks as part of the rebate program, mulch giveaways, irrigation workshops, large landscape projects, and school presentations. Implementation of this EWMP is complete and NID will continue to maintain the conservation coordination position and duties at a budget estimate of $100,000 per year for the next 10 years.	Completed

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
12 **Water Management Services to Customers**	The District provides information and education to customers via the District's website (www.nidwater.com), inserts into the customer's bills, pamphlets and brochures, and an onsite Demonstration Garden. Throughout the year, the District provides irrigation efficiency workshops that are free to customers, as well as free seminars and other events which promote water use efficiency through BMPs. Further, the District responds to water waste reports and currently has a "Report Waste" link on their website. The District provides educational material and information on cost-share incentive programs that are offered by other agencies. The District works closely with local and regional resources such as the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) and Resource Conservation Districts (RCDs), University of California (UC) Cooperative Extension Farm Advisors, UC Certified Master Gardeners, and local county agricultural commissioners to provide customers with technical assistance and new advances in best management land practices, BMPs for herbicide use, conservation measures for environmental habitat, and the efficient use of water. Implementation of this EWMP is ongoing and is expected to continue for the next 10 years.	Ongoing
13 **Identify Institutional Changes**	The District has riparian rights and pre- and post-1914 water rights for most of its water supply. The District's Board of Directors has the legal authority to directly set and implement policies that affect the distribution of water. The District evaluates its policies, rules, and regulations regularly to address regulatory and other changes. For the small portion of supply from the District's contract with PG&E, additional flexibility in timing and location of purchased water was incorporated into the most recent PG&E agreement renewal. Implementation of this EWMP is ongoing and is expected to continue for the next 10 years. Staff costs for this practice are included in the regular budget for staff costs.	Ongoing

EWMP No.*	Description of EWMP Implemented	Description of EWMPs Planned
14 **Supplier Pump Improved Efficiency**	The District does not pump from groundwater and most of the distribution system is gravity flow. In a few isolated cases, 100–150 horsepower (hp) pumps lift water a short distance to a nearby reservoir. The pumps are inspected daily and any debris is removed. All pumps are inspected annually and are on an annual maintenance schedule to ensure efficient operations. The District replaces inefficient pumps as grant funding and/or budget is available. Implementation of this EWMP is ongoing. It is anticipated that the District will conduct two pump efficiency tests (and subsequent replacement based on available grant funding), during the next five and 10 years. Budget for testing is included in the regular operations budget, with identified replacement needs to be funded through budget and/or grants.	Ongoing
Other Optional EWMPs (as applicable)	N/A	N/A
Notes: *EWMP numbers correspond to CWC §10608.48(c)		

Table 7-2 presents the District's additional raw water system delivery improvements over the last five years.

Table 7-2. NID Raw Water System Infrastructure Efficiency Improvements (2021–2025)

Improvement	Location/List
New Gaging Stations	1) Hannaman 2 at End 2) Cement Hill Canal at End 3) Markwell Canal at End 4) Lincoln Canal at End 5) Rex Canal at Head Rubicon Gate 6) Maben Canal at pipe outlet 7) Clear Creek near End 8) CO IV spill to North Ravine
Replaced/Improved Gaging Stations	1) Hemphill @ Head Rubicon Gate 2) Lincoln Canal at Head 3) CO II at Head Rubicon Gate 4) Lower Grass Valley Canal at Head Rubicon 5) Allison Ranch Canal at Head 6) Quincy at Head 7) Chicago Park East Head Magmeter 8) Ripken at End 9) Cement Hill at Head 10) Red Hill at Head 11) Rex Reservoir Release 12) CFW to Midyankee Slough
Telemetry – Real Time Data	1) Allison Ranch at Head 2) Delivery to City of GV 3) Alta Hill Reservoir 4) Lower Grass Vally at Head 5) Rattlesnake at Cedarcrest 6) Cement Hill Head 7) Red Hill at Head 8) DS at Towntalk 9) Markwell at Head 10) Markwell at End 11) Hannaman II at Head 12) AR II Canal at Head 13) Doty Canal at Head 14) Doty North Canal at Head 15) Doty South Canal at Head 16) Combie Ophir 4 at Head 17) Spill to Deadmans 18) Combie Ophir II at Head 19) Gold Hill II to Sailors 20) Valley View Canal at Head 21) Valley View Reservoir 22) Combie Phase II Head 23) Combie Phase II/III above Wolf 24) Rex Canal at Head

Improvement	Location/List
Canal Repairs	1) Shotcrete Canals – 3,550 Linear feet 2) Encased Canals – 2,400 Linear feet 3) Pipes Replaced (Over Shots / New Structures) – 21,600 Linear feet 4) 6 new headgates, 3 new diversion structures, 6 new measuring station/weir/H Flumes 5) Flume sheet replacement at Flume Creek Canal 6) South Yuba Canal Improvements: 100 Feet of timber replacements, 800 Feet of aluminum liner, 300 Feet of flume sheet replacement
Other Improvements	1) Installed Mag meter on raw water delivery to LWW TP 2) Added irrigation water storage tanks as part of NID's rebate program

Table 7-3 presents the District's schedule, finance plan, and budget to implement the EWMPs.

Table 7-3. (DWR Table VII.A.3) Schedule to Implement EWMPs

EWMP No.(s)*	Implementation Schedule	Finance Plan	Budget Allotment (Annual)
Critical			
1 – Water Measurement	Completed	Rates	Included in various staff salaries budget allotment
2 – Volume-Based Pricing	Completed	Rates	Included in various staff salaries budget allotment
Conditional			
1 – Facilitate Alternative Land Use Changes	Ongoing	Rates	Included in various staff salaries budget allotment
2 – Recycled Water Use	Ongoing	N/A	No cost for recycled water supply
3 – Finance On-Farm Irrigation Capital Improvements	Ongoing	Rates	Included as part of larger operations budget
4 – Incentive Pricing Structure	Ongoing	Rates	$50,000 (Proposition 218 process/education per rate case)
5 – Infrastructure Improvements	Ongoing	Rates	$1 million
6 – Order/Delivery Flexibility	Ongoing	Rates	Included as part of larger operations budget
7 – Supplier Spill and Tailwater Systems	Ongoing	Rates	Included in Conditional EWMP No. 5 budget allotment
9 – Automated Canal Controls	Ongoing	Rates	Included in Conditional EWMP No. 5 budget allotment
11 – Water Conservation Coordinator	Ongoing	Rates	$100,000
12 – Water Management Services to Customers	Ongoing	Rates	$50,000
13 – Identify Institutional Changes	Ongoing	Rates	Included in various staff salaries budget allotment
14 – Supplier Pump Improved Efficiency	Ongoing	Rates/Grants	Included as part of larger operations budget
Notes: *EWMP numbers correspond to CWC §10608.48(c). List excludes EWMPs that are not implemented (see Section 7.2).			

7.1.1 Critical EWMPs

The District implements both mandatory Critical EWMPs: No. 1, Water Measurement, and No. 2, Volume-Based Pricing. A summary of how the District implements these Critical EWMPs is provided in Table 7-1. Additional background information is provided below.

Critical EWMP No. 1 – Water Measurement

All of the District's customer delivery points are measured. The majority of the District's irrigation customers purchase irrigation season water (i.e., seasonal irrigation service, typically April 15 through October 14). The typical duration of water delivery is 182 days. The standard measurement for a miner's inch requires a six-inch head of water over the center of the orifice and the water to free-flow through the delivery point. For customers that purchase 40 miner's inches or less, the amount of water is delivered through a standard water box and measured through an orifice sized for the amount of water purchased and the available head pressure. For purchases greater than 40 miner's inches, the measurement may be by any industry standard device, such as a weir or Parshall flume, that will give the most accurate measurement for the situation. Customers' water boxes and orifice plates are checked at the beginning of the irrigation season and periodically throughout the season for accuracy. Records are kept stating when customer services are turned on and off to assist in calculating the volume of water delivered. Volume is calculated as follows:

$$\text{Volume} = \text{Flow} \times \text{Duration}$$

Where,

$\text{Flow} = \text{miner's inch delivered converted to flow rate based on orifice}$

$\text{Duration} = \text{Duration of water service/delivery}$

Critical EWMP No. 2 – Incentive Pricing Structure

All water rates are determined on a cost of service basis, consistent with Proposition 218, and are reviewed annually. Raw water rates consist of a combination of a fixed charge (a constant fee assessed to customer) and a water rate (a price per unit of water delivered). Raw water is sold by quantity in increments of either miner's inches or AF. The District has several rate schedules for raw water depending on the type of service provided. Similar to the rates, the District also has several billing frequencies depending on the type of service. For a seasonal irrigation service, the customer has the choice of paying the amount in full or making payments in three installments. Most of the raw water customers purchase water for the summer irrigation season (April 15 to October 15). The current District water rates are provided in Appendix D.

7.1.2 Conditional EWMPs

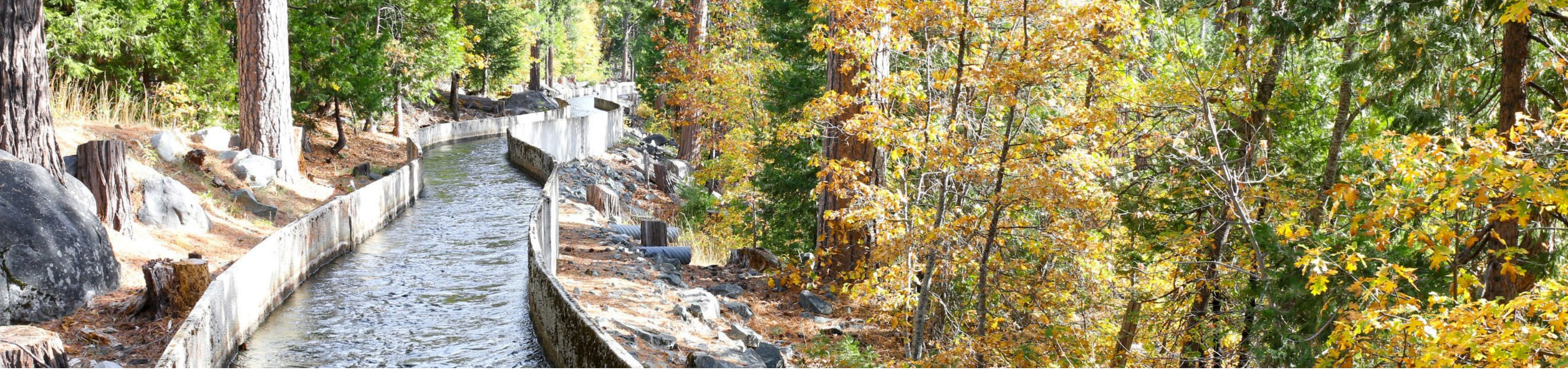
The District continues to implement locally cost-effective or technically feasible conservation measures including, but not limited to, the practices described in Table 7-1. All applicable Conditional EWMPs are being implemented. Two Conditional EWMPs (No. 8, Conjunctive Use, and No. 10, Customer Pump Test/Evaluation) are considered not applicable based on the lack of groundwater availability and use within the District and are therefore considered not technically feasible (see Section 7.2 for documentation).

7.2 Documentation for Non-Implemented EWMPs

The EWMPs that the District has determined are not locally cost-effective or technically feasible are listed in Table 7-4.

Table 7-4. (DWR Table VII.B) Non-Implemented EWMP Documentation

EWMP No.	Description	(check one or both)		Justification and/or Documentation
		Technically Infeasible	Not Locally Cost-Effective	
8	Conjunctive Use	X		This EWMP is not applicable as only fracture-rock groundwater is present in the service area (see Sections 4.1.2 and 5.1.2).
10	Customer Pump Test/Evaluation	X		This EWMP is not applicable as only fracture-rock groundwater is present in the service area and private groundwater production is considered negligible (see Sections 4.1.2 and 5.1.2).



8 SUPPORTING DOCUMENTATION

8.1 Agricultural Water Measurements Regulation Documentation

The Agricultural Water Measurement Regulation applies to water suppliers that serve more than 25,000 acres (excluding recycled water) and requires that water measurements be conducted at the farm-gate of a single customer and that measurement devices are certified as accurate through field-testing, laboratory/engineer certification, or inspection. In this chapter the term "delivery point" is used in place of the term "farm-gate" to be consistent with the District's terminology for the location at which the District transfers control of the delivered water to the customer.

8.1.1 Legal Certification and Apportionment Required for Water Measurement

The District can measure water at the delivery point for all customers and therefore does not need to submit legal certification and apportionment required for water measurement. This DWR AWMP Guidebook Attachment A requirement is not applicable to the District. There are no legal constraints to installing or operating water meters for any of the District's customers.

8.1.2 Engineer Certification and Apportionment Required for Water Measurement

The District can measure water at the delivery point for all customers. Therefore, the District does not need to submit engineer certification and apportionment required for water measurement. This DWR AWMP Guidebook Attachment B requirement is not applicable to the District. There are no physical constraints at the delivery points that prevent the installation or operation of water meters for any of the District's customers.

8.1.3 Description of Water Management Best Professional Practices

This section provides a description of the Best Professional Practices about the collection of water measurement data, frequency of measurements, method for determining irrigated acres, and quality control and quality assurance procedures.

Water Measurement Data Collection

Water measurement data are collected based on orifice plate settings for the duration of the customers purchase, either seasonally (from April 15 to October 14) or annually. As needed and if requested, the District will review, test, and evaluate the measuring device and its ability to provide the water accurately to the customer. Appendix G contains a memorandum from the District's interim engineering manager stating that the District's current methods of measuring customer deliveries meets raw water measurement BMPs under California Code of Regulations Section 597.2.

Measurement Frequency

Each customer is provided an orifice size which continuously measures the amount and limits the maximum amount of water at specific conditions. The orifice size is set on a regular basis per the respective ordered water supply.

Method for Determining Irrigated Acres

The District sends out a Crop Acreage Report form annually for the customer to report the irrigated acreage and types of crops with the application for water. The type of information required to be provided by the customer is:

- Crops grown and irrigated acreage by crop type
- Total acreage

Quality Control/Assurance Procedures

Information provided by the customers on the Application for Water and Crop Acreage report form sent out annually by the District is cross-checked by the District against prior reports and the total amount of acreage owned. If necessary, the District contacts the customer for clarification of the data submitted and/or conducts a site visit.

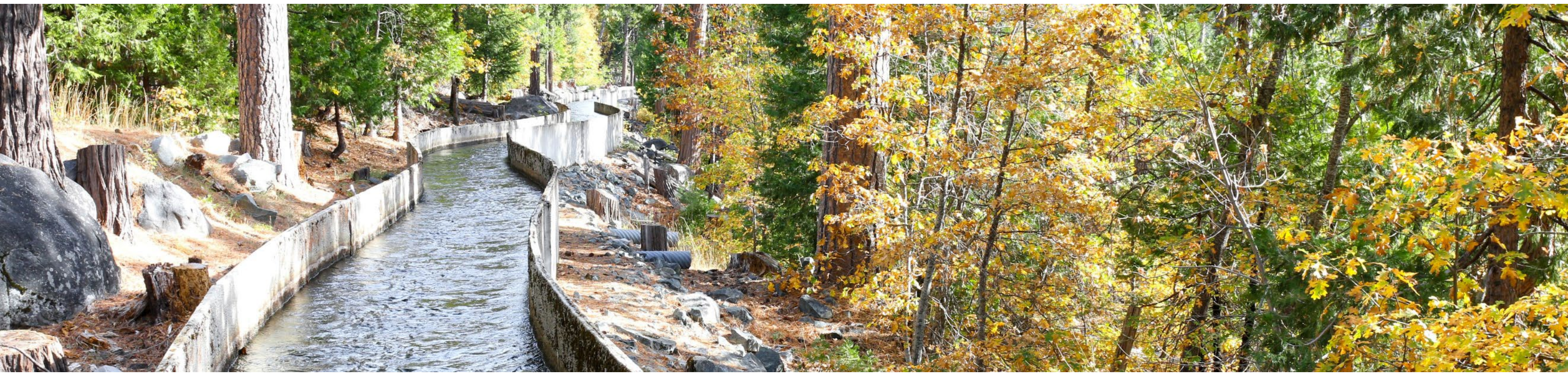
8.1.4 Documentation of Water Measurement Conversion to Volume

The orifice measurement is based on the miners inch. The District makes every reasonable effort to set the orifice to the proper head and allow free-flow through the orifice and assumes 1 miners inch equals 1.5 cubic feet per minute. The size of the orifice (defining quantity of miners inch) along with the delivery duration (in days) is used to convert the water measurement to volume. Duration is based on the customer order, which is usually for the entire irrigation season. In the event a customer requests a shutoff, turn on, or fall/winter delivery, these durations are factored into the duration total.

8.1.5 Device Corrective Action Plan Required for Water Measurement

Orifices used for customer delivery are checked at a minimum of twice a year for proper sizing, adequate head pressure, and condition of the service point. Flowmeters are included in a maintenance management program and are inspected annually and calibrated according to manufacturer recommendations.

Field checks on canal measuring stations occur three to four times per year. This continual verification allows the District to maintain proper and accurate measurement records (Teledyne, 2016 and USBR, rev. 2001). Open channel flow sites are inspected to ensure structures are plumb, staff gages are level with flume floors and weir crests, approach flows are laminar, and that no backwater conditions exist in the tailrace of the structures. Current meters are used as a secondary verification to confirm the volume of flow.



9 REFERENCES

American Society of Civil Engineers (ASCE). (2016). *Manual 70: Evaporation, Evapotranspiration, and Irrigation Water Requirements*.

Brown and Caldwell. (2016). *Agricultural Water Management Plan*.

CABY. (2020). *Integrated Regional Water Management Plan 2020 Update* [Public review draft].

California Department of Water Resources. (2025a). *California's Groundwater: Bulletin 118—Update 2025*. California Natural Resources Agency Open Data Portal.

California Department of Water Resources. (2025b). *A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2025 Agricultural Water Management Plan*.

California Department of Water Resources. (2012). *A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use*.

HDR. (2020). *Hydrologic Analysis Technical Memorandum—Final Report*.

Krantz, W., Pierce, D., Goldenson, N., & Cayan, D. (2021). *Memorandum on Evaluating Global Climate Models for Studying Regional Climate Change in California*.

Li, X., Liu, Y., Wang, M., Jiang, Y., & Dong, X. (2021). Assessment of the Coupled Model Intercomparison Project phase 6 (CMIP6) model performance in simulating the spatial-temporal variation of aerosol optical depth over Eastern Central China. *Atmospheric Research, 261*, Article 105747.

O'Neill, B. C., Tebaldi, C., Van Vuuren, D. P., Eyring, V., Friedlingstein, P., Hurtt, G., ... & Sanderson, B. M. (2016). The Scenario Model Intercomparison Project (ScenarioMIP) for CMIP6. *Geoscientific Model Development, 9*(9), 3461–3482.

Pierce, D. W., Su, L., Cayan, D. R., Risser, M. D., Livneh, B., & Lettenmaier, D. P. (2021). An extreme-preserving long-term gridded daily precipitation dataset for the conterminous United States. *Journal of Hydrometeorology, 22*(7), 1883–1895.

Starr Consulting and Palencia Consulting Engineers. (2022). *Yuba/Bear River Watershed Sanitary Survey, 2021 Update*.

Teledyne ISCO. (2016). *Open Channel Flow Measurement Handbook* (8th ed.).

United States Department of the Interior, Bureau of Reclamation. (2001). *Water Measurement Manual* (Rev. ed.).

United States Geological Survey. (1984). *Ground-Water Conditions and Well Yields in Fractured Rocks, Southwestern Nevada County*.

WEST Consultants, Inc. et al. (2024). *Nevada Irrigation District Plan for Water: Final Technical Memorandum*. Nevada Irrigation District.