

Water Demand Projection Questions from “Historic Data”
Staff Report 11/12/20 for the Hydrological Modeling

Plan for Water
Water Demand Projection Questions from “Historic Data”

From page 5 of the Staff Report 11/12/20 for the Hydrological Modeling

Public Questions, Comments & Requests

Staff has been encouraged by the amount of interest these Projections have garnered from the public. NID has received numerous questions from the public which have since been answered in writing and are currently uploaded for review on the NID website at: <https://nidwater.com/2020/08/water-planning-projections/>. In addition to the questions, NID has received a number of comments and requests which require an additional level of review and analysis which have not been budgeted for this process. The additional comments and requests all merit Board input, as much of the answers the public seeks are related to Board policy and direction. As such, staff has compiled all the comments and questions in this packet for public record and review. Staff anticipates these comments and requests will be incorporated into the early stages of the Plan for Water process. **I tried the link and it is inactive. Where are these questions?**

RESPONSE: The questions you are referencing were frequently asked questions. The link has been restored. Please note that the District will not be spending time on responding to comments that pertain only to previous analysis. The District will however, consider requests for modifications to the PFW. Please participate in the PFW meetings to understand model development and demand and supply scenario analysis. Many of your comments have been addressed in the meeting numerous times.

INSERT LINK

From Water Demand Projection Model Update – Final Report
Nevada Irrigation District (NID) November 12, 2020

Q32. Demand question number 10 re: growth. Census, Dept. of Finance, General plan data, and last urban water management plan. When you used 2015 UWMP assumptions, how were they used?

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A32. The original individual growth parameters from the 2011 Raw Water Master Plan were used as a starting point for each of the service areas within the NID system. The County General Plans were reviewed to determine if it was appropriate to adjust based on land use, and various sources of population and growth projections were reviewed to determine if the growth projections should be adjusted. *The review of censuses, Dept. of Finance, General Plan, and UWMP data was subjective.*

Comment: Basically it is just a guess.

RESPONSE: No response required. Please clarify the intent of your comment.

Q33. NID ran scenarios that did not consider conservation alternatives that could be done in the Ag sector, some that have been showed in other districts and countries that could realize significant savings.

A33. Conservation, demand management, and other demand reducing policies are a water resources planning alternative strategy to be evaluated and compared to other alternatives in **the future Plan for Water process**. The supply projection did take into account reductions of 40 to 50% during drought and is a form of conservation.

Comment: Please address this in the Plan for Water.

RESPONSE: As noted in multiple PFW meetings, conservation scenarios will be included in demand calculations.

Q35. Where do I find minimum inflow streams?

A35. Some of NID's instream flows are part of the 1963 Hydro-electric water rights and are attached to those filings. Future instream flows are a result of FERC relicensing negotiations and can be found in those documents. Deer Creek instream flows are part of an ongoing water rights process and have not been finalized, however preliminary targets have been included in the model.

Comment: Please address this in the Plan for Water.

RESPONSE: As noted in multiple PFW meetings, conservation scenarios will be included in demand calculations.

Q36. Will NID utilize the Water Budget model put out by State DWR?

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A36. District will adhere to the Water Budget as it is required for the UWMP. During the UWMP update, NID and consultants will be incorporating data from the model to complete the update. NID’s existing planning processes, and specifically the hydrology, supply, and demand analysis already include many of the approaches and methodologies listed in the Draft DWR Handbook for Water Budget Development. As identified in the Handbook, *the extent of the analysis is a local decision based on the district’s needs, capacity, and available resources.*

Response: Demand will not be calculated based solely on the water budget. However, it will be taken into account for treated water demands.

Comment: NID didn't do a real urban water management plan. If they had limited their study to Treated, measured water, they would have shown that there was no way they would ever run out of drinking or domestic water. Instead, they added in the raw water and managed to show a 55,000 acre foot deficit. They did this by using the 5 driest years in the last four decades put back to back instead of using the prescribed 5 consecutive driest years which would have shown 3,000 acre feet deficit. This “local decision” created a significant difference of 52,000 acre feet; appearing to be a deceptive move designed to show a need for a new reservoir.

NID claimed that they had the freedom to "conduct the analysis however they wanted". (Doug Roderick)

The 5 driest consecutive year drought analysis is not required in the Ag Water Management Plan. By moving the raw water totals into the Urban Water Management Plan, NID placed an elevated strategic priority on the raw water supply. That is contrary to the purpose of the Urban Water Management Plan. NID never did separate out treated and raw water deficits as requested.

Response: No response needed.

Q37. On page 19, figures 5-6, and 5-7, raw water sales are only shown for 5 years and increased 2.5% while demand per customer decreased 40%. What is the long term conservation target for raw water use?

A37. This is a policy related question and should be addressed as a Board-directed

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target **through the Plan for Water** and associated policies. As mentioned before, the model is intended for dynamic use and expected to be updated annually as conditions, policy, and technology changes. Conservation, demand management, and other demand reducing policies are a water resources planning alternative strategy to be evaluated and compared to other alternatives in the **future Plan for Water process**.

Comment: Please address this in the Plan for Water.

Response: Raw water conservation will be addressed through by applying drought water contingency reduction to demand and through the analysis of supply and demand strategies which will include conservation measures.

Q38. According to figure 5-7, page 21, potable water use dropped by 26% even though the number of customers increased by 7%. What is the long term conservation target for treated water?

A38. This is a policy related question and should be addressed as a Board-directed target **through the Plan for Water** and associated policies. As mentioned before, the model is intended for dynamic use and expected to be updated annually as conditions, policy, and technology changes. Conservation, demand management, and other demand reducing policies are a water resources planning alternative strategy to be evaluated and compared to other alternatives in the **future Plan for Water process**. Additionally, the District will incorporate future conservation mandates developed by the state and incorporate them into the model.

Comment: Please address this in the Plan for Water.

Response: Treated water conservation will be addressed through by applying drought water contingency reduction to demand and through the analysis of supply and demand strategies which will include conservation measures.

Q39. Why is there only 5 years of raw water data shown while there is 10 years of potable water data shown? How then can these be compared?

A39. Canal/gage data entry is a time consuming and costly exercise (thousands of data points). After it was decided that the 2011 model would be used, the direction was to focus on the 2012 to 2018 raw water data since that captured recent dry years. The dry year comparison (2012 to 2018) is still valid.

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Comment: Please address this in the Plan for Water.

I don’t know, but it would be helpful to show 20-30 years of #customers and AFY demand for raw, treated, and wholesale/mutual customers.

Response: Recommendation will be considered and incorporated as appropriate.

Q40. Where is an environmental water management plan and why has the environmental demand been limited to 2 paragraphs in this update when environmental water demand is the majority of the natural flow?

A40. The District does not have an “environmental water management plan”. Environmental Flows are established by regulation are their own “management plan”. They include the volume of water based upon the water year type, and the timing of flows. The District is required to follow this plan.

Comment: Please address this in the Plan for Water. Regulations do not constitute a plan. An Environmental Water Management Plan is much more than a set of regulations and has the potential to offer coordinated flows and the benefits of natural infrastructure.

Response: Environmental or regulatory flows will be included in the demand model consistent with current and expected regulatory permits and licenses.

Q41. Why doesn’t NID use the Handbook for Water Budget Development format for the Raw Water Master Plan when both the upcoming Ag Water Management Plan and Urban Water Management Plans will require this format?

A41. The District is currently in the process of updating the UWMP and the AWMP and will follow the state’s guidelines and format as appropriate. **When the District begins engaging in updating the Plan for Water,** it will assess the appropriate format to use. Recall, the RWMP is a District-developed plan, and not required by state guidelines or format however it may decide to utilize the states Handbook for Water Budget Development format if it is appropriate.

Comment: Please address this in the Plan for Water.

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Response: Treated water conservation will be addressed through by applying drought water contingency reduction to demand and through the analysis of supply and demand strategies which will include conservation measures.

Q42. Where is the groundwater demand addressed given the majority of residents in the District depend on wells and groundwater?

A42. NID’s water rights and the entire NID system is based on surface water, not groundwater. Determining the adequacy and sustainability of private groundwater wells on properties within District boundaries is not part of this analysis.

Comment: Please address this in the Plan for Water. *It is all connected.*

Response: Groundwater demand will not be considered in the PFW as the District does not have any current or future groundwater demands.

Q43. Given that water is a finite resource, how does NID plan to curb demand?

A43. This is a policy related question and should be addressed as a Board-directed target. As mentioned before, the model is intended for dynamic use and expected to be updated annually as conditions, policy, and technology changes. However, the model does contemplate the District drought management plan in the analysis. Conservation, demand management, and other demand reducing policies are a water resources planning alternative strategy to be evaluated and compared to other alternatives **in the future Plan for Water process.**

Comment: Please address this in the Plan for Water.

Response: Demand reduction strategies will be evaluated in Stages 10 and 11 of the PFW process.

Q45. Please describe why NID did not elect to re-evaluate the rate of demand increase, other than for new regulations and climate change, with an updated methodology.

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A45. The rate of demand increase was re-evaluated between the 2011 study and the 2020 study. The basic methodology remained the same, but new data was evaluated and the rate of demand increase changed between the 2011 and 2020 studies. Conservation, demand management, and other demand reducing policies are a water resources planning alternative strategy to be evaluated and compared to other alternatives **in the future Plan for Water process**. The demand projections are considered a baseline value, using historical customer data. In addition to alternative strategies to reduce unit water demands, *it is possible future regulations will also mandate maximum allowable usage*, and NID will incorporate any future restrictions as it updates its projections over time.

Comment: Please address this in the Plan for Water.

Response: Demand reduction strategies will be evaluated in Stages 10 and 11 of the PFW process.

Q47. Please discuss how the 5-year drought values was developed and used in the water demand projections. The water supply memo says that: *To simulate watershed runoff conditions for a five-year drought the five driest water years were placed back to back and ordered from wettest to driest, based on their annual runoff volume: 1994, 1987, 1988, 1976 and 1977*. Can you talk about how and if this back-to-back modeling was included in the operations modeling?

A47. DWR recently released its Urban Water Management Plan draft guidebook for public review. The guidebook recommends urban water suppliers to include a water service reliability assessment for a normal year, a single dry year and **a five consecutive-year** drought. While it directs the water supplier to use the driest five-year sequence within the historical period of record, *DWR will allow suppliers to characterize the five-year drought differently*. * **NID claimed that they had the freedom to "conduct the analysis however they wanted"**. (Doug Roderick)

NID asked HDR to modify the 5-year drought recently developed for the Water Supply Analysis Technical Memorandum (TM), presented as Table 3-1, to use the 5-consecutive driest years in the 1976-2011 2070 Median climate change hydrologic period of record. HDR subsequently created two alternative analysis, one using the 5-year running average watershed runoff and one using the 5-year actual watershed runoff. *The back-to-back five year drought was not simulated in*

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the operations model. The calculations in Table 3-1 were developed in a spreadsheet. The one value in Table 3-1 that is model derived is the average annual carryover storage, which was used as the initial carryover storage value going into year 1 of the five year drought. This value is based on modeled long-term average carryover storage for water years 1976 through 2011 under projected 2070 conditions.

Comment: Please address this in the Plan for Water. *Please use the 5 consecutive-year drought!* NID didn't do a real urban water management plan. If they had limited their study to Treated, measured water, they would have shown that there was no way they would ever run out of drinking or domestic water.

Instead, they added in the raw water and managed to show a 55,000 acre foot deficit. They did this by using the 5 driest years in the last four decades put back to back instead of using the prescribed 5 consecutive driest years which would have shown 3,000 acre feet deficit. This “local decision” created a significant difference of 52,000 acre feet; appearing to be a deceptive move designed to show a need for a new reservoir.

NID claimed that they had the freedom to "conduct the analysis however they wanted". (Doug Roderick)

The 5 driest consecutive year drought analysis is not required in the Ag Water Management Plan. By moving the raw water totals into the Urban Water Management Plan, NID placed an elevated strategic priority on the raw water supply. That is contrary to the purpose of the Urban Water Management Plan. NID never did separate out treated and raw water deficits as requested.

Response: The District did complete an UWMP per state requirements. Various demand and supply scenarios will be run which will include different drought scenarios.

A49. Watershed runoff in high elevation watershed under current conditions is predominantly snowmelt driven. In the future under climate change, watershed runoff will be more precipitation driven, resulting in flashier runoff events resulting in more spill from reservoirs. In addition, late spring water deliveries from high elevation reservoirs under climate change will be drawn from reservoir storage rather than snowmelt runoff. Both of these factors contribute to reductions

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in reservoir carryover storage. Projected carryover storage is expected to decrease by approximately 20,000 ac-ft, relative to historical average annual carryover storage (Table 5-16, 2012 Raw Water Master Plan). Carryover storage is the second largest source of NID water supply (2012 Raw Water Master Plan).

One other notable difference between the Supply TM and the 2012 Raw Water Master Plan in the quantification watershed runoff. Watershed runoff in the Supply TM includes runoff in the Bear River, and other small tributaries where NID has direct diversion rights during the irrigation season. Previously, runoff from these watersheds were not included resulting in an underestimate of watershed runoff. As a result, the two values of watershed runoff are not comparable.

Response: Comment is related to old documents; as such, no response needed.

Q50. What are the specific, numerical or other assumptions that you are putting into the models used for the Water Demand TM?

A50. Assumptions in the water demand TM include the following; future land use (general plans), future saturation of service areas (currently cannot exceed 80% for most service areas), population growth by sub-area (department of finance, 2015 RWMP), and canal losses (~15%). These assumptions can be adjusted in the model tool.

Comment: Please address this in the Plan for Water. These assumptions are a black box. Actual numbers and their relationships are needed.

Response: A new demand model is being developed. Unclear as to how this comment is related to the PFW.

Q52. How do you justify projecting an increase in water demand from agricultural production in this region given the projected impacts from climate change? See Informational Presentation to Nevada County Planning Commission by University of California Cooperative Farm Advisors Cindy Fake and Dan Macon regarding the state of agriculture in the County, December 2019.

A52. Projections are based on existing General Plan land uses and historic water usage. *Future scenarios could increase or decrease the unit water demands of a*

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respective land use. Planning assumptions will be updated once changes and/or legal actions have been made to change land use, restrict water use, or further define allowable uses.

Comment: Please address this in the Plan for Water. Nevada County agriculture production is 54th of 58 counties in California. Irrigated pasture is the least productive monetary use of water. Water supply is finite and groundwater is everywhere and useful to agriculture. Statewide standards will be useful.

Response: Thank you for your comment. As noted in several meetings, several factors will be utilized to calculate demand, including land use.

Q53 TM? Shouldn't reduced evapotranspiration from wildfire and forest management be incorporated into future run-off and supply estimates?

A53. While studies have shown reduced evapotranspiration after biomass removal and fuels reduction following wildfire or forest management, these events and/or management practices are discrete events that are not included in the modeling due to the uncertainty of actual location and impacts. These types of events are potential water management strategies that could be investigated in the **Plan for Water** process. Hydrologic projections for 2070 unimpaired flows were derived using simulated historical and projected 2070 surface runoff and base flow from the Variable Infiltration Capacity (VIC) model (Liang et al. 1994). The VIC model is a gridded hydrologic model that simulates land-surface-atmosphere exchanges of moisture and energy at each model grid cell. Projected changes in evapotranspiration resulting from climate change are included.

Comment: Please address this in the Plan for Water.

Response: Thank you for your comment, we will consider and incorporate as appropriate.

Q56. Acre feet projection, NID demand up to 2060 is a 43% increase in acre feet? Were those numbers used here?

A56. During FERC process, the projected demand scenario was to 2062. At the time, NID RWMP was projected to 2032. So we took the 2032 data and extrapolated out to 2062.

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Comment: Please address this in the Plan for Water. *This kind of linear extrapolation has been shown to grossly over estimate demand!!*

Response: This comment is in response to previous efforts; we will only be responding to specific PFW comments as those previous efforts will no longer be utilized once the new model is completed.

Q57. How will the new look at groundwater change your methodology? Water lost to the system is not really lost.

A57. District is a surface water only agency. Our water rights allow for the capture and diversion of surface water only. NID water that percolates into the ground water table is no longer accessible by NID. Additionally, a majority of the Districts boundary does not fall within a recognized ground water basin. When we say lost to the system, it means the District’s supply system can’t collect and deliver that water to its customers or its other obligations.

Comment: Please address this in the Plan for Water. *This is an antiquated vision of water management!* Please connect and collaborate with adjacent Water Agencies and look at whole watershed and groundwater function. Voluntary agreements can work toward connecting functional flows and natural infrastructure.

Response: The PFW modelling will not address groundwater.

Q58: Although three different water scenarios based upon climate change are modeled in the Hydrologic Analysis and used in the Water Supply Analysis TM, no alternative demand scenarios are modeled in the Demand Analysis. Question: Can HDR explain why there are no alternative demand scenarios in the Demand Analysis.

A58. Two demand scenarios were provided based on a range of environmental flow requirements. Growth, loss, and saturation. Values can be adjusted to develop additional demand scenarios.

Comment: Please address this in the Plan for Water.

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Response: This comment is in response to previous efforts; we will only be responding to specific PFW comments as those previous efforts will no longer be utilized once the new model is completed.

My Comments: on the Water Supply Analysis Technical Memorandum, table 3.1

According to Executive Order B-13-16, Making Water Conservation a California Way of Life, “State Agencies shall update temporary emergency water restrictions and transition to permanent, long term improvements in water use by taking the following actions: The Department shall strengthen requirements for **urban water** shortage contingency plans, which urban water agencies are required to maintain. These updated requirements shall include adequate actions to respond to droughts lasting at least five years, as well as more frequent and severe periods of drought. While remaining customized according to local conditions, the updated requirements shall also create common statewide standards so that these plans can be quickly utilized during this and any future drought.”

Further information:

During the September 24 webinar, there was discussion of the need for Table 3-1 to fulfill the requirements of the current draft *Guidebook for 2020 Urban Water Management Plans* and be based on the driest five consecutive years. In addition, neither Executive Order B-37-16 (8) referenced in the *Water Supply Analysis TM*, nor the draft *2020 Agricultural Water Management Plan Guidebook*, nor the California Water Code § 10826.2, et sec. require a 5-year drought risk analysis for agricultural water uses such as that depicted in Table 3-1.2

Given these directives, the actions and assumptions of the Nevada Irrigation District (NID) (District) have appeared biased and prejudicial. In fact:

1. The District took a state requirement for an **urban water** shortage contingency plan and expanded it to include the raw water demands, which comprise 90% of the total water volume sold annually. ***Please re-do this 5 year drought analysis using only the Urban (Treated) Water demand.*** The purpose of the Urban Water drought analysis is to support the right to **drinking water**. Since raw water is not potable, it is not subject to the same scrutiny. This would give the District the ability to declare that there was no shortage of drinking water projected in the future. Instead, they included the

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unmeasured raw water and produced a shortage to advocate (fear monger) for increased raw water supply via Centennial Dam. It appeared to be blatant manipulation.

2. NID did not look for consecutive years of drought but selected the 5 single worst drought years in the last 4 decades and lined them up consecutively. This action alone compromises the validity of the outcome. This flawed alternative must be totally removed from Water Supply Analysis, Technical Memorandum , table 3.1. NID claimed to create another correct 5 consecutive year analysis but then put it in an appendix instead of the body of the report.

[Dianna Suarez](#) Comment on NID Hydrology Report TM

Development of a Hydrogeologic Conceptual Model

The current NID hydrology report is based on linear concepts and modeling of 2 dimensional relationships. The next evolution of planning with water budgets will involve 3 dimensional models and planning. It is important for NID to start the transition to this next generation, 3 dimensional Hydrogeologic Concept using the Water Budget format for the Plan for Water. It is inadequate to proceed with the same frame of reference and linear thinking that produced the grossly misleading 5 consecutive year drought contingency plan from the Water Supply Analysis, Technical Memorandum , table 3.1.

This same limited grasp of our relationship with water was exposed when NID answered the question about future drought, catastrophic wildfire, power shutoffs, soaring home insurance prices, economic recession, and pandemics with, “Oh, those are only short term events”. Nothing could be further from the truth. We are now in active climate change. When the past estimates of water sales are compared to what actually happened, the estimates were off by up to 40%. Most people would find this to be an unacceptable margin of error. The answer NID gave to this large discrepancy is, “Well, they had an anomaly, the drought”. This “anomaly” is far more certain than the linear progressions that have proven so inaccurate within NID’s planning documents. NID management seems to think that they can continue with the simplistic linear models and just fill in the blanks when a comprehensive water budget is required by state agencies. A paradigm shift is needed to move ahead and understand the complex and multifaceted water cycles that extend well beyond the boundaries of the Nevada Irrigation District.

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Three dimensional planning offers a third plane to describe and account for unexpected and unforeseen future events that have major impacts on water supply, demand, and NID’s ability to transport and supply water. As we continue with the effects associated with a pandemic, wildfire, power shutoffs, soaring home insurance prices, and economic recession, understanding water cycles, and modeling the hydrogeologic structure of our watersheds will provide answers to water supply strategies to insure future resilience and ecological health. Please start creating hydrogeological models for Bear River and Yuba River watersheds as explained in the Handbook for Water Budget Development.

Thank you, Dianna Suarez