Nevada Irrigation District

Staff Report

for the Board of Directors' Meeting of May 25, 2016

TO: Board of Directors

FROM: Chip Close, Water Operations Manager

DATE: May 16, 2016

SUBJECT: **Urban Water Management Plan Update**

OPERATIONS

RECOMMENDATION:
Adopt Resolution No. 2016-18 (Adopting, Filing, and Implementing the Nevada Irrigation District Urban Water Management Plan Update).

BACKGROUND:
The Urban Water Management Planning Act became part of the CA Water code following the passage of Assembly Bill 797 in the1983-1984 legislative session. The Act was updated in 2009 with the adoption of SBx7-7 and again in 2014 as part of the Governor's emergency drought regulations. The act requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to adopt and submit an UWMP every five years. The deadline for the 2015 update is June 2016.

As part of the UWMP development process, the District notified local cities, counties, and neighboring water agencies of the availability of the draft for review. An initial public meeting was held on April 12, 2016 at the Water and Hydroelectric Operations Committee followed by another pubic meeting at the May 11, 2016 Board of Directors Meeting. One comment paper was received and reviewed for content and is attached for review.

Staff has edited the draft version to incorporate comments and to provide additional information. The first change includes a revision of forecasted demand numbers. The initial draft utilized the 2005 Raw Water Master Plan for its demand projection calculations. Staff has revised these estimates utilizing the more current 2011 Raw Water Master Plan document. The result is a slight decrease in projected demand over the next 25 years.

The second change includes an addition to the description of the District's actions regarding preparation for climate change. The previous description was incomplete and didn't address the multiple projects the District is exploring.

The changes are provide in the attached "red lined" version for review.

BUDGETARY IMPACT:
No budgetary impact

AC

attachments (3):

- Red Lined Pages UWMP
- Public Comments
- Resolution 2016-18

Table 3-2 presents the projected water use by water use sector in five-year increments through 2040. Normal year water demands through 2040 are estimated based on the selected GPCD target that is chosen by NID as described in Section 4 and the projected population (see Table 2-4). The projected demand breakdown by customer category for the District's treated water customers is based on the historical demand breakdown by customer category. Also shown in Table 3-2 is the demand projections for the District's water sales to others, agricultural water use and water losses. These projections are based on the Raw Water Master Plan Update Phase II (NID 2011) and what has occurred historically. It is anticipated that by the year 2020 NID will no longer provide raw water to PCWA for the City of Lincoln, but rather will provide treated water directly to the City of Lincoln for the customers within the District.

In years when there is a surplus of the District's Pacific Gas and Electric Company (PG&E) water supply (described in Section 5) the District has sold this surplus supply to South Sutter Water District (SSWD). This is PG&E raw water that the District purchases and then sells to SSWD as raw water. This water sale occurred in 2011 through 2013. No water was available to sell to SSWD in 2014 and 2015. The long-term agreement between the District and SSWD to sell this surplus PG&E water as available has recently expired and in the future will be handled by annual agreements.

Table 3-2. (DWR Table 4-2) Retail: Demands for Potable and Raw Water - Projected

Use type *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional description (as needed)	Projected water use *Report to the extent that records are available, ac-ft/yr*				
		2020	2025	2030	2035	2040
Single Family		8,336	9,499	10,794	12,236	13,720
Multi-Family		938	1,069	1,215	1,377	1,544
Commercial		1,158	1,319	1,499	1,699	1,906
Industrial		-	-	-	-	-
Institutional/Governmental		744	847	963	1,092	1,224
Landscape		226	258	293	332	373
Groundwater recharge						
Saline water intrusion barrier						
Agricultural Irrigation		~~167,726~~162,131	~~173,544~~168,778	~~175,804~~174,250	~~179,988~~178,435	~~184,271~~182,620
Wetlands or wildlife habitat						
Sales/Transfers/Exchanges to other agencies	South Sutter Water District	-	-	-	-	-
Sales/Transfers/Exchanges to other agencies	City of Grass Valley Broadview Heights	50	50	50	50	50
Sales/Transfers/Exchanges to other agencies	City of Grass Valley	50	50	50	50	50
Sales/Transfers/Exchanges to other agencies	City of Grass Valley	1,300	1,300	1,350	1,350	1,350
Sales/Transfers/Exchanges to other agencies	Nevada City	400	400	400	400	400
Sales/Transfers/Exchanges to other agencies	Bitney Springs LLC	6	6	6	6	6
Sales/Transfers/Exchanges to other agencies	Lake Vera Mutual Water Company	20	20	20	20	20
Sales/Transfers/Exchanges to other agencies	Placer County Water Agency (a)	-	-	-	-	-
Sales/Transfers/Exchanges to other agencies	City of Lincoln (a)	2,484	3,300	4,116	4,932	4,932
Losses	Treated water retail distribution system (10 percent loss assumed)	~~1,267~~1,248	~~1,444~~1,406	~~1,640~~1,583	~~1,860~~1,784	~~2,085~~2,009
Other						
TOTAL		~~184,704~~178,919	~~193,106~~187,960	~~198,199~~196,076	~~205,391~~203,080	~~211,930~~209,521

(a) *By the year 2020, the District will no longer provide raw water to Placer County Water Agency for City of Lincoln, but rather will provide treated water directly to City of Lincoln.*

Table 3-3 summarizes the current and projected demands for potable, recycled, and raw water usage by the District. The District's current and projected use of recycled water is described in Section 5.

Table 3-3. (DWR Table 4-3) Retail: Total Water Demands, ac-ft/yr

	2015	2020	2025	2030	2035	2040
Potable and Raw Water (From DWR Tables 4-1 and 4-2)	126,653	~~184,704~~178,919	~~193,106~~187,960	~~198,199~~196,076	~~205,391~~203,080	~~211,930~~209,521
Recycled Water Demand[a]	0	0	0	0	0	0
Total water demand	126,653	~~184,704~~178,919	~~193,106~~187,960	~~198,199~~196,076	~~205,391~~203,080	~~211,930~~209,521

[a] *Recycled water shown in DWR Table 6-4 (Table 5-4 in this UWMP) is not a retail demand and is not included in this table.*

3.2 Distribution System Water Losses

10631 (e) (1) and (2) Quantify, to the extent records are available, past and current water use over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:...(J) Distribution system water loss.

10631 (e) (3) (A) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

Water losses in the District's water system in 2015 are presented in Table 3-4. The District's water distribution system consists of approximately 400 miles of distribution pipelines and transmission mains. A detailed distribution system water loss analysis following the DWR Water Audit Manual (DWR, 2015) is provided in Appendix F. The water audit is an accounting exercise that tracks all sources and uses of water within a water system over a specified period.

Table 3-4. (DWR Table 4-4) Retail: 12-Month Water Loss Audit Reporting

Reporting period start date (month/year)	Loss
January 1, 2015	149.7 MG/yr (459 ac-ft/yr)

Note: Loss value is from the water losses field of the water audit reporting worksheet. It is a combination of the apparent losses and real losses and does not include unbilled metered and unbilled unmetered water uses.

5.10.1Regional Climatic Projections

Spring thaw in the central Sierra is occurring earlier in recent years than it did 60 years ago. Along with rising temperatures, more precipitation now falls as rain than snow. This has serious implications for a region whose snowpack has historically served as a 'reservoir,' a reliable slow-melting source of water for the District. As snow melts sooner and faster due to warming temperatures and combines with precipitation increasingly falling as rain rather than snow, uncertainty in water storage and release operations will confront water managers and hydropower producers. Flooding impacts are expected to increase with storm intensity and higher winter rain precipitation events while summer stream flows are expected to diminish over the season, potentially affecting domestic and environmental water supply and quality and engendering tough choices for water managers and policy makers. Regional climatic projections as presented in the IRWMP (CABY, 2014) are summarized below.

Increased Air Temperature - Higher air temperatures are predicted for warmer seasons, generally resulting in less available water overall. In the Sierra, the average temperature is predicted to increase by 2° to 4°F in the winter and 4° to 8°F in the summer by the end of the century.

Runoff - Along with the early melt, the increased rainfall produces runoff at an accelerated rate compared to snowmelt and has increased the frequency and amount of winter (as opposed to spring) runoff periods. The shift from spring to winter (November through February) runoff periods has implications for water use and management, both within the watershed and for those downstream.

Flooding - Increased flood potential is projected under many climate scenarios because higher temperatures cause earlier snowmelt and an increase in the ratio of precipitation arriving in the form of rainfall versus snow. Peak daily flows in winter are expected to increase even under scenarios with reduced precipitation overall due to expected higher intensity winter rain storm events.

Streamflow - PG&E examined possible side effects of climate change on runoff by comparing two consecutive 35-year periods (1942-1976 and 1977-2011). The company maintains daily runoff records for 100+ locations in the Sierra, southern Cascade, and Coastal Ranges of California. PG&E's data showed that out of the 13 rivers studied, the Yuba River at Smartsville has experienced the third highest reduction in unimpaired runoff between these two periods.

Water Quality - Earlier snowmelt coupled with rain-on-snow events that accelerate runoff may increase erosion and raise turbidity (and resulting sedimentation). Higher water temperatures also have accelerated some biological and chemical processes, increasing the growth of algae and microorganisms, the depletion of dissolved oxygen, and impacts to water treatment processes.

5.10.2 Long Term Program to Respond to Climate Change

The CABY IRWMP presents recommendations for a long-term climate program to help assure climate resiliency for the region. The program consists of eight components that focus on ways to mitigate climate change effects on the region, as well as identifying the contributing factors ~~within and outside~~ of the region (including potential State policy and regulation) that can exacerbate the impacts of climate change. The program seeks to provide the means, under an ~~altered~~ uncertain climate future, for the region to continue to produce high-quality water, provide reliable water supply and carbon-free hydroelectric generation, support sustained healthy and diverse ecosystems, and reduce socioeconomic impacts under an altered climate future.

These eight program components are: involvement in developing State policies and programs, increased knowledge sharing, increased coordination and collaboration, securing funding, monitoring the implementation of adaptive management strategies, reducing greenhouse gasses,

data gathering, and investment in infrastructure and monitoring. ~~Table 11-2 from the CABY IRWMP (CABY, 2014) climate change Chapter 11 is provided in Appendix I of this UWMP~~. ~~This table~~The plan summarizes the region's climate vulnerabilities and the suggested adaptive management strategies to increase ~~climate~~ operational resource resiliency. These strategies are continually reviewed and adapted as climate change modeling and theory are updated.

In addition to participation in the CABY climate change efforts, the District continues to work together with multiple regional water supply partners, academic institutes and regulatory agencies. Below is a list of some of the projects the District is performing in an effort to become more climate adaptable:

Water Efficiency/Conservation - The District continues to expand its conservations efforts. In recent years the District has expended more than a million dollars in grant funding to improve its water conveyance facilities through canal lining, measuring stations, and public outreach. The District will continue to fund, pursue grants, and explore incentive programs in the future.

Regional Water Storage - The District is exploring ways to expand surface water storage. Most climate change models include changes in the timing and durations of precipitation. Warming temperatures are expected to reduce snow pack and increase instantaneous runoff Surface water storage will be needed to capture these early runoff events and backstop the storage that the snow pack previously provided.

Meadow Restoration - In collaboration with local Academic Institutes and stakeholders, the District is exploring ways to increase water permeability within the Districts watershed. These projects range from high alpine meadow restoration to biomass placement on the forest floor to retain moisture.

Land Management - The District is proactively managing the lands within its watershed in an effort to reduce underbrush and canopy coverage. The proactive resource management will continue to increase the potential for snow fall to reach the forest floor and conglomerate on the soil surface. This promotes an increase in infiltration as opposed to snow trapped within the canopy that melts and evaporates at a high rate.

The District will continue exploring the most advantageous ways to address climate variability to combat climate change in the coming years.

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6.3 Supply and Demand Assessment

10635(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

This section provides a comparison of normal, single dry, and multiple dry water year supply and demand for the District. Water demands are addressed in Section 3 and water supplies are addressed in Section 5.

6.3.1 Current and Projected Normal Year Water Supplies vs. Demand

The normal water year current and projected water supplies are compared to the current and projected demand for the District in Table 6-4.

Table 6-4. (DWR Table 7-2)
Retail: Normal Year Supply and Demand Comparison, ac-ft/yr

	2020	2025	2030	2035	2040
Supply [a]					
PG&E [b]	8,000	8,000	8,000	8,000	8,000
Watershed runoff	221,500	221,500	221,500	221,500	221,500
Carryover storage	129,400	129,400	129,400	129,400	129,400
Recycled water	1,900	1,900	1,900	1,900	1,900
Supply total	360,800	360,800	360,800	360,800	360,800
Demand total[c]	~~184,704~~178,919	~~193,106~~187,960	~~198,199~~196,076	~~205,391~~203,080	~~211,930~~209,521
Difference (supply minus demand)	~~176,096~~181,881	~~167,694~~172,840	~~162,601~~164,724	~~155,409~~157,720	~~148,870~~151,279

[a] *Supply from Table 5-10.*

[b] *Full entitlement of PG&E contract is 54,361 ac-ft that is usually not purchased during normal and above normal runoff years due to conduit conveyance restrictions. Normally 7,500 to 8,000 ac-ft/yr is purchased from PG&E.*

[c] *Demand from Table 3-2.*

The current and projected water supplies are compared to the demands for a single dry year for the District in Table 6-5.

Table 6-5. (DWR Table 7-3)
Single Dry Year Water Supply and Demand Comparison, ac-ft/yr

	2020	2025	2030	2035	2040
Supply					
PG&E	16,003	16,003	16,003	16,003	16,003
Watershed runoff	77,378	77,378	77,378	77,378	77,378
Carryover storage	107,330	107,330	107,330	107,330	107,330
Recycled water	1,900	1,900	1,900	1,900	1,900
Supply total	202,611	202,611	202,611	202,611	202,611
Demand total	~~184,704~~178,919	~~193,106~~187,960	~~198,199~~196,076	~~205,391~~203,080	~~211,930~~209,521
Difference (supply minus demand)	~~17,907~~23,692	~~9,505~~14,651	~~4,412~~6,535	~~-2,780~~ -496[a]	~~-9,319~~ -6910[a]

[a] *With the completion of Centennial Reservoir in the future surface water supply in both the watershed runoff and carryover storage will be increased to eliminate this projected deficit. The District is in the early stage of evaluating the Centennial water supply and the quantified capacity will be included in a future update of the UWMP.*

The projected water supplies are compared to the demands for multiple dry years for the District in Table 6-6.

Table 6-6. (DWR Table 7-4)
Wholesale: Multiple-Dry Years Supply and Demand Comparison, ac-ft/yr

		2020	2025	2030	2035	2040
First year	Supply					
	PG&E	2,882	2,882	2,882	2,882	2,882
	Watershed runoff	223,069	223,069	223,069	223,069	223,069
	Carryover storage	140,310	140,310	140,310	140,310	140,310
	Recycled water	1,900	1,900	1,900	1,900	1,900
	Supply total	368,161	368,161	368,161	368,161	368,161
	Demand total	178,919184,704	187,960193,106	196,076198,199	203,080205,391	209,521211,930
	Difference	189,242183,457	180,201175,055	2172,085169,962	165,081162,770	158,640156,231
Second year	Supply					
	PG&E	4,367	4,367	4,367	4,367	4,367
	Watershed runoff	89,763	89,763	89,763	89,763	89,763
	Carryover storage	137,195	137,195	137,195	137,195	137,195
	Recycled water	1,900	1,900	1,900	1,900	1,900
	Supply total	233,225	233,225	233,225	233,225	233,225
	Demand totals	178,919184,704	187,960193,106	196,076198,199	203,080205,391	209,521211,930
	Difference	54,30648,521	45,26540,119	37,14935,026	30,14527,834	23,70421,295
Third year	Supply					
	PG&E	13,744	13,744	13,744	13,744	13,744
	Watershed runoff	120,041	120,041	120,041	120,041	120,041
	Carryover storage	117,500	117,500	117,500	117,500	117,500
	Recycled water	1,900	1,900	1,900	1,900	1,900
	Supply total	253,185	253,185	253,185	253,185	253,185
	Demand total	178,919184,704	187,960193,106	196,076198,199	203,080205,391	209,521211,930
	Difference	74,26668,481	65,22560,079	57,10954,986	50,10547,794	43,66441,255
Fourth year	Supply					
	PG&E	16,003	16,003	16,003	16,003	16,003
	Watershed runoff	77,378	77,378	77,378	77,378	77,378
	Carryover storage	107,330	107,330	107,330	107,330	107,330
	Recycled water	1,900	1,900	1,900	1,900	1,900
	Supply total	202,611	202,611	202,611	202,611	202,611
	Demand total	178,919184,704	187,960193,106	196,076198,199	203,080205,391	209,521211,930
	Difference	23,69217,907	14,6519,505	6,5354,412	-469-2,780 (a)	-6,910-9,310 (a)

To:
Lisa Francis Tassone, Board Secretary
Nevada Irrigation District
1036 W. Main Street
Grass Valley, CA 95945

Sent via email to tassone@nidwater.com and hand delivered 11 May 2016

Re: Comments on NID's 2015 Urban Water Management Plan Draft

Dear Ms. Tassone:

Thank you for the opportunity to provide feedback to NID's 2015 Urban Water Management Plan Draft.

There are several key areas where the plan falls short of providing a comprehensive plan for the future, including:

- projected demand from higher population is overstated,
- projected supply from watershed yield is overstated,
- projected supply is not based on millenial tree ring data
- climate change predictions are inadequately addressed
- distinctions between urban water use and ag water use are unclear and inadequate
- UWMP to an unacceptable degree relies on voluntary actions rather than District investment in innovative efficiencies, infrastructure and demand side measures,
- the plan does not address projects that the District has firmly stated are part of its plan (Centennial Reservoir),
- conservation in both raw and treated water categories is inadequately addressed.

The following specific comments expand on these general observations.

Section 2

Section 2.3 Historical and Projected Population. The UWMP assumes an average annual growth rate of 2.5% whereas the historical average for the years 2010 to 2015 was 0.5% (Tables 2.2 and 2.3). The high population growth projection of 2.5% is utilized by the UWMP to establish demand projections. The UWMP fails to establish a sound foundation for the assumption of a near doubling of the population by 2040, compromising the validity of the demand projections in Section 3.

Section 2.3 is inadequate as it fails to reference planning documents such as county general plans, transportation plans or land use zoning. Nor does it factor in the reasonably foreseeable impacts to water use of upgrades to building codes, Title 20 and other regulatory requirements to reduce water usage. The UWMP states only that "These growth rates are based on customer growth projections...as estimated by the District staff" (p 2--7). How the staff

arrived at the estimates is not disclosed. In addition, the population growth estimates and, more importantly, the actual future water use of the increased population, does not take into account the effect of aggressive long term water conservation measures which should be consequent to the actions proposed in an effective UWMP.

The 2015 plan does revise population downward from the 2010 plan by 15% (2010 table 2.4 vs. 2015 table 2.3). The reason for this reduction is important to discover, as it may illuminate the reason why the growth projections continue to be overstated in the 2015 plan. Is the inflated cost of living in this area an obstacle causing slower growth, even in a time when there are low interest rates and a recovered housing market? Is the job market in this area a limiting factor to growth? What is the inventory of urban housing and rural estates, and are there likely obstacles in the future? What impact will the certainty of rising interest rates have on the high cost housing and construction in this area? This plan implies that pre-2008 recession levels of growth will return. The growth projections for this area should not be based on the growth levels experienced in the biggest housing bubble in the history of the US housing market.

The plan also states that "per capita water use may rebound to pre-drought levels" providing "uncertainties with future per capita water use." California and the entire Southwest is moving toward a new paradigm of efficient water use, as we better understand the longer term history of water scarcity in the West and the predicted future of water scarcity exacerbated by climate disruption. NID needs to be a steward of the new conservation ethics, and support the transition to efficient water use with active programs. Instead, this plan characterizes NID as only an observer of possible trends, accommodating "whatever" water use levels emerge. NID needs to take active steps to ensure wise water use and sustainable watershed management that is our future paradigm of water management in the arid West.

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Section 3 System Water Use

While this plan is ostensibly an urban water use plan, significant insights are provided in this section on what NID calls "agricultural irrigation."

2015 Table 3.2 indicates current demand for agricultural irrigation is 115,989 AF. This level of use is then projected to increase by almost 50% by the year 2020.

2015 Table 3.3 2015 demand increases 46% by 2020 (a % factor of 10 versus 2020)
2020 demand increases 4.5% by 2025
2025 demand increases 2.6% by 2030
2030 demand increases 3.6% bt 2035
2035 demand increases 3.2% by 2040

The increase in demand from 2015 to 2020 needs explanation. Is this because usage dropped in the fourth year of a drought? If so, it is revealing, because NID had no active conservation program in the raw water division, but only minimal and passive public education programs. Did this apparent low use of raw water result in any reduction in the quality of life in our region? Was there any reduction to commercial agriculture? Were the reduced levels a result of more efficient use on rural estate landscaping? These distinctions need to be studied with real data that can provide a basis for future planning and future conservation and efficiency programs.

What is more curious is that the comparable table in NID's 2010 UWMP has this same anomoly in usage. 2010 UWMP Table 3.12 noted a similar spike in use from 2010 of 129,894 to 2015 180,046 or 39% increase. This increase didn't happen, even though 2010, 2011 and 2012

were all higher than normal water years (according to 2015 URMP Figure 5.1) . If the predicted 39% increase in agricultural irrigation use did not happen between 2010 and 2015 as predicted in the 2010 URMP, what makes NID think the 46% increase in agricultural irrigation will happen in the next five years as predicted in the 2015 URMP? These projections indicate the tremendous level of elasticity that exists in the use of raw water. NID's best opportunity for managing water use wisely in the future lies in this category of agricultural irrigation. This entire category is mis-named, as most of the water in this category is not commercial agriculture. It is rural estate landscape water which is labeled "irrigated pasture." It is undeniable that rural development and water use in the past half century as seen the demise of most commercial grazing, and its conversion to rural estate suburban housing. Most of this water should be categorized as urban water use, and analyzed in detail in this Urban Water Management Plan. It should be managed as urban landscape water, and brought up to the same standards of measurement (and metering) as urban treated water, and the same suite of conservation measures for landscaping should be applied as are used for urban treated water. The blanket term "agricultural irrigation" is being mis-used to describe all raw water applications. Suburban landscaping is not agriculture. Truly commercial agriculture should be addressed in the Ag Water Plan, and suburban landscaping should be included in this UWMP

2015 Table 3.2 plans to expand agricultural irrigation by 5% from 2020 176,626 to 2040 184,271. It is essential to discern ag water from rural estate landscape water. How much of this increase will be commercial agriculture? How much will be increased rural estate suburban landscape water?

In addition, 2015 Table 3.2 provides a challenge to NID's claim that increased storage capacity is needed in the future. Total projected volume in 2020 of 184,704 AF increases in 2040 to 211,930 AF. However, as noted above, the huge elasticity of "agricultural irrigation" calls these figures into question. Is the agricultural irrigation figure accurate, or is it overstated 39% (2010 UWMP) or 46% (2015 UWMP)? With total existing storage of 285,000 AF, this does not make a strong case for spending $300 million on a new reservoir to develop new supplies. The demand projections are too soft.

Section 3.4 Water Use For Lower Income Households. The UWMP, using Nevada and Placer County estimates, lists 48% of the Nevada County population as low income and 26% of Placer County as low income. The Plan does not examine whether lower income households use a disproportionate amount of water and what programs and measures are available or could be provided to promote upgrades to more efficient fixtures for both indoor and outdoor efficient usage.

Section 4 SBx7-7 Baseline and Targets

Section 4.5 Per Capita Water Use. As pointed out above, the Plans GPCD estimates are flawed as they are based on an unsubstantiated population growth projection of 2.5%. Use of the low growth estimate of 0.5% would produce a higher GPCD result under Method 1.

Section 5 System Supplies

Section 5.2 indicates that NID "does not utilize groundwater as a planned source of water supply due to limited groundwater availability." NID's service area overlies a portion of the American River Subbasin, which extends from the Mehrten Formation at the base of the foothills

throughout the entire western extent of NID's jurisdictional boundary. NID must recognize that significant groundwater resources exist within its boundary. Significant groundwater storage potential exists for the District. Lincoln has a history of utilizing groundwater, and continues to rely on groundwater for peaking and backup supply, though their plan is to rely on PCWA and NID for treated surface water supplies as its primary source. However, conjunctive use and groundwater banking are significant resources to protect Lincoln's supply from extended drought, climate disruption and emergencies. Roseville already has a program for injecting treated water into this groundwater basin for storage. Active groundwater management programs should be developed by NID to assure comprehensive and sustainable water management for the customer base in western portion of its District. Significant partnership options exist, for example, a partnership with SSWD to raise Camp Far West and use the additional capacity for groundwater banking.

Section 5.3 addresses surface water supplies. Comparison with the comparable 2010 data shows that in 2015 Figure 5.1, 31-year average is used to calculate an average watershed yield of 221,500 AF/yr. The 2010 URMP Figure 4.1 shows an 82-yr average was used to calculate a watershed yield of 229,100 AF/yr. In addition, 2015 Fugure 5.3 uses a 47-year average to calculate reservoir storage. When viewed historically from hydrology reconstructed for the Sacramento region from tree rings dating from 850 AD, all of these time periods overstate the amount of watershed yield or carry-over capacity. A prudent watershed yield estimate must be based on the centennial low water cycles, which are up to 30% less than indicated by the past 30-50 years. Further, the hydrologic record of the past millenia indicate ten-year droughts roughly every 100 years, and also indicate a 35-year drought. Water management plans need to use the best data from the past to indicate the future. The past record indicates the time periods used in this UWMP overstate available water supplies. This is particularly important because climate change predictions indicate a similar reduction in supply estimates, as well as predict decadal and multi-decadal droughts. Patterns of the past millenia are reliably repeatable, and should be used in estimating watershed yield and carryover potential. (http://www.water.ca.gov/waterconditions/docs/tree_ring_report_for_web.pdf)

Using historically accurate watershed yield will also provide a more realistic basis for estimating future needs. For example, if historically accurate supply averages indicate that present storage capacities are sufficient to reserve those available (and limited) supplies, additional storage capacity investments are a waste of District resources.

Section 5.4 dismisses stormwater as a source of supply. Interestingly, it only states that it is a District policy that ignores this resource. Does the District actually benefit from stormwater runoff? This needs to be measured.

An additional resource of rooftop collection and storage should be analyzed in this section. This is a practice used in many Mediterranean climates around the world, and may be beneficial here to reduce our reliance on stored surface water.

Section 5.8 Future Water Projects. "The urban water supplier shall include a detailed description of expected future projects and programs...." The UWMP lists Centennial Reservoir as a future project, adding 110,000 acre feet of water supply. However, the Plan fails to provide a detailed description of the Centennial Project. The Plan fails to describe how the project will "combat" climate change, how it will provide additional supplies "during multiple dry water years"

or why it is a preferred alternative to the investment in demand side conservation measures and improvements to existing infrastructure which the UWMP fails to examine adequately. The Plan fails to meet the basic requirement of a detailed description. NID has spent millions of dollars to date studying the Centennial project, and has stated on many occasions that the project is needed and "will be built". The intended project must be fully integrated into the analysis in this plan.

Section 5.10 offers a very incomplete analysis of climate change projections. Climate disruption is the most significant challenge facing the planet, and facing our region. Drastic changes to our historic norms are predicted, can be expected. NID relies on the CABY framework for climate change. This framework is inadequate in many respects.

The CABY states that there will be "relatively stable projected regional precipitation" in climate change predictions. USGS studies predict a radically different outcome from global warming, with potential reductions in precipitation ranging from 30-55%.

CABY indicates that potential "climatic changes are expected to shift forest types and species mixtures within the watershed." The CABY table does not indicate the consequence of this forest transformation, from a forest profile with a domant snowpack season to a much warmer rain dominated forest type growing 12 months as year. Studies by Roger Bale et al from UCMerced indicate this forest transformation will result in a reduced runoff and watershed yield for water supply of up to 20%. These predictions are non-trivial for planning our future. NID must include the most recent information from climate science predictions in its UWMP.

Foothills Water Network and American River Watershed Institute made extensive comments on the NID NOP for Centennial Reservoir citing relevant studies for climate change analysis. All of these studies must also be referenced and analyzed in the 2015 NID UWMP, including those from USGS, NOAA, NASA, and UCM. Additional new studies are being released on topics like reservoir evaporation in "hot drought" conditions, which are almost twice the evaporation estimates used in the past. As our most significant challenge of the future, much more rigorous work needs to be done in this area to support a legitimate water plan.

Section 6 Water Supply Reliability Assessment

As above, the reliability assessment overstates growth, understates demand elasticity, and is speculative and arbitrary in selecting drought year profiles. 20165Table 6.6 profiles a four year drought. At end of four years, even as portrayed, NID shows minimal shortage, with 5% demand over supply.

Significantly, the demand total stays constant throughout the four years. In the first place, the demand is overstated (see above). Secondly, as drought years succeed on one another, demand diminishes even on a volunteer basis. NID experienced this in 2015, with over 30% voluntary conservation in both treated and raw water. Yet this analysis shows no demand reduction over successive drought years. If this UWMP uses the past years 2013-2015 to profile supply in its multiple dry year supply and demand comparison scenario, it should likewise use the past years 2013-2015 to profile the demand in its multiple dry year supply and demand comparison scenario. The final bottome line "difference" will be 20-30,000 AFin the positive, rather than 9,000 AF in the negative.

As presented in the draft, the multiple dry years supply and demand comparison does not make a case for increased storage capacity, especially for dramatically expensive and large increases of capacity up to 110,000 acre feet additional storage to the system. Instead, this comparison underscores the elasiticity of demand, and NID's huge opportunity to begin addressing conservation of treated and raw water seriously.

Section 7 Water Shortage Contingency Planning

This section correctly addresses voluntary and mandated usage reductions, principally in landscaping, and details penalties and enforcement. This plan addresses only the treated water system, and landscaping using treated water. While this is an Urban Water Management Plan, the fundamental flaw is that NID's urban water use is not limited to treated water. As noted above, the largest single use of water overall is suburban rural estate landscaping which is mis-categorized by NID as "agricultural irrigation". NID needs to make the clear distinction between commercial agricultureal water use and suburban rural estate landscaping water in its raw water use category. Suburban rural estate landscaping must be included in the UWMP, as it is a suburban/urban use of water. As such, it should be subject to water shortage contingency planning that includes voluntary reductions in Stage I drought and mandatory reductions in Stage II-IV drought. This distinction will accurately relect usage, and additionally will assure that commercial agriculture is not subject to unnecessary across the board water reductions that can occur when the distinction between suburban uses and agricultural uses are blurred.

Interestingly, Table 7.4 shows a three year prediction 2016-2018 based on drought years 2013-2015. If demand elasticity is included in the supply-demand scenario (as above Section 6), NID will have ample water supply for the next three years of projected drought. Since 2016 is officially being pronounced a drought year, that projection reveals that with existing storage, NID will have had ample supplies for a total of seven years drought, 2013-2018.

Section 8 Demand Management Measures

This section is extremely weak in its assessment of DMMs, far weaker than the comparable Section 6 in the 2010 UWMP. This section reveals that NID has a very limited and weak conservation program in both its raw and treated water categories. One key difference between the 2010 UWMP plan and the 2015 UWMP is the 2010 plan actually asssessed NID's programs for all 14 DMMs.

According to the 2010 UWMP, NID makes absolutely no effort for DMM 2 Residential Retrofit, DMM 3 System Audits, DMM 5 Landscape Programs, DMM 6 Washing Machines, DMM 9 CII Conservation Programs, DMM 12 Water Conservation Coordinator, and DMM 13 UFLT Replacement.

The 2015 UWMP Draft indicates that NID has made progress on only one of those measures, and that is DMM 12 where NID has hired a conservation coordinator (however, there is no indication of the effectiveness of having hired a coordinator, i.e. did this result in any reductions in water use?). The 2015 plan takes a giant leap backward in not even mentioning the other half dozen DMMs. Is this a clear statement of intention? Is it NID's plan not to undertake any of the additional DMMs? It should be noted that these are the suite of DMMs that actually affect the customer directly with rebates for toilets and washing machines, with landscape buyouts, with system audits and residential retrofits. These DMMs which are eliminated from the 2015 UWMP are actually the measures that require investment in the customer, and have certainty in the measurement of water savings.

In this 2015 UWMP, every DMM should be addressed and assessed individually for its potential water savings, with a cost/benefit analysis included for each DMM. NID is currently proposing a $300 million increase in storage capacity at Centennial Reservoir. Presumably, this proposed project will have a cost/benefit analysis that can make clear the viability of the investment. Since conservation in the raw and treated water areas have the greatest potential to provide needed future supplies at the most reasonable cost, and with the most favorable cash flow for the District, each and every DMM deserves the same rigor on the demand side as is

being lavished on the supply side proposals. This UWMP is the time and place for such rigorous analysis of demand side measures.

Further, the DMMs and other programs that are addressed in the 2015 UWMP Draft are given short shrift and are inadequate.

Section 8.2 indicates the District is metered. However, NID is metered with technology that is antiquated. Modern meters are real time indicators of water use, and provide feedback to customers immediately if systems indicate leaks, or usage spikes from historical patterns. The current NID meter relies on information provided in the billing cycle which can be delayed six weeks and more from actual water waste indications. NID should assess and commit to replacing its existing antiquated meter technology with the new customer friendly and efficiency promoting technologies.

Section 8.3 indicates NID has tiered price structures. These in themselves are not "conservation pricing". Tiered structures only become conservation tools when the price signal changes behavior toward conservation. The question here is: has this pricing structure resulted in conserved water? What changes might be made to catalyze further savings? What pressure points on price exist that change behavior? A full analysis of how well this DMM is working, and how might it be made to work better, need to be included in the UWMP.

Section 8.4 describes public education and outreach. NID has begun to serve its customers in this area. However, there is no indication of how many programs are presented to how many customers. Metrics exist to evaluate these programs. Comparisons to what other agencies in California are useful to gauge the effort NID is placing in this educational arena. The UWMP needs to include evaluation metrics. The education programs need followup components that allow measurement of how many customers responded to outreach and education. The simple statement "savings from this program cannot be directly quantified." That is not good enough. Savings and effectiveness can be indirectly quantified through meaningful followup with customers, and metrics can be developed to show changed behavior from education.

Section 8.5 addresses assessment and management of district system real loss. NID has undertaken a program for this DMM. However, the assessment provided does not reveal overall effectiveness of the program, or if the program is extensive enough to meet the need. In the 2010 UWMP, system losses were estimated at 20% for each year. No such estimate is made in this 2015 UWMP except in the AWWA calculator in the appendix which seems to indicate a system loss of 12%. This is high. But is it 12 or 20%? Industry standard targets are much lower. This brief assessment needs expansion to reveal if this program is effective, and give guidance for its expansion to save more water, and what the costs/benefits of such an expansion would be.

Section 8.6 addresses the water conservation program coordinator and staffing. Again, metrics are lacking, and the Draft states "water savings cannot be directly quantified." But as a society we demand accountability in our schools for education--- is it being effective? Metrics need to be established and assessed in this UWMP for this DMM. "The effectiveness of this DMM will be evaluated by the success of the District's water conservation program" is far too vague a metric to measure success or failure.

Section 8.7.1 addresses large landscape conservation programs states that the measures provided now are a newsletter, a demonstration garden, and seminars. No metrics are included to indicate the viability of these programs. No active onsite programs exist such as onsite audits, rebates for irrigation efficiency, turf buyback, or any other measure that actually does something on the land. The lack of information here indicates a weak program that has no accountability or measurement of behavior changes.

Section 8.7.2 indicates that commercial and industrial accounts will be addressed “as needed”. What is the criteria for need? What is the record of this program, if it exists? How might it be improved? What are the costs/benefits of onsite investments in conservation technologies?

Section 8.7.3 addresses agricultural water conservation. The existing program is essentially volume measurement (by the miner’s inch of 16,000 gallons per day… really? Can this be considered volume measurement?), canal measurement improvements, and pump efficiency testing on the District supply side. The demand side relies on a “report on which efficient water management practices they have implemented and plan to implement and to describe the associated water use efficiency improvements.” This is a voluntary report. How well is this working? What are the metrics?

But beyond those elementary measures, ag water conservation is NID’s best opportunity to supply its future needs at a reasonable cost. At the heart of this issue is the fact that most of what is called ag water in the NID system is actually urban water use for suburban rural estate landscaping. Agriculture needs to be supported, and is a beneficia use of water. The lavish use of water measured by the miner’s inch for the purpose of suburban rural estate landscape water is simply not a beneficial use of water. The raw water system needs to discern these uses, and treat them separately, as they are distinclty different. There is no harm in providing landscape water for suburban dwellings, but it should meet the standards of modern DMMs, from metering and measurement of volume, to efficient systems for delivery. Criteria for wise use of water should cut across the boundary of raw and treated water to treat suburban landscape water use as just that, and should treat the beneficial use of water for agriculture as just that. Blurring the two categories blinds the District to its greatest savings potential, and places the Districts use of water at cross purposes to the entire changing paradigm of wise water use in the West. It is time to re-invent the way ditch water systems that were inherited from 18th century mining tradition deliver water to modern customers, acknowledging the clear difference between agriculture and suburban water use.

Missing and omitted DMMs. As stated above, the 2015 UWMP omits the following DMMs:

- DMM 1 water survey programs for single-family residential and multi-family residential connections,
- DMM 2 Residential plumbing retrofits.
- DMM 6 High-efficiency washing machine rebate programs,
- DMM 14 residential ULFT replacement programs.

All of these programs need to be included, with scenarios for implementation, and cost/benefit ratio analysis done with the same rigor that will be applied to supply side project proposals.

Thank you for this opportunity to provide comments to the 2015 UWMP Draft.

Sincerely,

Otis Wollan
President, American River Watershed Institute

Barbara Rivenes
Barbara Rivenes
Sierra Nevada Group, Sierra Club

Marilyn Jasper

Allan Eberhart
Sierra Club Conservation Committee

Marilyn Jasper
Placer Group, Sierra Club

ADOPTING, DIRECTING, FILING, AND IMPLEMENTING
THE NEVADA IRRIGATION DISTRICT
URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-84 Regular Session, and as amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, the District is supplier of water providing urban water to over 19,000 connections; and

WHEREAS, the Plan shall be periodically reviewed at least once every five years, and that the District shall make any amendments or changes to its Plan which are indicated by the review; and

WHEREAS, California Department of Water Resources requires that Plan be adopted by June 2016, after public review and hearing, and filed with the California Department of Water Resources within 30 days of adoption; and

WHEREAS, the District has, therefore, prepared and circulated a draft Urban Water Management Plan for public review and review by the Counties and Cities within the District's service area, and other interested parties, and a properly noticed public hearing regarding said Plan, including publication of notice as required by Government Code 6066 was held by the District's Board of Directors on May 11, 2016; and

WHEREAS, the District did prepare and shall file said Plan with the California Department of Water Resources by July 1, 2016.

NOW, THEREFORE BE IT RESOLVED, by the Board of Directors of the Nevada Irrigation District as follows:

1) The Urban Water Management Plan, 2015 Update, is hereby adopted and ordered filed with the District;
2) The Secretary of the Board of Directors is hereby authorized and directed to file the Urban Water Management Plan, 2015 Update, with the California Department of Water Resources within 30 days after this date;

3) The General Manager is hereby authorized and directed to implement the Water Conservation Programs as set forth in the Urban Water Management Plan, 2015 Update, which includes water shortage contingency analysis and recommendations to the Board of Directors regarding the necessary procedures, rules and regulations to carry out effective and equitable water conservation and water recycling programs;
4) In a water shortage, the General Manager is hereby authorized to declare a Water Shortage Emergency according to the Water Shortage Stages and Required Actions indicated in the Plan, and implement necessary elements of the Plan; and
5) The General Manager shall recommend to the Board of Directors additional procedures, rules and regulations to carry out effective and equitable allocation of water resources.
6) The General Manger or his designee will make a copy of the District's adopted 2015 Urban Water Management Plan available for public review during normal business hours within 30 days of its adoption.

PASSED AND ADOPTED by the Board of Directors of the Nevada Irrigation District at a regular meeting held on the 25th day of May 2016, by the following vote:

AYES: Directors:
NOES:
ABSTAINING:
ABSENT:

_____
President

ATTEST:

_____
Board Secretary