



TRUCKEE MEADOWS WATER AUTHORITY
Board of Directors

AGENDA

Wednesday, October 21, 2020 at 10:00 a.m.
Virtual Meeting Only

MEMBERS OF THE PUBLIC MAY ATTEND VIA THE WEB LINK, OR
TELEPHONICALLY BY CALLING THE NUMBER, LISTED BELOW.
NO PHYSICAL LOCATION IS BEING PROVIDED FOR THIS MEETING
(be sure to keep your phones on mute, and do not place the call on hold)

Please click the link below to join the webinar:

<https://tmwa.zoom.us/j/92263130225?pwd=ZXZWeThJUGVYRnRMM3BEVEN4WUZJUT09>

Password: 254339

Or call:

Phone: (888) 788-0099

Webinar ID: 922 6313 0225

Board Members

Chair Vaughn Hartung
Member Neoma Jardon
Member Jenny Brekhus
Member Paul Anderson

Vice Chair Kristopher Dahir
Member Jeanne Herman
Member Naomi Duerr

NOTES:

1. This meeting is being conducted pursuant to the Governor's Declaration of Emergency Directive 006 ("Directive 006 [http://gov.nv.gov/News/Emergency_Orders/2020/2020-03-22 - COVID-19 Declaration of Emergency Directive 006/](http://gov.nv.gov/News/Emergency_Orders/2020/2020-03-22_-_COVID-19_Declaration_of_Emergency_Directive_006/) and will be held by teleconference only.
2. The announcement of this meeting has been electronically posted in compliance with NRS 241.020(3) and Directive 006 at <http://www.tmwa.com>, and NRS 232.2175 at <https://notice.nv.gov/>.
3. Pursuant to Directive 006, the requirement contained in NRS 241.020(3)(c) that physical locations be available for the public to receive supporting material for public meetings has been suspended. Staff reports and supporting material for the meeting are available on the TMWA website at <http://www.tmwa.com/meeting/> or you can contact Sonia Folsom at (775) 834-8002. Supporting material is made available to the general public in accordance with NRS 241.020(6).
4. The Board may elect to combine agenda items, consider agenda items out of order, remove agenda items, or delay discussion on agenda items. Arrive at the meeting at the posted time to hear item(s) of interest.
5. Asterisks (*) denote non-action items.
6. Pursuant to Directive 006, public comment, whether on action items or general public comment, may be provided without being physically present at the meeting by submitting written comments online on TMWA's Public Comment Form (tmwa.com/PublicComment) or by email sent to boardclerk@tmwa.com prior to the Board opening the public comment period during the meeting. In addition, public comments may be provided by leaving a voicemail at (775)834-0255 prior to 4:00 p.m. the day before the scheduled meeting. Voicemail messages received will be noted during the meeting and summarized for entry into the record. Public comment is limited to three minutes and is allowed during the public comment periods. The Board may elect to receive public comment only during the two public comment periods rather than each action item. Due to constraints of TMWA's videoconference system, public comment must be provided by voicemail, email or online comment as indicated above.
7. In the event the Chairman and Vice-Chairman are absent, the remaining Board members may elect a temporary presiding officer to preside over the meeting until the Chairman or Vice-Chairman are present (**Standing Item of Possible Action**).
8. Notice of possible quorum of Western Regional Water Commission: Because several members of the Truckee Meadows Water Authority Board of Directors are also Trustees of the Western Regional Water Commission, it is possible that a quorum of the Western Regional Water Commission may be present, however, such members will not deliberate or take action at this meeting in their capacity as Trustees of the Western Regional Water Commission..

¹The Board may adjourn from the public meeting at any time during the agenda to receive information and conduct labor-oriented discussions in accordance with NRS 288.220 or receive information from legal counsel regarding potential or existing litigation and to deliberate toward a decision on such matters related to litigation or potential litigation.

1. Roll call*
2. Pledge of allegiance*
3. Public comment — limited to no more than three minutes per speaker*
4. Possible Board comments or acknowledgements*
5. Approval of the agenda **(For Possible Action)**
6. Approval of the minutes of the [September 16, 2020 meeting](#) of the TMWA Board of Directors **(For Possible Action)**
7. Recognition of [Pyramid Lake Paiute Tribe Member Norman Harry](#) – TMWA Staff and Board*
8. Informational report regarding [Hunter Creek Reservoir property public access](#) and unauthorized uses — John Zimmerman*
9. [Required communication from Eide Bailly](#) in regards to TMWA’s annual financial audit — Sophie Cardinal*
10. Discussion and action, and possible direction to authorize General Manager to finalize and execute an [Interlocal Agreement with City of Reno for cost sharing of the Basis of Design Report for Reno Stead Water Reclamation Facility \(RSWRF\) American Flat Aquifer Storage and Recovery Project](#) — John Enloe **(For Possible Action)**
11. Discussion and action, and possible direction to staff regarding approval of the [TMWA 2020-2040 Water Resource Plan](#) — Kara Steeland and John Enloe **(For Possible Action)**
12. Presentation of [TMWA’s Fiscal Year 2020 Customer Satisfaction Study](#) conducted by InfoSearch International — Andy Gebhardt*
13. Presentation of and discussion, and possible direction to staff regarding [preliminary funding plan for Fiscal Years 2021 through 2025](#) — Michele Sullivan **(For Possible Action)**
14. Presentation of [TMWA Goals and Objectives results for Fiscal Year 2020](#) — Mark Foree*
15. Discussion and action, and possible direction to staff on the [proposed TMWA Goals and Objectives for Fiscal Year 2021](#) — Mark Foree **(For Possible Action)**
16. Discussion and action, and possible direction to staff regarding canceling the November Board meeting and re-scheduling the December Board meeting to December 10, 2020 or such other date approved by the Board — Mark Foree **(For Possible Action)**
17. [General Manager’s Report](#)*
18. Public comment — limited to no more than three minutes per speaker*
19. Board comments and requests for future agenda items*
20. Adjournment **(For Possible Action)**

¹The Board may adjourn from the public meeting at any time during the agenda to receive information and conduct labor-oriented discussions in accordance with NRS 288.220 or receive information from legal counsel regarding potential or existing litigation and to deliberate toward a decision on such matters related to litigation or potential litigation.

TRUCKEE MEADOWS WATER AUTHORITY
DRAFT MINUTES OF THE SEPTEMBER 16, 2020
MEETING OF THE BOARD OF DIRECTORS

The Board of Directors met on Wednesday, September 16, 2020, via Zoom Virtual Meeting, Reno, Nevada. Chair Hartung called the meeting to order at 10: 00 a.m.

1. ROLL CALL

Members Present: Paul Anderson, *Jenny Brekhus, Naomi Duerr, **Neoma Jardon, Vaughn Hartung, Jeanne Herman, and Alternate Ed Lawson.

Members Absent: Kristopher Dahir

*Member Brekhus arrived at 10:02 a.m.

**Member Jardon left at 12:16 p.m.

A quorum was present by telephonic appearance.

2. PLEDGE OF ALLEGIANCE

The pledge of allegiance was led by Ed Lawson, City of Sparks Mayor.

4. POSSIBLE BOARD COMMENTS OR ACKNOWLEDGEMENTS*

Chair Hartung took item #4 out of order to express condolences on the passing of Carson City Mayor Crowell. Chair Hartung then noted the Board would have a closed-door session upon adjournment, and congratulated Mayor Ed Lawson of City of Sparks on his appointment as Mayor.

Alternate Lawson stated Mayor Crowell was a great man who championed for Carson City and he will be missed.

Member Jardon was also saddened by Mayor Crowell's passing whom she had known for a very long time. She also congratulated Ed Lawson on his promotion to Mayor at City of Sparks and acknowledged Chair Hartung's recognition by Water Environment Federation (WEF) for Public Official of the Year for his contribution to clean water public policy and government service.

3. PUBLIC COMMENT

Mr. Joe Nannini, TMWA customer, submitted written comment on Tuesday, September 8, 2020 regarding TMWA's decision to close the Hunter Creek Ponds to fishing be reconsidered. "These ponds are such a great place to teach kids to fish for bass. There are not a lot of fisheries in this area that support this sort

of family activity and the Hunter Creek Ponds are a great resource! It is understood that there were a few people who left behind their trash. I would be the first in line to organize park cleanups and similar activities for this area if need be. I am sure there are also local non-profits who would get involved. Closing off access does nothing but create animosity toward TMWA. TMWA's decision to take away a phenomenal opportunity for kids to learn how to fish with their families is such a disappointment. These sorts of hidden spots are what makes Reno a great place to raise kids. I urge you to reconsider this decision as it hurts this community greatly.”

4. POSSIBLE BOARD COMMENTS OR ACKNOWLEDGEMENTS*

Chair Hartung asked Mark Foree, TMWA General Manager, to have an agenda item regarding the Hunter Creek Pond issue at the next Board meeting to have further discussion.

5. APPROVAL OF THE AGENDA

Upon motion by Member Duerr second by Member Jardon, which motion duly carried by six to zero of the members voting the Board approved the agenda. (Member Herman, who participated telephonically, did not indicate a vote on the item)

6. APPROVAL OF THE MINUTES OF THE AUGUST 19, 2020 MEETING

Upon motion by Member Jardon, second by Member Anderson, which motion duly carried by six to zero of the members voting the Board approved the August 19, 2020 minutes. (Member Herman, who participated telephonically, did not indicate a vote on the item)

3. PUBLIC COMMENT

The Public Comment period was reopened to accommodate a late received public comment request. Michele Hulbert, TMWA customer and member of the Juniper Hills Homeowners Association (HOA), stated the ponds at Hunter Creek never had fish in them, but someone planted fish in the ponds and the unintended consequence in the past six months is the increased traffic at all hours of the day and night, as well as trash and debris left behind, and people cutting across private property to get to the ponds instead of using the trail. They have had to call the police at times when people are at the ponds fishing and causing a noise disturbance into the night and urged TMWA to keep the ponds dormant from fish.

7. RECOGNITION OF CITY OF SPARKS MAYOR RON SMITH

Mark Foree, TMWA General Manager, noted August 19th was a sad day for TMWA and the community with the passing of Sparks Mayor Ron Smith. Chair Hartung said Mayor Smith was a dear friend to all of us, a great advocate, and colleague.

Member Anderson thanked TMWA for recognizing Mayor Smith and he is sitting on the TMWA Board of Directors because of him.

Alternate Lawson informed the Board that the Northern Nevada Veteran's Memorial (Memorial) will be completed sooner than expected due to an unexpected generous donor.

Member Jardon stated she had known him since before she held public office and appreciated his guidance and friendship. He advocated for projects that would benefit the region and not just City of Sparks for years to come and was always looking out for you and seeing how he could help.

Member Duerr said the Memorial was Mayor Smith's legacy. She had the privilege of working with him at the Flood Authority for years and got to know him personally, and his contributions to the community.

Member Brekhus said she only served with Mayor Smith on the TMWA Board for a brief time and expressed her sympathies to his family.

Andy Gebhardt, TMWA Director of Operations & Water Quality, on behalf of staff said it was refreshing that you could deal with Mayor Smith as a "normal" guy and not an elected official. That he didn't pretend to know what he didn't know, trusted staff, and asked questions to understand.

Chair Hartung requested staff provide a plaque to his wife in his honor.

8. DISCUSSION AND ACTION, AND POSSIBLE DIRECTION TO STAFF REGARDING ACCEPTANCE OF THE 2020 INTEGRATED SOURCE WATER AND 319(H) WATERSHED PROTECTION PLAN FOR PUBLIC WATER SYSTEMS AND THE TRUCKEE RIVER IN THE TRUCKEE MEADOWS

Kara Steeland, TMWA Hydrologist, updated the Board since their approval of allocating TMWA staff to work on the plan in January 2017, and introduced Lynn Zonge and Jill Sutherland, Resource Concepts Inc. (RCI), and Kim Rigdon and Birgit Widegren, Nevada Department of Environmental Protection (NDEP) with whom staff has been working to finalize the plan. Ms. Widegren presented the progress made since the initial presentation in 2017, and Ms. Zonge presented the Source Water and Watershed Protection Web Map in the Truckee Meadows region and how to navigate the webtool.

Members of the Board commended staff on all their work and the relevancy of the plan and web map. They discussed the possibility of adding a layer for domestic wells at a later date, expressed concerns regarding the risks of wildfires and their impact on water quality (the web map describes the relationship between the two factors), and how TMWA would use this plan as part of the review process (TMWA staff has been working with City of Reno staff on its zoning code update, which will now require certain projects to notify TMWA prior to continuing through the review process).

Ms. Widegren acknowledged all the different groups and stakeholders they have been working with these past few years. It is also a watershed management plan, which requires state and federal endorsement that would open up additional sources of funding.

Upon motion by Member Anderson, second by Member Brekhus, which motion duly carried by six to zero of the members voting the Board accepted the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows. (Member Herman, who participated telephonically, did not indicate a vote on the item)

9. DISCUSSION AND ACTION, AND POSSIBLE DIRECTION TO STAFF REGARDING THE UPDATED TMWA DRAFT 2020-2040 WATER RESOURCE PLAN

Ms. Steeland updated the Board on the edits to the draft 2020-2040 Water Resource Plan (2040 WRP) since staff presented in June. Much of the public feedback received was positive with a few requesting staff to make clarifying edits on key language regarding climate change, water conservation and groundwater capacity, which are presented in the updated 2040 WRP. Also, per a Board Member comment regarding changes to Chapter 5 “Other Conceptual Resources,” which are private water projects, staff is looking to the Board for input on next steps.

Member Brekhus confirmed she raised concerns regarding Chapter 5 and the public perception that TMWA supports private entities to import water, and stressed TMWA should be the developer of water resources in the region and would like a larger discussion regarding that topic.

The Board expressed they approved of the changes made (regarding climate change scenarios, conservation and water use) and the new platform for the 2040 WRP and discussed the listing of potential projects in the 2040 WRP and public perception misconstruing these as officially endorsed by TMWA. John Enloe, TMWA Director of Natural Resources, agreed and said TMWA is not advocating for or against these projects listed, and there are other projects that were not listed in the 2040 WRP simply because they were not ready to be made public. Mr. Foree added that TMWA does not currently have any contracts with these projects and any such projects would go before the Board for approval prior to any work by TMWA commencing.

Mr. Enloe said he and staff can modify the Other Conceptual Resources section introduction in Chapter 5 based on the discussion today and will provide the provide proposed language to Members Brekhus and Duerr prior to October for final approval of the 2040 WRP.

No action taken.

10. DISCUSSION AND ACTION ON RESOLUTION NO. 288: A RESOLUTION TO APPROVE FUNDING FOR THE PROJECTS RECOMMENDED BY THE TRUCKEE RIVER FUND ADVISORY COMMITTEE AND AN AUTHORIZATION FOR THE COMMUNITY FOUNDATION TO FUND SUCH PROJECTS FROM FUND PROCEEDS (RESOLUTION MAY REFLECT ACTION TAKEN IN ONE OR MORE VOTES ON RECOMMENDED PROJECTS)

Mr. Enloe presented the staff report for Board approval and referred to Project #244, Washoe County project regarding river encampment cleanup, in particular. Mr. Enloe informed the Board on the progress being made with the Portland Loo, which has been opened and in operation for over a month now and has been successful because of the outreach and communication with people along the river. They are also opening it an hour earlier in response to the public request because of the relationships being built with people along the river. He introduced Dana Searcy, Washoe County Project Coordinator, to provide the Board with more information regarding Project #244.

Ms. Searcy stated this project is innovative and is part of the Build for Zero project, which is a movement of over 80 different communities across the country to address homelessness in a comprehensive system. Here, it is a regional effort by over 33 different organization as well as all three jurisdictions, Cities of Reno and Sparks and Washoe County (under the County Manager's office). They are working closely together on two focus areas: in the short-term is to clean up the river through the work of the river stewards program, and long-term to improve the river corridor and water quality in our community and reduce the number of people along the river. Already, a lot of work has been accomplished through Grant Denton at Karma Box Project and the One Truckee River with the Portland Loo as well as all the outreach that occurring.

Members of the Board thanked Ms. Searcy for her contribution in the effort to address the homeless issue and collaborative work with partner agencies to pool resources to positively affect change. The Board discussed how the Built for Zero is the key to collecting data to track the program, connecting the jurisdictions with resources, and bringing them together. Ms. Searcy replied the County Manager's office is the lead and they will track all activities and monitor what is working well and how to replicate it without duplicating efforts, and the project will start October 1, 2020. Member Jardon commended Mr. Denton on the progress his initiative has made along the river and his continued communication with staff at the City of Reno.

Upon motion by Member Jardon, second by Member Duerr, which motion duly carried by six to zero of the members voting, the Board adopted Resolution No. 288: A Resolution to approve funding for the projects recommended by the Truckee River Fund Advisory Committee and an authorization for the Community Foundation to fund such projects from Fund proceeds. (Member Herman, who participated telephonically, did not indicate a vote on the item)

11. DISCUSSION AND ACTION, AND POSSIBLE DIRECTION TO STAFF TO EXPLORE POTENTIAL FUTURE AGREEMENT(S) WITH CITY OF RENO FOR IMPLEMENTATION OF AMERICAN FLAT ADVANCED PURIFIED WATER DEMONSTRATION PROJECT AND STAFF AND COST SHARING FOR WATER RESOURCE DEVELOPMENT WORK

Mr. Enloe introduced John Flansberg, City of Reno, to answer questions and informed the Board on the progress made regarding the A+ Feasibility Study Project at Reno-Stead, being the first of its sort in the state of Nevada, which will allow for recharge of 10 gallons per minute of advanced purified water. TMWA will show the science behind the project (TMWA has an engineering report which was provided to NDEP and an electronic copy can be provided); the last phase of the demonstration project will, after extensive water quality and geochemical testing, validate the water quality does not change once injected. A final report will be provided to NDEP by April 2021 and an executive summary can be provided to the Board at that time. TMWA has been working with agency partners for a number of years to get to this juncture and staff is requesting the Board to approve moving forward on working with City of Reno and bringing back an agreement(s) for approval.

The Board approved, and expressed full support for this project which ensures good management of water resources in the region. They inquired about the success of the proposed American Flat project considering that Bedell Flat did not succeed as expected. Mr. Enloe added the Bedell Flat project was in a remote location which had no infrastructure to recharge and after they conducted drilling tests to understand the hydrogeology, it showed an immediate response to pumping and did not have capacity to store water, which is when they switched to American Flat (they have been able to recharge potable water for 5 months at 500 gallons per minute). The Board asked whether nearby wells would be impacted by the project and to initiate a mitigation program for safety measures. TMWA and City of Reno staff are currently monitoring the site to ensure that irrigation needs are met and not over saturating the soil.

Member Anderson said this is a fantastic project and thanked Mr. Enloe and staff for all their work, and stated for the record he approves TMWA supporting a project that even though the City of Sparks will not see a direct benefit from, this will help City of Reno right now, and will count on in the future in years of drought; a great thing for the community as a whole.

Mr. Flansberg added that the City of Reno has expanded resources out there as well as TMWA along with OneWater Nevada and noted that it is a promising project, and location, to move forward with at this point, as well as to identify roles and responsibilities in Reno and appreciates the support.

Mr. Enloe added it is good for all entities and it addressed the City of Reno's issues. In addition, NDEP hosted a 2-hour public workshop on the feasibility study effort, which was well advertised, and approximately 50 people signed into the workshop.

Upon motion by Member Jardon, second by Member Duerr, which motion duly carried by six to zero of the members voting, the Board approved staff to explore potential future agreement(s) with City of Reno for implementation of American Flat Advanced Purified Water Demonstration Project and staff and cost sharing for water resource development work.

(Member Herman, who participated telephonically, did not indicate a vote on the item)

*Member Jardon left at 12:15pm.

Chair Hartung called for a recess at 12:16p.m.

Chair Hartung reconvened the meeting at 12:20pm

12 DISCUSSION AND ACTION REGARDING GENERAL MANAGER PERFORMANCE REVIEW FOR CONTRACT YEAR 2019/2020 AND DISCUSSION AND ACTION ON POSSIBLE PERFORMANCE LUMP SUM AWARD AND/OR OTHER COMPENSATION ADJUSTMENT

Jessica Atkinson, TMWA Human Resources Manager, presented the staff report and noted they received 100% responses on the survey for the first time; the summary of the results is attached to the staff report.

Mr. Foree stated he is not looking for, and did not want, any additional compensation and adjustments.

Members of the Board thanked Mr. Foree for all his work and dedication. Member Duerr requested for Mr. Foree address any rating identified as an “Area for Growth” such as Inter-local Cooperation, and Cooperative Communication,

Upon motion by Member Duerr, second by Member Brekhus, which motion duly carried by five to zero of the members voting, the Board accepted the report. (Member Herman, who participated telephonically, did not indicate a vote on the item)

13. DISCUSSION AND ACTION ON REQUEST FOR BOARD INPUT AND ACCEPTANCE OF GENERAL MANAGER PERFORMANCE OBJECTIVES FOR CONTRACT YEAR 2020/2021

Mr. Foree presented the report for his goals and objectives for the coming year including: the 2040 WRP for Board approval in October; working with the Cities of Reno and Sparks and Washoe County staff regarding regional water issues, including wastewater and effluent management, stormwater and the OneWater Nevada initiative; succession planning because three senior managers are set to retire within the next two years and the need to fill those positions; the Marlette Lake project now that the Memorandum of Understanding has been approved by the three parties, we will be working on identifying the amount of surplus water that could be available to TMWA; work with regional partners to develop and implement a digital plan review process; and continue working with NDEP and Washoe County District Health to further streamline and improve the plan review and approval process.

Upon motion by Member Brekhus, second by Member Duerr, which motion duly carried by five to zero of the members voting, the Board approved General Manager performance objectives for contract year 2020/2021. (Member Herman, who participated telephonically, did not indicate a vote on the item)

14. GENERAL MANAGER'S REPORT

Mr. Foree thanked the Board for their continued support, that he appreciated their comments and suggestions, and he will continue to work on the suggested areas to improve upon. He informed the Board that TMWA was recognized by WEF, as a utility of the future, which points to the OneWater Initiative and working with regional partners.

Mr. Enloe added that the recognition is due to the work with the Water Reuse Association and TMWA's involvement in the A+ water demonstration project; TMWA applied for the Innovative Partnership category.

15. PUBLIC COMMENT

There was no public comment.

16. BOARD COMMENTS AND REQUESTS FOR FUTURE AGENDA ITEMS

Member Duerr requested for an agenda item at a future meeting to address the possibility for TMWA to have the authority to take emergency action to temporarily shut-off water and repair a leak and then back bill the homeowner for the repairs.

17. ADJOURNMENT

With no further discussion, Chair Hartung adjourned the meeting at 12:43 p.m.

Approved by the TMWA Board of Directors in session on _____.

Sonia Folsom, Board Clerk.

****Member Brekhus was present for agenda items 2 thru 17 only.***

*****Member Jardon was present for agenda items 1 thru 11 only.***



STAFF REPORT

TO: Chairman and Board Members
THRU: Mark Foree, General Manager
FROM: TMWA Staff and Board
DATE: October 7, 2020
SUBJECT: **Recognition of Pyramid Lake Paiute Tribe Member Norman Harry**

The TMWA Board and staff would like to express our sincere condolences to the family of Norman Harry and the entire Pyramid Lake Paiute Tribe for their loss. Mr. Harry made invaluable contributions toward resolving a century of conflicts on the Truckee River and worked tirelessly on the Truckee River Operating Agreement. While he was an incredibly effective and staunch advocate for Pyramid Lake's interests in the Truckee River, he had the foresight and wisdom to recognize that those interests would be best protected and preserved for future tribal generations by securing an equitable compromise with other key river stakeholders such as TMWA and California. Throughout the decades-long TROA negotiation, Mr. Harry's soft-spoken and calm demeanor kept the many heated conversations from boiling over and causing issues with the negotiations. He dedicated himself to get the task accomplished and his perseverance, knowledge, and unwavering presence at the negotiation table provided a trustworthy and stable voice to the proceedings that no doubt was instrumental in completing TROA. Mr. Harry also contributed significantly to establishing Tribal water quality standards for the Truckee River.

TMWA, therefore, recognizes and thanks Norman Harry for his contributions to TROA and toward resolving conflicts on the Truckee River for the benefit of the Tribe and the Reno-Sparks community.



STAFF REPORT

TO: Chairman and Board Members
THRU: Mark Foree, General Manager
FROM: John Zimmerman, Water Resources Manager
DATE: October 21, 2020
SUBJECT: **Informational report regarding Hunter Creek Reservoir property public access and unauthorized uses**

SUMMARY

The Board requested a summary of recent issues regarding the ponds at TMWA's Hunter Creek reservoir property. Below is a summary of the history of the property, the recent complaints, and TMWA's response.

SITE HISTORY AND SPECIAL USE PERMIT

TMWA is required by a Washoe County special use permit to maintain a portion of the property as a landscaped area for aesthetic purposes to provide a buffer between the surrounding neighborhood and TMWA's Hunter Creek reservoir, tank, and water facilities.¹ The property was originally the site of a water treatment plant. Sierra Pacific Power Company sought to convert the treatment plant to a finished water covered reservoir site in 1995. Neighboring homeowners and the Juniper Ridge HOA were concerned about the visual impacts of the proposed reservoir and opposed the project. The homeowners and HOA eventually withdrew their protest on the condition that the County require Sierra to construct and maintain (in perpetuity) a landscaped area to act as an aesthetic buffer between the new reservoir and neighboring homes. The landscaped area also includes three ponds.

PUBLIC ACCESS AND UNAUTHORIZED USES

The Hunter Creek reservoir and all other TMWA water facilities on the property are within security fencing and closed to the public. The landscaped area is fenced and has three maintained access points that lead to a paved path, which meanders through the area. TMWA has installed pet waste stations at several places, provides trash cans, and pays for trash disposal. Sierra initially had bass and catfish placed in the ponds to control algae buildup and mosquitofish to control mosquitos. Until recently, staff observed only a few people fishing at the ponds occasionally and was not aware of any complaints about it so did not take any action to prevent

¹ The TMWA property and most of the surrounding neighborhood is within Washoe County and the Juniper Ridge subdivision is within the City of Reno.

it. Recently, however, staff have received complaints from several neighboring homeowners and the HOA regarding excessive pedestrian and vehicle traffic around the entrances, littering (including fishhooks), people urinating on the property because there are no restrooms, equestrian use and horse manure on the paved path, and noise. Staff have also received complaints about people trespassing across homeowners' properties to enter and exit the landscaped area. Staff believe the increase in traffic and fishing activity was largely caused by the ponds being listed on a fishing app that attracted anglers to the area (we have since had the app owner remove the ponds from the app).

TMWA'S RESPONSE

To reduce the above-described issues, staff determined it necessary to install signs to clearly state that: fishing, camping, campfires, and equestrian use are prohibited, access was limited to daylight hours only, access to the ponds was prohibited, and users must stay on the paved path and pick up after their pets. Staff also closed an unmaintained fourth access point that is not needed to get to the paved path and is located behind several homes in a more-secluded area of the property. Staff have received four emails from people asking TMWA to open the ponds to fishing and a phone call from one person upset at TMWA for installing the signs.

The special use permit requires the landscaped area to be maintained for aesthetic purposes as a buffer between the neighborhood and the Hunter Creek reservoir. The landscaped area has been open to the public but was not designed or intended to be used as a public park, equestrian trail, or fishing spot. TMWA does not provide parking, have staff monitor or patrol the area frequently, or provide public restrooms. The ponds were not intended or designed to provide a fishing spot and the special use permit does not require them to be open to, or accessible by, the public. Expanding the use of the area to allow access to the ponds and fishing, equestrian use, and a place for people to gather does not add to the aesthetic benefit of the area, which is its sole purpose. Lastly, TMWA does not have the staff time or expertise to operate, maintain, and regulate a fishing pond, public park, and equestrian trail and doing so would increase the cost to maintain the area and could raise questions regarding compliance with the special use permit.



STAFF REPORT

TO: Chairman and Board Members
THRU: Mark Foree, General Manager
FROM: Michele Sullivan, Chief Financial Officer
Sophia Cardinal, Principal Accountant
DATE: September 28, 2020
SUBJECT: **Required Communication from Eide Bailly in regards to TMWA's Annual Financial Audit**

Summary

The attached written communication from TMWA's external auditors, Eide Bailly, sets forth expectations for conducting and completing the audit of TMWA's financial statements and related disclosures for the fiscal year ended June 30, 2020. The Eide Bailly communication also defines the roles and responsibilities of TMWA's management, Eide Bailly, and the TMWA Board of Directors.



September 15, 2020

To the Board of Directors
Truckee Meadows Water Authority
Reno, Nevada

This letter is provided in connection with our engagement to audit the financial statements of Truckee Meadows Water Authority as of and for the year ended June 30, 2020. Professional standards require that we communicate with you certain items including our responsibilities with regard to the financial statement audit and the planned scope and timing of our audit.

Our Responsibilities

As stated in our engagement letter dated March 12, 2020, we are responsible for conducting our audit in accordance with auditing standards generally accepted in the United States of America and, in accordance with *Government Auditing Standards*, for the purpose of forming and expressing an opinion about whether the financial statements that have been prepared by management, with your oversight, are prepared, in all material respects, in accordance with accounting principles generally accepted in the United States of America. Our audit of the financial statements does not relieve you or management of your respective responsibilities.

Planned Scope of the Audit

Our audit will include examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; therefore, our audit will involve judgment about the number of transactions to be examined and the areas to be tested. Our audit is designed to provide reasonable, but not absolute, assurance about whether the financial statements as a whole are free of material misstatement, whether due to error, fraudulent financial reporting, misappropriation of assets, or violations of laws or governmental regulations. Because of this concept of reasonable assurance and because we will not examine all transactions, there is a risk that material misstatements may exist and not be detected by us.

Our audit will include obtaining an understanding of the entity and its environment, including its internal control, sufficient to assess the risks of material misstatement of the financial statements and as a basis for designing the nature, timing, and extent of further audit procedures. Our audit is not designed to express an opinion or provide assurance on internal control over financial reporting. However, we will communicate to you at the conclusion of our audit, significant matters that are relevant to your responsibilities in overseeing the financial reporting process, including any material weaknesses, significant deficiencies, and violation of laws or regulations that come to our attention.

We began our audit in May 2020 and issue our report by November 30, 2020.

This information is intended solely for the information and use of the Board of Directors and management of Truckee Meadows Water Authority and is not intended to be and should not be used by anyone other than these specified parties.

Respectfully,

A handwritten signature in cursive script that reads "Eric Bailly LLP".

Reno, Nevada



STAFF REPORT

TO: Board of Directors
THRU: Mark Foree, General Manager
FROM: John Enloe, Director, Natural Resources
DATE: October 14, 2020
SUBJECT: **Discussion and action, and possible direction to authorize General Manager to finalize and execute an Interlocal Agreement with City of Reno for cost sharing of the Basis of Design Report for Reno Stead Water Reclamation Facility (RSWRF) American Flat Aquifer Storage and Recovery Project**

Recommendation: Subject to Reno City Council approval, authorize the General Manager to finalize and execute an Interlocal Agreement (ILA) with City of Reno, substantially consistent with the terms and conditions described herein, for cost sharing of the Basis of Design Report (BODR) for RSWRF American Flat Aquifer Storage and Recovery Project.

Summary

City of Reno and TMWA are interested in pursuing advanced purified water investigations as partners under a more formal process. In September, both the TMWA Board and the Reno City Council gave direction to staff to explore potential future agreement(s) for implementation of American Flat Advanced Purified Water Demonstration Project and related work. To accomplish this effort, while at the same time ensuring equitability to our respective customers, Reno's and TMWA's responsibilities must be clearly defined. Responsibilities, staffing needs, and cost sharing agreements need to be developed for the following:

- Ongoing research and development efforts;
- Infrastructure planning, design, finance and construction of pre-treatment, pipe, pump, advanced treatment, recharge and recovery well facilities;
- Staffing needs, including long-term management, operations and maintenance;
- Future water resources, water rights management and potential water rights sales;
- Other matters as may be identified.

Over the last few months, the City of Reno and TMWA staff have worked collaboratively to develop the attached proposal and scope of work from AECOM for Developing Basis of Design Report for RSWRF American Flat Aquifer Storage and Recovery Project. This initial effort is the first step in the Project planning and design process, which will provide detailed, essential information to allow Reno and TMWA to develop future agreements for the responsibilities,

staffing needs, and cost sharing concepts as outlined above. The AECOM work includes the following tasks, scheduled to be completed by May, 2021:

- Task 2.1 Siting Evaluation
- Task 2.2 Capacity Evaluation and Reuse Needs
- Task 2.3 Establish Treatment Requirements and Sizing
- Task 2.4 Site Layouts and Pipeline Alignments
- Task 2.5 Local Permitting and Land Use Requirements
- Task 2.6 Regulatory Permitting Requirements
- Task 2.7 Project Implementation Schedule
- Task 2.8 Opinion of Probable Cost Development
- Task 2.9 Project Delivery Methodology
- Task 2.10 Draft Basis of Design Report
- Task 2.11 Final Basis of Design Report

City of Reno and TMWA staff desire to continue to work collaboratively, provide direction and input to the consultant, and share in the cost of this initial planning effort. To memorialize the terms and conditions of this cost sharing proposal, an Interlocal Agreement between Reno and TMWA is currently being prepared by staff. Time is of the essence and Reno staff plans to seek approval of this scope of work and Interlocal Agreement at their November 4, 2020 City Council meeting. The ILA will include the following terms and conditions:

1. ILA is based on joint funding of the attached proposal from AECOM for Developing Basis of Design Report for RSWRF American Flat Aquifer Storage and Recovery Project;
2. AECOM will be under contract with the City of Reno;
3. The scope of services will be conducted on a time and expense basis not to exceed \$347,700 without prior authorization;
4. The total contract amount will be shared 50% - 50% between Reno and TMWA;
5. Upon completion of the work, Reno will invoice TMWA for TMWA's share of the work, which TMWA agrees to pay within 30 days;
6. Recognition that the 50% - 50% cost sharing of this specific scope of work does not imply that future expenses related to American Flat Advanced Purified Water Demonstration Project and related work will be borne in this same proportion;
7. Recognition that this work product will be used to inform the City of Reno and TMWA for subsequent agreements related to responsibilities, staffing, cost sharing and other matters.

To facilitate this effort, staff is requesting TMWA Board approval and authorization to allow the General Manager to finalize and execute an Interlocal Agreement with City of Reno, based on the terms and conditions as outlined above.

Fiscal Impact: \$173,850, which was anticipated within the \$300,000 FY 2021 budget of the FY 2021 – 2025 Capital Improvement Plan, Raw Water Supply Improvements, Advanced Purified Water Demonstration Facility.

Attachment: AECOM scope of work

PROPOSAL FOR

**DEVELOPING BASIS OF DESIGN REPORT
FOR RSWRF AMERICAN FLAT AQUIFER
STORAGE AND RECOVERY PROJECT**



TABLE OF CONTENTS

SECTION 1 – SCOPE OF WORK	2
Project Background	2
Scope of Work	3
SECTION 2 – SCHEDULE	9
SECTION 3 – FEE AND RATES	11

SECTION 1

SCOPE OF WORK



SECTION 1

SCOPE OF WORK

PROJECT BACKGROUND

The City of Reno (City) and partnering local and regional agencies have been considering several seasonal effluent storage options for Reno Stead Water Reclamation Facility (RSWRF). During irrigation season, Nevada Category A reclaimed water from RSWRF is utilized for landscape irrigation, construction dust control, and other uses. Seasonal effluent storage is needed during the non-irrigation season. The main seasonal effluent storage options include: 1) aboveground open topped reservoir storage and 2) ASR.

As part of the overall effluent management planning, the City is currently evaluating the feasibility of aboveground effluent storage in an open topped reservoir. This reservoir concept is known as the Red Rock Reservoir. Algae growth is expected when effluent is stored in an open topped reservoir.

The reservoir will be sized to capture and contain the precipitation and runoff from the contributing hydrobasin. Some of the stored water will be lost due to evaporation, which will slightly increase the salinity of the stored water. Other water quality impacts from algal growth include increased turbidity and algal-related organic matter. Therefore, additional treatment such as dissolved air flotation for algae removal and refiltration will be required when stored effluent is utilized for irrigation during the following irrigation season.

The ASR option is a field-scale groundwater recharge demonstration project led by the OneWater Nevada team. The ASR project will include injection well groundwater recharge of purified water meeting the Nevada Category A+ exceptional quality requirements. Purified water stored in the aquifer will initially be extracted and utilized for irrigation. Long-term water quality will



Hampton Roads Sanitation District (HRSD) Sustainable Water Initiative for Tomorrow (SWIFT) Program will bring a broad spectrum of specific projects from concept to reality..



AECOM's Process Planning/Research group operates HRSD's Research Center that consists of 1 MGD pilot SWIFT facility.

be monitored. TMWA has performed a preliminary investigation of ASR capacity at the American Flat site and found promising results. The OneWater Nevada team is currently conducting an advanced purified water (APW) pilot-scale demonstration at RSWRF. This proposed BODR development effort is for the field-scale demonstration to be implemented through the regional partnership between the City, TMWA and partnering agencies under the OneWater Nevada initiative. While ASR requires a higher level of treatment to achieve Category A+ standards, it does not require substantial retreatment steps and eliminates evaporation water loss and associated salinity increase.

The primary goal of the proposed scope of work is to develop a BODR for the ASR. The City has contracted with Nevada Water Innovation Institute (NWII) to assist in the development of regional solutions and to coordinate effluent management planning activities with the OneWater Nevada regional team. Utilizing the existing NWII contract with City, Rick Warner with Warner Associates (a subcontractor under NWII), will provide input and support for this effort.

SCOPE OF WORK

The ASR will require the following project elements:

1. Pretreatment facilities, as-needed, upstream of RSWRF dual-media filters;
2. An advanced purified water facility (APWF) along with outreach and training facilities to be constructed offsite or at the RSWRF site;
3. Conveyance pipelines;
4. Pump station improvements;
5. Injection wells (planning and design of injection wells will be led by TMWA); and
6. Extraction wells (planning and design of extraction wells will be led by TMWA).

The proposed work will utilize previous efforts including the following:

- 2010 ECO:LOGIC Regional Integrated Wastewater System Planning Report
- 2010 ECO:LOGIC North Valleys Initiative Report
- 2019 Farr West North Valleys Facility Plan Report

HRSD SWIFT Program Management: The SWIFT Program Team is responsible for delivering a complex series of treatment plant upgrades, in addition to new SWIFT facilities at 5 WWTPs.



The following two APWF siting options will be considered during the BODR development:

- **Option 1 – APWF located Offsite:** Category A reclaimed water from RSWRF will be conveyed to a new facility to be located offsite of RSWRF via a new pipeline. Consideration of locating advanced filtration process at RSWRF and the rest of the processes in the OneWater Nevada APW treatment train at a new offsite facility will also be evaluated. Category A+ purified water from the APWF will be conveyed to the injection wells. City will provide the candidate sites.
- **Option 2 – APWF co-located at RSWRF:** RSWRF Category A reclaimed water will be further treated at a new facility to be co-located at the RSWRF site. Category A+ purified water will be conveyed to the injection wells via a new pipeline.

The objective of the proposed BODR effort is to establish the following:

- Locations for APWF, injection wells, extraction wells and conveyance system

- Treatment unit process and electrical power requirements
- Site layout
- Regulatory permitting requirements, to include input from TMWA and regional agencies
- Project delivery methodology
- Project implementation schedule
- Opinion of probable construction cost

The BODR will serve as a foundational document for future design and implementation steps. Suggested future next steps include the preparation of a preliminary design report (PDR), a 30% design, and a final design. AECOM's proposal includes the scope of work and proposed fee described below.

SCOPE OF SERVICES

AECOM will assist the City by performing the following:

Town of Davie, Florida Water Reclamation Facility, Water Treatment Plant and Potable Reuse Pilot: This project, which included a new 6-mgd water treatment plant (expandable to 12-mgd) and a 3.5-mgd expandable to 7-mgd water reclamation plant, won the 2014 *Project of the Year* by Florida DBIA.



TASK 1 COORDINATION WITH REGIONAL AGENCIES AND DATA REVIEW

Task 1.1 Coordination Meetings and Workshops

AECOM will convene up to five coordination workshops/meetings with the City, Truckee Meadows Water Authority (TMWA), OneWater Nevada team, Regional Effluent Management Team (REMT), University of Nevada, Reno (UNR)/NWII, and Warner Associates to discuss and obtain information on topics related to the BODR development, and to present the BODR findings. Topics to be covered in coordination meetings include the OneWater Nevada APW pilot-scale demonstration project, TMWA injection well/extraction well capacity investigation, and other ongoing effluent management activities. The ASR treatment, the public outreach and the training facility needs will be determined based on NDEP Category A+ requirements, stakeholder requirements, OneWater Nevada APW pilot results, and groundwater injection capacity. AECOM will present BODR findings at one of the workshops included in this task. AECOM will prepare agendas and meeting minutes.

Task 1.2 Data Review

AECOM will review pertinent data available for RSWRF, the proposed sites, and the proposed injection well sites including (but not limited to) site plans and location maps. City and TWMA to provide input on desired flow rates and transmission facilities.

Task 1 Deliverables

- Workshop/meeting agendas and minutes.

TASK 2 BASIS OF DESIGN REPORT DEVELOPMENT

Task 2.1 Siting Evaluation

AECOM will evaluate potential APWF sites (i.e., offsite and RSWRF site) and make a recommendation on the preferred APWF site for the City's consideration.

Siting evaluation includes, but not limited to the following factors:

- Considerations of locating advanced filtration options at RSWRF
- A high-level cost benefit analysis of having a dedicated Category A+ pipeline versus a shared Category A pipeline serving both the APWF site and future Category A customers



AECOM provided construction management services for the Groundwater Recovery Enhancement and Treatment (GREAT) program's Advanced Water Purification Facility (including UV AOP treatment units shown), for the City of Oxnard, California.

- Proximity to sewer versus other approaches for handling filter backwashes and other process drains
- Availability of space for handling off-spec water
- Environmental constraints
- Utility access

Task 2.2 Capacity Evaluation and Reuse Needs

Based on Task 1 review and discussion and review of the OneWater Nevada ASR capacity investigation results, AECOM will make recommendations on near-term and long-term treatment, injection capacities, and withdrawal needs. AECOM will also quantify the long-term reuse need and fate of the water extracted from the proposed ASR project, including potential land areas or

other high-level requirements for utilization of extracted water. This task will be completed with input from City as to the underlying assumption that future development will be required to utilize reclaimed water.

Task 2.3 Establish Treatment Requirements and Sizing

Based on the City's decision regarding the APWF site and injection rates, AECOM will establish treatment and conveyance requirements. Based on those requirements, AECOM will develop:

- Preliminary sizing of treatment process units and electrical power requirements
- Preliminary sizing of backwash and off spec flow management facilities
- Preliminary alignments and sizing of conveyance pipelines. AECOM will consider both a west and east of Stead Airport Pipeline alignment options
- Preliminary sizing of injection and extraction wells, based on input from TMWA.
- An outline for a wastewater collection system source control plan
- A conceptual plan for utilizing the existing agricultural/irrigation operation infrastructure at American Flat
- Process flow diagrams to serve as the basis for process and instrumentation diagrams during detailed design

Task 2.4 Site Layouts and Pipeline Alignments

Task 2.4.1 NWII Center needs

AECOM will facilitate an additional (1) workshop with City, TMWA and OneWater Team to discuss the needs for a NWII Center. AECOM will be part of this discussion, but City, TMWA and OneWater Team (including Warner Associates and NWII) will be primarily responsible for this task.

Task 2.4.2 Site Layouts and Pipeline Alignments

Based on Task 2.3, AECOM will develop site layouts and figures illustrating:

1. Preliminary pipeline alignments;
2. Locations of APWF;
3. Backwash and off spec flow management facilities;
4. Outreach/training facilities;
5. Injection and extraction wells;
6. Land requirements; and
7. Location of the existing American Flat Farm project, including intake structure at Swan Lake and temporary pipeline.

The BODR will include graphics and CAD renderings sufficient for clarity but will not include design drawings.

Task 2.5 Local Permitting and Land Use Requirements

AECOM will identify the requirements to obtain the necessary approvals from Washoe County Board of Adjustment and City of Reno regarding the American Flat site and pipeline land use.

Task 2.6 Regulatory Permitting Requirements

AECOM will assist City, TMWA, and partner agencies in identifying regulatory compliance and permitting requirements for the construction and operation of ASR. Based on the input from City, TMWA, and partner agencies, AECOM will summarize

permit requirements, approval agencies, and corresponding timelines. AECOM will also identify regulatory and permitting requirements that may have impacts on the co-use of the American Flat site for Swan Lake Stormwater Disposal, the contemplated ASR project, and long-term irrigation with both Class A effluent and/or water extracted via ASR. AECOM will work through TMWA and Warner Associates as primary leads for all contacts with NDEP.

Task 2.7 Project Implementation Schedule

AECOM will develop a preliminary ASR implementation schedule identifying design, permitting, and construction timelines, critical milestones, and major considerations, including Environmental Permitting. The recommendations will include input from TMWA as the identified operator of all injection/extraction facilities.

Task 2.8 Opinion of Probable Cost Development

AECOM will develop AACE Class 4 OPC for the ASR project. OPC will be accompanied by a list of assumptions utilized in developing the OPC. The OPC will include costs associated with designing, constructing, commissioning, operating, and maintaining the aforementioned project elements.

Task 2.9 Project Delivery Methodology

AECOM will provide an analysis of the advantages and disadvantages of traditional Design-Bid-Build method and an alternative project delivery method that could be

Ozone Generator at the Burloak Water Treatment Plant, Halton Region, Ontario, Canada.



applied to design and construction of the project and conduct a joint workshop with the City and TMWA, to recommend the preferred delivery method.

Task 2.10 Draft BODR

A draft BODR documenting recommendations and findings of Task 2.1 through Task 2.9 will be submitted to the City, TMWA and OneWater Team for review.

Task 2.11 Final BODR

A final BODR will be submitted to the City, TMWA and OneWater Team after incorporating review comments.

Task 2 Deliverables

- Draft and Final BODR.

TASK 3 EVALUATION OF STRATEGIES TO ADDRESS POTENTIAL SEASONAL STORAGE OPERATIONAL ISSUES

AECOM will evaluate strategies to address potential operational issues of having both aboveground reservoir and ASR in operation at the same time. Operational strategies including number of conveyance pipelines and sizes, timing of fill and withdrawal of aboveground reservoir, retreatment facilities location and mode of operation, and management of Category A (from RSWRF and withdrawn from the reservoir) and Category A+ (for injection) will be evaluated. This work will be documented in a draft memorandum. AECOM will submit a final memorandum reflecting City review comments.

Task 3 Deliverables

- Draft and Final memoranda.

TASK 4 MEETINGS AND PROJECT MANAGEMENT

Project management includes project billing, scheduling, coordination, and regular meetings to monitor project progress to

meet schedule deadlines and coordinate with City and TMWA staff. Bi-weekly progress phone calls and project milestone meetings and up to five (5) workshops (same workshops as identified in Task 1.1) will be held to keep the City, TMWA and OneWater Team updated on the project's status and deliverables.

Task 4 Deliverables

- Monthly invoices, progress meeting minutes.

TASK 5 CONTINGENCY

The hours budgeted under Task 5 - Contingency will only be utilized after receiving authorization from the City of Reno Project Manager.

Task 5.1 As-needed Contingency

As-needed contingency hours are budgeted to address potential project tasks beneficial for the project and requested by the City and not explicitly described in this scope of services.

ASSUMPTIONS:

- Services will be provided on a time and materials not-to-exceed basis (T&M NTE).
- TMWA will provide capacity and design requirements for the injection and extraction wells.
- Regulatory discussions and outreach activities will be led by TMWA, City and the regional team. AECOM will provide as-needed assistance.

SECTION 2

SCHEDULE



SECTION 2

SCHEDULE

AECOM understands the importance of establishing and maintaining reliable project schedules. We are prepared to assist the City in meeting all major milestones that are established for this project. We take pride in our reputation for completing projects on time, which comes from our attention to project planning and our ability to provide experienced personnel to carry out the work.

The figure on the following page illustrates our proposed preliminary project schedule, showing main tasks and subtasks with estimated task durations, dependencies, and major milestones.

SECTION 2 Schedule

SECTION 3

FEE AND RATES



SECTION 3

FEE AND RATES

PROPOSED FEE

AECOM is proposing to conduct the scope of services identified above on a time-and-materials basis not to exceed \$347,700.00. The detailed breakdown of the proposed fee is included in Attachment 1 - Estimate of expenditures.

Task No.	Task Description	Fee
1	Coordination Meetings and Data Review	\$ 31,720.00
2	Basis of Design Report	\$ 223,150.00
3	Seasonal Storage Operational Issues & Strategies	\$ 11,560.00
4	Project Management	\$ 23,320.00
5	Contingency	\$ 57,950.00
TOTAL		\$347,700.00

City of Reno Department of Public Works
Estimated Cost Breakdown of Total Fee
for
American Flat Aquifer Storage and Recovery Basis of Design Report
October 12, 2020



	Vijay Sundaram, PhD, PE Project Manager	Tom Guinn, PE Project Controls & QA Officer	Paul Delphos, PE QA/QC	Simon Breese, P.Eng. QA/QC	Joe Huang, PE Treatment Lead	Craig Smith, PE Conveyance Lead	Gabriel Perigault, PhD, PE Effl. Mgmt. & Permitting Lead	Alex Franchi, PhD, PE Sr. Adv. Treatment Engineer	Wastewater Process Engineer	Dwayne Deutscher, PE Sr. Civil Engineer	Bin Ge, PE Structural Engineer	Raul Aviles, PE Sr. Electrical Engineer	Kunal Rathatha I&C Engineer	Quirien Muylywyk, P.Eng. Sr. Water Quality Specialist	Martin Hammer Sr. Cost Estimator	Natasha Raykhman, PG Sr. Hydrogeologist	Cad/Graphics Designer	Admin/Word Processor	Direct Costs (Reproduction and Mileage)	TOTAL
Billing Rate (\$/hr.)	\$ 280	\$ 230	\$ 280	\$ 280	\$ 250	\$ 250	\$ 250	\$ 250	\$ 150	\$ 230	\$ 175	\$ 280	\$ 175	\$ 280	\$ 280	\$ 280	\$ 150	\$ 100	-	-
Task 1 - Coordination Meetings and Data Review																				
1.1 Coordination Meetings and Workshops	40	8			8		16			8									\$ 1,500	\$ 22,380
1.2 Data Review	8	4			4	2	4	4	8	4						2				\$ 9,340
Task 2 - Basis of Design Report																				
2.1 Siting Evaluation	8	4	2	2	8	4	8	4	24	4								8		\$ 15,600
2.2 Capacity Evaluation and Reuse Needs	4	2					8		8				8				8			\$ 7,380
2.3 Establish Treatment Requirements and Sizing	8	8	2	2	16	8	16	16	40	8	4	8		4						\$ 31,100
2.4 Site Layouts and Pipeline Alignments																				
2.4.1 NWII Center Needs	12	4																	\$ 250	\$ 4,530
2.4.2 Site Layouts and Pipeline Alignments	8	16	2	2	24	8	24	24	40	24	4	4				4	24			\$ 45,100
2.5 Local Permitting and Land Use Requirements	4	16							8											\$ 6,000
2.6 Regulatory Permitting Requirements	8	8					18		16							4				\$ 12,100
2.7 Project Implementation Schedule	4	4			4		8	4	4											\$ 6,640
2.8 Opinion of Probable Cost Development	4	4	1	1	8	4	4	4	8	4					16					\$ 13,400
2.9 Project Delivery Methodology	2	4					24	4	8											\$ 9,680
2.10 Draft BODR	16	8	4	4	24	8	24	24	80	24	4	4	4	4	4	4	40	24	\$ 200	\$ 60,360
2.11 Final BODR	4	2	1	1	4	2	4	4	16	2						2	8	8	\$ 200	\$ 11,260
Task 3 - Seasonal Storage Operational Issues & Strategies																				
3.1 Evaluate Strategies to Address Operational Issues	8	4	2		4		16		4					8						\$ 11,560
Task 4 - Project Management																				
4.1 Kickoff Meeting	8	8																	\$ 200	\$ 4,280
4.2 Progress Meetings	16	24																		\$ 10,000
4.3 Project Controls	4	24																24		\$ 9,040
Task 5 - Contingency																				
5.1 Project Contingency																				\$ 57,950
Subtotal Hours	162	152	14	12	104	36	174	88	264	78	12	16	12	16	20	16	80	64	\$ 2,350	\$ 347,700



Imagine it.
Delivered.

AECOM is the world's premier infrastructure firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to consulting and construction management. We partner with our clients in the public and private sectors to solve their most complex challenges and build legacies for generations to come. On projects spanning transportation, buildings, water, governments, energy and the environment, our teams are driven by a common purpose to deliver a better world. AECOM is a *Fortune 500* firm with revenue of approximately \$20.2 billion during fiscal year 2019. See how we deliver what others can only imagine at aecom.com and [@AECOM](https://twitter.com/AECOM).



STAFF REPORT

TO: Board of Directors
THRU: Mark Foree
FROM: John Enloe, Director, Natural Resources
Kara Steeland, Hydrologist
DATE: October 7, 2020
SUBJECT: Discussion and action, and possible direction to staff regarding approval of the TMWA 2020-2040 Water Resource Plan

Recommendation

Staff recommends that the Board approve the 2020-2040 Water Resource Plan (WRP).

Summary

The 2020-2040 WRP will guide TMWA in effectively managing water resources in the region over the next five years, until the next plan revision. TMWA's WRP provides an in-depth analysis of water supply and demand over the next 20 years. This updated and redesigned version of the WRP will be a valuable tool in helping further inform the public about water supply and management in the Truckee Meadows.

The WRP is available in Attachment A. The final version of the plan is very similar to the draft WRP presented to the Board in September 2020. Minor edits were made to the introduction of the Other Conceptual Resources section in Chapter 5 based on Board input. The new language in Chapter 5 is intended to clarify TMWA's purpose in including conceptual private projects in the WRP. It states:

"The following descriptions are of privately prepared water supply projects that are conceptual in nature and are promoted by project proponents as possible regional water resources. These projects have not been vetted for feasibility by TMWA, permitted, or constructed. Identification of a conceptual project shall not be construed as an indication of TMWA support or opposition of any project nor an indication of project viability. The list is not exhaustive and is intended to merely identify some potential projects for informational purposes."

Some key elements of the 2020-2040 WRP update include:

- Public input incorporated from the beginning of plan development through a public survey.
- Updated formatting that includes user-friendly elements, such as sidebars, images, at-a-glance sections, and chapter overviews.
- In-depth study on the possible impacts of climate change on the region's water resources to the end of the century.
- Analysis of potential future water supply options.
- Explanation of TMWA's efforts to protect the watershed and environment.
- Recommended actions to guide TMWA over the next five years.

The draft WRP was presented to the following groups:

- Four public webinars (via Zoom and Facebook)
- Northern Nevada Water Planning Commission
- Western Regional Water Commission
- TMWA Standing Advisory Committee
- Nevada State Engineer
- Several Nevada legislators
- TMWA All-Employee Meeting

Public comments and questions received during the presentations and via the online comment form have been addressed in a question and answer page posted on <https://tmwa.com/wrp2020/>. TMWA will be announcing the final WRP to its customers in the November bill insert to further increase awareness about plan completion and water resource management in the Truckee Meadows. TMWA intends to use the WRP to further the existing Smart About Water goal of establishing high levels of regional water-management knowledge among civic, political, and public stakeholders. An infographic regarding the 2020-2040 WRP update is provided in Attachment B.

Attachments

Attachment A: TMWA 2020-2040 Water Resource Plan

Attachment B: TMWA WRP November Bill Insert Infographic

2020-2040 Water Resource Plan





Lake Tahoe Dam

TO OUR CUSTOMERS

Since 2001, Truckee Meadows Water Authority (TMWA) has drafted its Water Resource Plan (WRP) to analyze future conditions and outline strategies to meet the region's drinking water needs. From the lowest snowpack year in recorded history (2015) to the wettest water year on record (2017), TMWA has effectively managed its water resources to provide a resilient and reliable water supply for the region.

Diligent planning requires an analysis of a broad range of future conditions. Accordingly, the 2020–2040 WRP incorporates climate and population scenarios that effectively stress-test the community's water system for the next 20 years and beyond.

To adapt to changes over time, the WRP is updated every five years. This current revision occurred over 18 months and incorporated customer survey feedback from the beginning. Of the customer insights collected, the top concerns related to two topics: population growth and extreme climate variation. These topics are woven throughout this plan. The following pages provide readers insight into TMWA's water resource management strategies and the future of drinking water in the region.

Many contributors were essential to the completion of this plan. TMWA would like to thank its customers for their invaluable feedback, which helped shape the 2020-2040 WRP. Additionally, TMWA extends its appreciation for contributions made by the following organizations and agencies:

- TMWA Board of Directors
- Precision Water Resources Engineering
- Western Regional Water Commission
- Northern Nevada Water Planning Commission
- Truckee Meadows Regional Planning Agency

TABLE OF CONTENTS

ES	EXECUTIVE SUMMARY	1
1	INTRODUCTION	6
	Plan Introduction	7
	About TMWA	8
	TMWA's Service Area	8
	Plan Goals and Objectives	10
	Plan Scope	10
	Plan Update Process	11
	Major Events since Previous Water Resource Plans	12
	Summary	13
2	CURRENT WATER RESOURCES	15
	Surface Water Resources	17
	Truckee River Watershed and the Truckee River Operating Agreement (TROA)	18
	Groundwater Resources	21
	Conjunctive Use	24
	Water Rights	24
	Reclaimed Water	26
	Summary	28
3	CURRENT AND FUTURE PLANNING ENVIRONMENT	30
	Droughts	31
	Climate Change	34
	Future Water Demand Projections	35
	Future Water Supply Scenarios	36
	Adaptive Management	40
	Development and Growth in the Region	42
	Washoe County Question #3	43
	Water System Resiliency	44
	Summary	45

4	CONSERVATION STRATEGIES	47
	Drought Contingency Plan	48
	Ongoing Conservation Initiatives	48
	Drought Response	52
	Summary	55
5	FUTURE WATER RESOURCES	57
	Treatment of Existing Groundwater Resources	59
	Additional Groundwater Capacity	61
	Creek Water Resources	63
	Marlette Lake Water System – Wholesale Service	64
	Reclaimed Water	65
	Advanced Purified Water (OneWater Nevada)	66
	Water Banking Projects	68
	Other Conceptual Resources	69
	Summary	71
6	PROTECTING THE WATERSHED AND ENVIRONMENT	73
	Watershed Protection and Restoration Initiatives	74
	Sustainability	79
	Summary	79
7	RECOMMENDED ACTIONS	81
	Completed Recommended Actions and Policies	82
	2020–2040 WRP Recommended Actions	83
	Summary	88
8	APPENDICES	90
	Appendix A	91
	Appendix B	96
	Appendix C	106
	Appendix D	109

FIGURES

FIGURE 1-1: MAP OF TMWA'S SERVICE AREA, WATER TREATMENT PLANTS, ACTIVE PRODUCTION WELLS, AND SATELLITE SYSTEM	9
FIGURE 1-2: VISUAL REPRESENTATION OF TMWA'S INTEGRATED PLANNING APPROACH	10
FIGURE 2-1: DIAGRAM OF THE TRUCKEE RIVER SYSTEM	19
FIGURE 2-2: LAKE TAHOE ELEVATIONS FROM 1986 TO 2019	20
FIGURE 2-3: MAP OF TMWA WELLS PERMITTED FOR RECHARGE	23
FIGURE 2-4: SOURCES TO MAKE TMWA ANNUAL WATER SUPPLY FROM 1990 TO 2019	24
FIGURE 2-5: CONVERSION OF TRUCKEE RIVER RIGHTS OVER TIME	26
FIGURE 3-1: LAKE TAHOE ELEVATIONS DURING DROUGHT PERIODS FROM 1986 TO 2018	32
FIGURE 3-2: TMWA UPSTREAM MAXIMUM STORAGE VS. AMOUNT OF STORED WATER USED FROM 1985 TO 2019 ...	33
FIGURE 3-3: MEAN TEMPERATURE DEPARTURE FOR NEVADA FROM 1895 TO 2018	34
FIGURE 3-4: PROJECTED GLOBAL MEAN TEMPERATURE CHANGE UNDER EACH RCP	35
FIGURE 3-5: TMWA'S WATER DEMAND PROJECTION FOR 2020 TO 2040	36
FIGURE 3-6: LAKE TAHOE ELEVATION AND TMWA ANNUAL PROJECTED SOURCES OF SUPPLY THROUGH 2098 UNDER HISTORICAL SCENARIO	37
FIGURE 3-7: LAKE TAHOE ELEVATION AND TMWA PROJECTED ANNUAL SOURCES OF SUPPLY THROUGH 2098 UNDER RCP 4.5	38
FIGURE 3-8: LAKE TAHOE ELEVATION AND TMWA PROJECTED ANNUAL SOURCES OF SUPPLY THROUGH 2098 UNDER RCP 8.5	39
FIGURE 3-9: WASHOE COUNTY POPULATION VERSUS TMWA ANNUAL WATER PRODUCTION	43
FIGURE 4-1: POPULATION SERVED BY TMWA AND RESIDENTIAL PER-CAPITA DAILY WATER USE	50
FIGURE 4-2: TMWA DROUGHT SEVERITY LEVEL FLOWCHART	53
FIGURE 5-1: LOCATIONS OF POTENTIAL FUTURE WATER RESOURCES FOR THE TRUCKEE MEADOWS	70

TABLES

TABLE 2-1: ACTIVE PRODUCTION WELLS BY HYDROGRAPHIC BASIN	22
TABLE 2-2: TMWA WATER RIGHTS	27
TABLE 2-3: 2018 RECLAIMED WATER USE	27
TABLE 2-4: SOURCES OF TRIGID RETURN FLOW RESOURCES	28
TABLE 4-1: DROUGHT SEVERITY LEVEL RESPONSE TIMELINE CHART	54
TABLE 4-2: CONSERVATION ACTIONS AND DROUGHT SITUATION SEVERITY	55
TABLE 5-1: ESTIMATED YIELD OR CAPACITY OF FUTURE WATER RESOURCE PROJECTS	58
TABLE 5-2: BENEFITS AND CHALLENGES OF SPARKS GROUNDWATER TREATMENT FACILITY	59
TABLE 5-3: BENEFITS AND CHALLENGES OF NITRATE TREATMENT	60
TABLE 5-4: BENEFITS AND CHALLENGES OF LONGLEY LANE WATER TREATMENT FACILITY	60
TABLE 5-5: BENEFITS AND CHALLENGES OF SOUTH TRUCKEE MEADOWS WATER TREATMENT FACILITY	61
TABLE 5-6: BENEFITS AND CHALLENGES OF NEW WELL DEVELOPMENT	62
TABLE 5-7: BENEFITS AND CHALLENGES OF ASR EXPANSION	62
TABLE 5-8: BENEFITS AND CHALLENGES OF ADDITIONAL FISH SPRINGS RANCH WATER	63
TABLE 5-9: BENEFITS AND CHALLENGES OF CREEK WATER RESOURCES	64
TABLE 5-10: BENEFITS AND CHALLENGES OF MARLETTE LAKE WATER SYSTEM WHOLESALE SERVICE	64
TABLE 5-11: BENEFITS AND CHALLENGES OF RECLAIMED WATER	65
TABLE 5-12: BENEFITS AND CHALLENGES OF ADVANCED PURIFIED WATER	67
TABLE 5-13: BENEFITS AND CHALLENGES OF WATER BANKING PROJECTS	69

LIST OF ACRONYMS

AIS	Aquatic Invasive Species	SAC	Standing Advisory Committee
AF	Acre-Feet	SDF	State of Nevada Demographer Forecast
AFA	Acre-Feet Annually	SNOTEL	Snow Telemetry
ASR	Aquifer Storage Recovery	STMGID	South Truckee Meadows General Improvement District
CAB	Citizen Advisory Board	STMWRF	South Truckee Meadows Water Reclamation Facility
CFS	Cubic Feet per Second	SWE	Snow Water Equivalent
CIP	Capital Improvement Plan	SWPA	Source Water Protection Area
CTMRD	Central Truckee Meadows Remediation District	TCID	Truckee Carson Irrigation District
DRI	Desert Research Institute	TDS	Total Dissolved Solids
EPA	Environmental Protection Agency	TMRPA	Truckee Meadows Regional Planning Agency
GCM	General Circulation Model	TMSA	Truckee Meadows Service Area
GPM	Gallons per Minute	TMWA	Truckee Meadows Water Authority
GWTF	Groundwater Treatment Facility	TMWRF	Truckee Meadows Water Reclamation Facility
ISWPP	Integrated Source Water Protection Plan	TNC	The Nature Conservancy
JPA	Joint Powers Agreement	TRF	Truckee River Fund
MCL	Maximum Contaminant Level	TRFMA	Truckee River Flood Management Authority
MGD	Million Gallons per Day	TRIC	Tahoe Reno Industrial Center
NAB	Neighborhood Advisory Board	TRIGID	Tahoe Reno Industrial General Improvement District
NDEP	Nevada Division of Environmental Protection	TROA	Truckee River Operating Agreement
NDOT	Nevada Department of Transportation	UNR	University of Nevada, Reno
NNWPC	Northern Nevada Water Planning Commission	USACE	United States Army Corps of Engineers
NRCS	Natural Resource Conservation Service	USFS	United States Forest Service
OTR	One Truckee River	USGS	United States Geological Survey
PCE	Tetrachloroethylene	WCF	Washoe County Consensus Forecast
PLPT	Pyramid Lake Paiute Tribe	WCM	Water Control Manual
POSW	Privately Owned Stored Water	WDWR	Washoe County Department of Water Resources
PWRE	Precision Water Resources Engineering	WHPP	Wellhead Protection Plan
RCP	Representative Concentration Pathway	WRP	Water Resource Plan
RPGB	Regional Planning Governing Board	WRWC	Western Regional Water Commission
RWMP	Regional Water Management Plan	WTP	Water Treatment Plant
RSF	Rate Stabilization Fund	WUR	Water Usage Review
RSWRF	Reno-Stead Water Reclamation Facility		



ES

EXECUTIVE SUMMARY

Lake Tahoe

CHAPTER OVERVIEW

Truckee Meadows Water Authority (TMWA) is a not-for-profit, community-owned water utility overseen by a seven-member Board of Directors from Reno, Sparks, and Washoe County. TMWA was formed in 2001 and currently serves over 425,000 residents in the Truckee Meadows. TMWA's primary objective is to provide reliable, high-quality water service to its customers in an efficient, cost-effective manner.

TMWA's Water Resource Plan (WRP), updated every five years, is a long-range planning and management document that spans a 20-year period. The 2020–2040 WRP describes how the utility will meet the drinking water supply needs of current and future customers in the Truckee Meadows. This version of the WRP builds on the four previous versions of the plan and focuses on how regional conditions have changed since the last update in 2016. TMWA's planning efforts and water resource management practices have ensured a reliable, resilient water supply now and into the future.

PLAN UPDATE PROCESS

The 2020–2040 WRP looks different from TMWA's previous plans with more emphasis on future conditions and analysis of TMWA's water resources and their ability to provide a reliable water supply under variable climate conditions and continued population growth. A major goal of this plan update is to increase the usability and approachability of this document for local decision makers and the public. In this regard, community feedback has guided the structure of this plan, with content that directly addresses topics that TMWA customers want to know about.

At the beginning of the plan update process, TMWA distributed an electronic survey to the community. The top three issues the public wanted to see addressed in the WRP were

- Growth and future water demand
- Future availability of existing resources
- The state of our current water resources

These issues are discussed throughout the WRP, providing transparency on how the planning process factors in growth and water availability to ensure a sustainable water supply for the region.

CURRENT WATER RESOURCES

TMWA has a diverse water supply, with a mix of surface and groundwater resources. Surface water includes the Truckee River, upstream reservoir storage, and creek resources. The Truckee River Operating Agreement (TROA), implemented in 2015, provides additional upstream drought storage and operational flexibility for TMWA. Groundwater resources include 89 production wells in nine hydrographic basins, including five production wells in Honey Lake Valley as part of the Fish Springs Ranch water supply project. Through its aquifer storage and recovery (ASR) program, TMWA augments its groundwater supply by injecting treated surface water into many of its production wells during the winter, when customer demand is lower. With this mix of water

resources, TMWA is able to conjunctively manage its water supply by utilizing mostly surface water when demand is low and supplementing with groundwater when demand is higher in the summer months or during drought periods.

WATER CONSERVATION

TMWA is a steward of the region's water resources and promotes the efficient use of water in drought and non-drought years. Due to TMWA's ongoing conservation programs, among other factors, municipal residential per capita demand has decreased by 30% since the early 2000s, even though TMWA's customer base has grown by approximately 30%. TMWA has many education and outreach programs focused on water conservation, particularly during the summer months, when customer demand can be three to four times higher than wintertime use, primarily due to landscape irrigation. When the region is experiencing a drought, TMWA can enact enhanced conservation measures to help decrease demand to minimize the use of drought reserves.

ADAPTING TO CHANGE

Many factors can impact the region's drinking water supply and demand, including population growth, economic cycles, and climate conditions. The WRP considers these factors to ensure that available water resources are sufficient for TMWA's current and future customers. A goal of the WRP is to show that TMWA can reliably meet customer demand under a range of potential future conditions, including extended droughts. Accordingly, supply and demand scenarios are incorporated into the plan to indicate any areas where action needs to be taken to address possible water supply challenges in the future.

FUTURE DEMAND & GROWTH

Estimating future demand is largely a function of projected population growth for the Truckee Meadows. TMWA's 20-year water demand projection estimates that water demand will increase 15% from approximately 83,000 acre-feet in 2020 to 96,000 acre-feet in 2040. All new developments

served by TMWA are required to dedicate water rights to meet the project's estimated water demand. For every acre foot of surface water rights needed for new development, an additional 11% of water rights must be dedicated to TMWA for drought storage. To meet anticipated future demand, TMWA will rely primarily on the conversion of Truckee River water rights from irrigation to municipal use along with Fish Springs Ranch groundwater.

WATER SUPPLY SCENARIO PLANNING

Droughts are a common occurrence in Northern Nevada, and to capture a worst-case scenario TMWA uses the worst historic drought on record, lasting from 1987 to 1994, for planning purposes. Climate change is also factored into this plan, as data show that the region has been warming over the past several decades. In recognition of both, TMWA evaluated a range of scenarios featuring historic drought cycles, climate warming trends, and future greenhouse gas emission projections. These scenarios were created using the most up-to-date climate change research for the region. TMWA ran multiple climate scenarios through the operations model for the Truckee River to determine how municipal water supply may be affected from now until 2098. The results of this research give insight into the resiliency of TMWA water resources under various future conditions.

“TMWA’s primary objective is to provide reliable, high-quality water service to its customers in an efficient, cost-effective manner.”

In the near and long-term, the modeling effort demonstrates that TMWA has sufficient water resources to meet the growing demand in the region under almost all climate conditions modeled. No water shortages were found under any of the climate scenarios during the 20-

year planning horizon. Some water shortages were seen in the latter half of the century, with much higher customer demand levels under the climate change models. [Ch. 3](#) includes a detailed explanation of these results. Shortfalls were identified under a conservative approach that did not account for many of the water resources the region could possibly obtain over the next 50+ years. Uncertainty is a given, especially toward the end of the century when there are many variables that cannot be accurately predicted at this time. TMWA uses the best science available when making resource planning decisions and will continue to model future conditions as the projections and modeling science change.

One of the most significant adaptations that would improve the future water supply outlook for the Truckee River Basin is the reoperation of the federally owned flood control reservoirs in the region, including Prosser, Stampede, and Boca Reservoirs. TMWA and other partners applied for and received a grant through the Bureau of Reclamation in September 2019 to provide the necessary hydrologic modeling and develop new guidelines to allow TMWA and others to store water earlier in the runoff season, based on forecast-informed reservoir operations. Results from this project will be presented in TMWA’s next WRP.

FUTURE WATER RESOURCES

TMWA has sufficient water resources and additional water rights are available to meet anticipated demand in 2040 and beyond. To further expand TMWA’s water resource portfolio and increase drought supplies and off-river resources, the WRP identifies future water supply projects. Most of the identified projects would provide relatively small quantities of water to the region but are important for expanding and diversifying the community’s water supply portfolio. Each future resource includes an analysis of the possible benefits and challenges associated with project implementation. Potential future projects include groundwater expansion and treatment

of existing groundwater resources, increased use of creek water resources, Marlette Lake Water System wholesale service, and water banking projects. Additionally, OneWater Nevada, which includes TMWA and a diverse group of regional partners, is exploring innovative water treatment technologies to determine the feasibility of using advanced purified water to enhance water resource sustainability and drought resiliency.

ENVIRONMENTAL PROTECTION INITIATIVES

TMWA recognizes that a healthy, thriving Truckee River watershed is essential to having a high-quality water supply and providing benefits for the community as a whole. To help protect the watershed and its water quality, TMWA created the Truckee River Fund which provides grants to local agencies and organizations that are working on projects to protect and enhance the river environment. Sustainability is also a key component of TMWA's operational strategy. For example, when its three run-of-the-river hydroelectric plants are running at capacity, TMWA eliminates over 90,000 pounds of CO₂ emissions per day, which offsets approximately 75% of the power used by TMWA to produce and deliver treated water throughout the community.

IMPLEMENTING THE WRP

Continued success in managing a resilient water supply for the region will come with the continuation of clear guidance, straightforward action paths, and supportive policies. Based on the findings throughout the WRP, recommended actions fall under three categories for the TMWA Board to consider and act on:

1. Water Resource Planning

These recommendations include the continuation of TMWA's water resource planning process, analysis of the geographic extent of TMWA's planning area, and criteria regarding small water system acquisitions.

2. Management of Current Water Resources

Recommendations in this category address TMWA's current water resource management strategies, which include continued conjunctive use of resources and expansion of the ASR program. Also included are recommended actions related to the acquisition of water rights, implementation of water conservation measures, and continuation of work on source water protection efforts and emergency water supply standards.

3. Future Water Demand and Resources

These recommendations include continued analysis of future population and water demand, adaptive management to address potential climate change conditions, coordination on regional efforts for regional effluent management and advanced purified water pilot projects, and continued investigation and evaluation of potential future water supply projects.

CONCLUSIONS

TMWA's WRP accounts for changes over time, while effectively charting the next 20 years of water resource management for the region. Although this plan is formally updated every five years, TMWA constantly analyzes supply and demand conditions and adapts its water management strategies as needed. The 2020–2040 WRP, and subsequent future updates, will help guide TMWA in confronting any potential water challenges to ensure that it continues to deliver reliable, high-quality drinking water to residents of the Truckee Meadows.

1

INTRODUCTION



CHAPTER OVERVIEW

While much has transpired since TMWA's inception in 2001, the community has maintained a keen interest in how growth, drought, and extreme climate variation may affect the future of water supply in our region. From environmental factors to technological advancements, each Water Resource Plan update forecasts how to best adapt to change. This chapter introduces major planning considerations, along with an overview of key events and issues that have shifted TMWA's approach to planning over the past two decades.

CHAPTER AT-A-GLANCE

Highlights of Chapter 1 include:

1. The scope of TMWA's integrated planning
2. How and why TMWA was formed
3. The boundaries of TMWA's service area
4. Key aspects that influence TMWA's water resource planning
5. Influential and historical milestones in water resource planning
6. The role of public input in this report



PLAN INTRODUCTION

Truckee Meadows Water Authority's (TMWA) WRP is a planning and management document that spans a 20-year period. Updated every five years, TMWA's *2020–2040 Water Resource Plan* (2040 WRP) builds upon the information developed in prior WRPs and other regional planning efforts. The WRP is important because it details how TMWA manages existing and future water resources for the region. The 2040 WRP is also a valuable resource to educate TMWA's customers about key aspects of the regional water supply.

TMWA's 2040 WRP describes how the utility will meet the drinking water supply needs of current and future customers in the Truckee Meadows, considering factors such as population growth, economic cycles, climate conditions, and available water supplies. With these variables, water resource planning has become increasingly complex in recent years, but this plan will demonstrate that TMWA has sufficient water resources to meet the region's water needs.

Important aspects of water supply planning in the Truckee Meadows will be explained in detail throughout the plan, with a consistent focus on the following key topics:

- **Truckee River Operating Agreement (TROA) implementation:** TROA, which was implemented in December 2015 puts into practice an operational framework that provides greater

flexibility in Truckee River operations and provides opportunities for additional upstream reservoir storage. Under TROA, TMWA can store additional water in upstream reservoirs in the years preceding and during a drought. This potentially doubles the amount of TMWA's upstream drought reserves compared to the previous operational agreement. TMWA has successfully operated under TROA for the last four years, benefitting the water supply in the Truckee Meadows region. For details on TROA implementation, see [Ch. 2](#).

- **New service territory and regional growth:** The Truckee Meadows region has been developing quickly since the end of the recession, and TMWA has been diligently working to ensure there is a reliable water supply to meet future demand. The WRP evaluates population growth and future water demand projections to assess the resiliency of the region's water resources.
- **Drought situations and scenario planning:** Drought cycles are common throughout the West, and Northern Nevada is no exception. A key component of the 2040 WRP is its assessment of the availability of TMWA's water resources under a range of future demand and supply scenarios. These scenarios incorporate the most current and relevant research about changing climate conditions in the region. Using climate modeling and growth

projections, TMWA can analyze potential future conditions to ensure a sustainable drinking water supply is available for the Truckee Meadows.

- **Future water resources and technological advances:** While this plan will demonstrate that TMWA has sufficient water resources to meet customer demand well beyond the 20-year planning horizon, developing new water resources to meet future needs takes time. TMWA is actively working to develop innovative new water resources to supplement its existing resources. Through a collaboration called OneWater Nevada, TMWA and regional partners are researching advanced purified water treatment technologies to determine the feasibility of expanding the use of reclaimed water resources in the Truckee Meadows. [Ch. 5](#) details future water resource opportunities and projects.

ABOUT TMWA

TMWA is a not-for-profit, community-owned water utility overseen by a seven-member board of directors made up of elected officials from Reno, Sparks, and Washoe County, as well as an appointed citizen advisory committee. Formerly owned by Sierra Pacific Power Company, the water utility began operations as TMWA in June 2001 through a Joint Powers Agreement (JPA) between the City of Reno, the City of Sparks, and Washoe County. TMWA serves more than 427,000 residents in the Truckee Meadows. TMWA's primary objective is to provide reliable, high-quality water service to its customers in an efficient, cost-effective manner.

One of the main purposes in creating TMWA, as described in the JPA, is to meet the "common interest in assuring that water resources be developed and managed to fulfill the present and future water needs of the greater Truckee Meadows community" and "to assure sufficient water supply to meet the needs of existing and future development."

The Washoe County Department of Water Resources (WDWR) and the South Truckee Meadows General Improvement District (STMGID) water systems were

successfully merged into TMWA and consolidated operations began on January 1, 2015. This merger made TMWA the primary water purveyor for the Reno-Sparks metropolitan area and portions of unincorporated Washoe County, also known as the Truckee Meadows. As a result, TMWA provides water for approximately 90% of Washoe County's population.

TMWA'S SERVICE AREA

TMWA's retail service area covers approximately 162 square miles and provides wholesale service to the Sun Valley General Improvement District. The service area expanded by approximately 50 square miles after the consolidation of WDWR and STMGID into TMWA. The service area is within the planning boundary of the Western Regional Water Commission (WRWC) and the Truckee Meadows Regional Planning Agency's (TMRPA) Truckee Meadows Service Area (TMSA), except for several remote satellite service areas in Washoe Valley and near Wadsworth. Figure 1-1 shows TMWA's current service area.

TMWA's service area includes nine hydrographic basins, including Lemmon Valley (hydrographic basin 92A/B), Spanish Springs (hydrographic basin 85), Truckee Meadows (hydrographic basin 87), Pleasant Valley (hydrographic basin 88), and small, satellite systems in Washoe Valley (hydrographic basin 89), Pleasant Valley East (hydrographic basin 88 east), the Tracy Segment (hydrographic basin 83), and Truckee Canyon (hydrographic basin 91). TMWA also manages groundwater in Honey Lake Valley as part of the Fish Springs Ranch water supply project (hydrographic basin 97). [Appendix B](#) includes a map of the hydrographic basins.

The portion of TMWA's distribution system located in hydrographic basins 85, 87, 88 (west portion), 91, and 92 provide customers access to Truckee River resources and the benefit of drought reserves made available by TROA. TMWA's satellite systems do not receive Truckee River water because they were developed as stand-alone subdivisions which, upon recordation of a final map, required sufficient groundwater resources to meet the full build-out requirements of the development.

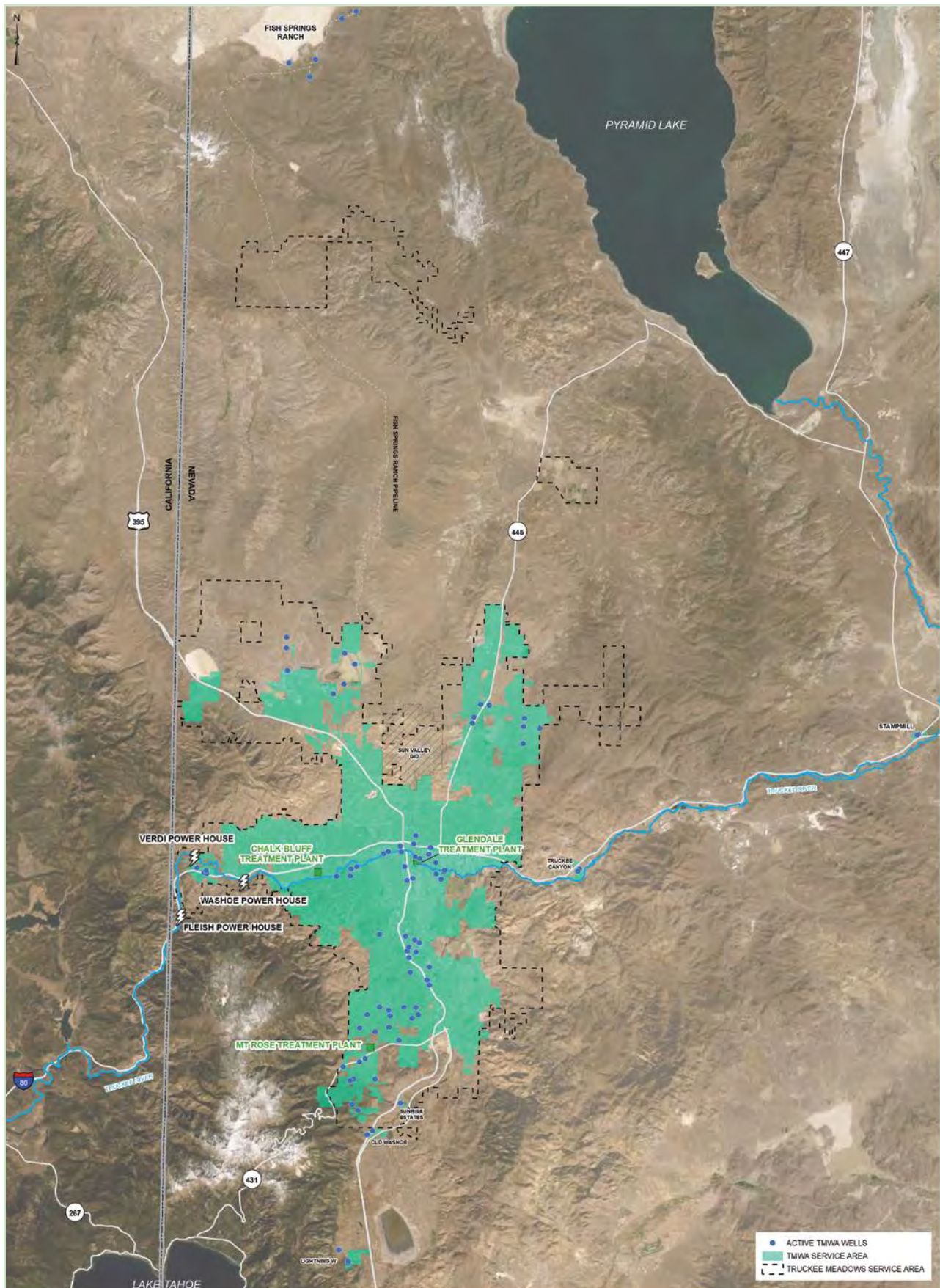


FIGURE 1-1: MAP OF TMWA'S SERVICE AREA, WATER TREATMENT PLANTS, ACTIVE PRODUCTION WELLS, AND SATELLITE SYSTEMS

PLAN GOALS AND OBJECTIVES

As the regional water provider, it is TMWA's responsibility to ensure water supply reliability for the Truckee Meadows. The WRP update process allows TMWA to assess any changes to the system that have occurred over the previous five years to ensure that water supplies are adequate under a range of future conditions. This section outlines the goals and objectives for the 2040 WRP.



GOALS

- ✓ Ensure TMWA has adequate water resources to meet the community's needs over the next 20 years and beyond.
- ✓ Create innovative solutions to best manage water resources in the region.
- ✓ Maintain community confidence in TMWA's planning process.
- ✓ Recommend management strategies and proposed policies to guide TMWA over the next five years.



OBJECTIVES

- ✓ Provide an overview of TMWA's current water resources and available water rights.
- ✓ Analyze alternative supply and demand scenarios to determine the resiliency of TMWA's resources.
- ✓ Assess potential impacts of climate change on regional water resources.
- ✓ Describe TMWA's current water management and conservation strategies.
- ✓ Identify future water resource opportunities and water management strategies.
- ✓ Provide opportunities for input from the public and Board throughout the planning process.

PLAN SCOPE

TMWA updates its WRP every five years to address significant changes in the water system and region. TMWA follows an integrated planning approach, and several other planning documents are relied upon in conjunction with the WRP, including TMWA's Facility Plan and Funding Plan (see Figure 1-2).

The scope of TMWA's water planning process, as defined by its JPA directive, does *not* provide for municipal sewer, water reclamation, flood control, storm water drainage, or groundwater remediation. Those functions are planned for by Reno, Sparks, and Washoe Counties. All water-related utility planning efforts, including TMWA's WRP and Facility Plan, are incorporated into the WRWC's Comprehensive Regional Water Management Plan (RWMP), most recently updated in 2016.

The WRWC is charged with improving water resource planning at the regional level (including water, wastewater, stormwater, and flood

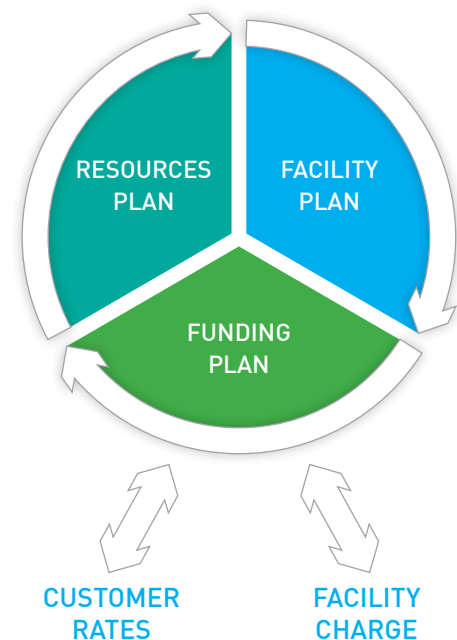


FIGURE 1-2: VISUAL REPRESENTATION OF TMWA'S INTEGRATED PLANNING APPROACH

control) and facilitating coordinated resource management among the Truckee Meadows member entities.

Following an established process, the WRP scope is focused on planning and management of water supplies for existing and future water demand within its existing retail service area as well as those areas where it is deemed appropriate to receive TMWA water service.

PLAN UPDATE PROCESS

Throughout the planning process, TMWA provided opportunities for the public to give feedback on the WRP and regional water resource matters. Initial public outreach for the 2040 WRP included an electronic survey about people's awareness and concerns regarding water resources in the region. The survey was distributed to TMWA customers, employees, and stakeholders via email and social media. Approximately 2,000 responses were received. Input was analyzed and incorporated into the planning process. [Appendix A](#) includes a detailed overview of survey responses.

TMWA staff presented information about the WRP to TMWA's Board of Directors throughout the update process. Information about the WRP and survey results were also presented at Smart About Water Day in May 2019. In August 2019, TMWA held a workshop with its Board to discuss possible policy recommendations and management strategies for the 2040 WRP.

In June through August 2020, TMWA presented the draft WRP to its Board, its Standing Advisory Committee, the WRWC, and the Northern Nevada Water Planning Commission (NNWPC). Due to the ongoing restrictions resulting from the COVID-19 pandemic, TMWA held four public webinars to present the draft WRP and to collect public feedback, instead of holding open houses in person. Customers were notified about these events via email and social media. Additionally, TMWA provided public access to the draft WRP and an electronic comment form for feedback on its website from June through August 2020. A question and answer page that addresses public comments received during the outreach process is available at tmwa.com/your-water/resources/.

WRP PUBLIC SURVEY SUMMARY

TMWA surveyed customers, stakeholders, and employees regarding their attitudes toward TMWA's water resource planning efforts. The survey, which was conducted in the fall and winter of 2018, included questions regarding topics the public would like to see addressed in the WRP and concerns over issues that could negatively impact future water supplies. The survey also contained questions on trust in the agency and important issues surrounding the region's water resources such as conservation, drought storage, and the use of reclaimed water. Results from the survey were used to ensure public input was considered in the planning process from the onset. Over a two-month period, approximately 2,000 responses were received.

The top three public concerns for issues that may negatively impact our water supply over the next 20 years:

- Population growth
- More severe droughts
- Wildfire in the upper watershed

The top three issues the public would like to see addressed in the WRP:

- Growth and future water demands
- Future availability of existing resources
- The state of our current water resources

The top three topics of importance to the public:

- Planning water resources around projected growth
- Maintaining drought reserves
- Maintaining groundwater supplies

In general, respondents had a high degree of trust in TMWA to effectively manage regional water resources.

MAJOR EVENTS SINCE PREVIOUS WATER RESOURCE PLANS

Outlined below is a brief overview of the major events that have been covered in TMWA's WRPs over time. The 2040 WRP is the fourth version of the plan since TMWA was established in 2001.

TMWA's 2005–2025 Water Resource Plan, adopted by the Board in 2003, presented the following:

- History of municipal water supply in the Truckee Meadows;
- Description of the region's water supply system including conjunctive use of surface and groundwater;
- Confirmation of the use of Truckee River flows during the historical 1987–1994 drought period as the basis for TMWA's drought plan;
- Projected population and water demand;
- TMWA's conservation program; and
- Potential future water resource options.

The subsequent plan, the 2010–2030 Water Resource Plan, built on the foundational strategies from the first plan and expanded upon the following issues:

- Legislative directives to consolidate water purveyors in Washoe County;
- Execution by the five Mandatory Signatory Parties of TROA (TMWA, Pyramid Lake Paiute Tribe (PLPT), California, Nevada, and the United States) and seven other parties on September 6, 2008;
- Changes in population and demand projections as a direct result of the regional economic downturn from 2007 to 2009; and
- Completion of the conversion of flat-rate, single-family residences to the metered rate, which was required as part of the 1989 Preliminary Settlement Agreement.

TMWA's 2016–2035 Water Resource Plan reviewed and updated TMWA's water resource planning strategies due to several key events, including the following:

- The merger of WDWR and STMGID water utilities into TMWA;
- A reversal of negative or stagnant economic trends dominating the region from 2007 to 2009, which altered the economic activity and growth projections for the Truckee Meadows;
- Purchase of the Truckee Carson Irrigation District's (TCID) 4,750 acre-feet of Donner Lake water rights;
- Successful implementation of TROA with the five Mandatory Signatory Parties on December 1, 2015; and
- Extended meteorological drought from 2012 to 2015, culminating in the driest year on record in 2015.

The 2020–2040 Water Resource Plan builds off the foundation established in the previous plans and addresses important issues that have arisen over the past five years, including:

- Successful operation under TROA in storing credit water to improve total upstream drought storage for the Truckee Meadows;
- Recovery from meteorological drought conditions with a record-breaking winter in 2017;
- Expansion of TMWA's aquifer storage and recovery program to increase the ability to store treated surface water in aquifers to sustain groundwater levels and improve drought preparedness;
- Construction of the Mt. Rose Water Treatment Plant in the south Truckee Meadows to increase the sustainability of the groundwater aquifer that provides water to customers in that area;
- TMWA management of the water resources of Reno, Sparks, Tahoe Reno Industrial General Improvement District (TRIGID), and Nevada Department of Transportation (NDOT) for return flow purposes. This will facilitate implementation of the TRIGID effluent management agreement, enhancing the efficient use of Truckee River resources and facilitating regional water management objectives; and
- Purchase of West Reno Water Company's water system in Verdi in 2019.

SUMMARY

The 2040 WRP update builds upon previous plans and continues to establish the importance of long-range planning to address changing conditions in the Truckee Meadows. Challenges faced by the region in 2020 are different from those faced when TMWA was first established in 2001. TMWA strives to provide a reliable, high-quality water supply for its customers, and the WRP

is a critical component to ensure TMWA continues to meet that goal. The following chapters describe TMWA's current water resources, current and future planning environment, water conservation strategies, future water resources, watershed and environmental protection efforts, and recommended actions.

“The Water Resource Plan is important because it details how TMWA manages existing and future water resources for the region.”

2

CURRENT WATER RESOURCES



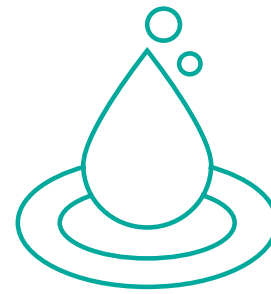
CHAPTER OVERVIEW

The Truckee River is regulated by the Truckee River Operating Agreement, which dictates how much water flows, who gets it, and when. This chapter briefly describes these rules and goes into more detail about TMWA's existing water resources: from surface water reserves stored in six upstream reservoirs to 89 production wells in nine groundwater basins around the Truckee Meadows. This diverse water resource portfolio allows TMWA to efficiently utilize available water by managing the ways in which surface water, groundwater, and storage reservoirs are used.

CHAPTER AT-A-GLANCE

Highlights of Chapter 2 include:

1. Management of the Truckee River and creek resources
2. TMWA's groundwater production
3. Groundwater recharge and management
4. TMWA's conjunctive use strategy
5. Surface water and groundwater rights over time



TMWA serves more than 425,000 people with a service area spanning over 162 square miles. The utility has built a diverse portfolio of surface water and groundwater resources to ensure the region's water supply is resilient and reliable. This chapter describes TMWA's current water resources and how the Truckee River Operating Agreement (TROA) benefits the region and the Truckee River.

TMWA's surface water treatment and groundwater production facilities are also described, which when operated together as an integrated system allows for conjunctive use, making it possible for TMWA to reliably meet demands under drought and non-drought conditions. Lastly, a summary of TMWA's surface water and groundwater rights portfolio is presented, providing

THE TRUCKEE RIVER WATERSHED

A watershed is an area from which runoff resulting from rainfall or snowmelt collects and drains to a common point, such as a river or lake. Reno and Sparks are in the Truckee River watershed, which spans California and Nevada and encompasses approximately 3,060 square miles. The Lake Tahoe Basin is part of the Truckee River watershed, with the Truckee River being as the only outlet of Lake Tahoe. The length of the Truckee River is 121 miles from Lake Tahoe to its terminus at Pyramid Lake. This watershed is unique in that it does not flow to the ocean like many other watersheds in the United States. There are many tributaries to the Truckee River, including the Little Truckee River and Donner Creek in California and Hunter Creek and Steamboat Creek in Nevada. Ch. 6 includes details about efforts to protect and preserve the Truckee River watershed. The aerial photo included here shows Lake Tahoe on the bottom left and Pyramid Lake on the top right.



an overview of the water resources available to serve existing and future customers.

SURFACE WATER RESOURCES

The Truckee River is the primary source of water for the Truckee Meadows, providing 80–85% of the region's drinking water. TMWA's surface water rights come predominantly from the Truckee River, plus water from several major tributaries, including Hunter, Steamboat, and Whites Creeks.

TMWA has two surface water treatment plants (WTPs) on the Truckee River: Chalk Bluff and Glendale. The Chalk Bluff WTP is TMWA's largest, capable of producing approximately 90 million gallons per day (MGD) of treated water. Raw water at the Chalk Bluff WTP is treated via a conventional water treatment process through settling of heavy solids, screening, flocculation and sedimentation, filtration, and chlorination. The plant is designed for modular expansions to have an ultimate treatment capacity of 120 MGD.

The Glendale WTP is TMWA's supplemental treatment facility and can produce approximately 33 MGD of surface water. The plant is typically operated on a seasonal basis (May through October) to meet summertime demand. Additionally, groundwater from six wells can be pumped to Glendale to be treated for arsenic and blended with surface water to meet water quality standards for distribution into the system. With groundwater included,

the combined capacity of Glendale is 45 MGD. The Glendale WTP employs the same treatment process as the Chalk Bluff WTP.

The Mt. Rose WTP will be a relatively small surface-water treatment plant scheduled for completion in 2020. It will treat Whites Creek water to supplement groundwater supplies on the Mt. Rose Fan and will produce up to 4 MGD when sufficient creek flows are available. Construction of the Mt. Rose WTP will further TMWA's conjunctive use of its surface water and groundwater supply, allowing TMWA to rest production wells (passive recharge) and use surface water to meet customer demand. Additionally, the Mt. Rose WTP will allow for the injection of treated surface water into the aquifer (active recharge). This will improve water resource sustainability in the area and will address needed groundwater level recovery. Groundwater elevations were in decline when the area was completely reliant on the groundwater supply to serve residents (prior to consolidation of the utilities).

TMWA has a robust monitoring and operating plan to manage Whites Creek water, which has been approved by the Nevada State Engineer and accepted by the Federal Water Master, Nevada Division of Wildlife, and The Nature Conservancy. To ensure the Whites Creek ecosystem remains healthy and all downstream water rights are satisfied, minimum bypass flows and flushing flows below the Mt. Rose WTP are required. TMWA is exploring options to use additional creek resources, which are described in more detail in [Ch. 5](#).



CHALK BLUFF WATER TREATMENT PLANT



MT. ROSE WATER TREATMENT PLANT CONSTRUCTION (JANUARY 2020)

TRUCKEE RIVER WATERSHED AND THE TRUCKEE RIVER OPERATING AGREEMENT (TROA)

The Truckee River watershed is predominantly snow fed. Mountain snowpack acts as a natural reservoir, accumulating in the winter and melting in the spring and summer months when more water is needed downstream for irrigation and outdoor watering. The Truckee River is the only outlet from Lake Tahoe and is controlled by a dam at Tahoe City that controls the top 6.1 feet of the lake, equalling 744,600 acre-feet (AF) of storage. Truckee River flows are highly dependent on Lake Tahoe's surface elevation at any point in time throughout the year.

In addition to Lake Tahoe, other reservoirs within the Truckee River watershed include Donner Lake, Independence Lake, Stampede Reservoir, Boca Reservoir, and Prosser Reservoir (Figure 2-1). TMWA owns all water rights from Donner and Independence Lakes, referred to collectively as TMWA's Privately Owned Stored Water (POSW). Together, this amounts to 27,000 acre-feet annually (AFA) of surface water storage. In dry years, when river flows are low and additional water resources are required in the Truckee Meadows, POSW can be released to help meet those demands.

TROA, implemented in 2015, governs operations on the Truckee River system. The Federal Water Master manages reservoir releases and the flow of water in the Truckee River system to ensure the operating requirements under TROA are satisfied for all water rights holders, including TMWA. TROA ratified the interstate allocation of water between California and Nevada, ensuring that

Nevada will receive 90 % of Truckee River water. The required flow rates at the state line are known as Floriston Rates. Floriston Rates require an average flow at the US Geological Survey (USGS) Farad Gage, near the California-Nevada border, of 500 cubic feet per second (CFS) from March through September and 400 CFS from October through February. Floriston Rates can be reduced under certain TROA conditions. Reduced Floriston Rates require either 300 CFS or 350 CFS at the Farad Gage and go into effect from November 1 through March 31, whenever the water surface elevation of Lake Tahoe is lower than 6,226 feet.

The Federal Water Master is responsible for releasing water from Lake Tahoe and the other federal reservoirs (Stampede, Boca, and Prosser) as needed to meet

Floriston Rates until this water is depleted. Lake Tahoe is considered the best barometer regarding the health of the region's water supply. When the elevation of Lake Tahoe approaches its natural rim (6,223 feet), Floriston Rates drop off shortly thereafter. When the elevation of Lake Tahoe drops below the natural rim, water ceases to flow from the lake into the Truckee River. Under TROA, a drought situation occurs when Floriston Rates are not projected to be maintained through October 31st, or the projected elevation of Lake Tahoe on or before November 15th will be less than 6,223.5 feet. TROA requires the Federal Water Master to determine by April 15th of every year whether a drought situation exists based on the above criteria. Figure 2-2 presents the history of recorded month-end elevations for Lake Tahoe.

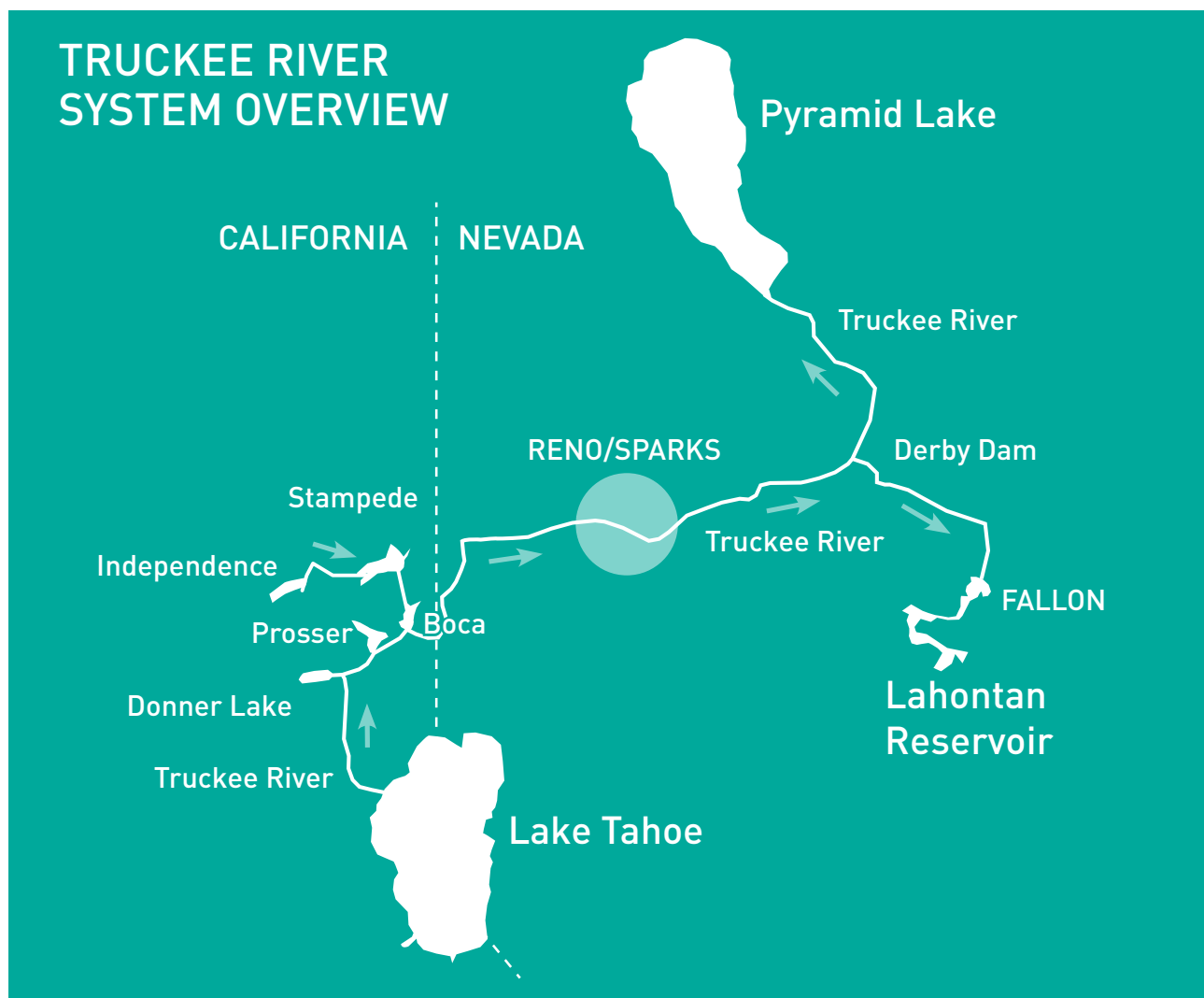


FIGURE 2-1: DIAGRAM OF THE TRUCKEE RIVER SYSTEM

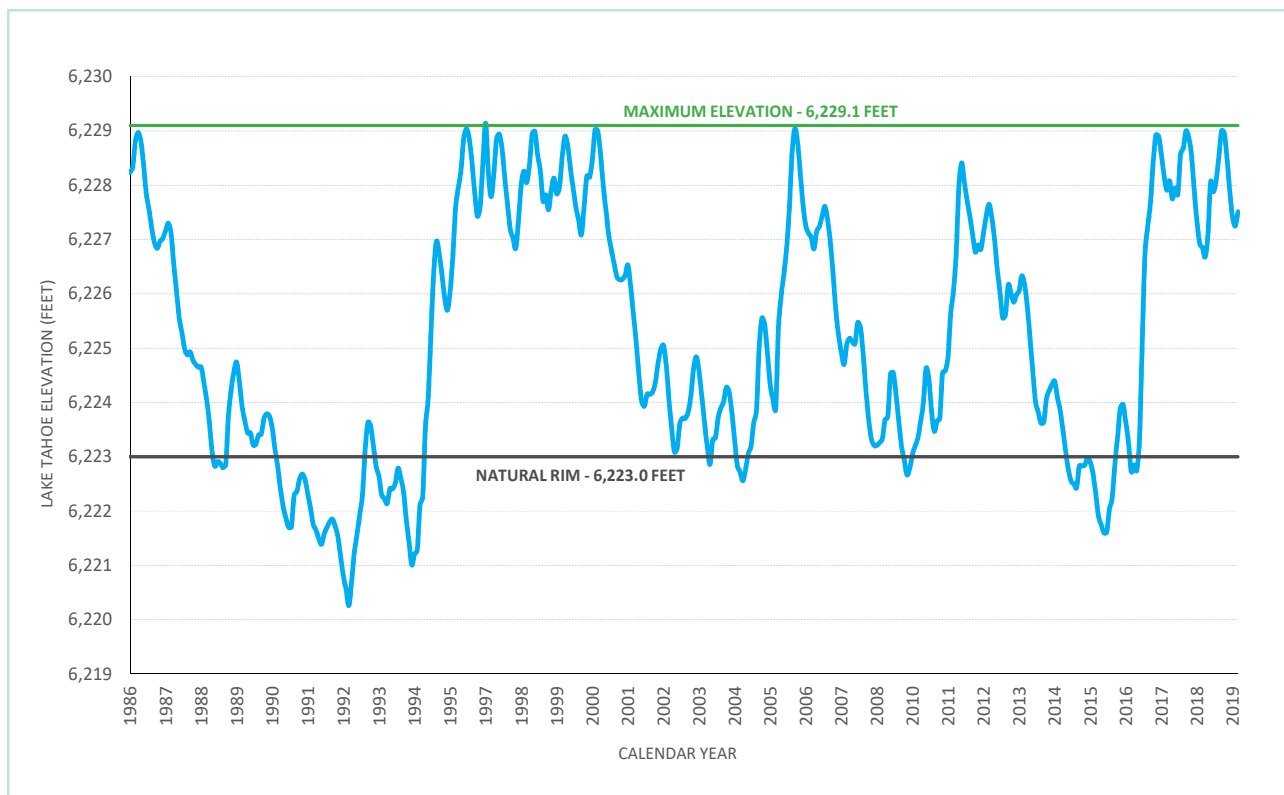


FIGURE 2-2: LAKE TAHOE ELEVATIONS FROM 1986 TO 2019

TROA provides for modified river and reservoir operations that result in multiple benefits for water users, including benefits to endangered fish and significant improvements in drought storage for TMWA. TROA also satisfies the Truckee-Carson-Pyramid Lake Water Rights Settlement Act signed by Congress in 1990. The five signatory parties of TROA include California, Nevada, TMWA, the Pyramid Lake Paiute Tribe (PLPT), and the US Department of the Interior.

TROA addresses two key elements that differentiate it from former operations: 1) the ability of a water right holder, such as TMWA, to exercise a portion of its water rights by storing water (credit water) that would otherwise have been released from storage or passed through the reservoirs to the Truckee River; and 2) the ability to exchange (or trade) stored water between Truckee River reservoirs. Thus, TROA allows TMWA to accumulate and carry over stored water through multiple drought years. Over time, TMWA has the potential to accumulate a significant amount of drought reserves, ensuring that

the Truckee Meadows will be protected from prolonged droughts with the increased ability to store water compared to pre-TROA operations.

A designated drought situation affects TMWA's operations and the ability to carry over credit water from year to year. If Floriston Rates cannot be met at any time, especially during the summertime demand season, TMWA's water operations may require the release of POSW and/or other stored water and may require increased groundwater pumping. In a drought situation, TROA allows TMWA to carry over stored water in upstream reservoirs from one year to the next, which provides additional surface water resources when a drought persists. There are several categories of stored municipal credit water under TROA, including emergency, firm, and non-firm. Emergency and firm storage do not suffer evaporative losses unless it is the only water in a reservoir, whereas non-firm water can spill when a reservoir fills. In non-drought situation years, TMWA's non-firm stored water above the base amount is automatically converted to fish credit water, which can

be used by the United States and PLPT for the recovery of endangered fish and to support the fishery in the lower Truckee River. For more information on TROA, see <https://tmwa.com/article/truckee-river-operating-agreement>.

GROUNDWATER RESOURCES

PRODUCTION WELLS

TMWA has groundwater production wells throughout the Truckee Meadows and surrounding basins that supplement surface water supplies and provide water to the satellite water systems where surface water supplies are not available. The utility operates and maintains 89 active production wells in nine distinct hydrographic basins, with 74 available to meet customer demand in TMWA's main service area and 15 available for service in the satellite systems. TMWA's groundwater wells range in capacity from approximately 100 gallons per minute (GPM) to 3,000 GPM. Table 2-1 summarizes active production well totals for each hydrographic basin. See [Appendix B](#) for a summary of each hydrographic basin.

Generally, TMWA diverts as much surface water as possible year-round and begins to bring on groundwater production wells later in the spring when customer demands increase, and when needed during drought situation years. Some production wells, generally located at the far reaches of the distribution system, may continue to pump during the winter months to meet customer demand and provide greater system reliability. All satellite water systems are solely dependent on groundwater, and therefore, the wells operate year-round.

The wellfield TMWA operates in Honey Lake Valley (Nevada) is a product of the Fish Springs Ranch water supply project completed by Vidler Water Company in 2008. The basin is located approximately 38 miles north of the Reno-Sparks metropolitan area. The project is currently permitted to provide up to 8,000 AFA of groundwater supply to the Truckee Meadows region. With additional aquifer testing and basin monitoring, the

Nevada State Engineer may allow an additional 5,000 AFA of groundwater pumping from the wells for a total supply of 13,000 AFA.

Two main issues TMWA must contend with to have a successful groundwater management program are poor groundwater quality areas and groundwater production capacity declines. Groundwater from five of TMWA's production wells undergoes treatment for tetrachloroethylene (PCE), and six wells must be treated or managed for naturally occurring metals such as arsenic. Treatment for PCE is completed at the wellhead via air-stripping. Several of the wells contaminated with PCE also have high levels of arsenic and must be treated at the Glendale WTP.

Over time, well production capacity may decline. Capacity declines are typically caused by well screen plugging resulting from chemical reactions that occur between the groundwater, aquifer material, and well screen material. To mitigate this occurrence, TMWA manages an annual well rehabilitation program. The program consists of actively monitoring each production well and prioritizing well rehabilitation based on observed production declines. Drilling a new well to mitigate the loss of groundwater production is considered a last resort due to the expense associated with large-diameter well drilling. However, when replacement wells are necessary, they are constructed with superior casing and screen material to increase well longevity.

PASSIVE AND ACTIVE RECHARGE

Groundwater is pumped to help meet peak summer customer demand and during dry years. In the winter season, most production wells are rested, which allows for passive groundwater recharge. When demand is lower, wells can rest because areas are served instead by surface water resources. For example, during 2017–2019, the Truckee Meadows experienced several above-average water years, which provided adequate Truckee River flows, allowing TMWA to minimize groundwater pumping. With reduced groundwater pumping, passive recharge occurred in many basins. Following the merger with Washoe

TABLE 2-1: ACTIVE PRODUCTION WELLS BY HYDROGRAPHIC BASIN

BASIN #	HYDROGRAPHIC BASIN	NUMBER OF ACTIVE PRODUCTION WELLS
83*	Tracy Segment	4
85	Spanish Springs	8
87	Truckee Meadows	47
88**	Pleasant Valley	9
89*	Washoe Valley	5
91*	Truckee Canyon (Verdi)	4
92A	W. Lemmon Valley	3
92B	E. Lemmon Valley	4
97	Honey Lake Valley	5
TOTAL		89

*indicates satellite systems, **Pleasant Valley East contains a satellite system

County Department of Water Resources (WDWR) and South Truckee Meadows General Improvement District (STMGID), TMWA has extended surface water resources to areas previously only served by groundwater, such as the Mt. Rose Fan in the South Truckee Meadows and areas in Spanish Springs and Lemmon Valley. In 2018, TMWA passively recharged approximately 2,240 AF of water by supplying those areas with surface water, thus allowing aquifer levels to recover.

Lower demand in the winter months allows TMWA to undertake its aquifer storage and recovery (ASR) program. Under TMWA's ASR program, treated surface water is injected, or recharged, into groundwater aquifers through many of TMWA's existing production wells to improve water quality at certain sites and enhance groundwater

elevations by offsetting the effects of summertime pumping. In the near future, water from Whites Creek and the Mt. Rose WTP will be used to satisfy the ASR program in the South Truckee Meadows.

Since its inception, TMWA's ASR program has helped improve or stabilize groundwater levels in and around many production wells. This has enhanced the ability to utilize groundwater resources to meet peak customer demand during the summertime. ASR is one element of TMWA's integrated management strategy to save drought reserves for use at a later date. Through ASR, TMWA has recharged approximately 38,000 AF of water since the program began in 1993. Figure 2-3 depicts which production wells are equipped for recharge.



FOG OVER FISH SPRING RANCH (HONEY LAKE VALLEY, NV)

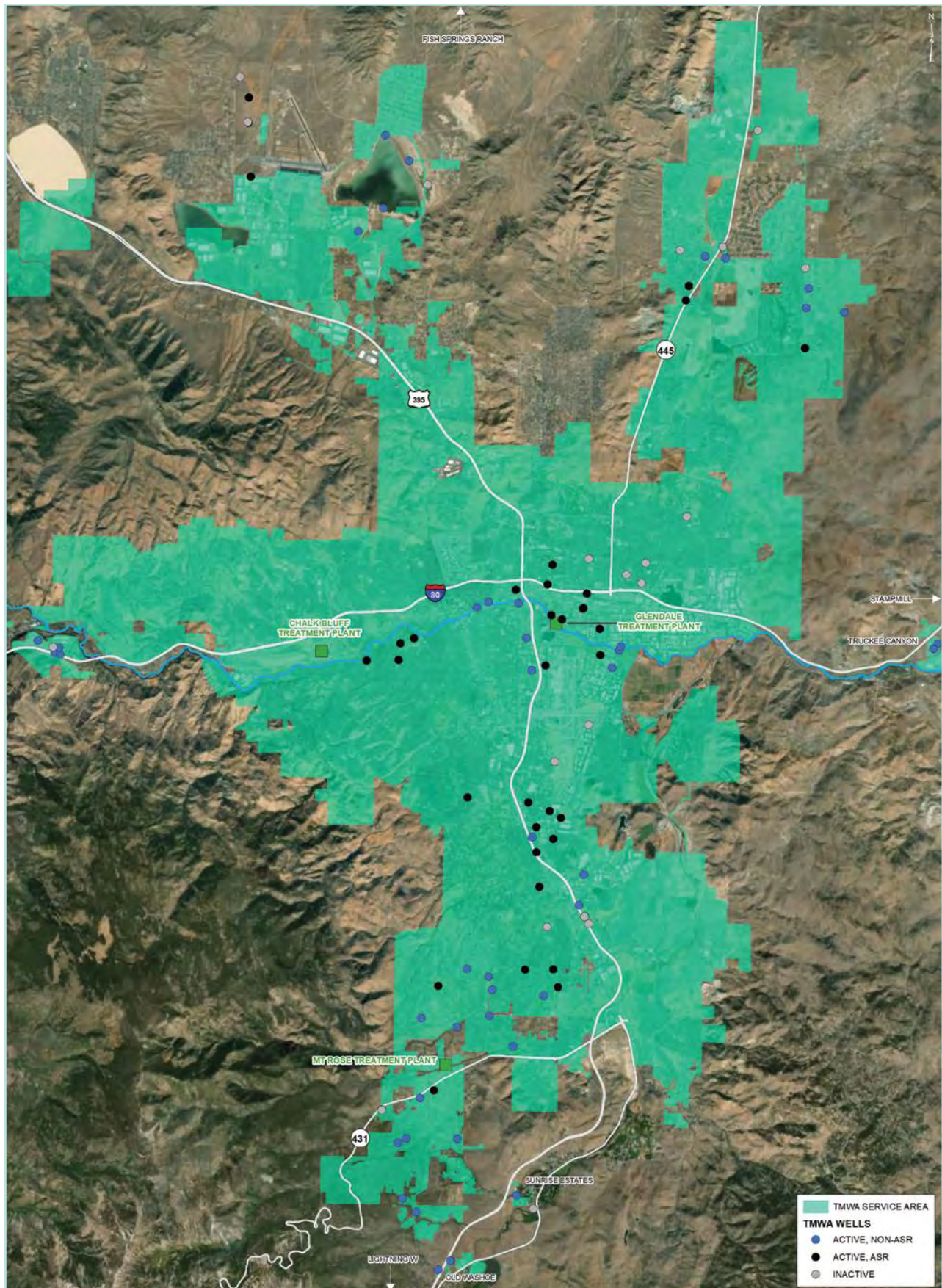


FIGURE 2-3: MAP OF TMWA WELLS PERMITTED FOR RECHARGE

The recharge program is evaluated by TMWA on an annual basis and modified to provide the maximum benefits to aquifer health and water quality. The State of Nevada permits TMWA's ASR program, which requires extensive monitoring to ensure groundwater quality is maintained. Expansion of TMWA's ASR program is discussed in [Ch. 5](#).

CONJUNCTIVE USE

Conjunctive use allows TMWA to optimize surface water, groundwater, and drought reserves to maximize the efficient use of water resources systemwide. This strategy allows sustainable management of resources under both drought and non-drought conditions.

The majority of water supply (80–85%) used to meet TWMA's annual demand comes directly from the Truckee River. Chalk Bluff WTP's ability to operate year-round allows TMWA to efficiently utilize its surface water resources in *any* type of year, thereby preserving groundwater for use during the peak summertime demand months. In the summer months of the driest years when Floriston Rates cannot be met, POSW and

credit water from upstream reservoirs are released to help meet customer demand. TMWA has only had to use a small amount of its stored water in five of the last 30 years, including 2015 which had the lowest snowpack year on record. Figure 2-4 shows the historical sources of TMWA's water supply on an annual basis.

WATER RIGHTS

AVAILABLE WATER RIGHTS

The Orr Ditch Decree (the Decree), issued in 1944, adjudicated water rights to the Truckee River and its tributaries. The Decree sets the total volume of mainstem and tributary water rights at 224,000 AF. Although water rights can be divided and converted from one use to another (e.g., agriculture to municipal use), the total number of surface water rights available from the Truckee River does not change from the amount of water rights set by the Decree. Originally, most water rights were for agricultural purposes within the Truckee Meadows. The Decree also granted municipal water rights to TMWA's predecessor, Sierra Pacific Power Company. These decreed municipal water rights, along with storage from Donner and

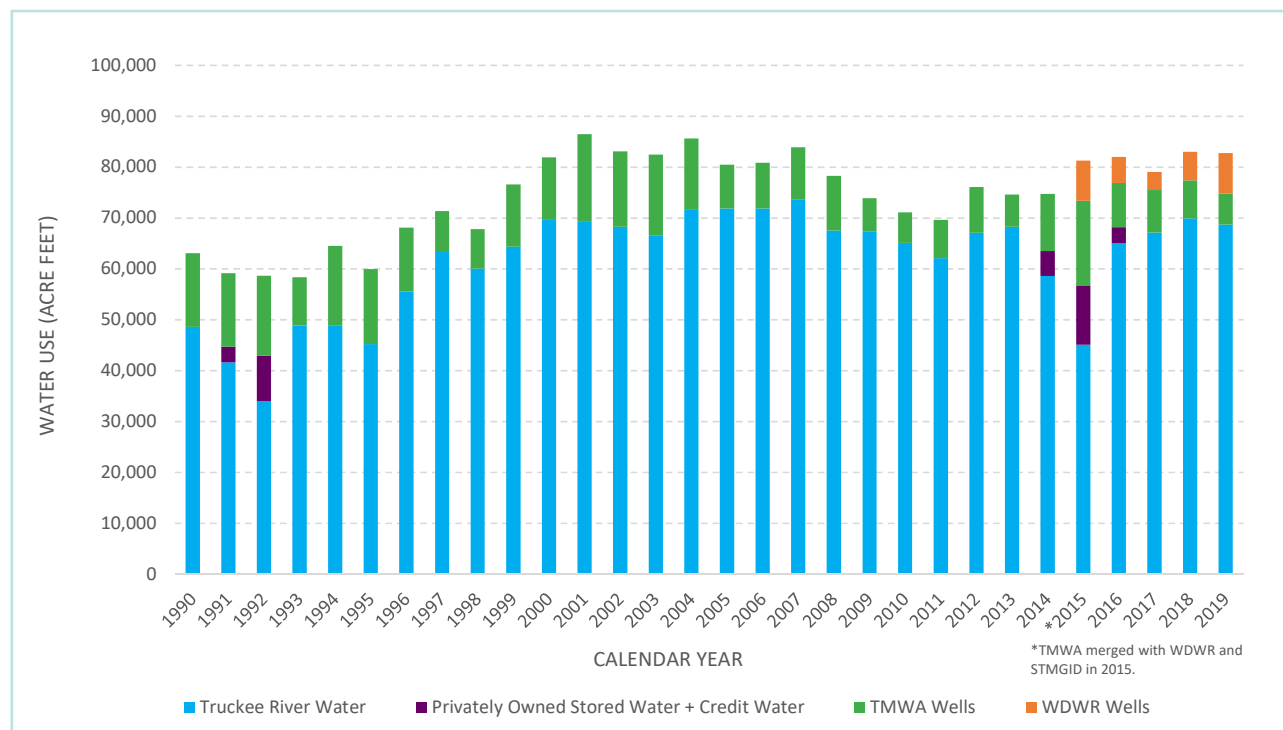


FIGURE 2-4: SOURCES TO MAKE ANNUAL TMWA WATER SUPPLY FROM 1990 TO 2019

Independence Lakes, were used to satisfy customer demand until the 1960s. Since that time, TMWA and its predecessor have been acquiring decreed agricultural water rights and converting them to municipal use. Figure 2-5 shows the conversion of decreed agricultural rights to municipal use over time. To date, TMWA has acquired over 79,000 AF of agricultural rights and converted them to municipal use to meet the wholesale and retail will-serve commitments of its customers. All water rights under the Decree are administered by the Federal Water Master and the Decree court (the US District Court in Reno). The Federal Water Master also administers TROA, which is designed to provide long-term sustainable water operations for the multiple stakeholders of the Truckee River system.

Groundwater resources began to be developed in the late 1950s and 1960s. Adding wells was a less expensive alternative to building additional surface water treatment plants to increase production capacity to meet the growing summer peak demand. Currently, TMWA operates 89 production wells in nine different hydrographic basins, which can supply about 40% of TMWA's summer peak demand.

Although TMWA is allowed to annually exercise, or pump, the total volume of groundwater rights described in Table 2-2, it actively manages its groundwater pumping within each basin to maintain the long-term sustainability of the aquifers. This strategy takes into account water rights, historical groundwater pumping, water levels, and variable hydrologic conditions. For example, TMWA's total annual groundwater pumping over the last five years has ranged from 11,882 AFA to 24,509 AFA, which demonstrates the variability in pumping depending on whether it's a wet year, like 2017, or a drought year, like 2015. TMWA's conjunctive use program, plus active and passive recharge, promotes sustainable groundwater management.

As summarized in Table 2-2, TMWA's surface and groundwater resources, plus TMWA's POSW in Donner and Independence Lakes, comprise the water rights portfolio that makes up the water supply for TMWA's customers.



NEVADA WATER LAW BASICS

Except for prestatutory water law rights established by federal or state court decrees, groundwater and surface water rights in Nevada are administered and managed by the State Engineer. Nevada water law follows the prior appropriation doctrine (also known as "first in time, first in right"), which stipulates that those who first appropriated a quantity of water and put it to beneficial use have the right to continue to use that water. Irrigation, mining, recreation, industrial, and municipal uses are examples of beneficial uses. Senior water rights holders (i.e., those with earlier priority dates) are protected even if new uses for a water source are allocated. Junior water right holders cannot impinge on the rights of senior water right holders. TMWA holds surface water rights to legally divert water from the Truckee River and groundwater rights to pump groundwater to provide water service to customers.

RULE 7

TMWA continuously works to maintain and improve the yield it receives from its existing water rights—decreed, converted agricultural rights, POSW, and groundwater—to generate a water supply that will meet the current and future needs of its customers. TMWA holds sufficient water rights to meet customer demand (83,000 AF in 2019).

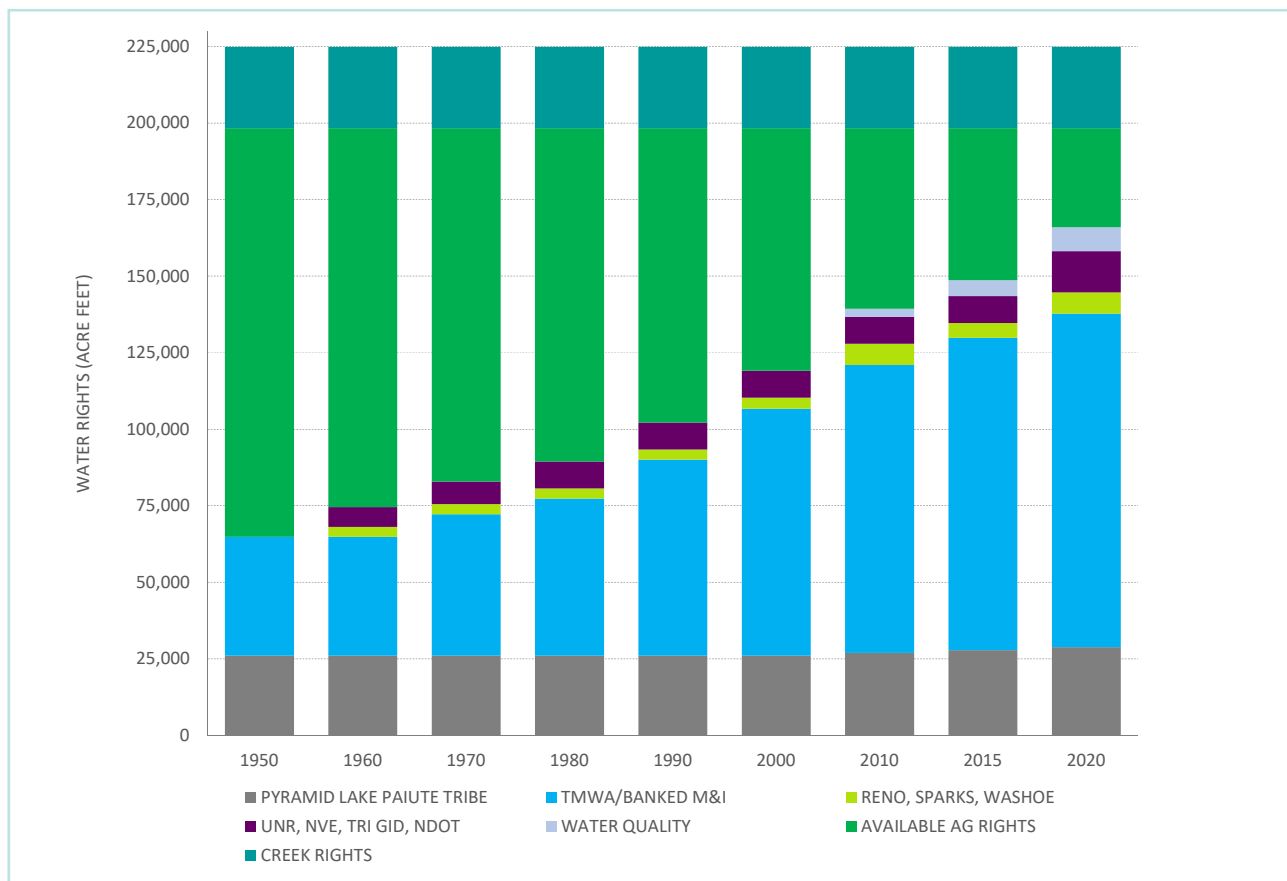


FIGURE 2-5: CONVERSION OF TRUCKEE RIVER WATER RIGHTS OVER TIME

To meet the additional water demand resulting from growth and new development, TMWA requires applicants for new or modified water service to dedicate acceptable water rights to obtain a will-serve commitment. A will-serve commitment is a letter from TMWA stating that it has sufficient water resources to provide the requested water delivery and that the project is within TMWA's service territory. Before accepting a water right for a will-serve commitment, TMWA researches a water right's source, priority, quantity, dry-year supply/yield, and ownership. In this manner, TMWA ensures that existing commitments can be sustained in perpetuity. Alternatively, developers can purchase an allocation of water rights from TMWA's inventory of uncommitted water rights. The price for purchasing an allocation from TMWA's inventory is based on TMWA's costs incurred in acquiring, processing, and maintaining the water rights.

Presently, TMWA estimates there are approximately 35,000 AF of mainstem Truckee River agricultural rights

available for future dedication. This includes agricultural rights that are still in decree form and agricultural rights that have been converted to municipal use and banked with TMWA for future service. In addition, 13,500 AF of groundwater rights are banked with TMWA and available for future dedication, primarily from the Fish Springs Ranch water supply project.

RECLAIMED WATER

TMWA does not directly supply reclaimed water but actively works with regional partners to utilize reclaimed water in efficient and innovative ways. Reclaimed water is derived through the process of treating wastewater, or effluent, into water that is suitable for use for other purposes. Reclaimed water has been used for irrigation throughout the Truckee Meadows for years. One of the local benefits of using reclaimed water is that it conserves potable (drinking) water and provides a reliable, drought-resistant water source, even in times

TABLE 2-2: TMWA WATER RIGHTS

TMWA WATER RIGHTS	ACRE FEET
Surface Water–Original M&I decreed rights	38,805
Surface Water–POSW	27,000
Surface Water–Converted decreed ag. rights	79,422
Total Surface Water Resources	145,227
Groundwater Rights By Basin	
Tracy	524
Spanish Springs	3,900
Truckee Meadows	23,689
Pleasant Valley	3,955
Washoe Valley	674
Truckee Canyon–Verdi	415
West Lemmon Valley	938
East Lemmon Valley	1,428
Honey Lake Valley–Fish Springs Ranch	8,000
Total Groundwater Resources	43,523
TOTAL WATER RESOURCES	188,750

of restriction and conservation. Reclaimed water also provides a more predictable way to help water reclamation facilities ensure compliance with discharge permit limitations when compared with river discharge or other effluent management strategies. Table 2-3 summarizes the 2018 reclaimed water usage from each of the region's water reclamation facilities. Reclaimed water currently represents approximately 8% of the region's water supply.

TABLE 2-3: 2018 RECLAIMED WATER USAGE

FACILITY	TOTAL (AFA)
Truckee Meadows Water Reclamation Facility	3,990
South Truckee Meadows Water Reclamation Facility	2,654
Reno-Stead Water Reclamation Facility	496
Total Reclaimed Water Usage	7,140

Commercial and industrial development downstream of the Truckee Meadows has been increasing. The Tahoe-Reno Industrial Center (TRI Center) and other developments require water for potable and non-potable uses. Once built out, TRI Center expects to have 10,000 AFA of non-potable

demand and approximately 2,300 AFA or more of potable demand. The Cities of Reno and Sparks have agreed to deliver up to 4,000 AFA of reclaimed water to the TRI General Improvement District (TRIGID) for resale to customers in TRI Center. When effluent generated at the Truckee Meadows Water Reclamation Facility (TMWRF) is used as reclaimed water and not returned to the Truckee River, secondary permits require a return flow component to the Truckee River from other water sources.

To promote the efficient use of Truckee River resources, Reno, Sparks, and TMWA collaborated to create a Return Flow Management Agreement with TRIGID. TMWA will help manage the return flow to the Truckee River to ensure that the river and downstream water rights holders are not adversely impacted. TRIGID will reimburse TMWA for all costs incurred in connection to the administration of the Return Flow Management Agreement.

Return flow resources will include some of TRIGID's Truckee River resources, Nevada Department of Transportation's resources, and TMWA's resources. TMWA, as allowed by TROA, has certain water resources that can support reclaimed water service and are either not subject to the return flow requirement (i.e., groundwater component

and POSW) or resources which otherwise can satisfy the return flow requirement to the Truckee River. TMWA will seek to promote the efficient use of resources to minimize the use of TMWA's resources, where feasible. See Table 2-4 for sources of return flow resources.

TABLE 2-4: SOURCES OF TRIGID RETURN FLOW RESOURCES

RETURN FLOW RESOURCES	TOTAL (AFA)
TRIGID Resources	1,500
NDOT Resources	1,500–2,200
TMWA Community Resources	300–1,000
Total Resources	4,000

SUMMARY

TMWA holds sufficient water rights to meet current customer demand. TMWA's water rights portfolio contains a mix of Truckee River, creek water, and groundwater resources. Water from the Truckee River makes up most of the water supply for the Truckee Meadows. With the implementation of TROA, TMWA has more flexibility to store additional water in upstream reservoirs, which can be released as needed. Through conjunctive use, TMWA maximizes the use of surface water in wet years, thereby preserving groundwater capacity for high demand periods. In dry years, TMWA can utilize a combination of increased groundwater pumping and releases from drought storage when Truckee River flows are reduced. While TMWA manages its existing resources, it will continue to evaluate additional, viable resources to ensure that the region has a resilient and sustainable water supply. An evaluation of TMWA's ability to supply increased future demand under a range of potential climate variability appears in [Ch. 3](#).



3

CURRENT AND FUTURE PLANNING ENVIRONMENT



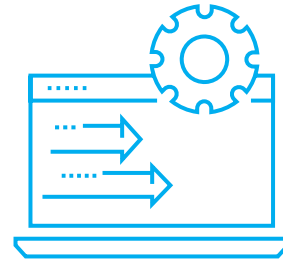
CHAPTER OVERVIEW

Analyzing the factors that can impact future water supply and demand is critical to ensuring continued reliability of the region's drinking water. Historic droughts provide important insights into the ways in which TMWA has effectively managed water resources; however, future climate conditions are expected to change from historic patterns. This chapter describes TMWA's analysis of the impacts of climate change scenarios on the regional water supply from the present through the end of the century. Also included is an evaluation of how population growth will affect future water demand.

CHAPTER AT-A-GLANCE

Highlights of Chapter 3 include:

1. How TMWA has managed water resources through historic droughts
2. Future water demand projections
3. Climate change scenarios that stress-test the region's water supply
4. Growth and development in the Truckee Meadows
5. Water system resiliency during emergencies



This chapter explores the current and future planning environment in the Truckee Meadows, including the reliability of TMWA's water supply under drought, potential future climate change scenarios, and increases in demand due to future development and water use patterns in the region. One of TMWA's goals is to maintain a consistent water supply for its customers under potential future conditions over the 20-year planning horizon and beyond. Information from the historic hydrologic record over the past 115 years provides important insights into water supply for the region. However, with potentially changing climate conditions, looking at alternative future scenarios depicting how the region's water supply may be affected is equally important. TMWA is adept at managing water resources in a highly variable climate but recognizes that new adaptive strategies may be needed in the future to ensure a reliable water supply under climate change.

DROUGHTS

For the Truckee Meadows region, the Truckee River is a crucial component of the water supply. Nevada is the driest state in the country, with the Truckee Meadows receiving an average of only 7.5 inches of rain annually. Due to its proximity to the Sierra Nevada mountains, the climate in Northern Nevada is marked by highly variable weather patterns with alternating periods of flooding and droughts. Water supply planning based on historical droughts is crucial in helping TMWA plan for future water policies and resources.

WHY IS SNOWPACK SO IMPORTANT?

A good indicator of an impending dry year is snowpack accumulation. Measured on April 1st of each year by the Natural Resources Conservation Service (NRCS), the snow water equivalent (SWE), or the water content of the snowpack, is used to forecast the amount of water that will run off each spring to help fill upstream reservoirs and provide river flows. The NRCS uses snow telemetry (SNOTEL) sites (see photo below) throughout the mountains that have automated equipment that measures snowpack. These measurements are key for TMWA to effectively manage its reservoirs and water supply each year.

Photo: Jeff Anderson



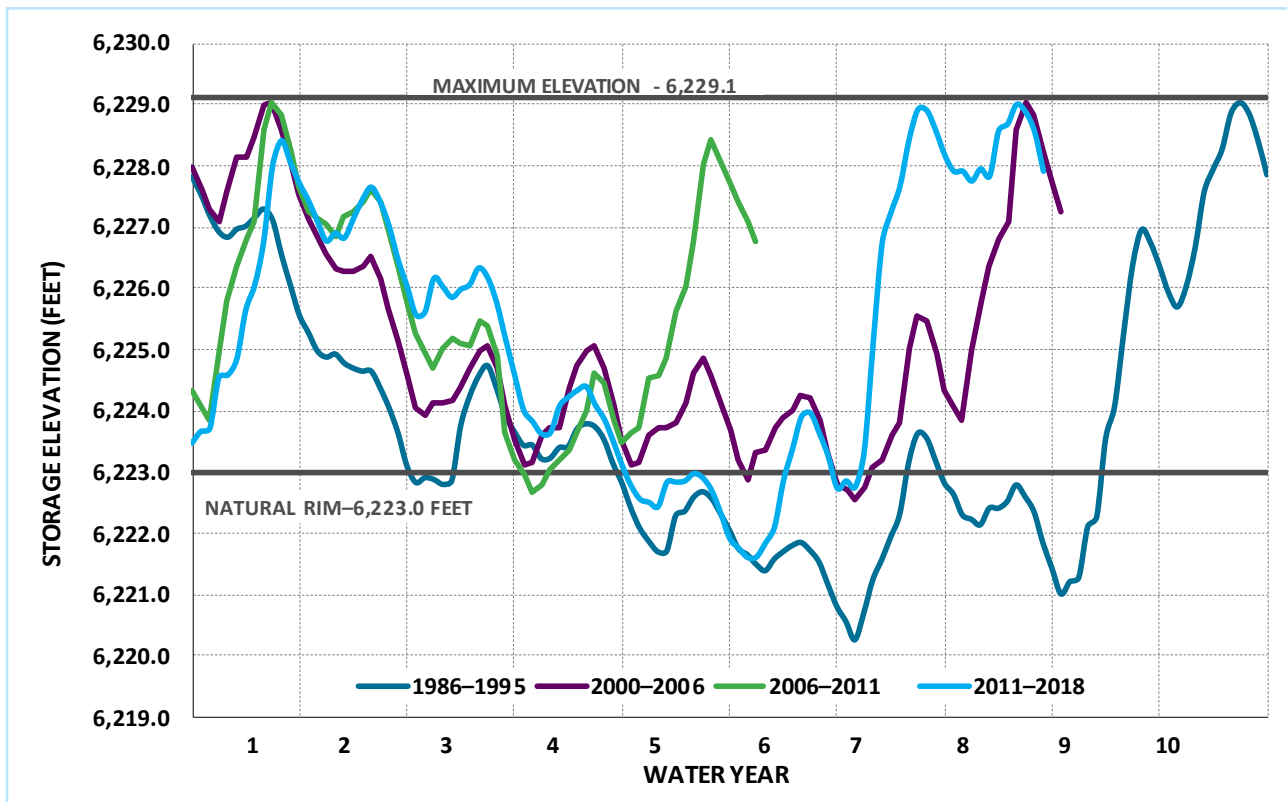


FIGURE 3-1: LAKE TAHOE ELEVATIONS DURING DROUGHT PERIODS FROM 1986 TO 2018

Since 1980, there have been four droughts varying in severity within the Truckee River system: 1987–1994 (eight years), 2001–2004 (four years), 2007–2010 (four years), and 2012–2016 (five years). The 1987–1994 drought was the worst drought in over 115 years and has been the basis for drought planning purposes to date. Although the 2012–2016 drought was unprecedented in terms of its severity (2015 had the lowest recorded snowpack and runoff in history), it was shorter in duration than the eight-year 1987–1994 drought. For a detailed explanation of the historic droughts, see [Ch. 2](#) of TMWA’s 2035 WRP. Since the completion of TMWA’s last WRP, the region has been experiencing a wetter period, with several above-average water years, including 2017 and 2019.

Important inferences can be made by reviewing the historic hydrology of the Truckee River Basin. With full upstream reservoirs (including Lake Tahoe), Floriston Rates can be met for typically the first two to three years of a prolonged drought, regardless of its severity. As the duration of the drought increases and Lake Tahoe approaches its natural rim or goes below it, required

rates of flow are less likely to be met, especially during the critical irrigation season. When upstream storage is depleted and springtime runoff is well-below average in successive years, Floriston Rates have fallen off as early as the middle of April (2015) when there was not enough upstream reservoir storage to provide for the required rate of flow at the CA–NV state line. When the elevation of Lake Tahoe approaches or goes below its natural rim during a drought (Figure 3-1), Floriston Rates cannot be maintained for very long and drop off soon thereafter.

As illustrated in Figure 3-1, water levels in Lake Tahoe are depleted gradually over two to three years in an extended drought but can refill rapidly with a large precipitation event or a large snowpack year, thereby ending a drought period. For example, 2017 was an excellent recovery year for the region, with Lake Tahoe starting below its natural rim and filling to its legal limit by the summer, thus ending the 2012–2016 drought. In fact, 2017 was the largest recovery year in recorded history at Lake Tahoe, with a net rise of 6½ feet between October 2016 and July 2017.



WINTER IN THE LAKE TAHOE BASIN

In the past, TMWA's privately owned stored water (POSW) has been used to meet customer demand during critically dry years. Based on historic droughts, upstream reserves typically do not need to be used until at least the third drought year in a row. Donner and Independence Lakes, TMWA's POSW reservoirs, typically fill each spring; however, Donner Lake may not fill in extremely dry years. During periods of extreme drought, TMWA has used drought reserves to meet customer demand between the

months of June and October (1987–1994, 2012–2016). Figure 3-2 shows that TMWA has only had to use its stored water during five years over the last three decades. Even in years when Floriston Rates are not met during the irrigation season, flows in the Truckee River are typically sufficient to meet wintertime production needs by late fall (TMWA's wintertime customer demand is approximately a quarter that in the summertime).

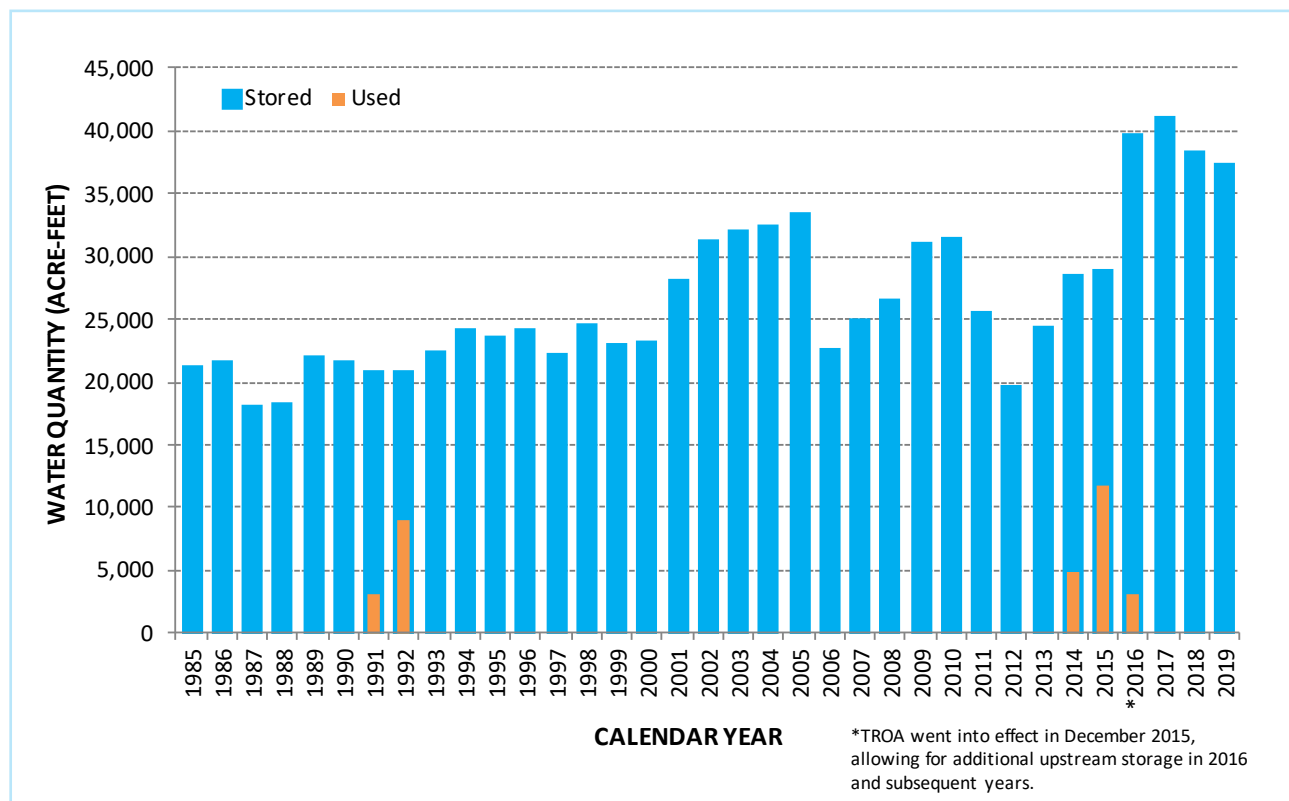


FIGURE 3-2: TMWA UPSTREAM MAXIMUM STORAGE VS. THE AMOUNT OF STORED WATER USED FROM 1985 TO 2019

CLIMATE CHANGE

While the climate of the Truckee Meadows is characterized by cyclical patterns of high and low precipitation, changing climatic conditions may prove more challenging for water supply reliability in the future.^{1,2} Climate change is defined as shifts in global or regional weather conditions that persist over multiple decades or longer.³ To design effective water supply strategies to mitigate against potential shifts in future climate conditions, TMWA incorporates the best available scientific information regarding regional climate change into its planning process.

Historically, TMWA's WRPs considered changes in water supply based on hydrologic data recorded over the past 100-plus years. However, as climate variability is projected to become increasingly more common in the future,

managing for a sustainable water supply may become more complex. It is uncertain how exactly the climate will change in the Truckee Meadows and the surrounding region, but altered precipitation and temperature patterns have the potential to affect both supply and demand.

The Lake Tahoe and Truckee River Basins are snowmelt driven systems where snowpack accumulates during the winter and melts during the spring and summer months. Regional temperatures are expected to continue to warm, which is consistent with the increase observed in Nevada over the past several decades (Figure 3-3). As temperatures continue to warm, less snow may accumulate and runoff may occur earlier, significantly altering the timing of peak streamflow runoff.⁴

There is uncertainty about how the magnitude and timing of

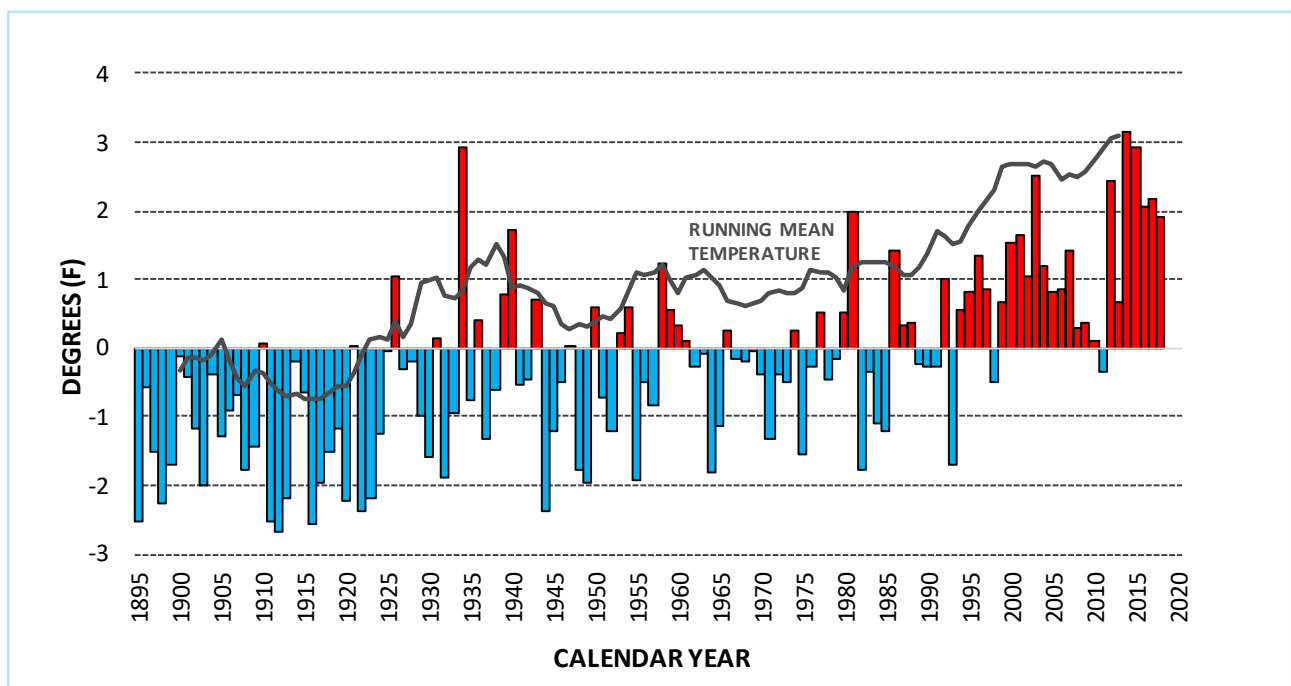


FIGURE 3-3: MEAN TEMPERATURE DEPARTURE FOR NEVADA FROM 1895 TO 2018 [SOURCE: WESTERN REGIONAL CLIMATE CENTER]

¹ Gonzalez, P., G.M. Garfin, D.D. Breshears, K.M. Brooks, H.E. Brown, E.H. Elias, A. Gunasekara, N. Huntly, J.K. Maldonado, N.J. Mantua, H.G. Margolis, S. McAfee, B.R. Middleton, and B.H. Udall. 2018. Southwest. In *Impacts, risks, and adaptation in the United States: Fourth national climate assessment*, Volume II. U.S. Global Change Research Program, Washington, DC, USA, pp. 1101-1184. doi: 10.7930/NCA4.2018.

² Karl, T., J. Melillo and T. Peterson, T. (Eds.), 2009. *Global climate change impacts in the United States*. Cambridge University Press.

³ Gonzalez, P., G.M. Garfin, D.D. Breshears, K.M. Brooks, H.E. Brown, E.H. Elias, A. Gunasekara, N. Huntly, J.K. Maldonado, N.J. Mantua, H.G. Margolis, S. McAfee, B.R. Middleton, and B.H. Udall, 2018. Southwest. In *Impacts, risks, and adaptation in the United States: fourth national climate assessment*, Volume II. U.S. Global Change Research Program, Washington, DC, USA, pp. 1101-1184. doi: 10.7930/NCA4.2018.

⁴ Erkman, C., S. Coors, A. Powel, and P. Noe. 2020. *TMWA Climate Change Analysis*. Precision Water Resources Engineering.

precipitation will change, but more variability is expected.⁵

Appendix C summarizes information from some key climate change research for the Truckee Meadows region.

To analyze the impacts of possible future conditions and to test the reliability of TMWA's water supply, TMWA analyzed specific long-term climatic and hydrologic scenarios in the Truckee River system using results from global climate, hydrologic, operational, and planning models.

Using regional climate modeling results from the Water for the Seasons project, TMWA partnered with Precision Water Resources Engineering (PWRE) to complete an analysis of future hydrologic conditions on the Truckee River system. One outcome of the project was the simulation of regional hydrology within the Truckee and Carson watersheds for a range of future climate scenarios through the end of the century (2098). The results of the hydrologic simulations were fed into the Truckee River planning model (RiverWare) to compare the performance and resiliency of TMWA's water supply under climate change to its performance under historical conditions. PWRE's report about the climate change modeling methodology and results can be found at tmwa.com/your-water/resources/.

Current climate change research uses General Circulation Models (GCMs). For this purpose, GCMs are mathematical models that simulate the physics of the global climate system. The models are typically downscaled to a smaller area, such as the northern Sierra Nevada, to predict the impacts of climate change under a range of possible greenhouse gas emissions scenarios. Rather than relying on one model, an ensemble, or collection of models created by different climate scientists, is used to predict possible future states. Although there are many GCMs applied globally, the eight best GCMs for this region were selected based on existing climate change research completed for the northern Sierra Nevada.⁶

An additional component of climate modeling consists

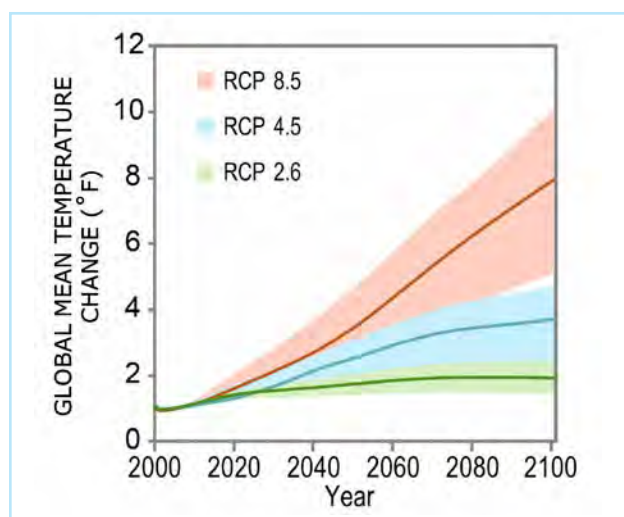


FIGURE 3-4: PROJECTED GLOBAL MEAN TEMPERATURE CHANGE UNDER EACH RCP - RCP 4.5 AND 8.5 ARE USED IN THIS WRP (SOURCE: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME 1)

of Representative Concentration Pathways (RCPs). An RCP is a future scenario that represents a greenhouse gas concentration trajectory. Higher RCP scenarios result in higher temperatures and increased associated impacts (see Figure 3-4). TMWA used two RCP scenarios representing moderate (RCP 4.5) and very high (RCP 8.5) emissions to provide a range of possible future climatic conditions for the Truckee River Basin. The moderate emissions scenario (RCP 4.5) represents greenhouse gases stabilizing in the mid-21st century, whereas the very high emissions scenario (RCP 8.5) has emissions increasing to the end of the century. These scenarios were used in conjunction with future demand projections, described below.

FUTURE WATER DEMAND PROJECTIONS

To estimate future annual water demand in the Truckee Meadows, TMWA creates water demand models using the following data sources: Washoe County population, historical water services in TMWA's service area, and historical water use data. Population growth is the

⁵ Gershunov, A., T. Shulgina, R.E.S. Clemesha, K. Guirguis, D.W. Pierce, M.D. Dettinger, D.A. Lavers, D.R. Cayan, S.D. Polade, J. Kalansky, and F.M. Ralph. 2019. *Precipitation regime change in Western North America: The role of atmospheric rivers*, *nature: scientific reports*, vol 9, 9944, <https://doi.org/10.1038/s41598-019-46169-w>

⁶ Lynn, E., A. Schwarz, J. Anderson, M. Correa, W. O'Daly, F. Keeley, and J. Woled. 2015. *Perspectives and guidance for climate change analysis*. California Department of Water Resources, Climate Change Technical Advisory Group Report.

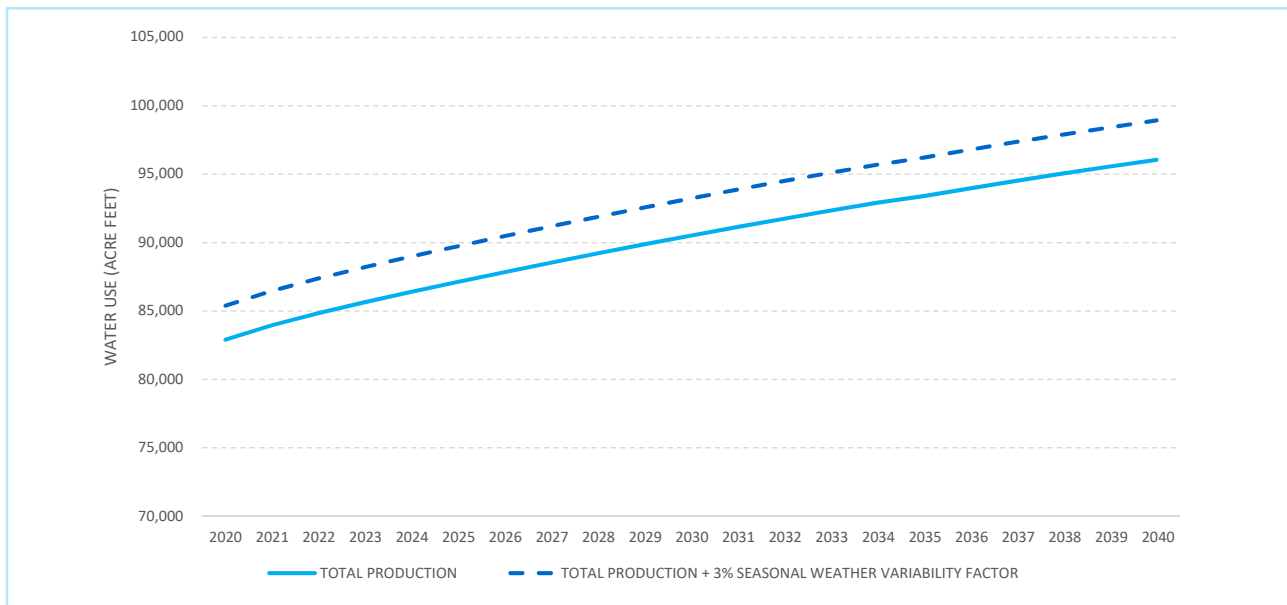


FIGURE 3-5: TMWA'S WATER DEMAND PROJECTION FOR 2020 TO 2040

basis for projecting the number of future active water services. Although several population projections for the region exist, including the State of Nevada Demographer's (SDF) projection and Truckee Meadows Regional Planning Agency's (TMRPA's) Consensus Forecast of Washoe County population (WCF), TMWA's population projection is based on a logistical growth curve and provides an estimate of population equilibrium, assuming that current trends and conditions continue. Using its population projection, TMWA creates water demand projections by modeling future active water services in each customer class. [Appendix D](#) includes a detailed overview of TMWA's demand projection methodology.

TMWA's 20-year water demand projection estimates that water demand will increase 14% from approximately 83,000 acre-feet (AF) in 2020 to 96,000 AF in 2040. From 2003 to 2019, per capita water use has been declining on average 3% per year. However, annual water demand is quite variable, driven primarily by seasonal weather patterns, such as hot, dry summers or cool, wet springs. Due to variability in weather patterns, the future water demand may be approximately 3% higher on an annual basis than projected, resulting in an estimated demand of nearly 99,000 AF in 2040 (Figure 3-5).

TMWA's forecast is very similar to the WCF, which is used in regional planning. The demand projection derived from the 2018 WCF shows a demand of 100,188 AF in 2040.

While statistically similar to the SDF and WCF projections for the region over the next 20 years, TMWA's model is preferred for the WRP because the long-range projection is useful for long-term resource planning.

To stress-test the reliability and sustainability of TMWA's water resources, a long-term water demand projection to 2098 was run through the Truckee River planning model under multiple historical drought and climate change scenarios. Based on TMRPA's recent master planning effort that projects future development based on zoning and analyzes land use scenarios for the region, TMWA generated a demand projection of 140,000 AF in 2098. It is important to note that this demand projection is hypothetical and is only used for water supply scenario modeling purposes in this plan.

FUTURE WATER SUPPLY SCENARIOS

TMWA modeled three scenarios to explore the strengths and vulnerabilities in TMWA's water supply and operational strategies 80 years into the future. A goal of the 2040 WRP is to determine whether TMWA can reliably meet customer demand under a range of future climatic conditions, including extended droughts. The scenarios included:

1. Historical ensemble of the most extreme droughts in the Truckee Basin
2. Moderate emissions scenario (RCP 4.5)
3. Very high emissions scenario (RCP 8.5)

HISTORICAL ENSEMBLE

TMWA included a historical ensemble as part of this water supply resiliency assessment. This ensemble includes nine different historical hydrologic patterns run through the RiverWare model under current river and reservoir operations. This analysis tested the reliability of TMWA's water supply under the most extreme droughts on record 80 years into the future at projected future customer demand levels. Three major droughts (1925–1937, 1987–1994, and 2012–2016) over the last 115 years were

staggered so that each was run through the planning model at TMWA's highest demand levels projected toward the end of the century.

The results of the historical ensemble scenario show that TMWA's water supply is more than resilient enough to withstand a repeat of any of the major droughts on the Truckee River system on record and not sustain any shortages, even at demand levels projected out to the end of the century (70% higher than current demand levels). Model results show that TMWA's total upstream storage never drops below 40,000 AF, with a median end of month storage value of 52,000 AF throughout the 80-year simulation. Each bar in Figure 3-6 represents the worst of the eight GCM traces for that particular year in terms of available supply for TMWA. No shortages were

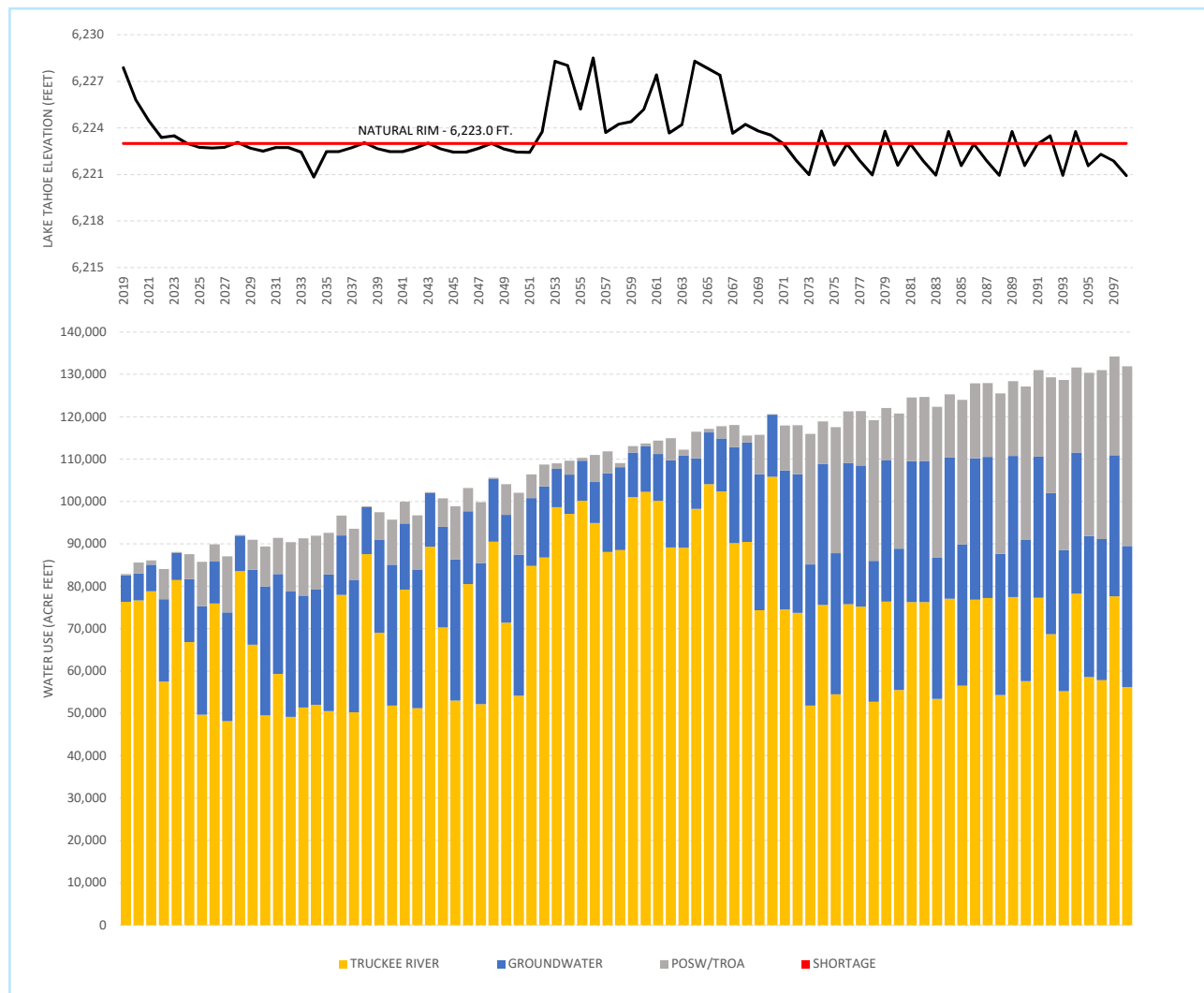


FIGURE 3-6: LAKE TAHOE ELEVATION (TOP CHART) AND TMWA ANNUAL PROJECTED SOURCES OF SUPPLY (BOTTOM CHART) THROUGH 2098 UNDER HISTORICAL SCENARIO

observed at any point under any of the historical drought scenarios through the year 2098. TMWA's modeling clearly demonstrates the robustness of the regional water supply to meet projected water demands 80 years into the future under the most extreme hydrologic conditions ever recorded on the Truckee River system.

MODERATE EMISSIONS SCENARIO

Under the more moderate emissions scenario (RCP 4.5), where carbon emissions are projected to continue to increase until 2050 then level off, results show there would be no water supply shortages in any of the eight GCMs until the year 2083 (Figure 3-7⁶). The shortage in supply is shown in only *one* of the eight GCMs in 2083; shortages

do not occur again until 2087 and 2088 (in the same GCM). In 2096, 2097, and 2098, two additional GCMs also show shortages occurring. Overall, out of the eight different GCMs in the RCP 4.5 scenario, there were only 10 years out of 640 simulation years (8 GCMs x 80-year simulations) that showed a shortage (1.5%), with the first shortage occurring 63 years in the future.

The RCP 4.5 scenario results indicate that hydrology in the Truckee River Basin will be more volatile than the historical period. In addition, the RCP 4.5 simulation exhibits more severe and frequent drought periods throughout the 80-year run. The ensemble of eight GCMs under the RCP 4.5 scenario provides a wide range of variability in terms of the number, the timing, and the

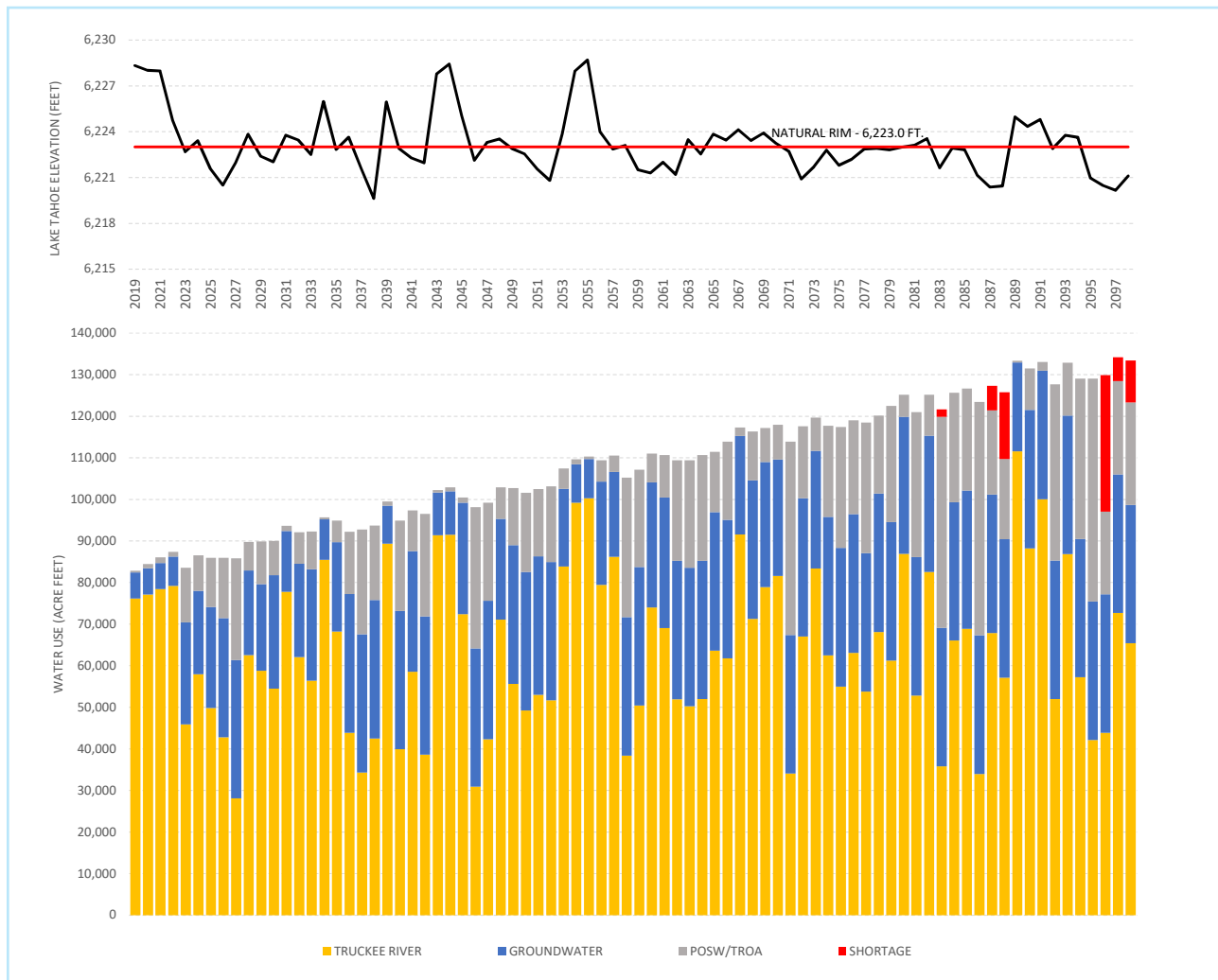


FIGURE 3-7: LAKE TAHOE ELEVATION (TOP CHART) AND TMWA PROJECTED ANNUAL SOURCES OF SUPPLY (BOTTOM CHART) THROUGH 2098 UNDER RCP 4.5

⁶ Figure 3-7 represents the worst year out of each of the eight GCMs for the RCP 4.5 scenario.

severity of droughts that could be expected through the end of the century.

VERY HIGH EMISSIONS SCENARIO

Under the worst scenario, RCP (RCP 8.5), carbon emissions would continue to increase through the end of the century. As shown in Figure 3-8⁷, results indicate that TMWA would not have a shortage in supply until the year 2069 (in one GCM) at a demand level of approximately 113,000 AF (36% higher than the current demand level of 82,000 AF). The same GCM shows a shortage in year 2070 as well. Then, as emissions levels continue to increase and extreme changes in the climate persist year after year, water supply shortages are shown to begin occurring again in 2085. Under this emissions scenario, model results

show shortages occurring over the last 14 years of the run from 2085 through 2098 as Lake Tahoe is projected to be below the rim in at least one of the eight GCMs in each of the last 16 years. Overall, out of the eight different GCMs in the RCP 8.5 scenario, there were 25 years out of 640 simulation years that showed a shortage (3.9%), and the first one did not occur until 49 years in the future.

The volatility in the hydrology is greatest for the RCP 8.5 scenario. In the RCP 8.5 scenario, the duration of droughts is noticeably longer, and the droughts are clearly more extreme. The top chart in Figure 3-8 shows that in the last year of the model run, at least one of the eight GCMs projects the elevation of Lake Tahoe to be almost seven feet below the natural rim.

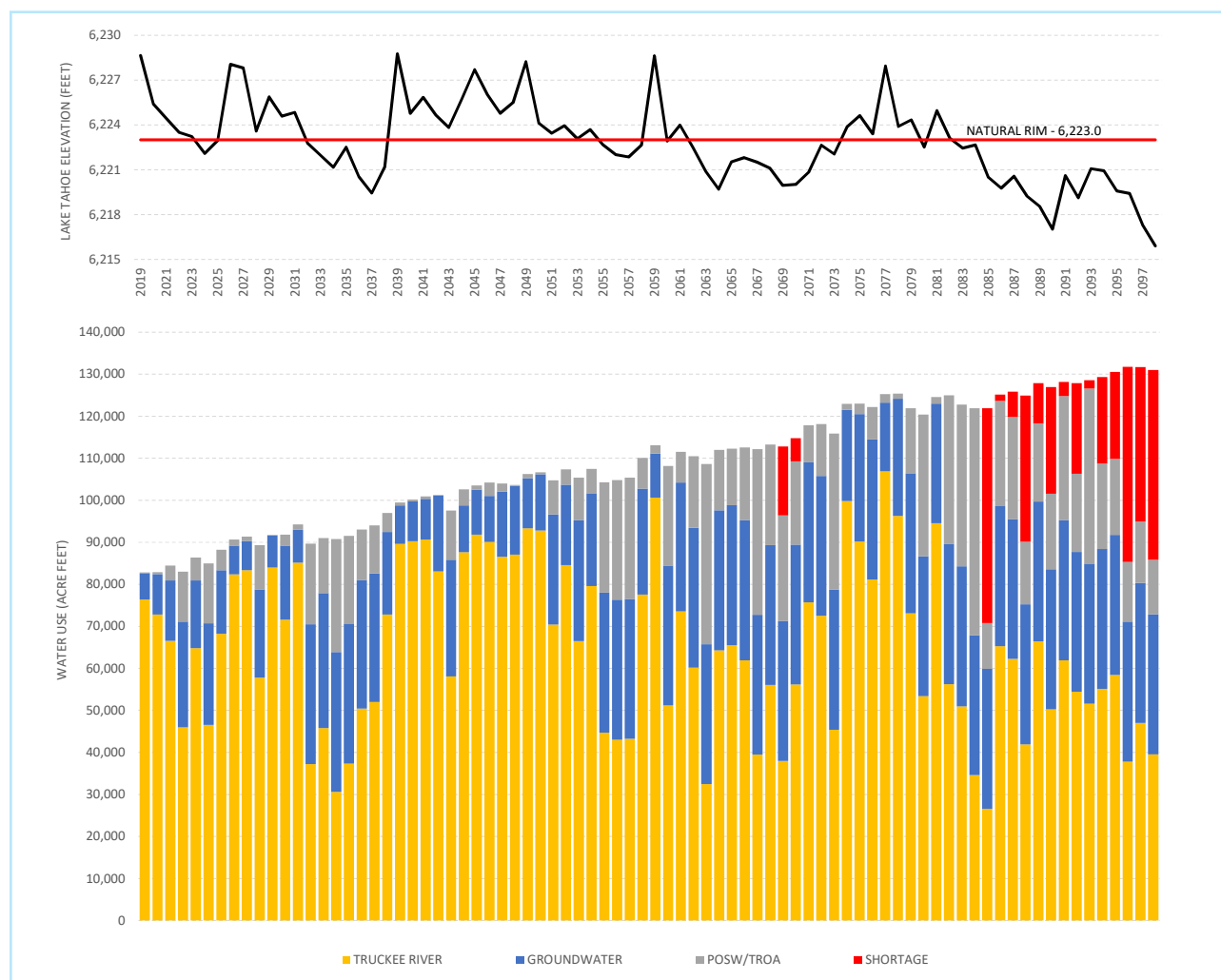


FIGURE 3-8: LAKE TAHOE ELEVATION (TOP CHART) AND TMWA PROJECTED ANNUAL SOURCES OF SUPPLY (BOTTOM CHART) THROUGH 2098 UNDER RCP 8.5

⁷ Figure 3-8 represents the worst year out of each of the eight GCMs for the RCP 8.5 scenario.

SUMMARY

Throughout the rest of the century, regional temperatures are expected to warm well beyond 3°F, which has already occurred since the 1920s. Increased warming could cause less snow to accumulate and lead to earlier runoff. While there is still uncertainty about expected changes in precipitation, model results suggest that more precipitation will be occurring in the region on an annual basis. The timing, form, and magnitude of precipitation could change significantly by the end of the century. There is consensus among the climate change models that more variability in precipitation will occur under continued climate change.

Snowmelt runoff is expected to continue to shift earlier in the season, significantly altering the amount of water able to be captured and stored in upstream reservoirs for water supply during the April through July filling period. Overall, annual runoff in the Lake Tahoe and Truckee River Basins is expected to increase over the next 80 years under both RCPs. Therefore, decreases in April-July runoff are projected to be offset by significant increases in runoff outside of the historical April-July runoff period. It is projected that there will be a greater frequency of wet years overall on the Truckee River system in terms of volume of streamflow on an annual basis. Droughts are also predicted to occur more frequently. PWRE's modeling shows an increasingly variable future hydrology where the wet years will be wetter, and the dry years will be significantly drier.

Modeling results indicate that TMWA's system is highly resilient, well into the future. The ensemble historical simulations, which emulate extreme drought conditions over the next 80 years, did not show any shortages for the entire simulation period. The climate scenarios (eight GCMs for RCP 4.5 and 8.5) did not show any shortages until 2069 (almost 50 years in the future), even with more volatile hydrologic conditions compared to historical conditions.

TMWA has been through periods of extensive drought historically and has used drought storage to meet customer demand in the past. With TROA in place (effective 2015), TMWA's ability to meet customer demand through an intense, prolonged drought has been significantly

enhanced. Even with increased drought frequency under climate change, modeling shows that storage of drought reserves adds significant resiliency, allowing TMWA to reliably create a water supply for its customers under almost all GCMs.

The models show that more water flows down the Truckee River, but the water is less efficient for Floriston Rate users (including TMWA) because more precipitation is occurring outside of the historical snowpack building season. When Floriston Rates are not met during the peak summertime demand months, TMWA must supplement available supply with releases from upstream storage and increased groundwater pumping to meet customer demand.

There are many factors that could change in terms of supply and demand that may not be accurately captured in a model projecting future hydrologic conditions (available runoff and upstream reservoir storage) 80 years into the future. These two RCPs, each using eight different GCMs representing a wide range of potential future outcomes in the Truckee River Basin, offer a glimpse of potential extremes in the climate of the future. Even under the high emissions scenario (RCP 8.5), shortages are not predicted for at least 50 years into the future and for only one GCM. It is also important to note that, for modeling purposes, very conservative assumptions were made in terms of TMWA's future groundwater pumping capabilities, water treatment plant diversion capacities, infrastructure and system intertie improvements, surface water right acquisitions, interbasin transfers, and development of new water supply projects in the future. TMWA will continue to monitor the most current climate change research and will make water resource management decisions to ensure the sustainability of the region's drinking water for future generations.

ADAPTIVE MANAGEMENT

TMWA uses a wide range of strategies to manage its water resources to address droughts and weather variability, as described in [Ch. 2](#). However, one of the most significant adaptations that would improve the



BOCA RESERVOIR DURING DROUGHT SITUATIONS

future water supply outlook for the Truckee River Basin is the reoperation of the federally owned flood control reservoirs in the region, including Prosser, Stampede, and Boca Reservoirs. With the implementation of TROA, TMWA can store credit water in Prosser, Stampede, and Boca Reservoirs. These reservoirs are currently operated for wintertime flood control based on the 1985 US Army Corps of Engineers' (USACE) Water Control Manual (WCM), which requires minimum specific flood space requirements in each reservoir and prohibits the capture of springtime runoff prior to April. Stakeholders throughout the Truckee River Basin recognize that the system can be better operated for both flood control and water supply. Several studies have provided findings that support the importance of modifying the flood control rule curves that govern the operations of these reservoirs to adapt to future climate change.

The Truckee Basin Study, completed in 2015, found that, without extending the time during which the flood control reservoirs can store their inflows under the drier climate change hydrology scenarios, up to 50,000 AF of the inflow is unable to be stored each year.

One of the publications produced as a result of the Water for the Seasons project explored re-operating the Truckee flood control reservoirs to mitigate impacts due to climate

change, specifically earlier runoff timing. The hydrology used for this study came from a hydrology model simulating historical precipitation and historical temperatures, with a uniform increase of 4.3°C. The amount of precipitation was the same as it had been historically, such that impacts attributable to changed precipitation were not introduced. Any impacts realized were due exclusively to the altered timing of the runoff due to warming. This analysis focused primarily on Prosser Creek Reservoir to illustrate the growing inefficiencies of storing water under the current WCM flood control criteria under climate change. It was found that whereas Prosser historically fills on average 22,500 AF (76% of capacity) each year, under the warming scenario it only fills to 13,800 AF (46% of capacity) each year. The unstored water flows downstream and is unavailable for release later in the year to help achieve environmental flow targets for endangered fish. Further, the study found that with the ability to start filling one month earlier under continued warming conditions, the average annual storage could be increased to 19,200 AF (64% of capacity) and two months earlier to 22,500 AF (76% of capacity). Prosser is indicative of similar effects on the other flood control reservoirs that store water for other types of demand, such as municipal and industrial uses.

Based on these findings, TMWA and other partners applied for and received a grant through the Bureau of

Reclamation in September 2019 to provide the necessary hydrologic modeling and develop new guidelines required to revise the USACE's WCM, allowing more flexibility in the winter based on forecast-informed reservoir operations. These changes will be instrumental in helping the region adapt to the effects of climate change, such as projections for earlier runoff and more precipitation falling as rain instead of snow. The project proposes to provide additional studies and modeling needed to support necessary revisions to the WCM. New flood control rule curves, adjustments to storage space, and adjustments to downstream flow thresholds for the Truckee River at the Reno gage will be developed based on the historical hydrology and projected hydrology under climate change scenarios. The project is expected to be completed by March 2023.

DEVELOPMENT AND GROWTH IN THE REGION

The Truckee Meadows has been experiencing renewed population growth and increased development since recovering from the economic recession. Economic and population growth has been positive since the completion of TMWA's 2035 WRP in 2016. However, the annual growth rates have not been as fast as those experienced before the start of the Great Recession in 2007.⁸ TMWA estimates future population growth and water demand annually to ensure there are sufficient water resources to meet the increasing demand.

During the WRP public outreach process, concerns were expressed about the adequacy of water sources for new growth. Although acceptable water rights are required for new developments to be approved, Reno, Sparks, and Washoe County determine the amount and type of growth within each of their respective jurisdictions. TMWA enters the process to ensure appropriate and sustainable water rights are dedicated and costs for new water supply, treatment, and delivery infrastructure are covered by developers.

ARE PROTECTIONS IN PLACE TO ENSURE THAT GROWTH WON'T EXCEED WATER SUPPLY?

Yes, the following measures are in place:

1. Set by court decree in 1944, new water rights from the Truckee River cannot be created. Existing rights can be bought and sold and are converted from agricultural to municipal use.
2. New development is served only if enough water rights are dedicated to meet the estimated water demand of the project. Dedicated rights are controlled by TMWA to divert, treat, and distribute water to new projects.
3. Water rights from outside sources can also be dedicated to TMWA. An example is groundwater from the Fish Springs Importation Project, which will serve future growth projected in the North Valleys.
4. For every AF of surface water rights needed for new development, an additional 11% of water rights must be dedicated to TMWA for drought storage.

TMWA holds all water rights dedicated to serving existing businesses or residences in its service territory. For any new development, water rights must be dedicated to TMWA or the developer must purchase a will-serve commitment from TMWA's inventory of uncommitted water rights. In most cases in which a developer purchases and dedicates water rights, those rights are decreed agricultural rights that have been converted to municipal use. The amount of Truckee River water available for use was determined by a 1944 court decree and has not changed. Any water rights that are not used in any given year because of water conservation are not rededicated

⁸ RCG Economics. 2015. *Northern Nevada Regional Growth Study 2015-2019. Volume I: A Forecast of Northern Nevada's Employment, Population, Households, and Associated Tax Revenues.*

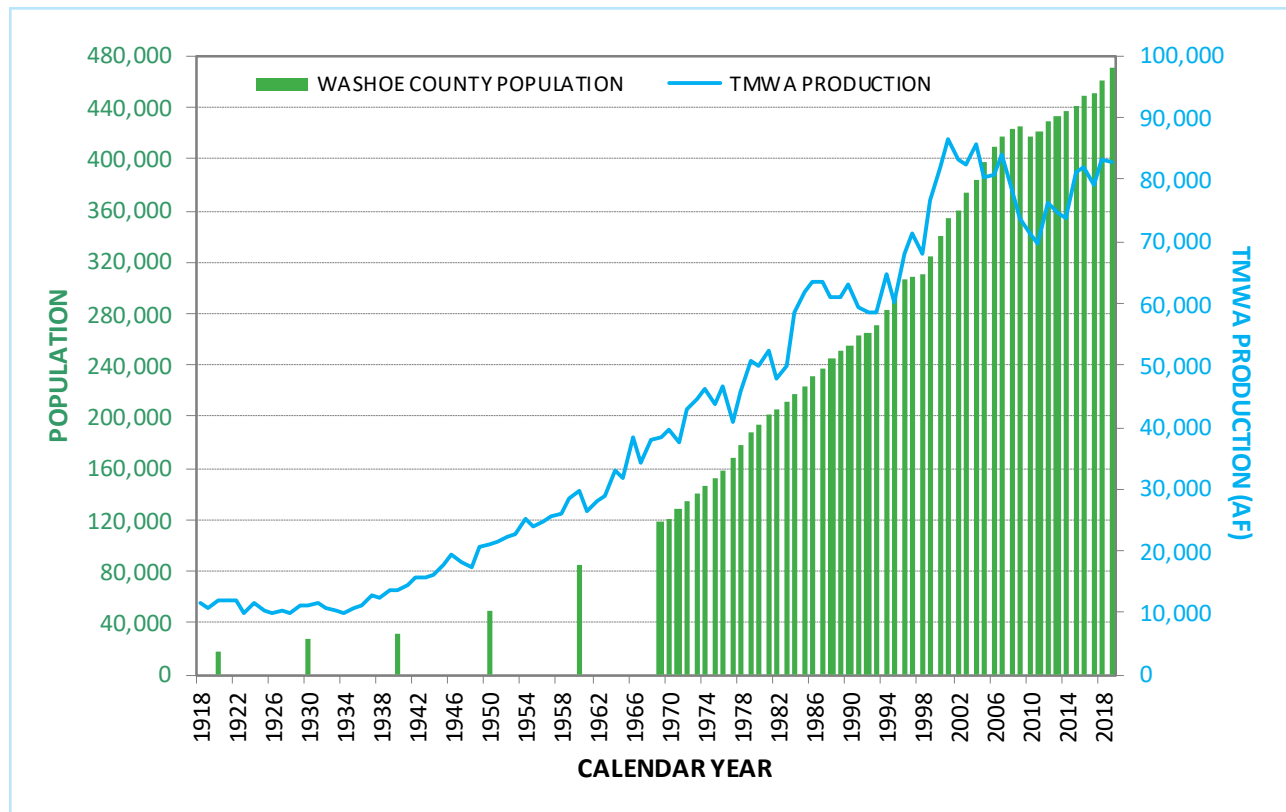


FIGURE 3-9: WASHOE COUNTY POPULATION VERSUS TMWA ANNUAL WATER PRODUCTION

for growth. The water is retained in upstream reservoirs as drought storage or flows downstream to other Truckee River water rights holders. See [Ch. 2](#) for additional information about TMWA's water rights.

Water demand does not necessarily increase due to population growth. Due to increased efficiency and ongoing water conservation measures, TMWA's water demand has decreased over the last 20 years, even with a growing population in Washoe County (Figure 3-9). TMWA has added more than 36,000 service connections since 2003. The decrease is due largely to TMWA's metering of most services within the system, a tiered rate structure that incentivizes efficient water use, a conservation program that helps customers detect leaks and correct inefficient water use practices, and the transition to a three day/week outdoor watering. Additionally, water use has decreased as older appliances and fixtures are replaced with newer models that are required to be more water efficient. TMWA's public outreach regarding the need for water conservation during droughts also decreases water use because customers adapt and use less water.

WASHOE COUNTY QUESTION #3

In a county-wide general election on November 4, 2008, voters approved Washoe County Ballot Question #3 (WC-3). WC-3 required the Truckee Meadows Regional Plan be amended to reflect and include a policy or policies requiring that local government land use plans be based upon and in balance with identified and sustainable resources available within Washoe County. In January 2010, the Regional Planning Governing Board (RPGGB) adopted amendments to the Regional Plan in response to WC-3. These amendments require the Northern Nevada Water Planning Commission (NNWPC) and Western Regional Water Commission (WRWC) to compare the draft WCF population to the population that can be supported by the estimated sustainable water resources identified in the Comprehensive Regional Water Management Plan (RWMP). The comparison consists of four parts: the 20-year population projection for Washoe County provided in the draft Consensus Forecast,

the sustainable water resources estimate in the adopted RWMP, a 20-year water demand projection based on the Consensus Forecast provided by TMWA, and a comparison of the water demand projection with the sustainable water resources estimate set forth in the RWMP.

If the NNWPC and WRWC find that the Consensus Forecast population can be supported by the sustainable water resources in the RWMP, the WRWC submits the draft population forecast to Reno, Sparks, Washoe County, and TMRPA, with the finding that the forecasted population can be supported.

The 2018–2038 Consensus Forecast projects the total population in Washoe County in 2038 will be 558,746. The 2016 RWMP provides an estimate of potentially available, sustainable water resources of approximately 190,500 AFA (and 143,800 AFA without additional water importation). The estimated water demand to serve the projected 2038 population is 111,875 AF. This forecast differs from TMWA's forecast because it is a projection for all of Washoe County, whereas TMWA's forecast only covers its service area. The projected 2038 population is significantly less than the population that can be supported by the sustainable water resources identified in the RWMP. For more information, see the WRWC Comprehensive Regional Water Management Plan at <http://www.wrwc.us/2016WaterPlan.html>

WATER SYSTEM RESILIENCY

In addition to climate conditions, there are events beyond TWMA's control that could affect the reliability of its supply, such as chemical spills, earthquakes, or wildfires. While there is a risk to source water during these events, TMWA has enough well capacity and distribution storage to meet reduced customer demand during a water quality emergency; additional actions are available to TMWA in the event of extended off-river emergencies. An earthquake in 2008 tested TMWA's emergency response plan with a loss in water supply and demonstrated TMWA's ability to respond by providing trained staff and

alternative water supplies. For more details on TMWA's management strategies during natural disasters, see [Ch. 4](#).

The water quality of the Truckee River is normally excellent. Surface water is of exceptional quality because flows originate from Sierra Nevada snowpack runoff. Turbidity—the concentration of particulate matter in water—levels are generally very low. However, water in the Truckee River can have higher turbidity at times due to storm runoff and/or algae growth associated with low flows and warm temperatures in summer. To ensure safe, reliable water is always provided to its customers, TMWA utilizes a water quality assurance program comprised of the following components:

- **Source Water Protection:** TMWA has an integrated and coordinated source water protection program designed to protect or improve the quality of TMWA's surface water and groundwater supplies. TMWA, in conjunction with NDEP, is completing an Integrated Source Water Protection Plan for Washoe County that provides management strategies to protect groundwater and surface water. Further information is provided in [Ch. 6](#).
- **Potable Water Treatment:** TMWA's modern treatment facilities for its raw surface water and groundwater supplies complies with all federal and state drinking water regulations. Also, TMWA uses a highly skilled staff of scientists, engineers, and operators who continually monitor water quality in the distribution system. Additional information is available at <https://tmwa.com/your-water/water-quality-facts/>.
- **Cross Connection Control:** TMWA has an extensive backflow prevention and cross-connection control program. The purpose of the program is to prevent backflow of pollutants or contaminants from customer plumbing systems into TMWA's distribution system.

SUMMARY

Climate change and drought are the most significant variables with the potential to change the quantity of the water supply. Studies indicate that climate change will likely alter the timing and type of precipitation, but to what extent is still uncertain. By stress-testing the system under various climate change scenarios, TMWA can plan for future variability in supply and demand. Drought periods have established historical patterns in the Truckee River Basin, with the most severe drought on record lasting eight years. TMWA plans for drought periods with a combination of natural river flows, release of POSW and credit water, groundwater pumping, and extraction of banked groundwater stored through aquifer storage recovery (ASR). Addressing climate change will require similar strategies; however, the region is extremely fortunate to have TROA, which provides for additional municipal storage under drought conditions and increased operational flexibility. With TROA and TMWA's conjunctive use of its diverse water resources portfolio, TMWA is confident in its ability to meet the region's growing water demand well into the future.

4

CONSERVATION STRATEGIES

Truckee River



CHAPTER OVERVIEW

Northern Nevada goes through cyclic patterns of wet periods and droughts. To help mitigate unpredictability, conservation strategies to build resiliency in TMWA's water supply. While customers are asked to use water efficiently in and around their homes and businesses, TMWA also works on reducing water loss in its delivery system. This chapter reviews TMWA's conservation programs and tactics, addressing how conservation efforts ramp up when drought conditions escalate. The outcomes of conservation efforts are demonstrated in the pages that follow.

CHAPTER AT-A-GLANCE

Highlights of Chapter 4 include:

1. How TMWA prevents water loss
2. Customer conservation programs and outreach
3. Demand management during drought situations
4. The effectiveness of conservation efforts



As described in the previous chapters, TMWA has a diverse water portfolio and utilizes conjunctive use of its water resources to address variability in climate and hydrologic conditions. Water conservation is also an essential component of TMWA's water management strategy. Conservation allows TMWA to effectively supply water to the Truckee Meadows, even during prolonged periods of drought. This chapter describes these conservation strategies, which are designed to ensure efficient use of water in the region under a range of conditions.

DROUGHT CONTINGENCY PLAN

Conservation is a major component of TMWA's resiliency strategy. TMWA's Drought Contingency Plan addresses the TROA and state law requirements and allows for proactive conservation strategies that promote both drought resiliency and water resource sustainability.¹ To help customers exercise responsible water use, TMWA employs a suite of demand-management programs tailored around seasonal watering habits in the Truckee Meadows. Whereas the 2040 WRP outlines TMWA's conservation initiatives, its Drought Contingency Plan is a separate plan. To see a detailed description and analysis of the strategies used for TMWA's conservation program go to www.tmwa.com/dcp.



TRUCKEE RIVER—FALL 2014 (TOP) AND WINTER 2017 (BOTTOM)

ONGOING CONSERVATION INITIATIVES

A healthy annual snowpack is vitally important to fill upstream reservoirs and naturally recharge aquifers in the Truckee Meadows. Lake Tahoe is the largest reservoir in the system. Three or more years of consecutive

¹ Per TROA Section 12.A 2(e), TMWA must maintain a conservation plan that ensures water savings equal to, or better than, a plan that requires 10% or more water savings during a drought year.

below-average snowpack in the Truckee River Basin can significantly diminish upstream reservoir storage used to provide Floriston Rates (the TROA required flowrate in cubic feet per second in the Truckee River near the Nevada–California border).

The last four exceptionally dry years in a row (2012–2015) reduced the level of Lake Tahoe to below its natural rim in 2015. During that summer and fall, with no water flowing from Lake Tahoe into the Truckee River, TMWA needed to release its upstream drought reserves to meet customer demand. This event highlights the fact that TMWA’s water supplies are typically not impacted until the third year of a drought. It also illustrates the need to effectively manage water resources *before* a drought occurs. Moreover, since climate variability cannot be predicted from year-to-year, and the region is predominantly a high desert, TMWA promotes ongoing conservation measures to help ensure water is used efficiently by all customers. During droughts, any water conserved by TMWA’s customers generally can be stored in upstream reservoirs to be used to meet customer demand later. Water conserved by residential customers is not used to support growth.

MANAGING WATER LOSS

A key component of mitigating drought is managing water loss within the delivery system. To efficiently capture and measure the water it delivers to customers, TMWA tracks water loss within its system by conducting a water balance study annually. This information helps ensure TMWA has reliable water resources during drought, minimizing the need to ask customers to reduce their use.

Capital Improvement Plan Projects

TMWA’s Capital Improvement Plan (CIP), updated annually, identifies projects that are essential to reducing water loss within the delivery system over the next five years. Through a well-funded program that maintains and expands its existing water system, the CIP further bolsters TMWA’s ability to store water.²

MANAGING WATER DEMAND

Promotion of smart water use in drought and non-drought years is important because efficient use of water within the Truckee Meadows extends this vital resource. TMWA focuses on outdoor watering, typically occurring

HOW TMWA MANAGES WATER LOSS

Much of the drinking water infrastructure nationwide is nearing the end of its life. Fortunately, TMWA’s delivery system is generally newer than other parts of the United States. TMWA allocates millions of dollars annually into replacing water mains and conducting service repairs and meter change-outs. This ensures water is delivered and measured reliably. Between 2016 and 2018, TMWA replaced 157 water mains, repaired over 1,600 service laterals, and changed out almost 20,000 pieces of metering equipment. Its proactive efforts have resulted in an average of 6–8% water loss per year, which is significantly below the national average.

When planning large water-main rehabilitation jobs, TMWA will often coordinate the project with others (e.g. city street reconstructions, utility projects, etc.) to reduce overall costs and provide the least amount of disruption to customers.



² For more information on the most current CIP, visit <https://tmwa.com/financial-information/>

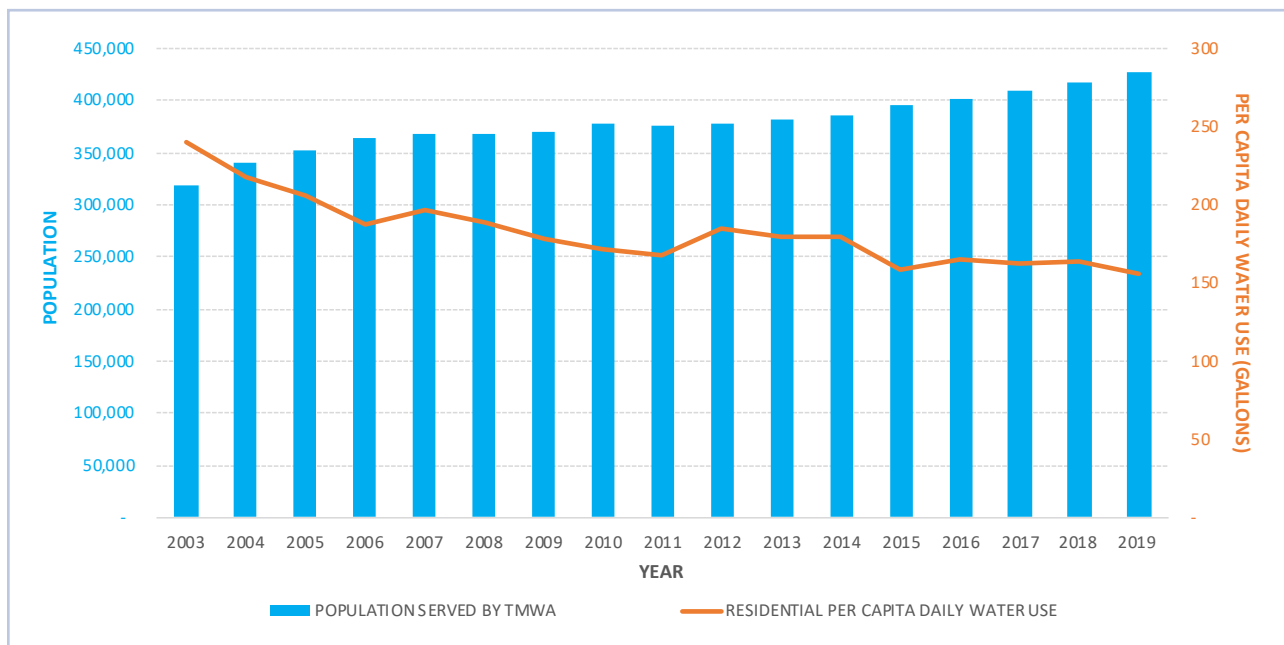


FIGURE 4-1: POPULATION SERVED BY TMWA AND RESIDENTIAL PER CAPITA DAILY WATER USE.

from April through mid-October. During this time, customer demand can be three-to four times higher than wintertime use. Therefore, TMWA conservation efforts are seasonally relevant and targeted to address customers' usage patterns. TMWA's outdoor watering programs also reduce peak-day demand on the system, helping minimize the need for infrastructure expansion. This continual demand management has aided in the general decline in per-capita water consumption within the Truckee Meadows. Proven effective over the years, conservation has resulted in residential per-capita water usage declines of 30% over the last 15 years (Figure 4-1). The following section outlines TMWA's ongoing conservation programs.

Water Conservation Education and Outreach Program

TMWA has numerous educational initiatives designed to help customers learn the benefits of water conservation while providing tools, tips, and techniques to foster smart water use.

These educational initiatives include:

- A free workshop and tour series
- A native landscape planting guide designed specifically for the Truckee Meadows region (available in print or online at tmwa.com/landscape)
- A formal, one-week lesson plan on water conservation, targeting fifth grade students
- Partnerships with other organizations that provide water resource, water quality, and watershed protection activities to students
- Participation in public presentations and events (e.g., speaking engagements, Earth Day festivals, and other community activities)
- Xeriscape, tree care, and smart-watering-tips information provided at all events
- A TMWA YouTube channel containing how-to videos on fixing leaks and conducting water audits at home

TMWA's website provides online resources regarding the programs listed above.

"Residential per-capita daily water use has declined by approximately 30% while TMWA's customer base has increased by 30% since the early 2000s."

LANDSCAPING IN THE TRUCKEE MEADOWS

TMWA offers the only comprehensive landscaping guide to the trees, plants, and shrubs that thrive in the Truckee Meadows region. The guide, which is offered electronically, in print, and in a searchable online format, is tailored to help customers create water-efficient landscaping

that makes sense in the Truckee Meadows region. Users can select vegetation based on a variety of attributes including color, light requirements, wildlife attraction, drought tolerance, and fire resistance. The goal of the guide is to take the guesswork out of creating a beautiful, vibrant, and water-efficient yard that is compatible with our high-desert climate. Visit tmwa.com/landscape for more details.



Year-round outreach strives to promote useful and seasonally relevant information and programs to all customers. These communication channels include:

- Direct communication to customers via bill inserts and e-newsletters
- TV, radio, newspaper, and local magazine advertisements
- Social media engagement including Facebook, Twitter, and Instagram

Water-Efficiency Codes

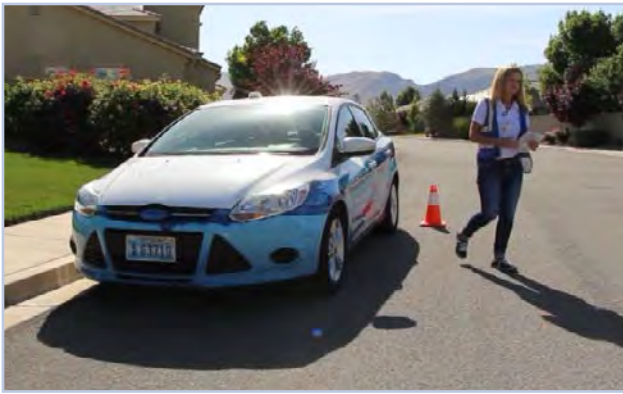
TMWA's Rule 2 provides water-efficiency codes to which customers must adhere.³ These codes have been effective at managing customer demand over time. As a condition of service, customers must not engage in any act which results in excessive use of water (i.e., no waste). The rule requires that customers follow an assigned, three-day-a-week irrigation schedule for lawns. Assigned-day watering helps prevent overwatering and reduces peak-day demand. Customers with even addresses may water Tuesday, Thursday, and Saturday and those with odd addresses may water Wednesday, Friday, and Sunday. No watering

is allowed on Mondays to allow the system to adequately recover. Additionally, lawn irrigation is not permitted between 12 p.m. and 6 p.m. from Memorial Day through Labor Day. Drip systems and hand watering are allowed anytime, as long as no waste occurs. Variances to water anytime will be granted annually for newly seeded lawns or newly laid sod, lawns in public parks, playgrounds, athletic fields, common areas, and parkways (if done in an efficient manner).

Water Watcher Program

To monitor the water-efficiency codes outlined in Rule 2, TMWA hires additional staff during the outdoor watering season. These water conservation consultants drive around the TMWA service territory and are trained to assist customers in following TMWA's water use rules. They also respond to water waste reports submitted by the public and provide customers with information about TMWA's water-efficiency codes and identify any observed leaks or sources of water waste. The rule also contains penalty charges for individuals who repeatedly violate TMWA's water-efficiency codes (from \$25 up to \$75). TMWA also distributes water-saving devices such as low-flow

³ For more information, please refer to https://tmwa.com/wp-content/uploads/docs/Customer_Services/rules/Rule02_20120119.pdf.



WATER WATCHER IDENTIFYING WATER WASTE

showerheads, automatic hose nozzles, and hose timers upon request.

Water Pricing Structure

TMWA has an inverted, tiered-rate billing structure in which customers are charged increasing rates based on the amount of water they use. This billing structure provides a “price signal” to customers whose usage crosses into a higher tier, thereby encouraging efficient use of water. In 2015, TMWA’s Board approved the conversion of all flat-rate customers to a metered rate (applicable if a meter existed at the service location). Since that time, nearly all services have been metered and are being billed at the metered rate.

Water Usage Review Program

The Water Usage Review (WUR) includes reviews of services to determine water usage behavior and help customers determine the sources that contribute to high consumption levels. When a WUR is requested, TMWA staff visit customer premises to check meter accuracy and detect potential leaks in the customer’s system. If a leak is detected, staff help customers identify its location and provide information on fixing the leak. When completed, staff provide an overview of leaks detected and review customer watering habits that may be leading to high consumption. Finally, staff make recommendations on how to reduce water use and teach customers how to monitor for future leaks. On average, TMWA provides over 2,000 WURs annually and has conducted over 28,000 WURs since 2003.

Landscape Retrofit Fund

The Landscape Retrofit Fund provides financial support for approved educational projects that improve water efficiency. The fund supports landscape-augmentation projects that focus on public agency grass removal and replacement with artificial turf or xeriscape to reduce water requirements. The fund also supports educational programs designed to inform customers about drought-tolerant landscaping (e.g., xeriscape) and conservation practices. Prior projects supported under this program include replacement of traditional turf grass with drought-tolerant vegetation and native vegetation, free arborist consultants, and educational classes and workshops targeted toward smart landscaping, such as TMWA’s free workshop series and the WaterSense-approved Qualified Water Efficient Landscaper certification class.

DROUGHT RESPONSE

Under average Truckee River flow conditions, Floriston Rates are maintained through October. When Floriston Rates are sufficient, TMWA’s surface and groundwater supplies can be used to meet customer demand without using stored water or drought reserves. When a drought situation occurs and Floriston Rates *cannot* be met, TMWA must rely more heavily on groundwater, and conservation efforts increase as needed. In instances where conditions are severe enough that drought reserves must be released, TMWA may implement enhanced conservation measures to minimize the use of drought reserves, including temporary, voluntary reductions. This approach was effective during the recent drought of 2012–2015. During the 2015 drought, TMWA was able to temporarily reduce customer usage by 9–16%, on average. Enhanced conservation efforts are used to heighten awareness regarding drought conditions and highlight the importance of responsible water use.

TMWA DROUGHT LEVEL DESIGNATION

As described in Section 2.1, TROA defines a drought situation based on Lake Tahoe’s elevation and on the loss of Floriston Rates. When a drought situation exists under

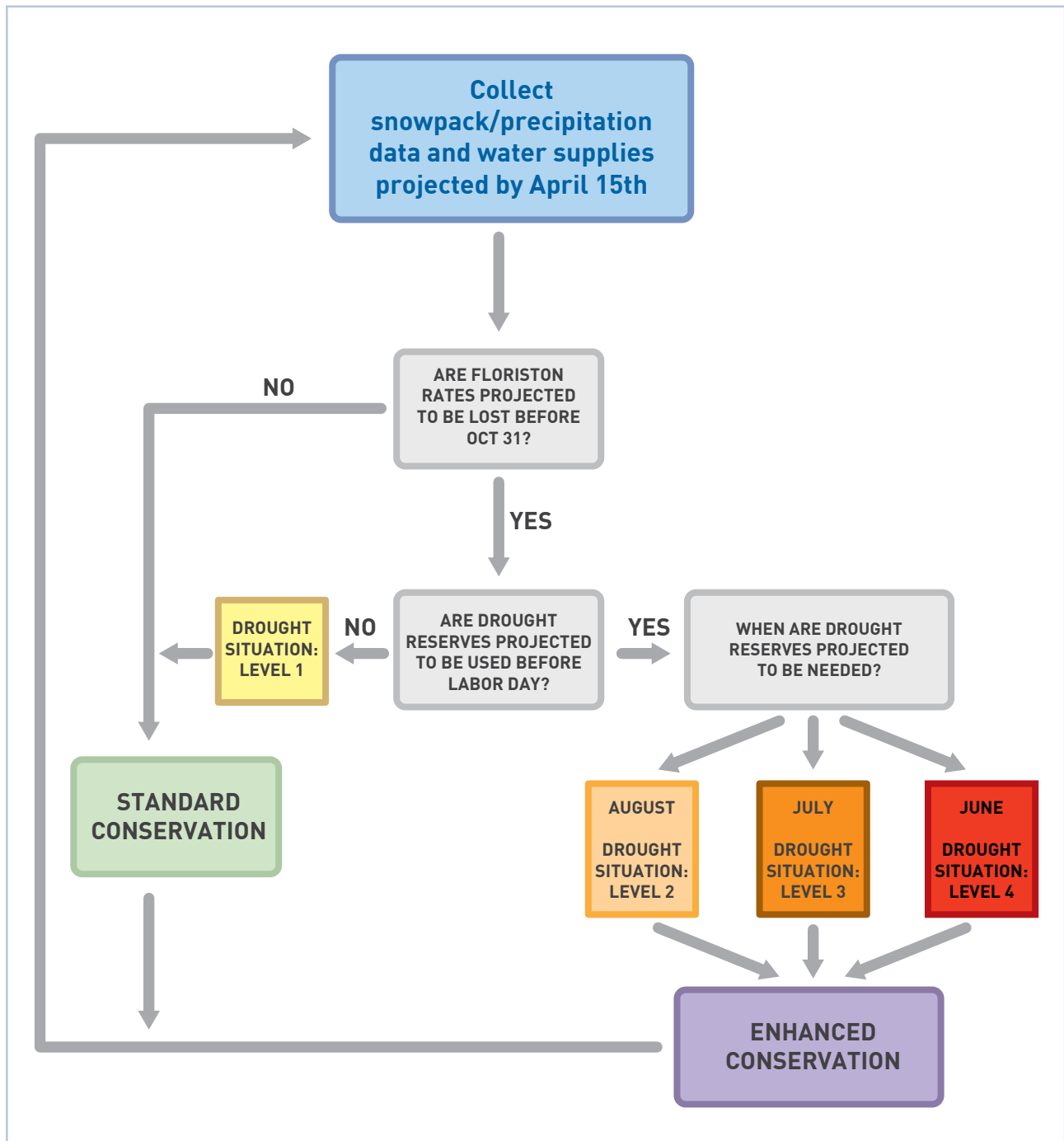


FIGURE 4-2: TMWA DROUGHT SEVERITY LEVEL FLOWCHART

TROA, TMWA has four categories for drought severity, which are based on when TMWA's upstream drought storage is projected as necessary to meet anticipated customer demand later in the year. If the release of upstream storage projected need is in June, July, and August, drought severity is designated as level 4, 3, or 2, with 4 the most severe. If upstream storage is not expected

to be needed until after Labor Day, TMWA's drought severity is a level 1. When the drought severity is a level 4, 3, or 2, TMWA implements enhanced conservation. When the drought severity is a level 1, enhanced conservation is not required, and standard conservation practices are used. Figure 4-2 provides a flowchart of the triggers required for each of TMWA's drought severity levels.

DEMAND MANAGEMENT DURING DROUGHT SITUATIONS

TMWA orients conservation initiatives to better manage demand over the course of a drought situation, with the goal of minimizing the use of upstream drought reserves. The level of response depends on the total amount of drought reserves available and the amount required to meet the demand projected during the summer. To minimize the use of drought reserves, TMWA will enhance existing conservation initiatives when drought severity is at a level 4, 3, or 2. TMWA can also implement additional restrictions and temporary cutback requests, as necessary.

TMWA begins enhancing conservation efforts the month before drought reserves are needed to meet customer demand. Table 4-1 provides the timeline for enhanced conservation based on drought severity.

Table 4-2 shows the different initiatives used for TMWA's standard and enhanced conservation efforts. Enhanced conservation begins with TMWA ramping up its education and outreach efforts during the months when outdoor watering occurs (typically May through mid-October). TMWA increases media advertising to promote awareness of drought conditions and any additional watering restrictions needed. TMWA utilizes expanded media coverage to highlight its programs and online resources

that help customers conserve water. Table tents asking that water only be served by request are provided to local restaurants. Mirror stickers encouraging customers to use water efficiently are placed in public restrooms. TMWA also sends letters to homeowners' associations (HOAs), requesting they not penalize residents who let their lawns turn brown during the drought.

TMWA also increases its water-efficiency requirement during drought severity levels 2–4. Time-of-day restrictions are expanded to prohibit watering between 11 a.m. and 7 p.m. from Memorial Day through Labor Day. Depending on the severity of the drought and how many years a drought has been in effect, TMWA can request that customers reduce their water consumption by a targeted amount during the months when reserves are needed. The cutback amount depends on the quantity of drought reserves TMWA has accumulated and the projected level of demand during peak-use months.

DEMAND MANAGEMENT AND EMERGENCY SUPPLY CONDITIONS

Natural disasters and other unforeseen events can interrupt TMWA's available water supplies; these include floods, earthquakes, equipment failure, or distribution leaks. Sometimes the events are localized within the distribution system and sometimes the whole community

TABLE 4-1: DROUGHT SEVERITY LEVEL RESPONSE TIMELINE CHART

	Outdoor Watering Months					
Level of Severity	May	June	July	August	September	October
	Drought reserves are not needed before Labor Day.					
Level 1	Standard Conservation					
	Drought reserves are needed before Labor Day.					
Level 2				Drought Reserves Needed		
	Standard Conservation		Enhanced Conservation			Standard Conservation
Level 3			Drought Reserves Needed			
	Standard Conservation	Enhanced Conservation				Standard Conservation
Level 4		Drought Reserves Needed				
	Enhanced Conservation					Standard Conservation

TABLE 4-2: CONSERVATION ACTIONS AND DROUGHT SITUATION SEVERITY

CONSERVATION INITIATIVE	DROUGHT SITUATION LEVEL OF SEVERITY	
	LEVEL 1	LEVEL 2 - 4
Communication and Outreach Campaign	Standard campaign	Enhanced campaign
Water Efficiency Codes	Time-of-day: No lawn watering from 12 p.m. to 6 p.m.	Time-of-day: No lawn watering from 11 a.m. to 7 p.m.
Water Watcher Programs	Standard staffing level	Increase staffing level
Water Usage Review Program	Standard staffing level	Standard staffing level
Landscape Retrofit Fund	Standard funding level	Standard funding level
Temporary Cutback*	No cutback request	Temporary cutbacks may be requested
Water Pricing Structure**	Standard pricing structure	Drought rates or increased fines may be implemented

* The exact amount of curtailment requested is determined based on projected demand levels, drought storage availability, and estimated surface and groundwater available.

** While historically this measure has never been used in the Truckee Meadows, increasing the price of water during a drought has been an effective measure used by other water purveyors.

can be affected. During such events, TMWA's goal is to minimize customer disruptions. During states of emergency, the community may be required to comply with increased conservation measures such as mandatory temporary cutbacks or severe watering restrictions (e.g., no outside watering or once per week during summer months). Additionally, commercial properties may be asked to reduce laundry, use paper plates in restaurants, and to not use potable water for non-potable purposes.

Increased conservation by TMWA customers during emergencies is just one element of the successful management of emergency water supply interruptions. TMWA's personnel train for and practice responding to various emergency situations. This has shown success during past emergencies in which water supply interruptions have been mitigated as swiftly and efficiently as possible. For example, the April 2008 earthquake in Mogul destroyed the Highland Flume, thereby preventing gravity-fed delivery of water to the Chalk Bluff Water Treatment Plant (WTP). TMWA mitigated the incident by 1) turning on its Orr Ditch Pump Station and installing temporary pumps to feed Chalk Bluff, 2) turning on its Glendale WTP, 3) turning on its wells as needed for demand, and 4) installing temporary piping around the Highland Flume failure to deliver more water to Chalk

Bluff. These actions avoided any water supply interruptions for TMWA customers.

SUMMARY

Conjunctive use allows TMWA to efficiently store drought reserves and recharge underground aquifers for potential use during dry periods. In addition, its robust conservation plan includes actions to reduce water loss on the distribution side and demand management programs to keep customer usage down. Such initiatives include a well-funded CIP, an extensive education and outreach program, tier-based water rates structure, water efficiency codes and enforcement, and other programs tailored to reducing specific customers' usage. Demand management programs can be enhanced to respond to drought. Deployment of these programs is based on the severity of the drought, as defined within TMWA's drought severity index. The conservation strategies outlined in this chapter have proven effective over the past several decades. To enhance existing conservation programs, TMWA will be employing smart meter technology over the next three to five years to allow automated meter monitoring and advanced leak detection. TMWA will continue to research new and innovative ways to further help customers manage their water use in the future.

5

FUTURE WATER RESOURCES



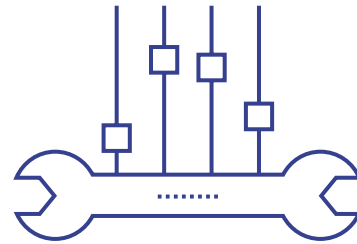
CHAPTER OVERVIEW

Accounting for continued growth and climate impact on the water supply, all projections confirm TMWA will continue to meet the water needs of this community over the next 20 years and beyond. To further bolster TMWA's water supply resiliency, there are several small-volume water resources identified in this chapter that will be investigated within the 20-year timeframe of this plan. Additionally, technologies to purify reclaimed water to enhance water resource resiliency and sustainability are being explored. If proven feasible, the implementation of these projects will require an investment of time and funds over multiple years.

CHAPTER AT-A-GLANCE

Highlights of Chapter 5 include:

1. Overview of future groundwater development
2. Additional applications for reclaimed water
3. Feasibility studies for advanced purified water
4. Exploration of water banking projects
5. Potential water importation projects



TMWA has a diverse water resource portfolio that will sufficiently meet the projected needs of the Truckee Meadows over the 20-year planning horizon. Currently, and for the foreseeable future, TMWA will rely on the conversion of Truckee River water rights from agriculture to municipal use and Fish Springs groundwater to meet projected growth. The merger and integration of the Washoe County Department of Water Resources (WDWR) and South Truckee Meadows General Improvement District (STMGID) water systems

brought additional groundwater and creek resources and facilities to TMWA. Future water resource projects and management strategies will be pursued and implemented as needed to further increase drought reserves and to continue to meet the region's water needs into the future.

The water resources and projects outlined in this chapter would provide relatively small quantities of water to the region but are important to expand the community's future water supply portfolio. The 2040 WRP is a high-level

TABLE 5-1: ESTIMATED YIELD OR CAPACITY OF FUTURE WATER RESOURCE PROJECTS

RESOURCE/PROJECT	RANGE OF YIELD OR CAPACITY
Treatment of Existing Groundwater Resources	
Sparks Groundwater Treatment Facility	11.9 MGD
Spanish Springs Valley Nitrate Treatment Plant	3-4 MGD
Longley Lane Groundwater Treatment Facility	4-6 MGD
South Truckee Meadows Groundwater Treatment Facility	4-6 MGD
Additional Groundwater Capacity	
New Well Development*	2 MGD (every 5 years)
ASR Expansion**	9,000 AFA
Additional Fish Springs Ranch Water	5,000 AFA
Expansion of Water Conservation	Varies
Creek Water Resources	
Mt. Rose Water Treatment Plant	4 MGD
Marlette Lake Water System – Wholesale Service	Varies
Reclaimed Water	
Expanded Irrigation	Varies
Advanced Purified Water	2,000 AFA
Water Banking	Varies

*New well development does not increase the total amount available for withdrawal annually.

**Targeting 9,000 acre-feet (AF) of recharge systemwide annually.

planning document and is not intended to be used for specific project details (i.e., detailed costs estimates, facility layouts, precise yield values). More detailed information for specific projects will be developed in the future. Table 5-1 (see previous page) summarizes the estimated ranges for the yields and capacity for each project currently being considered. A description of each resource or project, including a summary of the benefits and implementation challenges, is presented in the next section.

ABOUT ARSENIC AND OTHER CONSTITUENTS IN GROUNDWATER

The US Environmental Protection Agency (EPA) develops and sets regulatory standards that limit the amount of contaminants in public water supplies. The EPA's standards are enforced by the Nevada Division of Environmental Protection and Washoe County Health District. Some of TMWA's groundwater wells have naturally occurring constituents, such as arsenic, manganese, and iron. Many of these contaminants occur naturally in the geology of the region and erode from natural deposits. However, these constituents are below the maximum contaminant levels (MCL) set by the EPA, are treated to a level below the MCL, or are blended with other water to attain a level below the MCL. An MCL is the highest level of a contaminant that is allowed in drinking water. TMWA has never had a drinking water quality violation. For more information on TMWA's water quality, visit <https://quality.tmwa.com/>.

TREATMENT OF EXISTING GROUNDWATER RESOURCES

TMWA's production wells provide peaking capacity to ensure reliable service during the typical irrigation season and provide critical drought capacity in dry years. In areas where there are groundwater quality issues, TMWA is exploring opportunities for small-scale treatment plants to continue utilizing these important resources.

SPARKS GROUNDWATER TREATMENT FACILITY

TMWA has four production wells and two additional potential well sites in Sparks that have not been used due to water quality issues, including elevated levels of arsenic, iron, and manganese. These wells are not currently equipped but will be needed in the future to provide additional peaking capacity to serve future growth and to enhance TMWA's ability to provide reliable service during drought or emergency conditions affecting the Truckee River. Water from these wells will be treated in the proposed Sparks Groundwater Treatment Facility (GWTF), located along East I Street and East Prater Way. The Sparks GWTF will be designed with magnesium dioxide pressure filters to remove arsenic, iron, and manganese to meet federal and state drinking water quality standards. As described in TMWA's 2015–2035 Water Facility Plan, the Sparks GWTF is scheduled to be built in two phases beginning around 2030. Phase 1 will produce up to 7.6 MGD, and Phase 2 will add another 4.3 MGD of treated water production capacity.

TABLE 5-2: BENEFITS AND CHALLENGES OF THE SPARKS GROUNDWATER TREATMENT FACILITY

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Provides opportunities to use existing wells with arsenic, iron, and manganese water quality issues Provides new off-river resource Increases drought supply and peaking capacity 	<ul style="list-style-type: none"> Requires extensive phased construction of well buildings and treatment facility over several years
Cost	<ul style="list-style-type: none"> Time frame to build the water treatment plant is expected around 2030, based on TMWA's Water Facility Plan. 	<ul style="list-style-type: none"> High cost

SPANISH SPRINGS VALLEY NITRATE TREATMENT FACILITY

Due to the high density of septic systems, over-watering of turf and impacts from livestock in the Desert Springs area of Spanish Springs, some of TMWA's municipal wells are contaminated with nitrate. TMWA completed a one-year pilot study to assess the effectiveness of using two-stage, fixed-bed (FXB) biological treatment for the removal of nitrate from Desert Springs Well 3 groundwater. Biological treatment is not presently an approved technology in Nevada for nitrate removal. The pilot study demonstrated that the biological treatment system consistently reduced nitrate from groundwater. With additional chemical treatment, naturally occurring arsenic can also be removed from the groundwater. Based on the findings of the pilot study, a conceptual design was created for a full-scale treatment facility with a capacity of 3–4 MGD to treat water from Desert Springs Wells 1, 2, 3, and 4. TMWA is evaluating various options to ensure its continued ability to use the wells in Desert Springs to meet existing customer demand.

TABLE 5-3: BENEFITS AND CHALLENGES OF NITRATE TREATMENT

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Allows continued use of TMWA's wells by mitigating water quality issues due to nitrates Will help maintain existing groundwater capacity in Spanish Springs 	<ul style="list-style-type: none"> Good location to site the nitrate treatment plant has not been identified. Requires the construction of a pipeline to the treatment plant site Requires permits for operating a new treatment facility
Cost	<ul style="list-style-type: none"> A treatment facility may be used to help mitigate a regional water quality issue. 	<ul style="list-style-type: none"> Relatively high cost to existing customers

LONGLEY LANE GROUNDWATER TREATMENT FACILITY

With an existing capacity of approximately 4 MGD, the Longley Lane WTP was owned and operated by WDWR prior to the merger with TMWA. TMWA currently does not use this facility for water treatment; however, it is used as a booster pump station serving the Hidden Valley area. Hidden Valley wells 3 and 4 used to be treated at the Longley Lane WTP when it was operated by WDWR, but TMWA is investigating treating these wells individually on site. TMWA recently completed a preliminary design report defining the necessary improvements to allow these wells to be brought back online. These improvements consist of ultraviolet light (UV) treatment at Hidden Valley 4 for pathogen inactivation and blending with Hidden Valley Well 3 to reduce arsenic concentrations to acceptable levels.

In the future, TMWA plans to retrofit the Longley Lane treatment facility with magnesium dioxide pressure filters to remove iron and manganese from existing and future wells. The combined capacity of Hidden Valley Wells 3 and 4, plus the modified treatment facilities is expected to be approximately 4–6 MGD. These supply facilities are not currently being used but will be needed in the future to provide additional peaking capacity to serve growth and enhance TMWA's ability to provide reliable service during drought or emergency conditions affecting the Truckee River.

TABLE 5-4: BENEFITS AND CHALLENGES OF THE LONGLEY LANE WATER TREATMENT FACILITY

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Allows continued use of TMWA's wells by mitigating water quality issues Increases drought supply, reliability, and peaking capacity 	<ul style="list-style-type: none"> Requires implementation of creative UV/blending treatment process for two wells Requires retrofitting existing treatment facility using media filtration rather than membranes
Cost	<ul style="list-style-type: none"> Improves conjunctive use and operational flexibility and lowers operating costs Construction can be phased as needed. 	<ul style="list-style-type: none"> Relatively high cost to existing customers

SOUTH TRUCKEE MEADOWS GROUNDWATER TREATMENT FACILITY

Double Diamond Wells 1, 3, and 5 were owned by WDWR prior to the merger with TMWA. Of the three wells, only Well 1 was equipped for operation due to naturally occurring arsenic in Wells 3 and 5. TMWA has since made improvements to Well 3, which is currently blended with treated surface water and operated during peak summertime demand. TMWA is also investigating the feasibility of blending at Well 5. In the future, when needed for peaking capacity, drought protection, and/or reliability, TMWA plans to replace Well 1 with a higher capacity well and route all three to an arsenic groundwater treatment facility. TMWA acquired a 10-acre site off Double R Blvd. during the merger with WDWR that is permitted for a treatment facility. The ultimate capacity is expected to be 4–6 MGD.

TABLE 5-5: BENEFITS AND CHALLENGES OF THE SOUTH TRUCKEE MEADOWS WATER TREATMENT FACILITY

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Allows expanded use of TMWA's wells that have water quality issues Increases drought supply and peaking capacity 	<ul style="list-style-type: none"> Requires construction of pipelines to the treatment plant site Requires permits for operating a new treatment facility
Cost	<ul style="list-style-type: none"> Improves conjunctive use and operational flexibility Construction can be phased as needed. 	<ul style="list-style-type: none"> Relatively high cost for construction

ADDITIONAL GROUNDWATER CAPACITY

There are some opportunities within TMWA's current service area where new wells could be developed, and TMWA is constantly analyzing opportunities to expand its groundwater resources. These projects, besides Fish Springs Ranch, would not increase the total amount of withdrawal annually from the groundwater basins. This section outlines projects TMWA could implement to expand groundwater capacity in its service area, including new wells and ASR expansion.

NEW WELL DEVELOPMENT

Because of the merger with STMGID and WDWR in 2015 and the acquisition of West Reno Water Company in 2019, TMWA has expanded its groundwater well count to approximately 89 active production wells in nine hydrographic basins. TMWA plans to increase its groundwater pumping capacity from 63 million gallons per day (MGD) to 77 MGD



DRILLING A NEW PRODUCTION WELL

over the next 20 years, primarily to help meet peak summertime irrigation demand. It is highly likely that development of new groundwater sources will require new treatment facilities for naturally occurring constituents such as arsenic, iron, and manganese as TMWA expands its well network into areas with poorer water quality.

TMWA replaces existing wells when efficiency declines and/or a well's physical condition necessitates new well construction. When replaced, the new well is often drilled in proximity to, or on the same parcel as, the existing well. Recent replacement-well drilling includes Army Air (basin 92B), Thomas Creek (basin 89), and Spring Creek 5 (basin 85). In areas where there are no existing wells, exploratory drilling programs are implemented to characterize the groundwater capacity and quality. If the exploratory program results are favorable, the site may later be developed into a full-scale production well. To minimize the need to replace wells, TMWA uses an extensive well rehabilitation program, described in [Ch. 2](#), to maintain and improve well efficiency and capacity.

TABLE 5-6: BENEFITS AND CHALLENGES OF NEW WELL DEVELOPMENT

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Provides added off-river water resources Increases drought supply and peaking capacity Is a resource that the public readily accepts 	<ul style="list-style-type: none"> Lack of good locations to site new wells due to water quality constraints
Cost	<ul style="list-style-type: none"> Costs to drill and equip new wells can be incorporated into TMWA's capital improvement budget when needed. 	<ul style="list-style-type: none"> New wells are relatively expensive to drill and equip. Wells drilled in areas with low water quality may require expensive treatment systems.

AQUIFER STORAGE AND RECOVERY (ASR) EXPANSION

TMWA has been expanding its existing ASR program by equipping additional wells for recharge in the acquired WDW and STMGID water systems. Over the last several years, wells in Spanish Springs, South Truckee Meadows, and Pleasant Valley have been retrofitted to increase ASR capacity. In Spanish Springs, Desert Springs Wells 1 and 2 have recently been equipped for ASR. In the South Truckee Meadows and Pleasant Valley, Arrowcreek 2, Tessa East Well, and STGMID 11 have also been retrofitted.

For planning purposes, TMWA is targeting a total annual recharge volume of 9,000 acre-feet annually (AFA). Of this 4,000 AFA is planned within the Central Truckee Meadows and Spanish Springs Valley. The completion of the Mt. Rose Water Treatment Plant (WTP) will allow for approximately 3,000 AFA of recharge opportunities using treated Whites Creek water at production wells on the Mt. Rose Fan. In the North Valleys, a planned recharge volume of 2,000 AFA is being investigated.

TABLE 5-7: BENEFITS AND CHALLENGES OF ASR EXPANSION

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Provides opportunity to use available surface water in winter months when demand is low Aligns with TMWA's strategy of conjunctive use of water resources 	<ul style="list-style-type: none"> Requires complex state permits and drilling of new monitoring well sites Only able to recharge a relatively small amount of water in comparison to demand
Cost	<ul style="list-style-type: none"> Costs to equip existing wells for ASR can be incorporated into TMWA's capital improvement budget. 	<ul style="list-style-type: none"> Costs may increase at certain locations due to potential treatment requirements.

ADDITIONAL FISH SPRINGS RANCH WATER

TMWA's current use of water from the Fish Springs Ranch is discussed in [Ch. 2](#). As Stead, Lemmon Valley, and Cold Springs continue to develop, Fish Springs Ranch water will be the primary supply for these areas. As of December 2019, TMWA has committed 227 AF of the 8,000 AFA of Fish Springs Ranch water to development. Currently, TMWA is permitted to use 8,000 AFA, but there is the potential to increase the water supply in the future by an additional 5,000 AFA. This would be subject to favorable water level and water quality monitoring and by securing all necessary permits. These additional water rights may be increasingly important, given that this water will be available to serve future development throughout the North Valleys and potentially to Spanish Springs.

As a condition of the existing water rights filed with the State Engineer, TMWA has a monitoring plan to track hydrogeological impacts on the southeast side of Honey Lake Valley. The annual monitoring report includes groundwater pumping, groundwater levels, groundwater chemistry, and surface water and spring flow measurements. To predict possible impacts of increased groundwater withdrawal, a groundwater flow model for Honey Lake Valley is maintained. This model will help TMWA analyze the possibility of future water quality concerns, such as the potential to draw in water high in total dissolved solids (TDS) from beneath the playa to the north. In addition to monitoring, multiple permitting approvals will be required prior to TMWA accessing the additional Fish Springs Ranch water.

TABLE 5-8: BENEFITS AND CHALLENGES OF ADDITIONAL FISH SPRINGS RANCH WATER

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Expands utilization of existing infrastructure Increases drought supply and peaking capacity, especially for the North Valleys 	<ul style="list-style-type: none"> Requires environmental permitting to use additional 5,000 AFA Need to prove ability to pump the additional 5,000 AFA from the basin without impacting water quantity and/or water quality
Cost	<ul style="list-style-type: none"> Limited infrastructure will need to be constructed. 	<ul style="list-style-type: none"> Operating cost is relatively high.

CREEK WATER RESOURCES

Creeks throughout the South Truckee Meadows represent a valuable resource that TMWA can use to increase off-river reliability of its water supply. TMWA will be diverting Whites Creek water to the Mt. Rose WTP (to be completed in 2020) to decrease reliance on groundwater in that area. Mt. Rose WTP will be used to provide treated water for ASR and will also allow for passive recharge of the aquifer by allowing production wells to rest when Whites Creek water is available to serve customers.

Whites Creek water can also be used through a creek exchange permit. Creek exchange allows TMWA to measure the quantity of Whites Creek water left instream and exchange that water for Truckee River water. In addition to Whites Creek, TMWA holds water rights on Thomas and Galena Creeks. TMWA is currently investigating the feasibility of using additional creek resources through creek exchange permits.



WHITES CREEK

TABLE 5-9: BENEFITS AND CHALLENGES OF CREEK WATER RESOURCES

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Provides new off-river resources State allows permits for creek exchange for Truckee River water Decreases reliance on groundwater in regions with declining water levels 	<ul style="list-style-type: none"> Lacks infrastructure to use many creek resources currently Creek flows likely to be affected by changing climate and hydrologic conditions Not reliable during severe drought conditions
Cost	<ul style="list-style-type: none"> Creek exchange is a low-cost option 	<ul style="list-style-type: none"> New water treatment plants or other infrastructure needed to use creek resources directly are expensive

MARLETTE LAKE WATER SYSTEM—WHOLESALE SERVICE

In late 2018, the Nevada Department of Administration approached TMWA to determine TMWA's interest in purchasing wholesale water supplies from the Marlette Lake Water System, which includes Marlette Lake, Hobart Reservoir, and the so-called "East Slope" facilities. The water system currently provides water from Hobart Reservoir and its East Slope Facilities to Carson City and Virginia City. The water system includes water rights totaling approximately 11,500 AF, only a portion of which are currently used by the state for water service deliveries. Since late 2018, TMWA staff has conducted due diligence and held several discussions with the Nevada Department of Administration and staff from the State Engineer and Federal Water Master's offices. Based on TMWA's due diligence, purchasing available wholesale water from Marlette Lake Water System under a long-term contract could prove beneficial for TMWA customers and the greater Reno, Sparks, and Washoe County community. For instance, possible uses of the water include return flow augmentation for the Truckee Meadows Water Reclamation Facility (TMWRF) and drought storage augmentation.

TMWA, the Department of Administration, Carson City, and Virginia City have initiated discussions to conduct analyses and investigate necessary authorizations for the long-term use of a portion of the water available from Marlette Lake Water System. The goal is to develop the following:

- 1) Provide agreeable terms and conditions for establishing a long-term operating agreement that maximizes the beneficial use of the state's available water resources from the Marlette Lake Water System among TMWA, Carson City, and Virginia City.
- 2) Provide an agreed-upon delivery schedule, special conditions of service, and pre-determined adjustments to the quantity of water available for sale each water year to address variable hydrologic conditions.
- 3) Provide predictable revenue sources to the state and reduce the per-acre-foot charge to each water user by fully allocating the available water resources.

TABLE 5-10: BENEFITS AND CHALLENGES OF THE MARLETTE LAKE WATER SYSTEM WHOLESALE SERVICE

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Provides new water resources Marlette Lake water could be delivered through the Truckee River Maximizes the beneficial use of the state's available water resources among TMWA, Carson City, and Virginia City 	<ul style="list-style-type: none"> Requires development of a complex, cooperative agreement among numerous parties Flows may be impacted under changing climate and hydrologic conditions. Not reliable during severe drought conditions Involves water rights and permitting considerations
Cost	<ul style="list-style-type: none"> Wholesale service to TMWA requires few infrastructure improvements. 	<ul style="list-style-type: none"> Unclear whether Marlette Lake Water System improvements required at this time

The water service agreement would also address future rate setting procedures, memorializing the Nevada Department of Wildlife’s operating restrictions on Marlette Lake for the benefit of fisheries, water rights permitting requirements, and other general terms and conditions.

RECLAIMED WATER

Reclaimed water provides both local and regional benefits. Reclaimed water use provides a sound method of effluent management and beneficial use through irrigation and other uses. The main local benefit of reclaimed water is that it conserves potable water and provides a reliable, drought-resistant water source, even in times of restriction and conservation. Using reclaimed water provides a more predictable way to ensure compliance with discharge limitations when compared with river discharge but likewise competes with water needs for instream flows. Dedicated Truckee River water that does not return to TMWRF as wastewater, such as in the Stead and South Truckee Meadows areas, generally requires additional water rights to be dedicated to provide for that return flow depletion.

TMWRF currently supplies reclaimed water to numerous sites in Sparks, including Wildcreek Golf Course, Reed High School, Shadow Mountain Sports Complex, Golden Eagle Regional Park, and numerous other parks and streetscapes; and in Reno, this includes the University of Nevada, Reno (UNR) Farms property and Mira Loma Park. Reclaimed water is treated to very high standards that meet both the discharge limits to the Truckee River and the standards required for reclaimed water use.

The Reno-Stead Water Reclamation Facility (RSWRF) has an annual average flow of 1.85 MGD. During the winter and when reclaimed water flows are greater than the irrigation demand, excess reclaimed water is discharged into a natural drainage channel that flows to Swan Lake. This is the primary disposal site for RSWRF, which is permitted to discharge an average of 2.35 MGD (2,630 AFA), with 1.85 MGD being allocated to discharge to the lake after meeting reuse demand. Under present operation, the RSWRF reuses an average of 0.50 MGD, or about 27% of its total flow primarily for irrigation of the Sierra Sage Golf Course, the North Valleys Sports Complex, Mayors Park, and a truck fill station at the treatment plant. Starting in 2019, approximately 0.5 MGD was pumped (aka, “shaved”) to TMWRF for treatment to reduce the discharge to Swan Lake due to high lake levels. In the future, when lake levels drop, this practice of flow shaving will likely transition to serve as capacity augmentation for RSWRF, until such time as treatment capacity at RSWRF is expanded and additional effluent management practices are implemented, making the flow shave unnecessary for normal operations.

TABLE 5-11: BENEFITS AND CHALLENGES OF RECLAIMED WATER

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> Reliable under changing climate and hydrologic conditions Allows reuse of water for uses when potable water is not needed (e.g., irrigation) TMWA has been actively involved in partnerships to expand reclaimed water use in the region. Offsets wastewater flows to the Truckee River There is strong public acceptance of reclaimed water for non-potable uses 	<ul style="list-style-type: none"> TMWA does not have the ability to supply reclaimed water Infrastructure to use reclaimed water is only in place in certain areas Water right return flow requirements must be satisfied
Cost	<ul style="list-style-type: none"> Reclaimed water rates are typically less than potable water rates 	<ul style="list-style-type: none"> Reclaimed water distribution systems are expensive

South Truckee Meadows Water Reclamation Facility (STMWRF) is one of the few water reclamation facilities in the United States that operates a zero-discharge system with 100% reuse. STMWRF reclaimed water meets or exceeds the State of Nevada's Category A designation, which permits unrestricted use of reclaimed water. Reclaimed water is used for irrigating parks, schools, golf courses, commercial landscapes, and thoroughfare median landscapes. Specific reuse areas include the South Meadows Industrial Park, Double Diamond and Damonte Ranch residential areas, the Arrow Creek and Wolf Run Golf Courses, the South Valley Regional Park, and Manogue High School, among others.

Although TMWA does not supply reclaimed water, TMWA recognizes the value of using this resource to meet non-potable demand and collaborates with partner agencies to implement regional strategies for its use. As described in [Ch. 2](#), TMWRF will be providing 4,000 AFA to TRIGID, primarily for cooling systems for large companies in the industrial park. TMWA has been a key player in creating operational strategies for this large-scale reclaimed water project. There are future opportunities for TMWA and the region to innovatively use reclaimed water. TMWA strives to use all regional water resources as efficiently as possible. Therefore, TMWA will continue to collaborate with regional partners and pursue projects such as advanced purified water, water banking, and other reclaimed water opportunities, as described in the next several sections.



SIGN IDENTIFYING RECLAIMED WATER USE AT MIRA LOMA PARK

ADVANCED PURIFIED WATER (ONEWATER NEVADA)

In 2016, Nevada adopted new regulations to permit the use of "Category A+" reclaimed water, or advanced purified water, for groundwater augmentation. These new regulations have the potential to provide many benefits for the Truckee Meadows region. TMWA is a key partner in OneWater Nevada, a collaborative effort involving TMWA, University of Nevada Reno, Washoe County, City of Reno, City of Sparks, WRWC, NNWPC, and TMWRF.

The goal of OneWater Nevada is to evaluate treatment technologies and determine if advanced purified water can offer long-range regional benefits and opportunities to the Truckee Meadows' water portfolio.¹ Although new to the Truckee



ONEWATER NEVADA ADVANCED PURIFIED WATER TREATMENT DEMONSTRATION PROJECT

¹ For more detail on advanced purified water treatment in the Truckee Meadows, visit <https://onewaternevada.com/>.

BENEFITS OF ADVANCED PURIFIED WATER

SAFE, RELIABLE WATER SUPPLY

Advanced purified water uses proven technology that cleans water to a level that meets or exceeds state and federal drinking water standards.

DROUGHT-PROOF WATER SUPPLY

Having a safe, sustainable water supply ensures water is available even during periods of drought.

SUSTAINABLE WATER SUPPLY OPTION

Advanced purified water could diversify the region's water supply portfolio. It provides a sustainable water supply option that is less energy intensive than alternative options.

INDEPENDENT OF WEATHER VARIABILITY

Advanced purified water may enhance the region's water supply resiliency to help address future climate change uncertainties, such as longer growing seasons, changes to snowpack, and changes in the timing of runoff.

Meadows, advanced purified water has been used to replenish underground aquifers and surface water reservoirs throughout the United States for over 40 years.

OneWater Nevada is assessing the feasibility of multiple field-scale advanced water treatment demonstration projects. The feasibility study will occur over two to three years and consists of technical, social, environmental, and financial analyses; regulatory compliance; public engagement; advanced treatment pilot testing; geotechnical investigations; and field-scale treatment demonstration projects. UNR is leading the treatment technology demonstrations with multiple demonstration trailers that will be equipped with advanced water purification treatment technology including filtration, ozonation with biologically activated carbon, ultraviolet light and advanced oxidation process, and granular activated carbon. These treatment trailers, most recently located at RSWRF and previously at the STMWRF, will be operated as a technology demonstration project for 9–12 months. Following treatment, about 14 gallons per minute (GPM) of purified water will be injected in and recovered from a controlled, test-site aquifer to confirm that the water quality meets all requirements.

Augmenting groundwater or surface water supplies with advanced purified water is generally referred to as indirect potable reuse. This is a process whereby highly purified water is stored in an environmental buffer such as a lake or

TABLE 5-12: BENEFITS AND CHALLENGES OF ADVANCED PURIFIED WATER

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> • Maintains local control of the water resource • Drought-proof and sustainable resource • Nevada has adopted regulations that allow use of Category A+ water for groundwater augmentation • Potential to offset development of other water resources that could benefit the environment • Public outreach efforts are underway 	<ul style="list-style-type: none"> • Requires construction of advanced treatment facilities • Large-scale advanced purified water projects are a long-term goal • Requires extensive public outreach and education • Public acceptance for using advanced purified water for potable uses is uncertain
Cost	<ul style="list-style-type: none"> • Potential to generate revenue from sale of will-serve commitments 	<ul style="list-style-type: none"> • New advanced treatment facilities and other infrastructure required will be expensive

aquifer before eventually reentering the drinking water supply. Conceptually, an indirect potable reuse project might be well suited for areas such as the North Valleys or the South Truckee Meadows, because the water reclamation facilities for these areas do not return the treated water to the Truckee River. Purified water could be recharged using infiltration basins or injection wells in areas generally isolated from domestic wells and blended with ambient groundwater. Months or years later, the stored water would be recovered using TMWA's municipal wells, providing "banked water" for future use. TMWA is exploring potential areas where the hydrogeology may be favorable to create a water bank which, as described in the following sections.

WATER BANKING PROJECTS

BEDELL FLAT

As part of TMWA's overall conjunctive use management strategy, TMWA is working with the City of Reno, Washoe County, and the US Geological Survey (USGS) to evaluate the feasibility of an integrated ASR program in Bedell Flat. Bedell Flat is located about 13 miles north of Stead and was identified in a previous analysis performed by the City

of Reno in 2007 as having potentially favorable geologic conditions for the storage of advanced purified water. See Figure 5-1 for the regional project location.

Bedell Flat is a relatively small (53 square miles), undeveloped hydrographic basin composed of federal lands administered by the Bureau of Land Management. Depths to water in the aquifer range from less than five feet in the northwest, where surface drainage exits the basin, to at least 180 feet near the middle of the basin.

Several ASR options have been under consideration within Bedell Flat. TMWA and its partners have completed hydrogeological investigations and environmental clearance and permitting work to gain an understanding of the feasibility, scope, and cost of a water banking program in Bedell Flat. Based on initial findings, the geology of the basin does not appear favorable for water banking. However, TMWA is continuing to investigate the feasibility of water banking projects in other basins.

AMERICAN FLAT

Similar to the Bedell Flat project, TMWA is actively working on an ASR feasibility study at the north end of West Lemmon Valley (basin 92A). See Figure 5-1 for regional project location. The purpose of the study is to



AMERICAN FLAT DRILLING

TABLE 5-13: BENEFITS AND CHALLENGES OF WATER BANKING PROJECTS

OBJECTIVE	BENEFITS	CHALLENGES
Implementation	<ul style="list-style-type: none"> • Feasibility studies at multiple sites are currently ongoing • Ability to store water underground for future use • Diversifies the water supply and reduces reliance on Truckee River resources • Potential to provide drought backup 	<ul style="list-style-type: none"> • Water banking projects are a long-term goal, in conjunction with groundwater augmentation and using advanced purified water • Substantial feasibility testing and permitting
Cost	<ul style="list-style-type: none"> • Potential to generate revenue from the sale of future will-serve commitments 	<ul style="list-style-type: none"> • High cost due to advanced treatment and proximity to existing infrastructure

characterize aquifer storage potential through localized field testing, data acquisition, and groundwater modeling. Three wells were installed at the American Flat Road site. Related activities included geophysical surveying, well siting and drilling, small-scale pump/injection testing, and groundwater flow and transport modeling.

A 124-day injection test using potable water was performed to determine the ability of the aquifer to store water over long periods. Preliminary results of the study indicate the site may be favorable for storage, transmission, and recovery of water. Flow modeling results indicate that up to 2 MGD could be recharged for 25 to 50 years, but only if a nearly equivalent amount of water is pumped to ensure that undesirable shallow groundwater conditions do not develop.

TMWA will continue to collect information to determine if a full-scale ASR program can be implemented and sustained at the site. Should the site be deemed suitable for full-scale ASR program implementation, it will enhance TMWA's ability to safely store, recover, and distribute an additional water resource that could be utilized in the region.

OTHER CONCEPTUAL RESOURCES

The following descriptions are of privately prepared water supply projects that are conceptual in nature and are promoted by project proponents as possible regional water resources. These projects have not been vetted for feasibility by TMWA, permitted, or constructed. Identification of a

conceptual project shall not be construed as an indication of TMWA support or opposition of any project nor an indication of project viability. The list is not exhaustive and is intended to merely identify some potential projects for informational purposes. TMWA will continue to monitor project progress. See Figure 5-1 for project locations.

IWS BASIN, LLC (FORMERLY INTERMOUNTAIN WATER SUPPLY, LTD.), DRY VALLEY, BEDELL FLAT, NEWCOMB LAKE VALLEY

This project seeks to import approximately 3,500 AFA of groundwater to Lemmon Valley from three relatively undeveloped hydrographic basins approximately 20–30 miles north of Reno. In 2018, the State Engineer canceled IWS's water right permits because it failed to show reasonable diligence in placing the water to beneficial use. As of this writing, the status of IWS Basin's water right permits is uncertain and subject to legal proceedings. IWS Basin has other pending applications to appropriate water in these basins; however, they are protested by other parties and have not been acted on by the State Engineer.

LOWER SMOKE CREEK

The Lower Smoke Creek project is located just north of Pyramid Lake in the Smoke Creek Desert groundwater basin. Much of the water in the basin is held by the Jaksick family through various entities, including Bright-Holland Co. and Jackrabbit Properties LLC. Jackrabbit and Bright Holland executed a water development agreement with LSC Development, which intends to develop a



FIGURE 5-1: LOCATIONS OF POTENTIAL FUTURE WATER RESOURCES FOR THE TRUCKEE MEADOWS

water importation project. The first phase of the water importation project is intended to capture the water in the southern portion of the basin and pipe the water to Winnemucca Ranch and other planned developments consistent with the relevant water resource plans. The second phase would extend the pipeline to transport water from the northern portion of the basin. The Smoke Creek Desert basin has a perennial yield, substantiated by the USGS, of 16,000 AFA and is currently being adjudicated. With existing monitoring information, including USGS gages in place since 1986, the abovementioned water rights will support approximately 10,500 to 14,000 AFA of municipal water, subject to State Engineer approvals and additional hydrogeological monitoring.

RED ROCK

The Red Rock Valley Importation Project holds 1,273 AFA of water rights in the Red Rock Valley groundwater basin for use in West and East Lemmon Valley. Through 2008 Red Rock's project sponsors progressed with design and planning, which led to filing an application for a Special Use Permit with Washoe County in December 2008. The Board of Adjustment denied the application at its March 4, 2009 meeting, and the Board of County Commissioners also denied an appeal in May 2009. The denial was ultimately upheld by the Nevada Supreme Court in 2011.

SIERRA VALLEY

Since the late 1800s, a diversion ditch has carried up to 60 cubic feet per second of water for agricultural use from the Little Truckee River above Stampede Reservoir out of the Truckee Basin to Sierra Valley, California, in the Feather River Basin. The Little Truckee River diversions are inversely proportional to the Sierra Valley natural runoff, meaning that the lower the available flows in the native Sierra Valley streams, the higher the diversions from the Little Truckee River. Thus, these rights have a higher drought yield than a normal year yield, but the ability to store these rights would be required.

SUMMARY

While the region has adequate water resources to meet future demand, TMWA is constantly analyzing options to further expand its water supply portfolio. TMWA is committed to researching innovative ways to increase water resource resiliency, especially to increase its drought-resistant and off-river resources. There are opportunities for TMWA to expand its groundwater resources and retrofit its existing infrastructure to increase its ability to pump groundwater when needed. Additionally, TMWA is furthering its utilization of creek water resources, especially in the South Truckee Meadows. TMWA is collaborating with many regional partners through OneWater Nevada to explore innovative ways to use advanced purified water and the possibility of creating water banks for additional drought storage. TMWA has an extensive water resource portfolio that has been further bolstered by the implementation of TROA; however, TMWA will continue to identify and develop safe and sustainable local water supplies to ensure that a reliable, high-quality product is delivered to customers into the future.



PROTECTING THE WATERSHED AND THE ENVIRONMENT

CHAPTER OVERVIEW

As one of the users of the Truckee River, TMWA understands its intrinsic duty to help steward the protection of the watershed. Many initiatives outlined in this chapter are supported through the Truckee River Fund, a vehicle that both allows TMWA to manage the numerous grant requests it receives and also leverage matching funds for projects it supports. TMWA provides funding and support for projects that protect and restore water quality throughout the Truckee River watershed.

CHAPTER AT-A-GLANCE

Highlights of Chapter 6 include:

1. Truckee River Fund project spotlights
2. TMWA's collaborative efforts to help restore upstream forest health
3. Integrated source water protection with state, county, and municipalities
4. Assisting the recovery of the Lahontan cutthroat trout
5. Long-term energy sustainability through hydroelectric power



TMWA recognizes the importance of protecting the region's unique natural resources by using sustainable business practices to minimize environmental impact. By working cooperatively with community organizations throughout the Truckee River watershed, TMWA has improved the protection of the region's drinking water supply. TMWA participates in and supports many efforts to improve water quality, forest health, and riparian habitats in the watershed. Additionally, TMWA uses renewable energy, including hydropower and solar, to offset most of its power costs and reduce CO₂ emissions.

WATERSHED RESTORATION AND PROTECTION INITIATIVES

TRUCKEE RIVER FUND

The Truckee River and its tributaries provide key wildlife habitats and important recreational opportunities, while being an essential water source for the community. Because TMWA relies on the Truckee River for most of its water supply, it established the Truckee River Fund (TRF) in 2004 to facilitate source water protection. TRF utilizes



TRF HELPS FUND FOREST THINNING PROJECTS TO IMPROVE FOREST HEALTH AND DECREASE WILDFIRE RISK.

TRF PROJECT SPOTLIGHT: WATERSHED AQUATIC INVASIVE SPECIES PROGRAM



In 2009, the Tahoe Resource Conservation District (TRCD) initiated the pilot Watercraft Inspection program for the Truckee River watershed. Working with partner agencies, the purpose was to begin monitoring and conducting watercraft inspections to prevent and control aquatic invasive species (AIS). This included an education and outreach program and was designed to protect the recreational, economic, and ecological resources of the region.

Over the next few years, the AIS program continued to benefit from funding from the TRF. It was implemented at Lake Tahoe; Donner, Weber, and Independence Lakes; and Stampede, Boca, and Prosser Reservoirs. Since 2013, TRCD was able to fully support the AIS program with funding from other partner agencies such as the US Fish and Wildlife Services.

After extensive public education and outreach, the TRCD established enforceable, mandatory watercraft inspection programs across local jurisdictions (Town of Truckee and Nevada, Sierra, and Placer Counties). Since 2008 no new species have entered Lake Tahoe.

an Advisory Committee of nine appointed members that equally represent Washoe County, the City of Reno, and the City of Sparks.

TRF is used to support projects that protect and enhance water quality or resources of the Truckee River or its watershed, which also benefits TMWA's customers and the community. The projects funded by the TRF normally involve areas of the watershed that are multi-jurisdictional in nature, which makes a watershed improvement project difficult, if not impossible, to implement solely through

one entity or agency. In addition, TRF provides TMWA a vehicle for responding to funding requests from outside groups and organizations involved in promoting and improving the health of the Truckee River system and watershed. The TRF has been highly successful in leveraging matching funds for the projects it supports. This allows TMWA to help local organizations and agencies complete projects at a lower cost and support projects outside of its jurisdictional boundaries, without additional impacts on customer rates.

TRF PROJECT SPOTLIGHT

TRUCKEE RIVER WATERSHED COUNCIL

DONNER CREEK RESTORATION

In 2018, TRF provided \$125,000 in funding for the design and construction of two restoration projects along Donner Creek. These projects will reduce erosion, decrease sedimentation, and improve water quality. Improved water quality from restoration work can lead to decreased water treatment costs for municipal supply downstream in addition to providing benefits for instream habitat and flood attenuation. Truckee River Watershed Council leveraged \$900,000 in construction funding from Caltrans in 2019 to implement this work.

TRUCKEE DONNER LAND TRUST

WEBBER LAKE, LITTLE TRUCKEE RIVER HEADWATERS MANAGEMENT

In 2016, TRF granted \$18,750 to launch a multi-year program on the trust's Webber Lake property, which is located at the headwaters of the Little Truckee River. The objective was to address areas of tree disease and overstock and assist with the prevention of catastrophic wildfires. Both will aid in source water protection and reduction in the amount of sediment entering waterways due to erosion, which affects water quality.

TRUCKEE MEADOWS PARKS FOUNDATION

TRUCKEE MEADOWS NATURE STUDY AREA PROJECT

In 2018, TRF granted this project \$38,400 to repurpose the former Rosewood Lakes Golf Course into the Truckee Meadows Nature Study Area, a wetland habitat that will serve as an outdoor learning laboratory and public recreational park.

NEVADA LAND CONSERVANCY

CAUGHLIN FIRE EMERGENCY WATERSHED STABILIZATION & RESTORATION EFFORT

In 2011, TRF granted this project approximately \$220,000 to stabilize and restore public and private lands severely damaged by the Caughlin Fire. Work included installation of debris basins, channel clearing and debris removal, reseeding, hydro seeding, straw waddles, check dams, willow waddles, and the installation of other appropriate Best Management Practices (BMPs) to reduce erosion potential and sediment loading to drainage courses and tributary creeks terminating at the Truckee River.

SIERRA NEVADA JOURNEYS

WATERSHED EDUCATION INITIATIVE

This program has been funded since 2011. The Watershed Education Initiative program has proven results in empowering youth to protect and enhance the quality of the Truckee River. Over time, there have been significant increases in parent engagement and student volunteerism. This initiative bolsters improved protection of the community's primary water source.

CITY OF RENO

VIRGINIA LAKE WATER QUALITY IMPROVEMENTS

In 2015, TRF provided \$100,000 in funding to construct a new primary outlet structure for Virginia Lake. The project improved circulation and water quality by relocating the primary outlet structure near the lake's north end.

To date, TRF has approved and funded over 174 diverse projects that further the fund's goals. Since its inception, TRF has approved distribution of nearly \$14.1 million to qualifying projects. Partner organizations provided additional funding of over \$22.3 million in cash and in-kind services. Examples include riparian cleanup, river restoration, forest management, watershed education, aquatic invasive species inspections and removal efforts, and many other activities. Projects completed or underway are listed at www.truckeeriverfund.org.

PREVENTING LARGE WILDFIRES IN THE HEADWATERS

Large wildfires in the heavily forested headwaters of the Truckee River watershed can potentially have major impacts on downstream communities. Although fire can be good for forest health, unnaturally large fires can result in high levels of sediment, ash, and debris in waterways. Among many devastating impacts to the community, headwater wildfires can increase the cost of water treatment and degrade source water quality.

The Nature Conservancy—Nevada Chapter (TNC) conducted a study in 2016 to define areas susceptible to high-intensity wildfires in the headwaters of the Truckee River watershed. In collaboration with TMWA and the US Forest Service (USFS), this modeling effort identified areas at increased risk of high-intensity wildfires in forested headwaters. In addition, the study analyzed how fires might impact the community and identified strategies to reduce large wildfires in the watershed. Research shows that restoring forest health can be economically efficient because fire impact costs are often greater than proactive forest treatment costs. Based on findings from the headwater forest study, TNC plans to assist the USFS with leveraging funding and support to increase the pace and efficacy of forest restoration projects in the Truckee River watershed.

ONE TRUCKEE RIVER MANAGEMENT PLAN

TMWA has been an active participant in the implementation of the One Truckee River Management Plan (OTR Plan) since its inception. Phase 1 of the

INDEPENDENCE LAKE & LAHONTAN CUTTHROAT TROUT

TMWA works with The Nature Conservancy (TNC) to promote the health of the federally threatened Lahontan cutthroat trout (LCT) population at the Independence Lake Preserve. Independence Lake hosts one of only two wild, self-sustaining lake populations of LCT in the world. TNC has been working toward recovering the LCT population by removing non-native brook trout, brown trout, and kokanee salmon from Independence Lake and Upper Independence Creek. When operationally feasible, TMWA draws down the lake level at appropriate times to dry out established kokanee salmon redds (spawning nests) in the nearshore areas of the lake in the late fall and early winter. By decreasing the non-native kokanee population, TNC expects that the native LCT population will be able to increase over time.

Photo: Mike Conner/The Nature Conservancy



OTR Plan was completed in 2017 by a wide range of public and private partners in the Truckee Meadows. The overarching goal of the effort is to manage, protect, and provide stewardship of the Truckee River across all jurisdictional boundaries. Areas of focus include water quality, connectivity to community resources, health and wellness opportunities, habitat protection and restoration, stewardship, and long-term funding strategies. Recognizing the efforts to improve conditions

on the Truckee River, TRF funding of OTR continues with specific focus on protecting the community's drinking water supply. TMWA participates in the stewardship of the river and continues to be involved in the implementation of the four primary goals and over 140 strategies and action items identified in the plan. More information can be found at <http://onetruckeeriver.org/>.

TRUCKEE MEADOWS INTEGRATED SOURCE WATER PROTECTION PLAN

The Nevada Division of Environmental Protection (NDEP) initiated the development of an Integrated Source Water Protection Plan (ISWPP) for the Truckee Meadows in 2016. The final plan, titled the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, will be finalized and brought to relevant boards for approval in 2020. Prior to the creation of the ISWPP, TMWA updated its Wellhead Protection Plan (WHPP) in 2016 for the coordinated protection of public drinking water resources. TMWA's existing WHPP was a key component in the development of the ISWPP. The ISWPP expounds upon the existing WHPP and takes a collaborative approach with other local agencies, including those in Reno, Sparks, and Washoe County to ensure the

protection of groundwater and surface water supplies from future contaminants.

The ISWPP identifies Source Water Protection Areas (SWPAs) for drinking water sources. An interdisciplinary team of scientists and stakeholders identified SWPAs and the susceptibility of those areas to contamination or pollution. SWPAs take into consideration buffer areas around drinking water supplies and the modeling of groundwater systems to determine areas at the most risk for contamination. The final plan describe implementation strategies to help protect the Truckee Meadows' drinking water sources into the future. A key outcome of the planning process was is increased communication between TMWA and regional jurisdictions regarding potential contaminant sources in SWPAs. When identified activities that could impact drinking water supplies are occurring in the SWPAs, TMWA and/or other public water systems will be notified and will work with property owners to help mitigate potential risks to groundwater and surface water quality. The plan includes a map viewer with the SWPAs, watershed descriptions, and water quality improvement projects. To view, visit

<https://gis.rtcwashoe.com/portal/apps/webappviewer/index.html?id=59c200e46b5f48d18ba8169f95445c62>.



VERDI HYDROELECTRIC PLANT

SUSTAINABILITY

Power is one of TMWA's largest expenses. TMWA can offset more than 90% of the power it uses to provide drinking water to its customers on an annual basis through hydroelectric generation. TMWA owns and operates three run-of-the-river hydroelectric power plants: Fleish, Verdi, and Washoe. These hydroelectric plants were constructed in the early 1900s and continue to play an important role in TMWA's operations. Run-of-the-river hydroelectric plants rely on gravity to move diverted river water through canals to the power generation facilities. After the water passes through the generators, the water is returned to the river. TMWA's hydroelectric plants produce an average of 6.7 megawatts of power, which is enough to power approximately 3,500 households. The hydroelectric plants provide a source of clean, renewable energy, generating on average 40 million kWh per year. Every day TMWA runs its three hydroelectric plants at capacity, over 90,500 pounds of CO₂ emissions are effectively eliminated from our atmosphere, equating to roughly 15,000 metric tons a year.

Due to improvements to the Highland Canal raw water delivery system, the installation of a 30-kWh solar power generation project, and multiple improvements in efficiency at TMWA's treatment plants, TMWA anticipates continuing to increase efficiency and optimize its renewable energy generation. In addition, TMWA is currently investigating the feasibility of partnering with a solar project in Honey Lake Valley that could be used to help power the Fish Springs Ranch wells and pump station.

SUMMARY

TMWA uses a range of approaches to support restoration and protection efforts in the Truckee River watershed to maintain the excellent quality of the region's drinking water supply. The TRF effectively leverages funding from diverse partners throughout the watershed and allows TMWA to support projects it could not complete otherwise due to jurisdictional limitations, such as land ownership. TMWA will continue to support projects through TRF and will be involved in collaborative watershed management efforts, such as One Truckee River and the Integrated Source Water Protection Program. Additionally, TMWA values its role in being a good environmental steward for the community and will continue to improve efficiency and utilize renewable energy when feasible to minimize impacts on the environment.

7

RECOMMENDED ACTIONS



CHAPTER OVERVIEW

Each WRP details recommendations for the Board of Directors to consider. Some become new policies when warranted. Completed recommendations and policy adoptions from the 2016–2035 WRP are highlighted in this chapter. Many ongoing recommended actions from that plan have been carried over, with new recommendations added to this 2020–2040 update. Actions noted here may need to be amended if new challenges or information should arise.

CHAPTER AT-A-GLANCE

Highlights of Chapter 7 include:

1. Completed recommendations from the 2016–2035 WRP
2. Conversion of Meter Retrofit Fee to Water Resource Sustainability fee
3. Adoption of a Rate Stabilization Fund
4. Water resource management recommendations for TMWA Board consideration



The 2040 WRP is a planning document that outlines TMWA's water resource management strategy options through 2040. The preceding chapters have explained TMWA's current water management strategies, future impacts from climate conditions and growth, conservation practices, and possible future water resources. Based on the information and findings presented throughout the plan, this chapter includes recommended actions and policies for the TMWA Board to consider and act upon.

COMPLETED RECOMMENDED ACTIONS AND POLICIES

TMWA's 2016–2035 WRP *Volume I: Abstract* included "Findings & Recommended Actions" based on the findings from that plan. This section includes an overview of those recommended actions that have been completed. Also included are two important policies that have been approved by the Board and implemented since the adoption of the previous WRP.

COMPLETED RECOMMENDED ACTIONS FROM THE 2016–2035 WRP

Consolidation of TMWA and Washoe County Department of Water Resources (WDWR) Water Operations

In response to the Western Regional Water Commission (WRWC) legislative directive to evaluate the potential consolidation of water purveyors in the Truckee

Meadows, WDWR and South Truckee Meadows General Improvement District (STMGID) were effectively merged into TMWA on December 31, 2014.

Truckee River Operating Agreement Implementation

The five mandatory signatory parties—TMWA, Pyramid Lake Paiute Tribe (PLPT), the United States, California, and Nevada—implemented the Truckee River Operating Agreement (TROA) on December 1, 2015.

Donner Lake Acquisition

In March 2016, TMWA purchased the Truckee Carson Irrigation District's (TCID) share (4,750 acre-feet (AF)) of Donner Lake water rights, thereby acquiring all 9,500 AF of Donner Lake water rights.

NEW POLICIES ADOPTED SINCE THE 2016– 2035 WRP

Rate Stabilization Fund

In September 2018, TMWA's Board adopted a Rate Stabilization Fund (RSF) with an intended outcome of decreasing, avoiding, or deferring rate increases to customers. The designated maximum amount of funding for the RSF is 3% of annual water sales forecast for the subsequent three years. To be used at the discretion of the board, the fund may be applied toward operating costs, capital improvements, and other necessary expenses related to serving the current customer base as needed (e.g., for years where there is a shortfall in water sales revenue due to drought, weather variations).

Water Resource Sustainability Fee

In January 2018, TMWA's Board adopted a rule change to allow the Meter Retrofit Fee to be changed to the Water Resource Sustainability Fee. The meter retrofit fee was charged to new development projects and was required by TMWA Rule 7(H)(3) to finance and install water meters. With nearly all services metered, this decision broadens the use of the fee to support projects such as expanded conjunctive use, aquifer storage and recovery (ASR), demonstration and validation of advanced purified water uses, future water resource research and acquisition, and other projects that enhance water resource sustainability and drought resiliency.

2020–2040 WRP RECOMMENDED ACTIONS

Many ongoing recommended actions have been carried over into this plan from the 2016–2035 WRP, and several new actions and policies have been included. It is important to note that while many of these actions have been carried over from the previous plan, the numbering for the recommendations has changed due to plan format changes for the 2040 WRP. Recommendations in this plan also take into consideration Regional Water Planning Policies and Criteria from the WRWC's Comprehensive Regional Water Management Plan to further guide the utility's proposed actions.

<http://www.nnwpc.us/2016waterplan.html>

OBJECTIVE 1. WATER RESOURCE PLANNING

RECOMMENDATION 1.1. TMWA's Water Resource Planning

Background: TMWA's WRP is a planning and management document that spans a 20-year period and is updated every five years. The WRP is a key component of TMWA's integrated planning approach in conjunction with its Water Facility Plan and Capital Improvement Plan. The 2040 WRP is the fourth version of the plan since TMWA's inception in 2001.

Recommendation: Continue monitoring, reviewing, and revising its water resource management strategies at least every five years through TMWA's planning efforts in response to current and future conditions including but not limited to changing conditions in hydrology, climate patterns, economic development, regulatory constraints, and customer demand.

RECOMMENDATION 1.2. Geographic Scope of TMWA's Planning Area

Background: The Truckee Meadows has been steadily growing since recovering from the recession. Historically, TMWA's planning for the delivery of water has been focused on areas adjacent to its retail service area. As the region continues to grow, TMWA's service area will likely expand, including through the acquisition of smaller water systems in the region. Moving forward, TMWA will continue to expand its service area as needed and in conformance with regional planning efforts.

Recommendation: Continue to analyze the geographic extent of TMWA's water resource planning area subject to the guidelines of TMWA's Joint Powers Authority.

“The recommended actions outlined in this chapter will help guide TMWA to effectively manage its water resources.”

RECOMMENDATION 1.3. Small Water System Acquisitions

Background: There are many private or cooperatively-owned small water systems throughout the region. Although TMWA has acquired small water systems, such as the West Reno Water Company in Verdi in 2019, these water systems often present a range of financial and technical challenges. Other small water systems



SUSPENSION BRIDGE OVER THE FLEISH DAM ON THE TRUCKEE RIVER

have inquired about possible acquisition in recent years; however, TMWA typically requires systems to be improved to TMWA standards prior to acquisition, as demonstrated by the Verdi Business Park acquisition in December 2014.

Recommendation: Encourage local jurisdictions to analyze all conforming regional master plans to determine what growth pressures may be placed on existing small water systems and identify which water utilities could be integrated into TMWA in the future, especially in growth-prone areas. When small water systems approach TMWA, TMWA should perform its due diligence to assess the resource benefits, financial impacts, and technical challenges of each system prior to considering acquisition. When applicable, other options besides acquisition may be more appropriate to assist small water systems by other means (e.g., providing a wholesale meter to a small system).

OBJECTIVE 2. MANAGEMENT OF CURRENT WATER RESOURCES

RECOMMENDATION 2.1. Conjunctive Use of Water Resources

Background: TMWA uses a combination of surface water and groundwater resources to meet customer demand. Following the merger with WDWR and STMGID, TMWA now provides access to Truckee River water resources to much of its service area, excluding its satellite systems which are supplied solely by groundwater. Access to these resources has allowed TMWA to conjunctively manage its resources for most of its customers. Under TROA, TMWA can store additional drought reserves to provide adequate supply for existing and new customers through future droughts. Based on the results from this WRP, TMWA has sufficient drought reserves to meet demand through 2040 in all scenarios tested. Therefore, TMWA does not need to alter its existing planning criteria or water management strategies at this time and will continue to conjunctively use its resources.

Recommendation: Continue to rely on TMWA's pool of resources to meet current demand, acquire additional water rights to meet future demand, and recognize that TROA provides additional drought-year reserves. Continue to monitor TMWA's ability to meet current

and future demand by modeling the 1987–1994 drought period and include factors such as increased future demand, conservation improvement, hydrologic cycles, climate change, and additional water resources. Analyze management strategies under TROA to ensure that the community is receiving the maximum benefits from the agreement. Update the Board when future conditions evolve that require changes to the planning criteria or supply operation.

RECOMMENDATION 2.2. Groundwater Management

Background: TMWA's 89 production wells, spanning nine hydrographic basins, are an essential component of TMWA's water supply, particularly in the summer months when additional water resources are needed to meet peak demand. The wells are also critical in drought years when Truckee River flows are depleted. Groundwater level declines have historically occurred due to increased pumping in the southwest Truckee Meadows, west Pleasant Valley, and east Lemmon Valley, whereas water levels have remained stable in most other hydrographic basins. TMWA monitors water levels quarterly in all hydrographic basins where TMWA has production wells to track trends in aquifer health. Efficient management of TMWA's wells is important to ensuring continued groundwater level recovery and stabilization throughout the region.

Recommendation: Continue to: (1) use TMWA's wells to meet demand while maintaining the sustainability of the aquifers and (2) maintain or improve water levels through passive and active groundwater recharge.

RECOMMENDATION 2.3. Aquifer Storage & Recovery

Background: TMWA's ASR program started in 1993 and is important to maintaining water levels in aquifers where TMWA has production wells. ASR augments the existing water supply to proactively improve water levels and increase drought storage. The ASR program is currently robust, but TMWA is constantly looking to expand the program, especially in areas where water levels have been declining due to historic over pumping. Once the Mt. Rose

Water Treatment Plant (WTP) is operational, TMWA will be able to divert and treat Whites Creek water for ASR in the winter months on the Mt. Rose Fan, which will help increase groundwater levels in that area of the Pleasant Valley hydrographic basin.

Recommendation: Continue to expand passive and active groundwater recharge to: (1) augment groundwater supplies that provide additional drought and peak-demand capacity; (2) reduce water quality concerns in specific areas; and (3) maintain and improve groundwater levels. Increase ASR with the ultimate goal of recharging 9,000 AFA. Increasing the breadth and scope of all three of these activities throughout the service area will help maintain sustainable groundwater levels and lessen the impact from septic, industrial, and naturally occurring contaminants.

RECOMMENDATION 2.4. Water Rights Availability

Background: As a result of the merger in 2014 of the WDWR and STMGID water systems formerly operated by Washoe County, TMWA has integrated most of the region into its distribution system, which allows the area to more effectively utilize Truckee River resources. A review of available Truckee River water rights shows a sufficient number of water rights exist to meet TMWA's average water service demand through the 2040 planning horizon and beyond. However, TMWA needs to continue to acquire Truckee River water rights to be able to issue will-serves for new development. Demand for Truckee River water rights has increased in response to a competitive development market, difficulties in finding willing sellers of large blocks of water rights, and competition for water rights from environmental and lower river uses. TMWA has been working proactively to acquire water rights to meet future demand.

Recommendation: Continue to accept the dedication of Truckee River water rights in the growth-prone Truckee Meadows, Spanish Springs, and west Pleasant Valley. Recognize Fish Springs Ranch is available to meet future demand in the North Valleys.

Continue to acquire water rights to meet future water

demand and maintain an inventory of water rights for future growth, pursuant to Rule 7.

TMWA should continue to pursue strategic water rights purchases where TMWA is uniquely positioned to obtain the maximum benefit through its pooling of resources, upstream storage, and TROA.

RECOMMENDATION 2.5. Water Conservation

Background: TMWA's conservation initiatives include measures to enhance efficient use of water and reduce or eliminate water waste. Specific programs include leak detection and repair, landscape design guidance, assigned-day watering, and water audits. TMWA works with WRWC in developing conservation plans for the region and cooperates with WRWC in implementing its conservation programs. While this WRP contains an overview of TMWA's conservation strategies, a more in-depth Drought Contingency Plan will be updated pursuant to Nevada Revised Statute (NRS) 540.131 and will be a separate document that is not included in the WRP.

Recommendation: Continue to implement, and revise as needed, TMWA's Drought Contingency Plan to promote smart and efficient use of the community's water resources in compliance with all federal and state regulations.

RECOMMENDATION 2.6. Source Water Contamination

Background: Generally, TMWA has excellent source water quality given that most of its water supply comes from the Truckee River which flows from Lake Tahoe. However, there are concerns about contaminants reaching the Truckee River, and its tributaries from anthropogenic sources, such as overflows from industrial areas or chemical spills from the railroad or highway. Additionally, some of TMWA's groundwater wells have been contaminated by human activity, including historic tetrachloroethylene (PCE) contamination from dry cleaning businesses, nitrate contamination from high-density septic systems, and leaching from fertilizer. TMWA works closely with the Central Truckee Meadows Remediation District (CTMRD) to identify

PCE-contaminated groundwater and remove PCE contamination at the affected wells.

Recommendation: Continue to work with the Nevada Department of Environmental Protection (NDEP) to implement the Integrated Source Water Protection Plan for Washoe County to preserve and enhance available water supplies and address known and potential threats to water quality. Continue to work with the CTMRD to address PCE contamination. Work to find solutions in other areas with water quality issues, such as nitrate contamination in Spanish Springs Valley.

RECOMMENDATION 2.7. Emergency Water Supply Standard

Background: There are events outside of TMWA's control that could lead to an emergency condition in which the water supply could be affected over multiple days, such as a chemical spill into the Truckee River, an earthquake, or a wildfire. Research conducted in 1996 and 2007 by the University of Nevada (UNR) on behalf of TMWA has shown no recorded river contamination events from rail or highway transportation. TMWA has completed analyses of the impacts of theoretical spill events on the Truckee River, but the likelihood of these events is extremely rare and there have been no historically recorded toxic spills that have rendered the Truckee River unusable. TMWA has dealt with supply outages due to earthquakes, such as the 2008 earthquake that damaged TMWA's Highland Canal, which conveys water from the Truckee River to its Chalk Bluff WTP. TMWA has sufficient well capacity and distribution system storage to meet non irrigation customer demand during a water quality emergency and has an extensive emergency action plan in place in the event of an extended river outage.

Recommendation: Maintain, as a minimum, the ability to meet daily indoor water use with TMWA wells. For river outages lasting up to seven days during the summer, maintain the ability to meet average daily indoor water demand using wells, treated water storage, and enhanced conservation measures.



HYDROELECTRIC FLUME ALONG THE TRUCKEE RIVER

OBJECTIVE 3. FUTURE WATER DEMAND & RESOURCES

RECOMMENDATION 3.1. Water Demand Forecast

Background: TMWA's 2018 population forecast estimates total Washoe County population will increase by 74,000 from approximately 471,500 in 2020 to 545,500 by 2040. The population estimates may change over time as the pace of development within the region varies and as the region moves toward greater density of land use. TMWA's forecast results are statistically similar to the State Demographer's near-term projections.

Water demand per service within TMWA's service area has been decreasing over time, resulting in slower total demand growth in TMWA's extended forecast. Based on the review of current growth and economic trends in the region, future water demand is anticipated to grow in the Truckee Meadows, but at a slower pace than historically seen. Projected water demand is expected to increase by 13,000 AF from approximately 83,000 AF in 2020 to 96,000 AF in 2040.

Recommendation: Continue to complete future population forecasts, in coordination with other regional planning entities. Accept for planning purposes that TMWA's water demand projections based on these population forecasts are reasonable estimates for use in TMWA's planning areas.

RECOMMENDATION 3.2. Future Climate Change Impacts

Background: TMWA recognizes the importance of addressing the potential impacts of a changing climate, like increased temperatures and more variability in precipitation patterns. Since the adoption of the last WRP, TMWA has been involved in studies with research partners, including UNR, Desert Research Institute (DRI) and Precision Water Resources Engineering (PWRE), to assess the impact of climate change on regional hydrology and water supply. As climate change effects become more pronounced, TMWA will need to adapt to new conditions that may be different from historical hydrologic and demand patterns. Because climate change science is

constantly evolving, TMWA recognizes the importance of being involved in ongoing research in the field.

Recommendation: Continue to consider new findings from climate change research for the greater Truckee Meadows region and continue working with UNR, DRI, and other researchers to assess potential climate change effects on TMWA's sources of supply and regional hydrology. Adaptively manage resources by working with partners to rewrite the existing flood control requirements for the federal storage reservoirs in the Truckee River Basin.

RECOMMENDATION 3.3. Coordination with OneWater Nevada

Background: TMWA supports ongoing regional effluent management efforts with a diverse group of partners including Reno, Sparks, Washoe County, Truckee Meadows Water Reclamation Facility, UNR, and others. This collaborative effort is known as the OneWater Nevada initiative. The initial effort is to evaluate whether advanced purified water offers significant water resource management benefits for the Truckee Meadows region, including improving water use efficiency, providing operating flexibility during periods of water scarcity, and diversifying the region's water supply portfolio.

Recommendation: Remain actively engaged in a leadership role of OneWater Nevada in evaluating the feasibility of using advanced purified water to enhance TMWA's water resource sustainability, drought resiliency, and efficient use of water resources in the region.

RECOMMENDATION 3.4. Future Water Resources

Background: TMWA has adequate water resources to meet expected demand through 2040 and beyond. However, given that water resource development projects can take years to analyze, permit, and implement, TMWA will continue to investigate and pursue other resource development projects to meet future water demand beyond the 20-year planning horizon. The selection of a project is typically a function of a project's yield, ease of implementation, sustainability, and financial feasibility.

It is possible that as new technology becomes available or as regulatory requirements or public opinions change, new projects may be developed, or projects previously thought infeasible may become feasible. TMWA is actively pursuing projects related to ASR expansion, new well development, water banking, and the feasibility of using advanced purified water.

Recommendation: Continue to investigate and evaluate potential future water supply projects consistent with and in addition to TROA to further increase the region's water security.

SUMMARY

TMWA has adequate water resources to meet future projected demand through 2040 and beyond under a range of hydrologic and climate conditions. However, because the factors influencing both supply and demand are constantly changing, TMWA recognizes the importance of adapting its management strategies to address new challenges. The recommended actions outlined in this chapter will help guide TMWA to effectively manage its water resources through the next WRP update, recognizing that these actions may be amended if new challenges or information should arise.



APPENDICES



APPENDICES

APPENDIX A
TMWA 2020–2040 WATER RESOURCE
PLAN PUBLIC SURVEY RESULTS

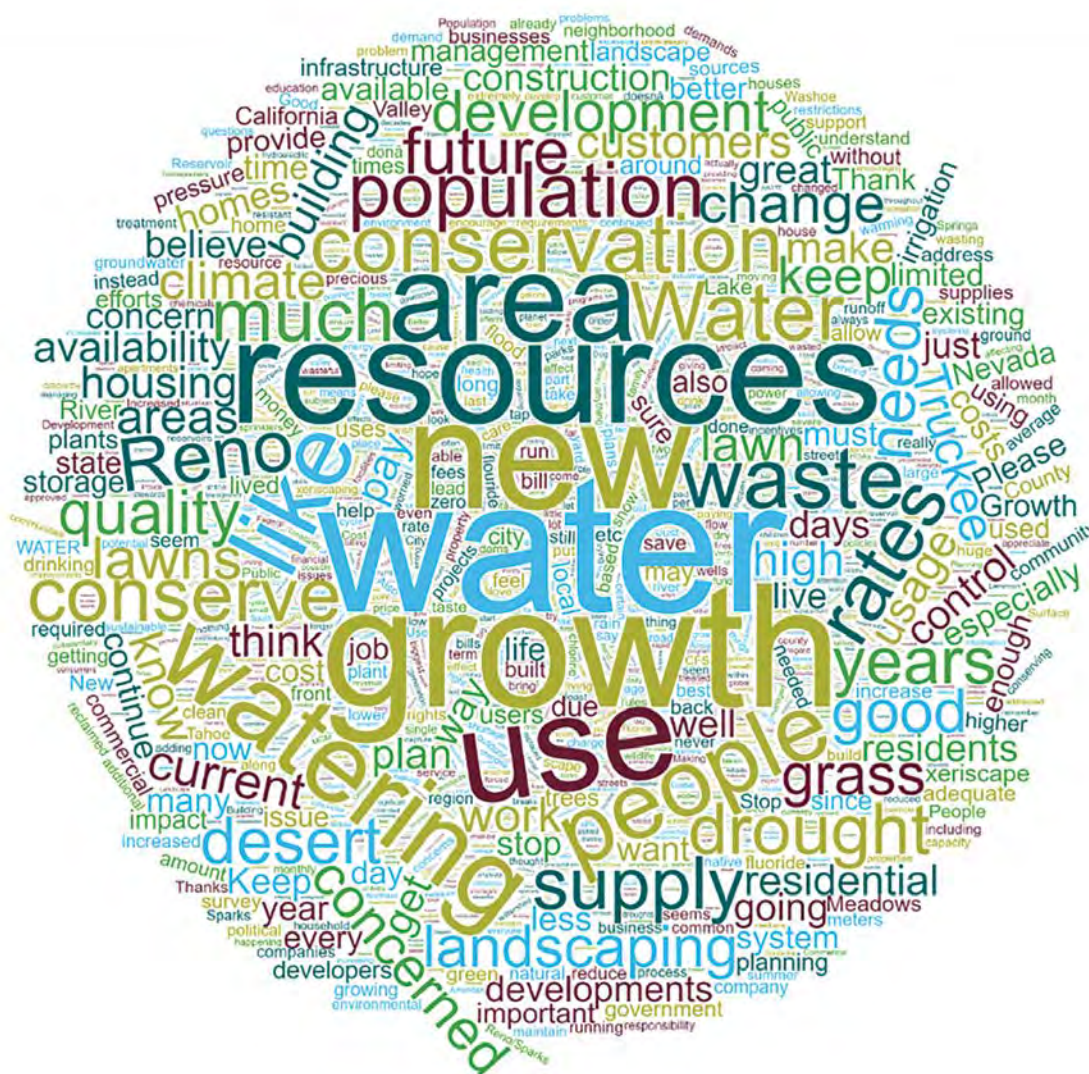
APPENDIX B
HYDROGRAPHIC BASIN
SUMMARY UPDATE

APPENDIX C
OVERVIEW OF CLIMATE CHANGE IN THE
TRUCKEE MEADOWS

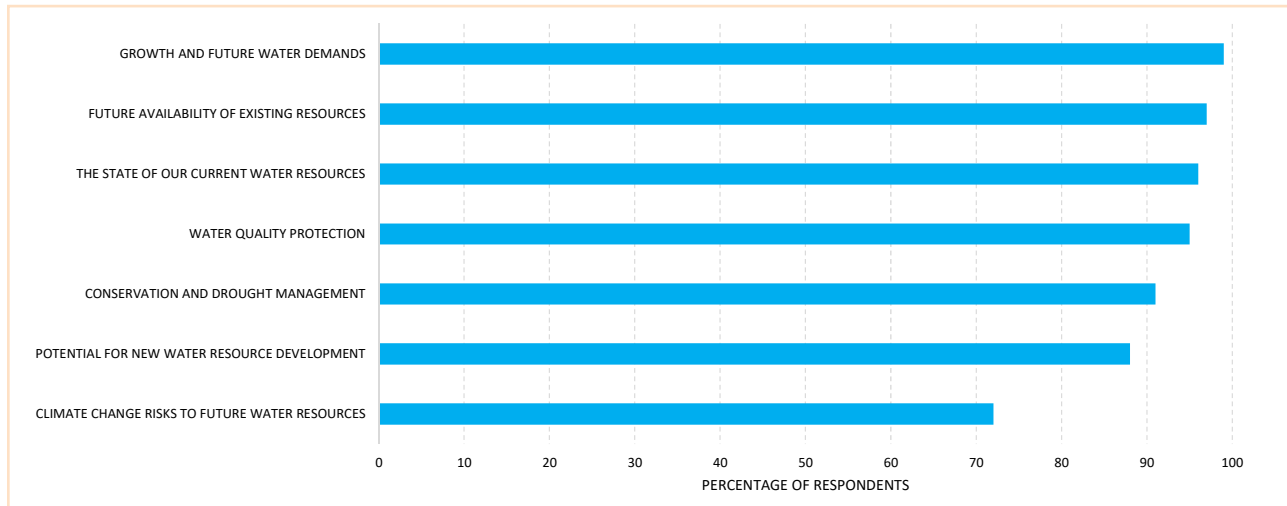
APPENDIX D
TMWA DEMAND PROJECTION
METHODOLOGY

TMWA 2020-2040 WATER RESOURCE PLAN PUBLIC SURVEY RESULTS

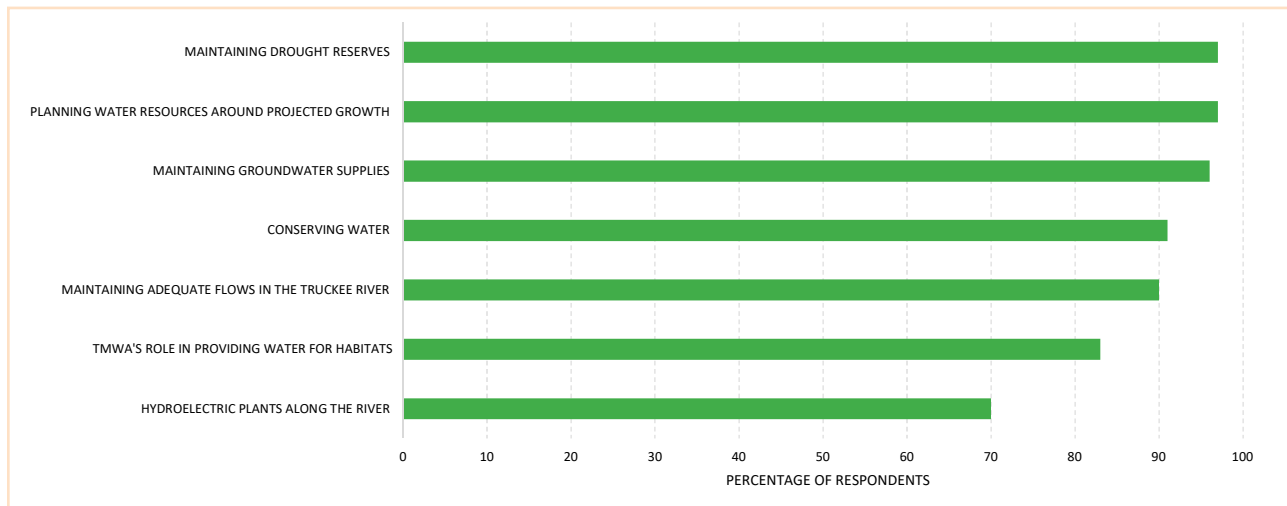
As part of the update process for the 2020–2040 Water Resource Plan (WRP), TMWA surveyed its customers, stakeholders, and employees regarding their attitudes toward TMWA’s water resource planning efforts. The survey, which was conducted electronically from November 2018 to January 2019, included questions regarding topics the public would like to see addressed in the WRP and concerns over issues that could negatively affect future water supplies. The survey contained questions on trust in the agency and important issues surrounding the region’s water resources, such as conservation, drought storage, and use of reclaimed water. Results from the survey were used to ensure public input was considered in the planning process from the onset. During the two-month survey period, approximately 2,000 responses were received. The word cloud below shows the top words and phrases provided by the public in the open-ended questions. Answers including the words *growth*, *conservation*, *drought*, and *future water resources* were a few of the most common responses. Results from specific questions are presented on subsequent pages.



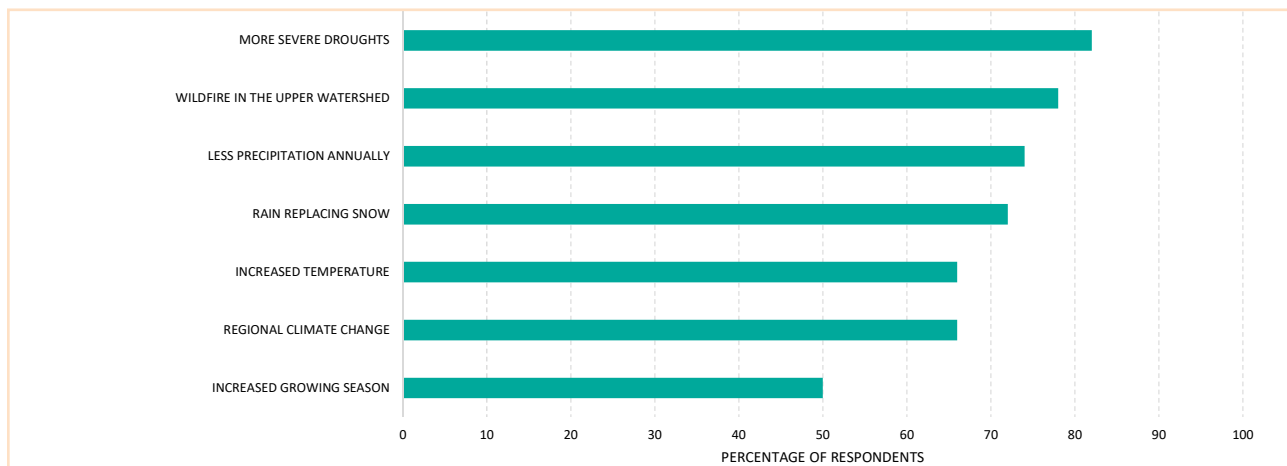
WHAT TOPICS WOULD YOU LIKE TO SEE ADDRESSED IN THE PLAN? (PERCENTAGE OF RESPONDENTS WHO ANSWERED YES OR DEFINITELY YES)



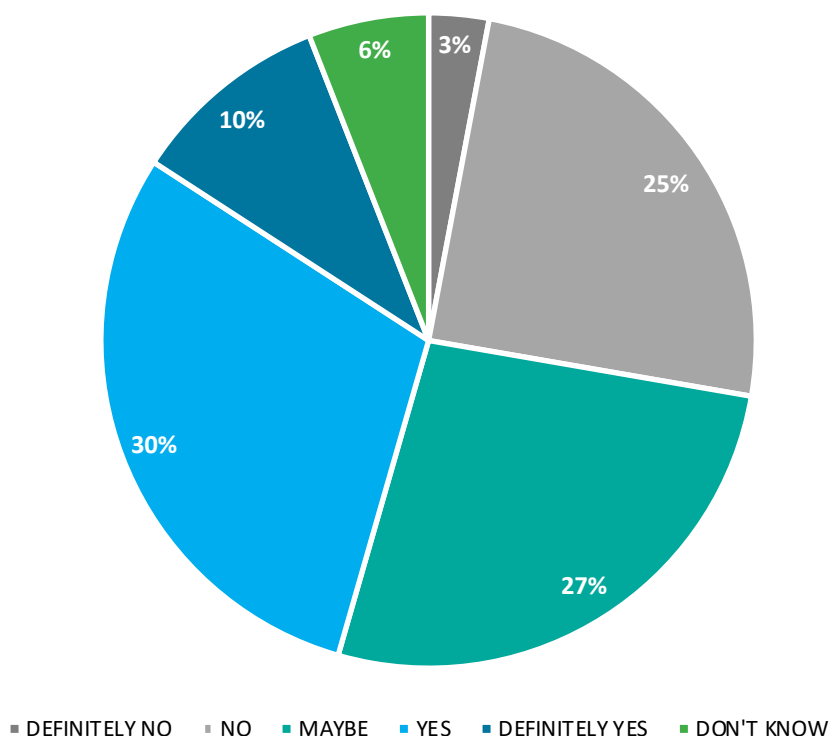
ARE THE FOLLOWING IMPORTANT TO YOU? (PERCENTAGE OF RESPONDENTS WHO ANSWERED YES OR DEFINITELY YES)



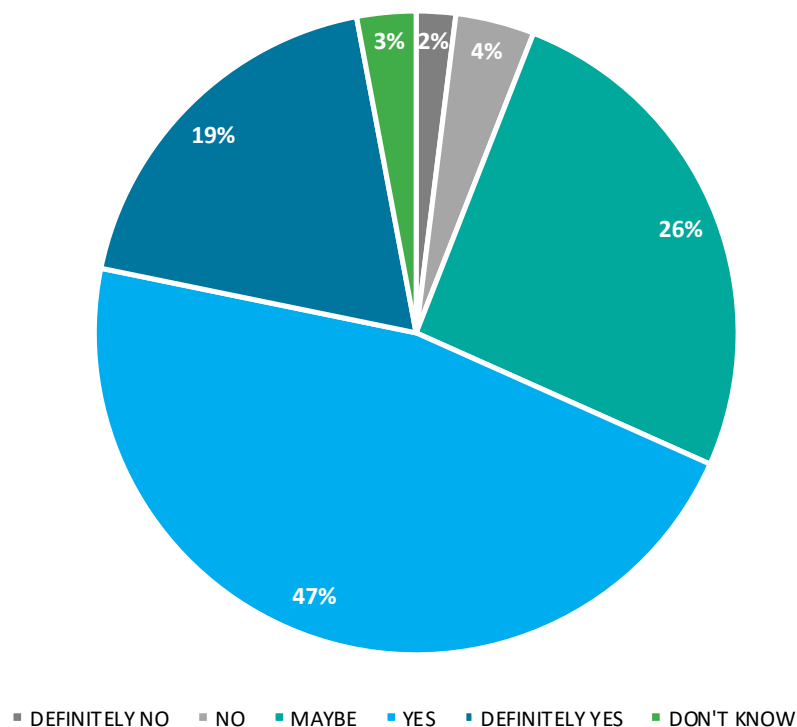
TO WHAT EXTENT ARE YOU CONCERNED THAT THE FOLLOWING MIGHT NEGATIVELY IMPACT OUR WATER SUPPLIES OVER THE NEXT 20 YEARS? (PERCENTAGE OF RESPONDENTS WHO ANSWERED CONCERNED OR DEFINITELY CONCERNED)



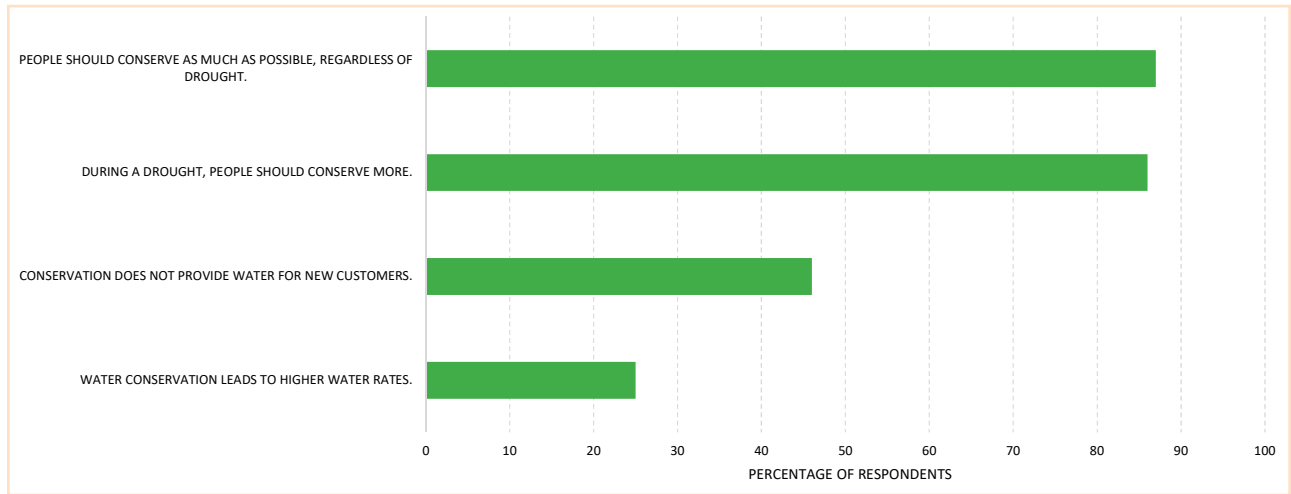
DO YOU UNDERSTAND HOW TMWA MANAGES THE REGION'S WATER SUPPLIES?



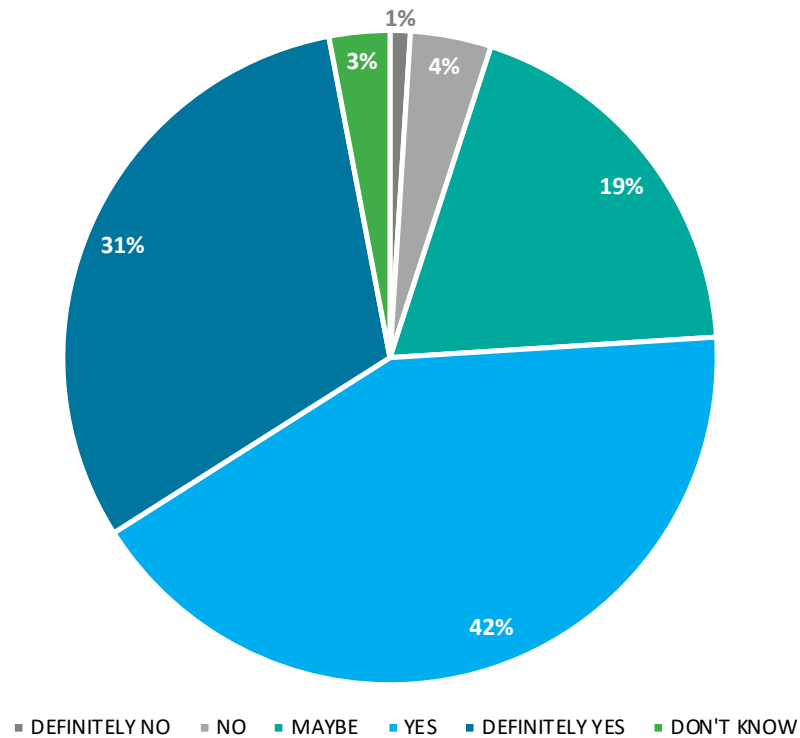
DO YOU TRUST TMWA TO EFFECTIVELY MANAGE TRUCKEE RIVER WATER SUPPLIES?



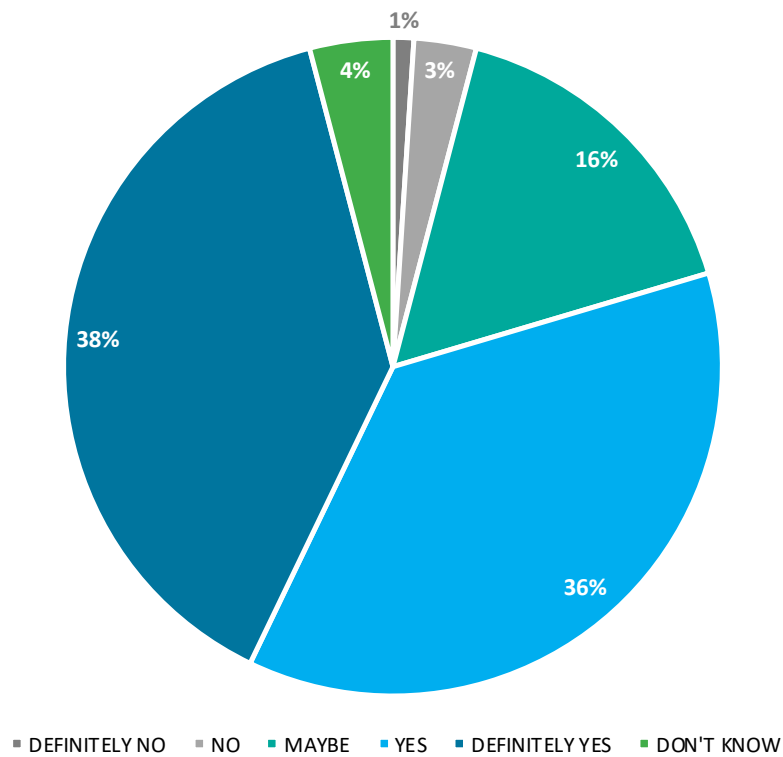
TO WHAT EXTENT DO YOU AGREE WITH THE FOLLOWING?
(PERCENTAGE OF RESPONDENTS WHO ANSWERED YES OR DEFINITELY YES)



DO YOU THINK ALTERNATIVE WATER SOURCES SHOULD BE INVESTIGATED IN OUR REGION?



DO YOU THINK A STUDY ON ADVANCED PURIFIED WATER SHOULD BE INVESTIGATED?



APPENDIX B

HYDROGRAPHIC BASIN SUMMARY UPDATE

INTRODUCTION

Truckee Meadows Water Authority (TMWA) operates groundwater production wells in nine hydrographic basins including:

- Tracy Segment (083)
- Spanish Springs Valley (085)
- Truckee Meadows (087)
- Pleasant Valley (088)
- Washoe Valley (089)
- Truckee Canyon (091)
- Lemmon Valley West and East (092A and 092B)
- Honey Lake Valley (097)

This appendix provides an update to the basin summaries provided in the previous (2016–2035) Water Resource Plan. The updates include new and rehabilitated wells, groundwater level trends in response to recharge and pumping, and water quality issues since 2015.

NEW AND REHABILITATED WELLS

TMWA manages an annual well rehabilitation program. This program consists of actively monitoring each production well and prioritizing well rehabilitation based on observed production declines. Drilling a new well to mitigate the loss of groundwater production is considered a last resort because of the high cost associated with large-diameter well drilling. However, when replacement wells are necessary, they are constructed with superior casing and screen material to increase well longevity. Figure B-1 shows the location of the 34 wells that have been rehabilitated, and Figure B-2 shows the five wells that have been drilled since 2015.

GROUNDWATER LEVEL TRENDS

TRACY SEGMENT (083)

TMWA operates four production wells in the Tracy Segment. Total production from these wells has decreased from 44 acre feet annually (AFA) in 2015 to 26 AFA in 2018. There have been no discernable trends in groundwater levels at the Truckee Canyon wells since 2015, and groundwater levels have increased approximately two feet from 2015 to 2018 at the Stampmill wells.

SPANISH SPRINGS (085)

TMWA operates eight production wells in the Spanish Springs hydrographic basin. Three wells are in the western portion and five are in the eastern portion of the valley. Groundwater pumping continues to decline in the west side of the valley, with net pumping (pumping—recharge) declining from 240 AFA in 2015 to 160 AFA in 2018. Pumping has increased in the east side from 630 AFA in 2015 to 1,100 AFA in 2018.

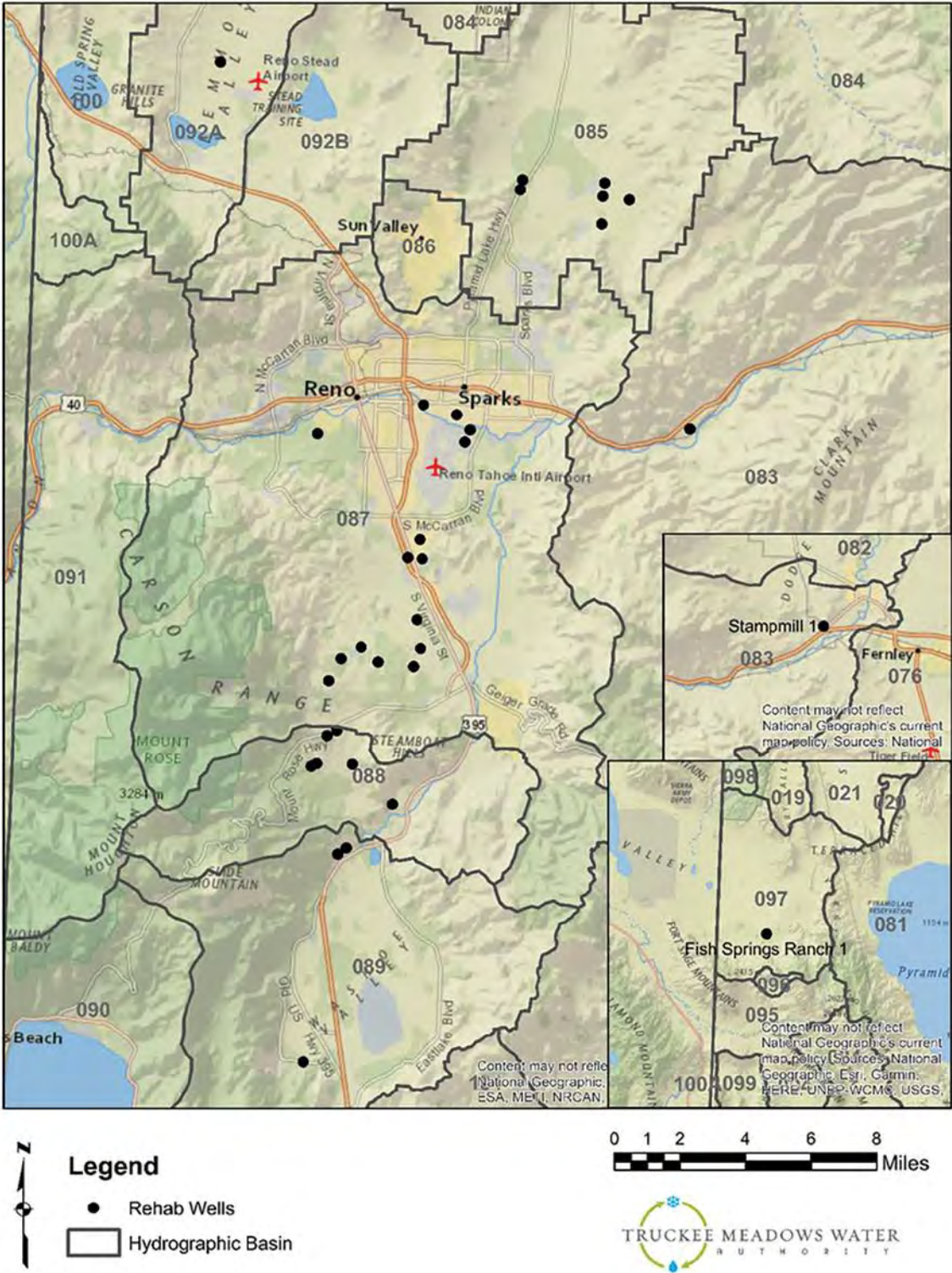


FIGURE B-1: TMWA PRODUCTION WELLS THAT HAVE BEEN REHABILITATED SINCE 2015

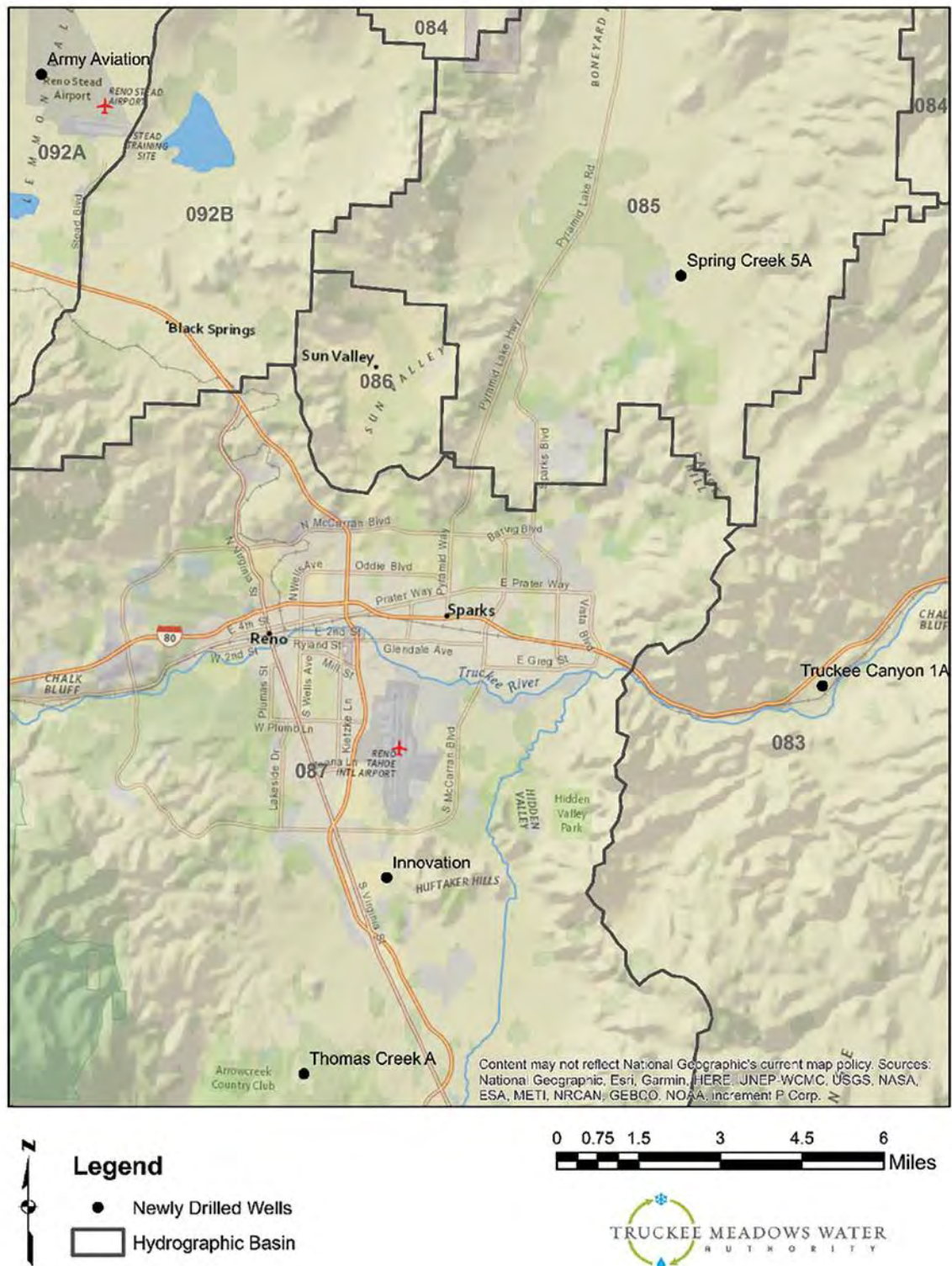


FIGURE B-2: NEWLY DRILLED PRODUCTION WELLS SINCE 2015

The following groundwater level trends have been observed since 2015:

- West side water levels remain stable since 2015, as shown in Figure B-3 (Desert Springs 4).
- East side water levels have continued to decline since 2015, in locations where a majority of the domestic and municipal groundwater pumping occurs. Springtime water levels have declined approximately 10 feet in the Hawkings well since 2015 (Figure B-4).

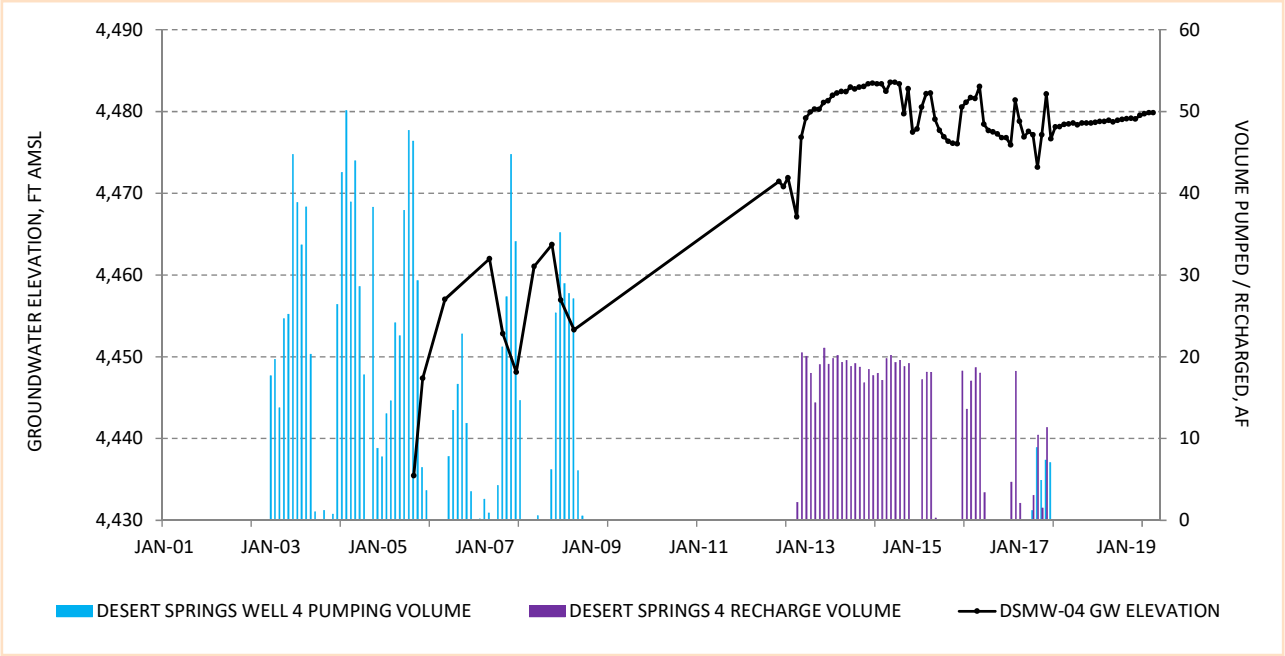


FIGURE B-3: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT DESERT SPRINGS 4, WHICH IS IN THE WEST SIDE OF SPANISH SPRINGS VALLEY

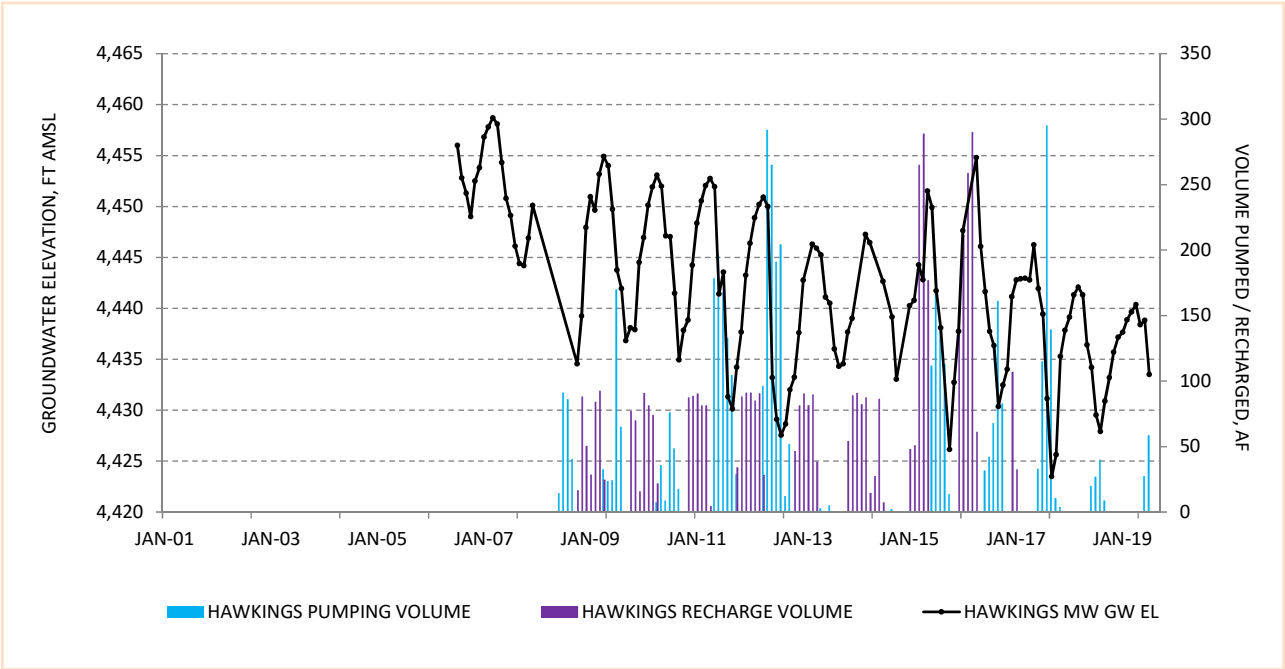


FIGURE B-4: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT HAWKINGS, WHICH IS IN THE EAST SIDE OF SPANISH SPRINGS VALLEY

TMWA is currently developing a groundwater management plan for the Spanish Springs hydrographic basin. An important aspect of the management plan will include increasing recharge on the east side of the basin to mitigate observed groundwater level declines.

TRUCKEE MEADOWS (087)

TMWA operates 47 production wells in the Truckee Meadows hydrographic basin. Groundwater pumping has declined significantly since 2015, with net pumping (pumping—recharge) declining from 17,400 AFA in 2015 to 9,100 AFA in 2018.

The following groundwater level trends have been observed since 2015:

- In the northern portion of the basin, continued recharge efforts and decreased pumping volumes have reduced the annual groundwater swings. This can be seen in the View Street well (Figure B-5), where water levels dropped 130 feet between the winter and summer months in 2015, but water levels only dropped 50 feet over the same period in 2018. Springtime water levels have remained relatively stable from 2015 to 2018.
- A similar trend is found in the central portion of the Truckee Meadows hydrographic basin. This can be seen in Figure B-6, where water levels dropped 120 feet between winter and summer months in 2015, but only 10 feet over the same period in 2018. Springtime water levels have remained relatively stable from 2015 to 2018.
- Groundwater levels have risen significantly in the southwest part of the basin in response to decreased pumping volumes. This is evidenced by the rising water levels in Arrowcreek 2, as shown in Figure B-7, where springtime water levels have increased 20 feet from 2015 to 2018.

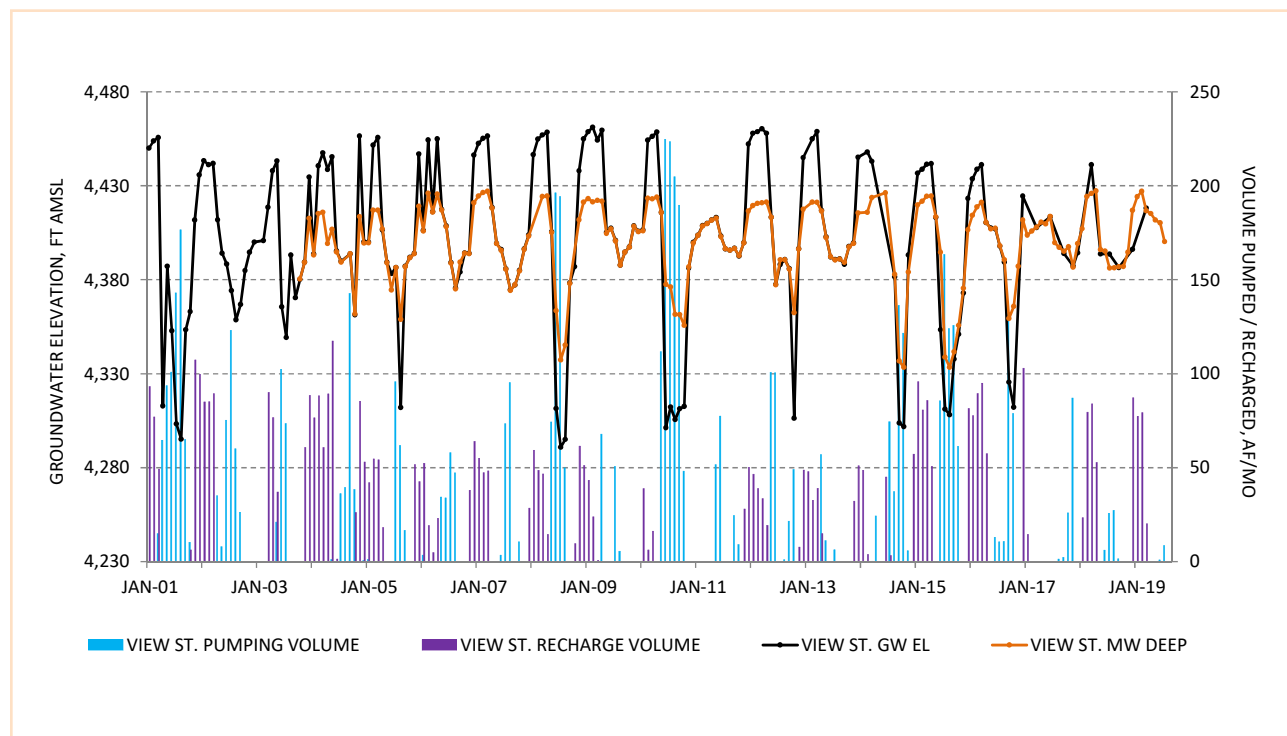


FIGURE B-5: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT THE VIEW STREET WELL, WHICH IS ON THE NORTH SIDE OF THE TRUCKEE MEADOWS HYDROGRAPHIC BASIN

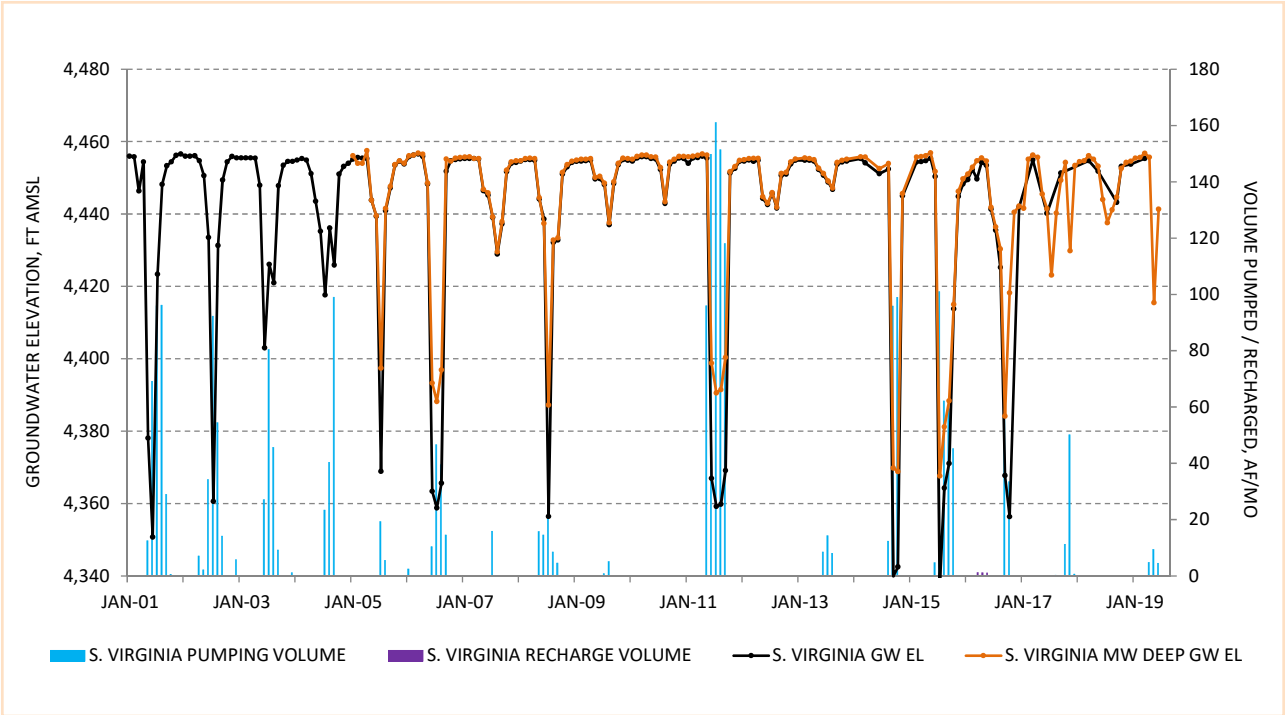


FIGURE B-6: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT THE SOUTH VIRGINIA STREET WELL, WHICH IS IN THE CENTRAL PORTION OF THE TRUCKEE MEADOWS HYDROGRAPHIC BASIN

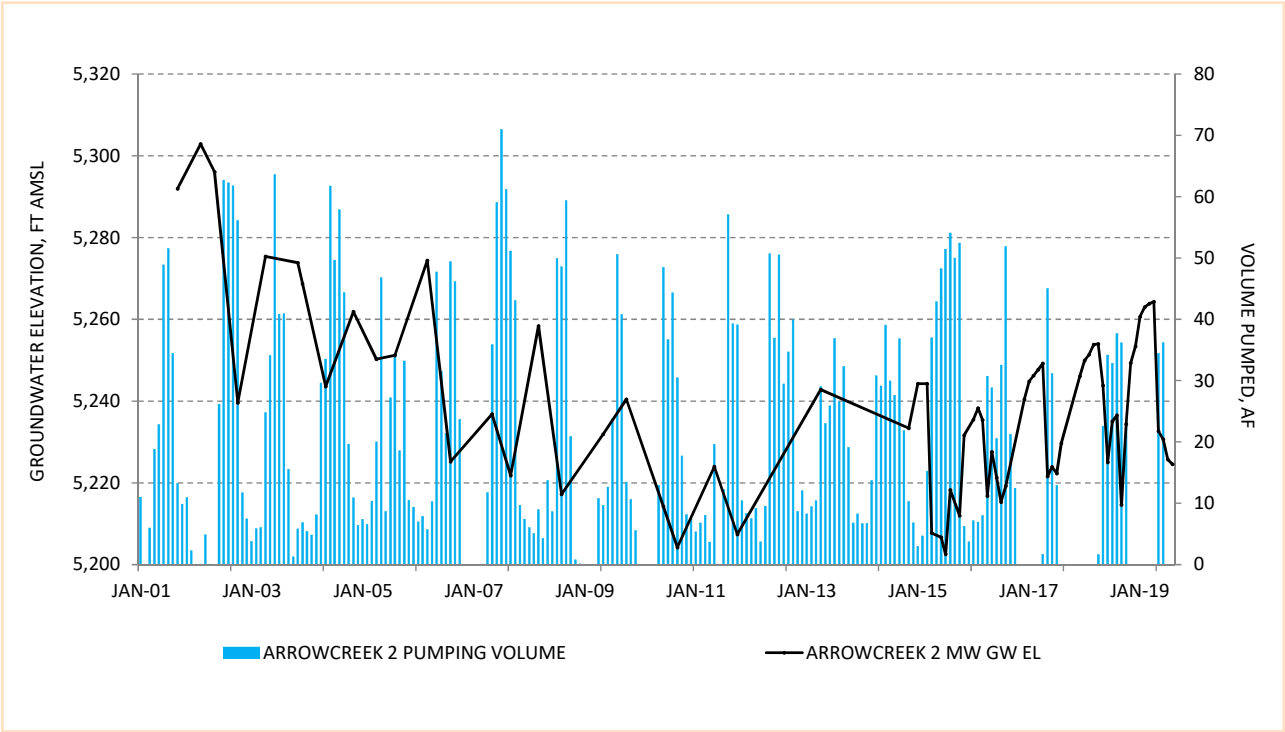


FIGURE B-7: PUMPING AND RECHARGE VOLUMES AND GROUNDWATER LEVELS AT THE ARROWCREEK 2 WELL, WHICH IS IN THE SOUTHWEST PORTION OF THE TRUCKEE MEADOWS HYDROGRAPHIC BASIN

PLEASANT VALLEY (088)

TMWA operates nine production wells in the Pleasant Valley hydrographic basin. Groundwater pumping declined from 1,400 to 900 AFA from 2015 to 2018.

The following groundwater levels trends have been observed since 2015:

- Groundwater levels have risen significantly in the southwest part of the basin in response to decreased pumping volumes. Increasing groundwater levels are seen at the Tessa East well (Figure B-8) which shows springtime water levels increasing in excess of 30 feet from 2015 to 2018.

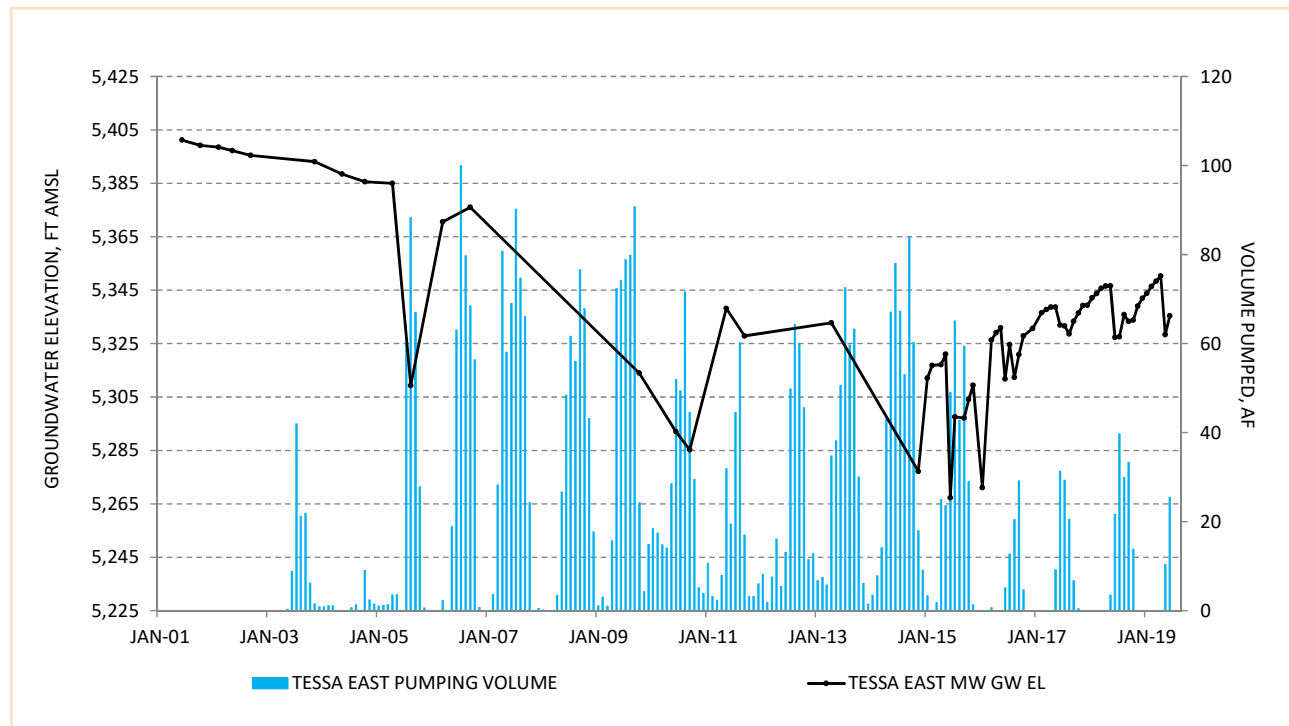


FIGURE B-8: PUMPING VOLUMES (TESSA EAST) AND GROUNDWATER LEVELS AT THE TESSA EAST MONITORING WELL, WHICH IS IN THE PLEASANT VALLEY HYDROGRAPHIC BASIN

WASHOE VALLEY (089)

TMWA operates five production wells in the Washoe Valley hydrographic basin. Groundwater pumping has declined from 160 to 140 AFA from 2015 to 2018. There have been no discernable trends in groundwater levels since 2015.

TRUCKEE CANYON (091)

TMWA operates four production wells in the Truckee Canyon hydrographic basin. Groundwater pumping has increased from 170 to 220 AFA from 2015 to 2018. There are no discernable trends in groundwater levels since 2015.

LEMMON VALLEY (092A AND 092B)

TMWA operates seven production wells in the Lemmon Valley hydrographic basin. Groundwater pumping has declined from 220 AFA in 2015 to a net recharge of 40 AFA in 2018.

The following groundwater level trends have been observed since 2015:

- Groundwater levels have risen significantly since 2015. Increasing groundwater levels are seen at the Lemmon Valley 7 well (Figure B-9), which shows water levels have increased 10 feet from 2015 to 2018.

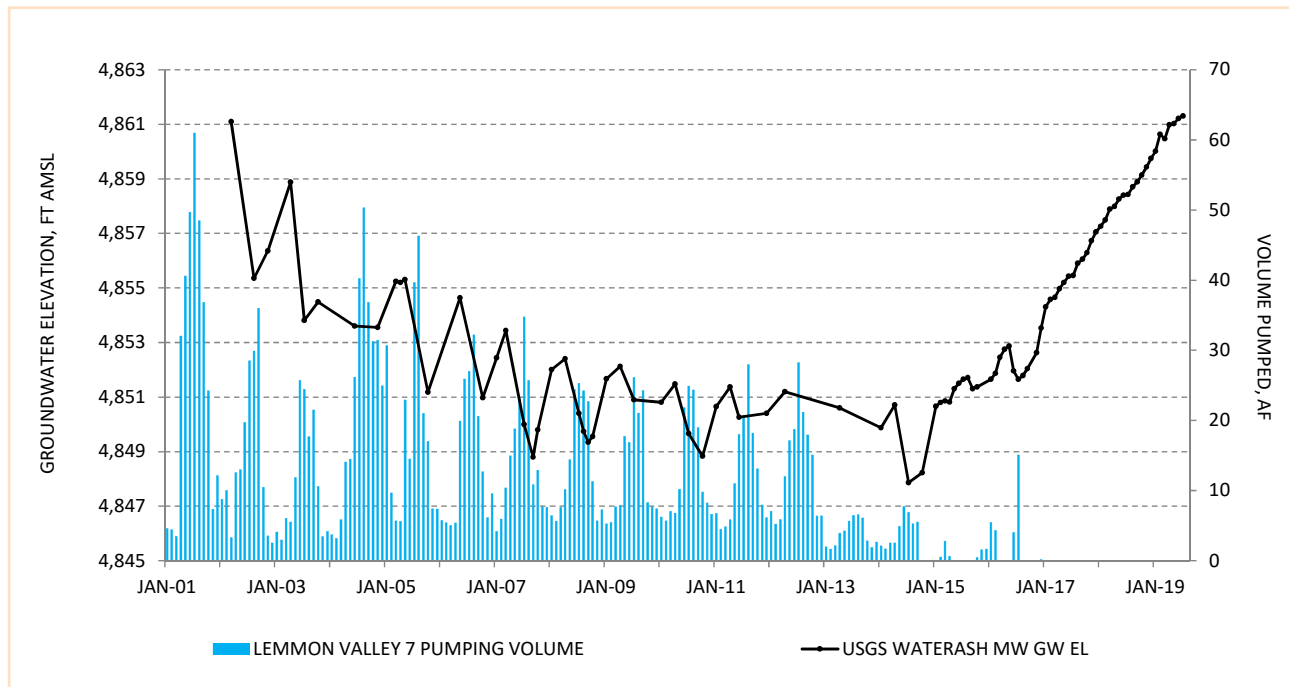


FIGURE B-9: PUMPING VOLUMES (LEMMON VALLEY 7) AND GROUNDWATER LEVELS AT THE USGS WATERASH MONITORING WELL

HONEY LAKE VALLEY (097)

TMWA operates five production wells in the Honey Lake Valley hydrographic basin. Groundwater pumping has declined from 960 AFA in 2015 to no pumping in 2018. There have been no discernable trends in groundwater levels since 2015.

TRUCKEE CANYON (091)

TMWA operates five production wells in the Truckee Canyon hydrographic basin. Groundwater pumping increased from 170 to 220 AFA from 2015 to 2018. There are no discernable trends in groundwater levels since 2015.

WATER QUALITY ISSUES

TRACEY SEGMENT (083)

Wellhead treatment is ongoing at the Truckee Canyon wells to treat elevated concentrations of arsenic.

SPANISH SPRINGS (085)

The following water quality issues have been observed in the Spanish Springs hydrographic basin:

- Nitrate, from septic tanks and natural sources, continues to increase in shallow groundwater in the western portion of the valley and is migrating deeper into the aquifer over time under the influence of pumping and existing downward gradients. Nitrate concentrations have been measured as high as 45 mg/L (DS3—2017).
- The wellhead treatment pilot project on the Desert Springs Well 3 indicates that nitrate and arsenic can be removed effectively. A groundwater treatment plant is being considered for the area to treat nitrate- and arsenic-impacted groundwater from Desert Springs Wells 1, 2 and 3 and Spring Creek Wells 2 and 3.

TRUCKEE MEADOWS (087)

The following water quality issues have been observed in the Truckee Meadows hydrographic basin:

- TMWA continues to monitor the highly mineralized geothermal waters discharged from the Steamboat Geothermal Area at the far southeast end of the basin. Arsenic concentrations continue to increase in the Double Diamond #3 production well, with the highest concentration at 8 ug/L in January 2019 (MCL is 10 ug/L).
- TMWA continues to work with the Washoe County Central Truckee Meadows Remediation District (CTMRD) to monitor the tetrachloroethylene (PCE) plume and associated treatment at TMWA wells (Kietzke, Mill, High, Morrill, and Corbett). No significant changes in PCE have been observed since 2015.
- TMWA continues to treat high arsenic levels in four production wells (Greg, Pezzi, Poplar #1, and Terminal) located in the northeast portion of the valley.
- TMWA continues to work with the Nevada Division of Environmental Protection (NDEP) to monitor other groundwater contaminant sites, including the Sparks Solvent Fuel Site. Concentrations are increasing at the edge of the plume and may be moving offsite toward the Sparks Marina and the Truckee River.

PLEASANT VALLEY (088)

The following water quality issues have been observed in the Pleasant Valley hydrographic basin:

- TMWA continues to monitor the highly mineralized geothermal waters discharged from the Steamboat Geothermal Area. TMWA production wells in Pleasant Valley continue to be outside of the geothermal outflow zone.

WASHOE VALLEY (089)

Wellhead treatment is ongoing at the Lighting W wells to treat elevated concentrations of uranium.

TRUCKEE CANYON (091)

The following water quality issues have been observed in the Truckee Canyon hydrographic basin:

- Elevated levels of aluminum have been measured in Well 9 and 12, with the highest concentration measured in well 9 at 0.19 mg/L (MCL = 0.20 mg/L). Well 9 is scheduled to be abandoned once the Verdi area is connected to the surface water distribution system.
- Iron and manganese are elevated in Well 12 but not in exceedance of the EPA secondary standards (iron MCL = 0.3 mg/L; manganese MCL = 0.05 mg/L) TMWA continues to monitor the water quality in this area to ensure that the aesthetic quality of the water is not impaired.

LEMMON VALLEY (092A AND 092B)

The following water quality issues have been observed in the Lemmon Valley hydrographic basin:

- TMWA continues to work with NDEP to monitor the solvent-related contamination at the Stead Solvent Site near the southern boundary of the Stead Airport in West Lemmon Valley. Remediation activities have successfully reduced the migration of the contaminant plume.
- Groundwater from the Silver Lake well is blended with groundwater from other wells and/or surface water to reduce slightly elevated concentrations of arsenic.

HONEY LAKE VALLEY (097)

There are currently no water quality issues in production wells, but TMWA continues to monitor total dissolved solids (TDS) beneath the playa to ensure that saline water does not migrate toward the production wells.

APPENDIX C

OVERVIEW OF CLIMATE CHANGE IN THE TRUCKEE MEADOWS

Although the climate of the Truckee Meadows is characterized by cyclic patterns of flood and drought, changing climatic conditions may prove more challenging for water supply reliability in the future throughout the American West (Gonzalez et al. 2018; Karl et al. 2009). Climate change is defined as shifts in global or regional weather conditions that persist over multiple decades or longer (Gonzalez et al. 2018). To design effective water supply strategies to mitigate against potential shifts in future climate conditions, TMWA incorporates the best available scientific information regarding regional climate change into its planning process. This includes the use of global climate models that are representative of the western United States and hydrologic models of the Truckee River watershed (Lynn et al. 2015; Huntington et al. 2013).

Regional temperatures are expected to warm, which is consistent with warming trends observed in the state over the past several decades (see Figure C-1). A 2018

study completed by the UCLA Center for Climate Science predicts that by 2041–2060, the Sierra Nevada will warm by 4°F on average (Reich et al. 2018). A concern identified in multiple studies is the impact of warmer temperatures on the timing of snowpack melt and the subsequent filling of storage reservoirs (US DOI 2015; Reich et al. 2018). Most climate models predict earlier snowmelt and changing streamflow patterns as spring temperatures increase (Reich et al. 2018). Currently, peak runoff from snowmelt to rivers and streams in the Truckee River Basin typically occurs in May or June. With increased temperatures, peak runoff in the Sierra Nevada could begin to shift as early as March or April by the end of the 21st century (Reich et al. 2018).

Higher average annual temperatures also lead to higher evaporation rates on lakes and reservoirs, thereby potentially reducing the available water supply (Huntington et al. 2015; USBR 2015). Evaporation on Lake Tahoe is expected to increase by an estimated 3% by 2050 and 5% by 2080 (Huntington et al. 2015). However, these evaporation increases could be offset by precipitation and inflow increases in some climate change scenarios.

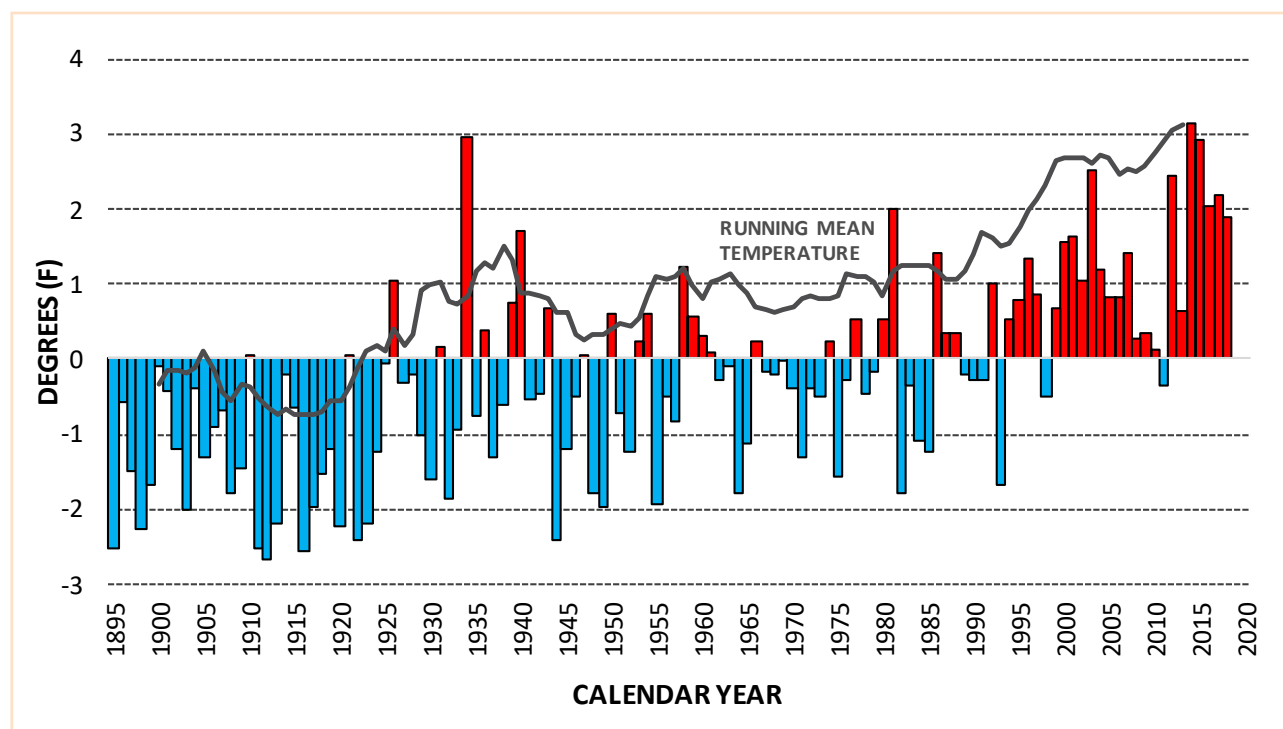


FIGURE C-1: MEAN TEMPERATURE DEPARTURE FOR NEVADA FROM 1895 TO 2018 (SOURCE: WESTERN REGIONAL CLIMATE CENTER)

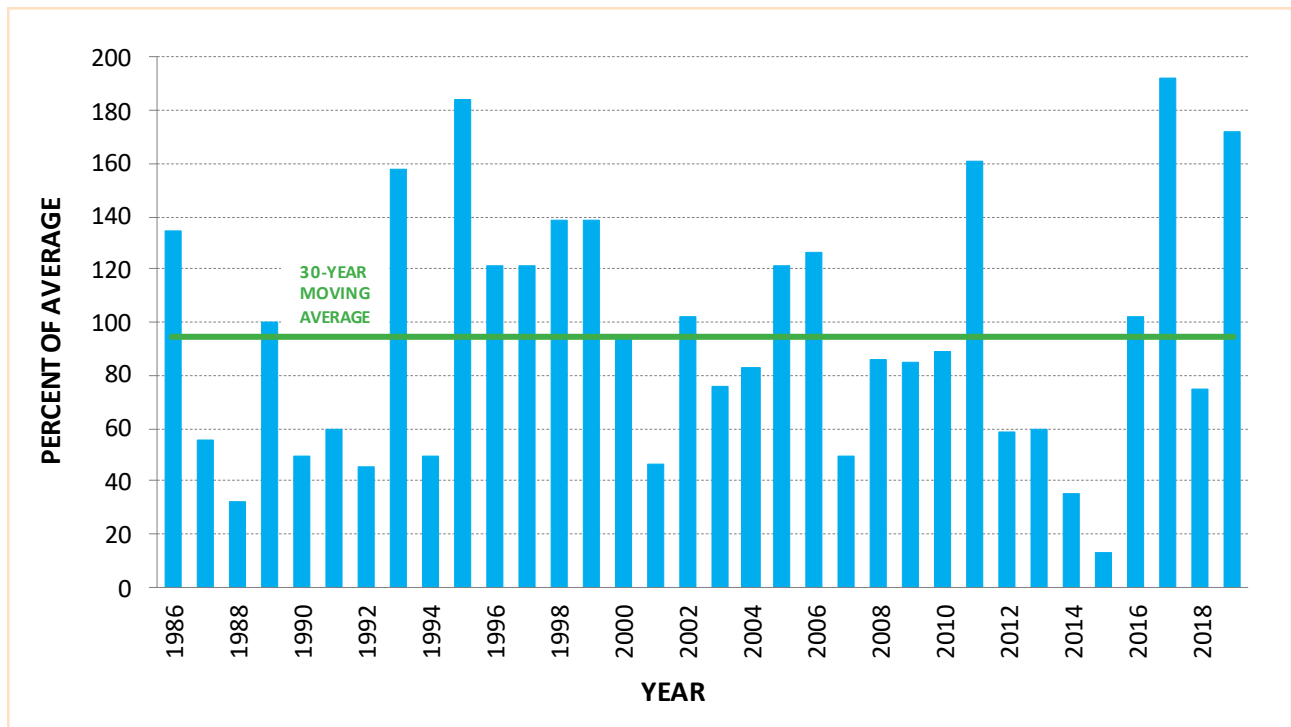


FIGURE C-2: TRUCKEE RIVER BASIN AVERAGE APRIL 1 SNOWPACK FROM 1986 TO 2019

There is a lack of consensus and a high degree of uncertainty about future annual precipitation in the Truckee River watershed. Many climate scenarios suggest that the northern Sierra Nevada may receive more precipitation in the future, whereas others suggest that the region may receive less (US DOI 2015; Lynn et al. 2015). However, in addition to the quantity of precipitation, the distribution, timing, and type of precipitation is projected to vary. Warming trends will likely result in more precipitation falling as rain instead of snow, which has the potential to decrease the region's winter snowpack, leading to snow droughts (Harpold et al. 2017; Hatchett et al. 2018; Cooper et al. 2017). Snow levels have already been increasing in elevation in the Sierra Nevada, with more rain falling at mid-elevations from 5,000–8,000 feet, which historically received more snow (Hatchett et al. 2017; Reich et al. 2018). Snow droughts can occur in years with average annual precipitation, but with low snow water equivalent (SWE) (Hatchett et al. 2018). Snowpack is typically variable in the Truckee River system (see Figure C-2), but a prolonged or permanent decrease in snowpack would impact the water supply, because mountain snow

acts as a reservoir that melts throughout the spring and summer during the highest demand periods.

Additionally, climate change has the potential to increase the severity and frequency of extreme weather events, such as atmospheric rivers and droughts (Gonzalez et al. 2018; Cayan et al. 2001; Dettinger et al. 1995). Several large atmospheric river events during the winter of 2017 caused flooding throughout the Truckee Meadows region; these heavy precipitation events and the associated flooding may become more common in the Sierra Nevada in the future. The frequency of prolonged droughts may also increase (Cayan et al. 2010). Frequent shifts, or hydrological cycle intensification between extreme dry years (e.g., 2015) and extreme wet years (e.g., 2017), are predicted, which may make water resource operations more complex (Swain et al. 2018).

TMWA also relies on groundwater to supply water to its customers, which serves as a “buffer” during dry times because it acts as a huge storage reservoir underground. Several studies have investigated the implications of climate change on groundwater systems in the western

United States, with wide-ranging results. Estimates range between declines to little change, to even slight increases in groundwater recharge and associated groundwater resources (Meixner et al. 2016; Huntington et al. 2012; Pohll et al. 2018). The uncertainty in the groundwater recharge estimates largely rests on the large uncertainty in future precipitation estimates. Regardless, TMWA's ASR program increases groundwater recharge through ongoing injection of treated surface water during non-drought periods. This strategy ensures sustainable management of groundwater resources under a wide range of future climate conditions.

REFERENCES

- Cayan, D.R., Kammerdiener, S.A., Dettinger, M.D., Caprio, J.M., and Peterson, D.H. 2001. Changes in the onset of spring in the western United States. *Bulletin of the American Meteorological Society*, 82(3), 399–415.
- Cayan, D.R., Das, T., Pierce, D.W., Barnett, T.P., Tyree, M., and Gershunov, A. 2010. Future dryness in the southwest US and the hydrology of the early 21st century drought. *Proceedings of the National Academy of Sciences*, 107, 21271–21276.
- Cooper, M.G., A.W. Nolin, and M. Safeeq. 2016. Testing the recent snow drought as an analog for climate warming sensitivity of Cascades snowpacks. *Environmental Research Letters*, 11, 084009, <https://doi.org/10.1088/1748-9326/11/8/084009>.
- Dettinger, M. and Cayan, D. 1995. Large-scale atmospheric forcing of recent trends toward early snowmelt runoff in California. *Journal of Climate*, 8(3), 606–623.
- Gonzalez, P., G.M. Garfin, D.D. Breshears, K.M. Brooks, H.E. Brown, E.H. Elias, A. Gunasekara, N. Huntly, J.K. Maldonado, N.J. Mantua, H.G. Margolis, S. McAfee, B.R. Middleton, and B.H. Udall. 2018. Southwest. In *Impacts, risks, and adaptation in the United States: fourth national climate assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, pp. 1101–1184. doi: 10.7930/NCA4.2018.
- Harpold, A.A., M. Dettinger, and S. Rajagopal. 2017. Defining snow drought and why it matters. *Eos Transactions American Geophysical Union*, 98, <https://doi.org/10.1029/2017EO068775>.
- Hatchett, B.J., and D.J. McEvoy. 2018. Exploring the origins of snow drought in the Northern Sierra Nevada. *Earth Interactions*, pp 1–13, DOI: 10.1175/EI-D-17-0027.1.
- Hatchett, B.J., B. Daudert, C.B. Garner, N.S. Oakley, A.E. Putnam, and A.B. White. 2017. Winter snow level rise in the Northern Sierra Nevada from 2008 to 2017. *Water*, 9, 899.
- Huntington, J.L. and R.G. Niswonger. 2012. Role of surface-water and groundwater interactions on projected summertime streamflow in snow dominated regions: An integrated modeling approach. *Water Resources Research*, 48, W11524, doi:10.1029/2012WR012319.
- Huntington, J., R. Niswonger, S. Rajagopal, Y. Zhang, M. Gardner, C. Morton, D. Reeves, McGraw, and G. Pohll. 2013. Integrated hydrologic modeling of Lake Tahoe and Martis Valley mountain block and alluvial systems, Nevada and California. *Proceedings Paper, MODFLOW and More 2013*. June 2–5, 2013, Golden, Colorado.
- Huntington, J.L., S. Gangopadhyay, M. Spears, R. Allen, D. King, C. Morton, A. Harrison, D. McEvoy, and A. Joros. 2015. West-wide climate risk assessments: irrigation demand and reservoir evaporation projections. U.S. Bureau of Reclamation, Technical memorandum No. 68-68210-2014-01, <https://www.usbr.gov/watersmart/baseline/index.html>.
- Karl, T., J. Melillo, and T. Peterson (Eds.). 2009. *Global climate change impacts in the United States*. Cambridge University Press.
- Lynn, E., A. Schwarz, J. Anderson, M. Correa, W. O'Daly, F. Keeley, and J. Woled. 2015. Perspectives and guidance for climate change analysis. California Department of Water Resources, Climate Change Technical Advisory Group Report.
- Meixner, T., A.H. Manning, D.A. Stonestrom, D.M. Allen, H. Ajami, K.W. Blasch, A.E. Brookfield, C.L. Castro, J.F. Clark, D.J. Gochis, A.L. Flint, K.L. Neff, R. Niraula, M. Rodell, B.R. Scanlon, K. Singha, and M.A. Walvoord. 2016. Implications of projected climate change for groundwater recharge in the western United States. *Journal of Hydrology*, 534, 124–138, <http://dx.doi.org/10.1016/j.jhydrol.2015.12.027>.
- Pohll, G., S. Rajagopal, R. Carroll, and S. Rybarski. 2018. Addressing basin management objectives for the Tahoe Valley South groundwater basin. Desert Research Institute, Division of Hydrologic Sciences Report for South Tahoe Public Utility District.
- Reich, K.D., N. Berg, D.B. Walton, M. Schwartz, F. Sun, X. Huang, and A. Hall. 2018. Climate change in the Sierra Nevada: California's water future. UCLA Center for Climate Science.
- Swain, D.L., B. Langenbrunner, J.D. Neelin, and A. Hall. 2018. Increasing precipitation volatility in twenty-first-century California. *Nature Climate Change*, 8, 427–433.
- U.S. Dept. of the Interior, Bureau of Reclamation. 2015. *Truckee River Basin Study*.

APPENDIX D

TMWA DEMAND PROJECTION METHODOLOGY

PROJECTIONS OF POPULATION, ACTIVE WATER SERVICES, AND TOTAL WATER DEMAND

As part of its financial and natural resource planning, Truckee Meadows Water Authority (TMWA) maintains a collection of projection models of population, active water services, and water demand. These models produce high-resolution projections suitable in the short run for operational and financial planning and can be aggregated to a resolution suitable for long-term water resource planning. The models are used in a chain where the output of one model serves as an input to the next model.

For the 2020–2040 WRP, the following models are used: Washoe County population, active water services, and water use coefficients. The population projection is a required variable for the projection of active water services. The water use coefficients model provides an estimate of how much water is used by each type of water service. The water demand is a product of active water services and water use coefficients. The active water services and use coefficients are both dependent on TMWA's extensive billing history database to produce meaningful projections in both the short and long term.

Because the model is based on historical information, it assumes current socio economic trends will continue. Therefore, future changes in economic growth, building and landscaping trends, climate conditions, and water-saving technology are not captured. Because these factors can ultimately influence true demand up or down, the model is reestimated on a semiannual basis. Analysis of prior water demand models have shown estimations to be slightly higher than actual demand.

WASHOE COUNTY POPULATION PROJECTIONS

In Washoe County, there are three prominent population projections commonly produced: State of Nevada Demographer's projection (SDF), TMWA's Washoe County population projection, and Truckee Meadows Regional Planning Agency's (TMRPA) Washoe County Consensus Forecast of population (WCF). Each projection is based on a different model/methodology and thus each can meet different needs in the community. TMWA's population projection is the preferred projection to be used with long-term (greater than 20 years) water resource planning.

The TMWA population projection is based on a logistical growth curve and provides an estimate of population equilibrium, assuming that current trends and conditions continue to 2099. TMWA's model is used to project population through 2099. The SDF and WCF projections are each based on a 20-year horizon. The state's model is a statewide economic and demographic model that produces projections for all counties and most major cities in Nevada and is updated annually by the State Demographer. TMRPA's WCF is an average of four different population projects, two of which are the SDF and TMWA projections. In the short run, all three produce very similar population projections. They differ greatly in the long run, and if extrapolated out to year 2100, the differences are very pronounced. To create comparative projections, SDF and WCF are simply extrapolated out to the year 2100 and used to create alternative projections for active water services and water demand.

ACTIVE WATER SERVICES PROJECTIONS

Active water services are a function of population and the businesses that provide services and jobs to the community. All active water services can be grouped into four major classes: single-family homes, multi-family dwelling units, commercial (businesses) services, and irrigation services. Using active water service counts derived from billing history and the historic population, a time series model was developed using a vector autoregression methodology (VAR) model. In this model, each month's service counts are explained by a relationship between the population, active services in prior months, and relationships between different service classes. Given a good model that explains past counts of active service with respect to population, the population projection is used to project future active water service counts. As a result of the differences between the three population forecasts in the long term (beyond 20 years), the number of active water services varies. However, TMWA uses the active water service projection based on the TMWA population forecast for planning purposes.

TOTAL WATER DEMAND PROJECTIONS

The active water services are multiplied with water use coefficients by customer rate class and service size to produce a projection of water demand for each rate class. The water use coefficients are computed monthly as an average of the same month for the prior three years and are the same for all projections. The assumption in each projection is that water use per service does not change moving forward. These models provide very granular details at a monthly level that are well suited for short-term operations. For water resource planning, the monthly values are summed to provide annual values, and customer class details are combined to provide total water demand.

NOVEMBER 2020

Understanding the big picture about water in the Truckee Meadows starts here...



...in TMWA's 2020-2040 Water Resource Plan

Designed with the following features, to provide information to readers in multiple ways:



Some important topics covered in this plan include:

-  Defining the Role of Conservation
-  Explaining Supply Scenarios under Climate Change
-  Protecting Our Watershed
-  Meeting the Demand of a Growing Community
-  Charting Potential Water Supply Options

Did you know? TMWA's Water Resource Plan, updated every five years, describes how the community's drinking water needs will be met for the next 20 years.

Learn more about the resiliency of our water supply at tmwa.com/wrp2020.



STAFF REPORT

TO: Board of Directors
FROM: Andy Gebhardt, Director Operations and Water Quality
DATE: October 21, 2020
SUBJECT: **Presentation of TMWA's Fiscal Year 2020 Customer Satisfaction Study conducted by InfoSearch International**

Background:

Beginning in 2002, InfoSearch International has conducted a customer satisfaction survey on behalf of TMWA in order to assess customers' overall level of satisfaction and attitudes toward water-related issues. Topics include water quality, sufficiency and security.

Discussion:

The results of TMWA's Fiscal Year Customer Satisfaction Survey were once again very favorable, with 92% of customers either totally or mostly satisfied. This marks the 8th consecutive year that the overall customer satisfaction rating was 90% or higher. In addition, of the 11 performance attributes that are measured, 9 of them were the highest they have ever been, with the other 2 near or at their historic peaks. Attached you will find the report.



Customer Satisfaction Study Fiscal Year 2020

Conducted by



(775) 332-3692
www.infosearch.online

2020 CUSTOMER SATISFACTION STUDY – EXECUTIVE SUMMARY

KEY OBSERVATIONS *(One Page Summary)*

1. **SATISFACTION:** In 2020, 92% of respondents expressed a positive level of satisfaction with Truckee Meadows Water Authority (TMWA) by indicating that they were either totally or mostly satisfied. Commercial (93%) and residential (92%) customers expressed similar levels of positive satisfaction. Three out of four respondents (75%) younger than age 45 were totally satisfied with TMWA, as compared to about half of those age 45 to 64 (51%) and age 65 or older (56%).
2. **PERFORMANCE:** Of the ten performance attributes measured on a 0-10 scale, maintaining an adequate water supply received the highest mean rating (9.5), while using public input received the lowest (but still high) rating (8.5). Six performance ratings increased significantly from 2019 to 2020: (1) responding to service problems quickly, (2) caring about customers, (3) providing water that looks and tastes good, (4) keeping people informed, (5) providing water that is affordable and reasonably priced, and (6) using public input. Two additional performance ratings trended significantly upward from 2018: (1) providing water that is safe and healthy to drink, and (2) providing for the security and safety of the water supply.
3. **CONTACT WITH TMWA:** In 2020, one out of six respondents (17%) had contacted TMWA in the prior 12 months, down from 26% in 2018. Women and/or respondents age 65 or older were more likely to have contacted TMWA.
4. **WATER QUALITY:** In 2020, 88% of respondents provided favorable ratings for water quality, with 43% saying the quality is excellent (down from 49% in 2019), and 45% said the quality is good (up from 38% in 2019). Over half indicated that the drinking water was better than that of other cities (58%) and/or that they never have problems with the taste (56%). One out of three residential respondents (34%) reported having a water filter in their homes; the lower the rating for water quality, the more likely respondents were to have a water filter.
5. **VALUE FOR PRICE:** In 2020, three out of four respondents (77%) reported that they receive either an excellent (28%) or good (49%) value for the price of water; this score has been between 74% and 77% since 2016. Half (52%) provided the same rating (e.g., “good”) for both water quality and value for price, while 36% provided a higher rating for quality than for value, and 13% provided a higher rating for value than for quality.
6. **CONCERNS:** Of the five issues measured, respondents in 2020 were the most concerned about community growth (up from 6.7 in 2017 to 7.3 in 2020), and were the least concerned about a sufficient water supply (5.6). Concern about rate increases rose significantly from 6.3 in 2019 to 6.9 in 2020. Additionally, concern levels for all five measures jumped up to the 8.5-8.7 range in Q4-2020 (April-June), with heightened concerns possibly related to the COVID-19 pandemic.
7. **COMMUNICATION FROM TMWA:** Two out of three respondents (66%) indicated that they read the water bill insert at least occasionally and half (53%) read the message printed on the front page of their bill. Residential customers were more likely (30%) than were commercial customers (18%) to report getting information about their drinking water primarily from TMWA.
8. **WATERING LAWNS:** In 2020, 73% of respondents reported that they were aware of Assigned Day watering, down from 90% in 2019. Overall, 53% reported having a lawn that they water (down from 64% last year) and, of those, 66% stated correctly that they could water with sprinklers three days a week (down from 72% last year). The drop in awareness of Assigned Day Watering appears linked to capturing a higher proportion of both renters and/or multi-family housing residents in the random sample of Q4-2020 during the Covid-19 “Stay at Home” order.
9. **ONLINE ACCOUNT:** One out of three respondents (34%) had accessed their TMWA account online in 2020, down from 39% in 2019 and 41% in 2018. Half (50%) of respondents under age 45 had accessed their TMWA account online, compared to just one out of four (26%) of those age 65 or older.

OBJECTIVES AND METHODOLOGY

2020 Objectives

The primary objectives of the 2020 Customer Satisfaction survey were to:

- Assess the current level of satisfaction of TMWA customers with performance and service issues,
- Assess customers' attitudes toward various water related issues including water sufficiency, security, and quality,
- Determine if there are significant differences between sub-groups of customers, and
- Identify significant changes in ratings over time.

2020 Methodology

This was the 19th wave of this annual survey, which has been conducted since 2002. The 2020 study consisted of 500 telephone interviews of TMWA customers; the interviews were evenly spread throughout the 12-month survey period of July 2019 to June 2020. This period represents TMWA's 2020 fiscal year and is referred to as 2020 data in this report.

The sample population was divided into two segments: residential customers (n=400) and commercial customers (n=100). To be eligible for the study, all residential respondents were asked to confirm that they were: (1) at least 18 years old, (2) responsible for their water bill, (3) not working for a market research or advertising company, and (4) not working for a water company. Additionally, real estate developers were screened out of the commercial sample.

All respondents were called at random from a customer list supplied by TMWA. In 2020, 21% of the residential numbers called and 18% of the commercial numbers called resulted in a completed survey.

The residential interviews were generally conducted Monday through Saturday between 4:00 and 8:00 p.m. and, on average, took 9 to 11 minutes each to complete. The commercial telephone interviews generally took place Monday through Friday between 2:00 and 5:00 p.m. and, on average, took 8 to 10 minutes each to complete.

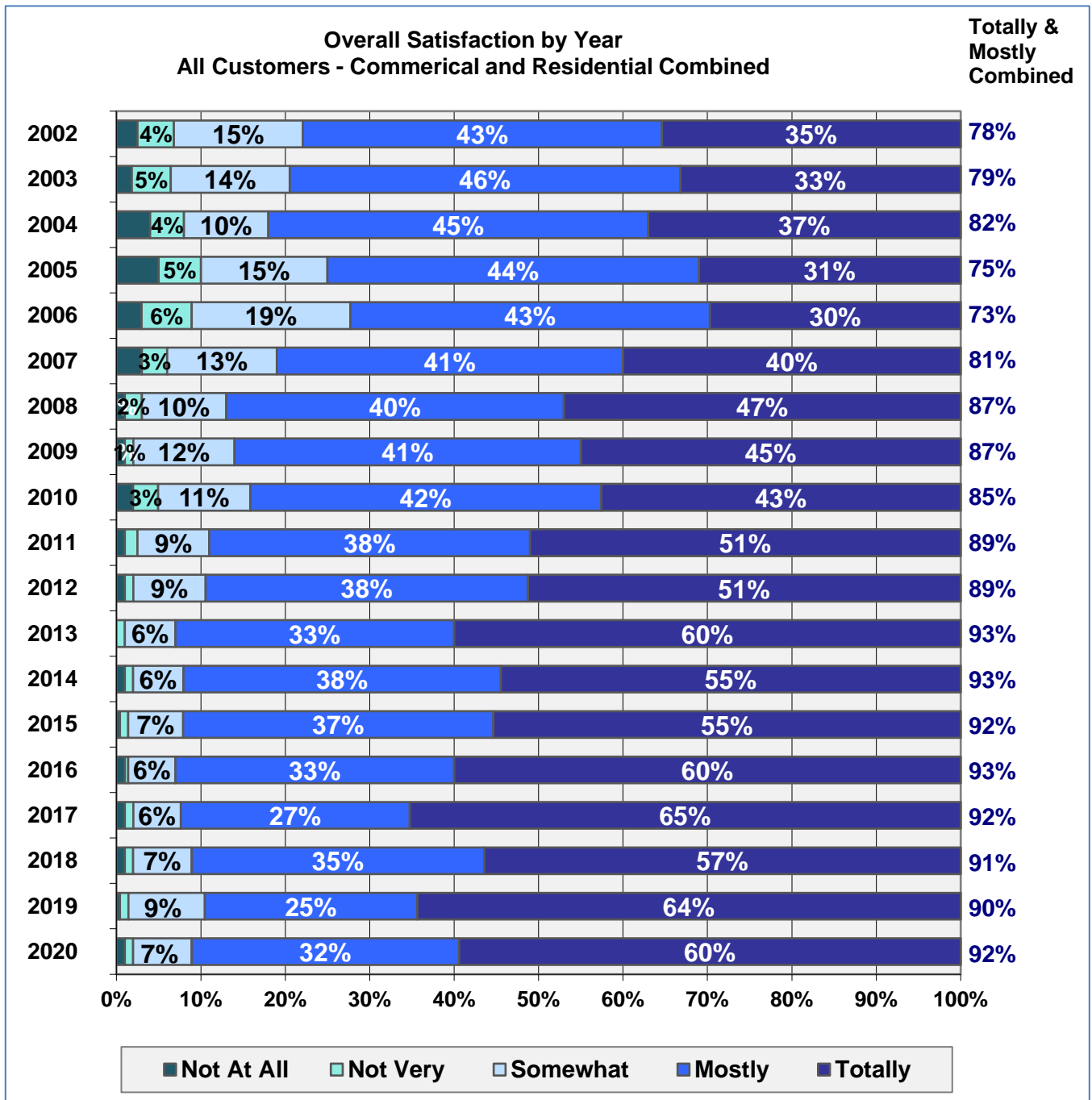
Data from the Q4-2020 (April-June) was collected during the peak of the COVID-19 "Stay at Home" order and was an atypical quarter. The data suggest that the two major differences during that quarter were: (1) heightened concern among respondents, and (2) a different demographic composition of customers who were at home and available in the random sample including a higher proportion of Hispanics, males, people age 45-64, lower-income respondents, renters, and residents in multi-family housing.

Based on a 95% confidence level, the total sample of 500 has a confidence interval of $\pm 4.4\%$. While the data from the different demographic groups is offered for comparison purposes, the sample size of subgroups does not carry the same confidence interval as the overall data. All statistically significant findings, however, take into account the sample sizes of the various subgroups.

While some of the charts in the Executive Summary include results that date back to the beginning of this study in 2002, the text in the Detailed Findings section focuses primarily on data over the past four years for readability.

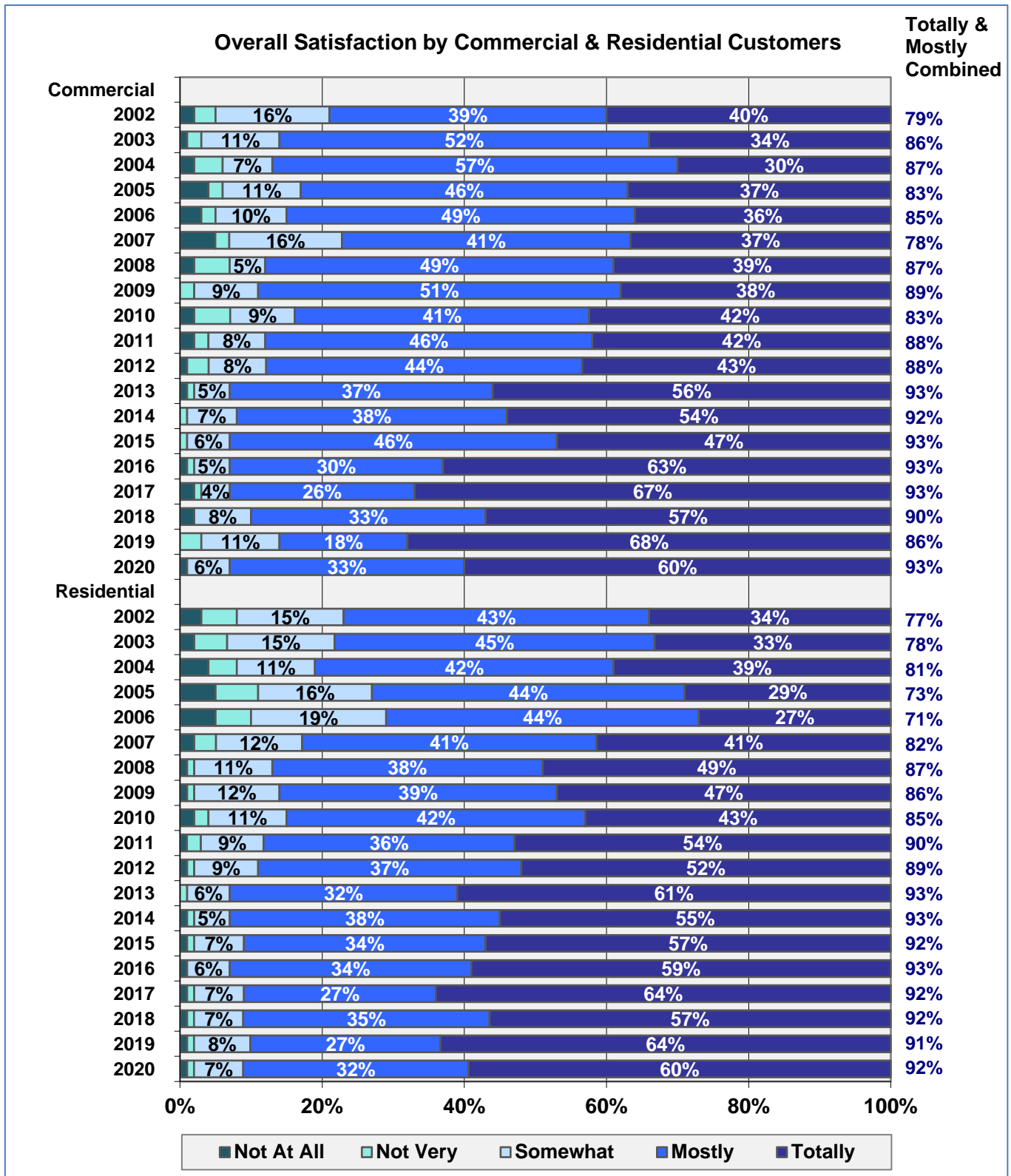
SUMMARY OF FINDINGS

Overall Satisfaction with TMWA



In 2020, 92% of respondents expressed a positive level of satisfaction with TMWA by indicating that they were either totally (60%) or mostly (32%) satisfied.

Overall, the percentage who expressed a positive level of satisfaction has been between 90% and 93% since 2013, including 92% this year. The fluctuation in the percentage who were totally satisfied over the past five waves was not statistically significant.



In 2020, 93% of commercial respondents and 92% of residential respondents expressed a positive level of satisfaction (totally or mostly satisfied) with TMWA. Overall, 60% of both commercial and residential respondents were totally satisfied in 2020; the results did not change significantly from the prior four years.

Performance Ratings

The chart on this page shows customers' ratings for ten specific performance measures plus overall performance on a scale from 0 (very poor job) to 10 (excellent job).

Of the 11 items measured including overall performance, all received a mean rating of 8.5 or higher in 2020, indicating that TMWA was perceived, on average, to be doing a very good or excellent job on each measure. Overall in 2020, maintaining an adequate water supply continued to receive the highest mean rating (9.5), while using public input in water related decisions continued to receive the lowest (8.5).

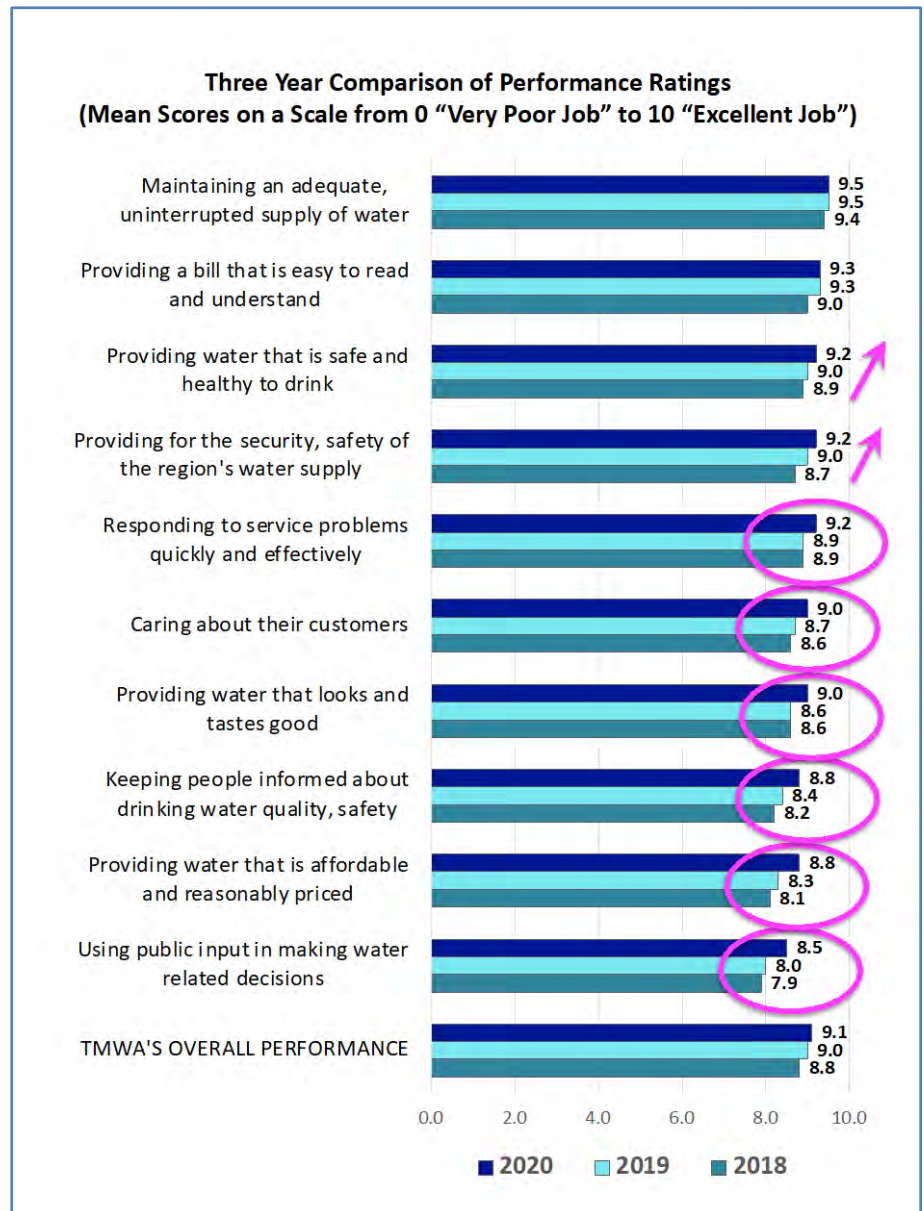
In 2020, performance ratings increased significantly from 2019 for six measures (circled on the chart):

- (1) Responding to service problems quickly and effectively,
- (2) Caring about customers,
- (3) Providing water that looks and tastes good,
- (4) Keeping people informed about drinking water,
- (5) Providing water that is affordable and reasonably priced, and
- (6) Using public input in water related decisions.

In 2020, two additional performance ratings significantly trended upward from 2018 (shown with arrows on the chart):

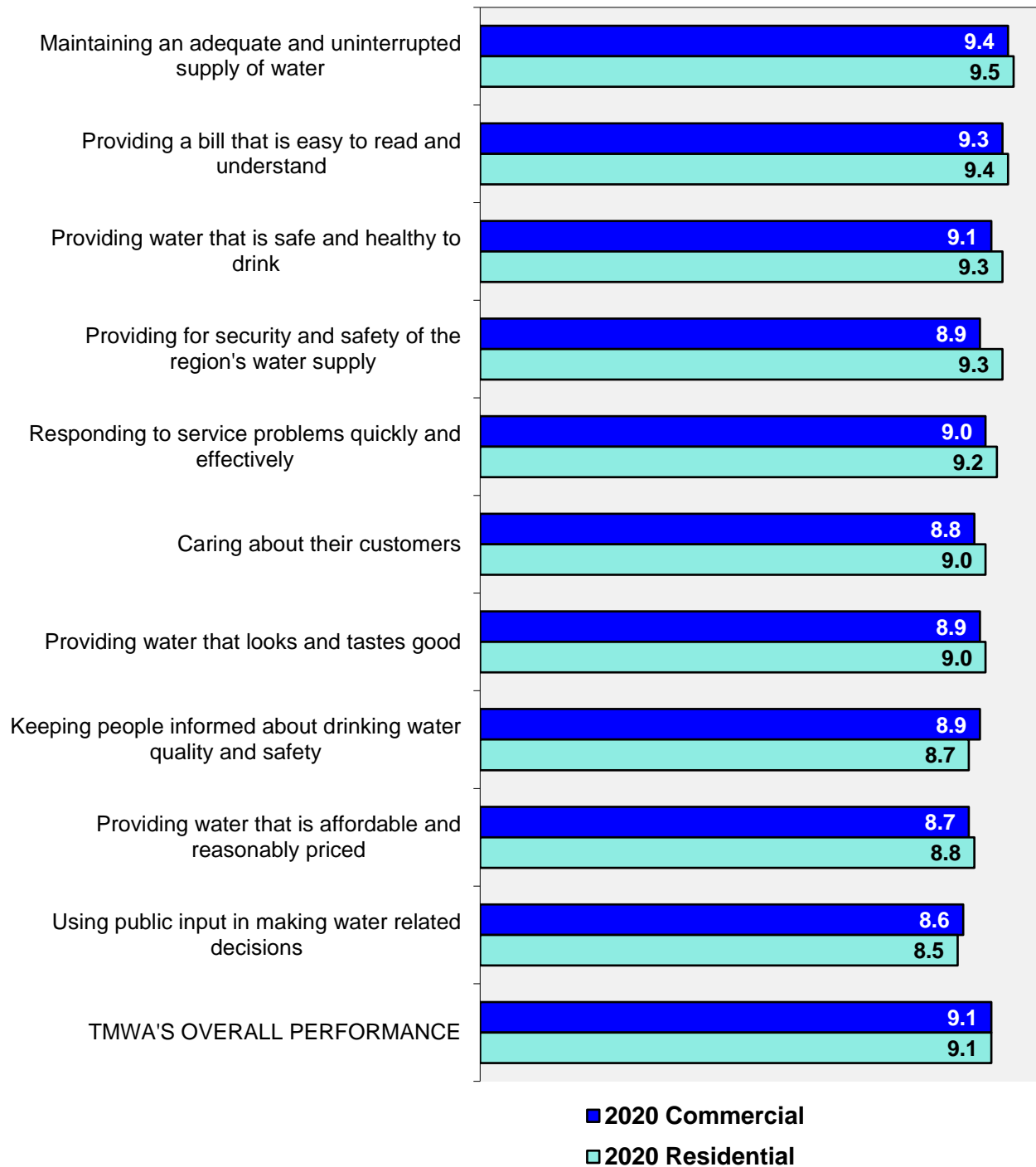
- (1) Providing water that is safe/healthy to drink, and
- (2) Providing for the security and safety of the region's water supply.

Since the study began in 2002, ratings were at the highest level measured to date for 9 of the 11 performance attributes, all but (1) maintaining an adequate, uninterrupted water supply (which peaked in 2017 at 9.6) and (2) providing a bill that is easy to read and understand (which tied with last year's high score of 9.3).

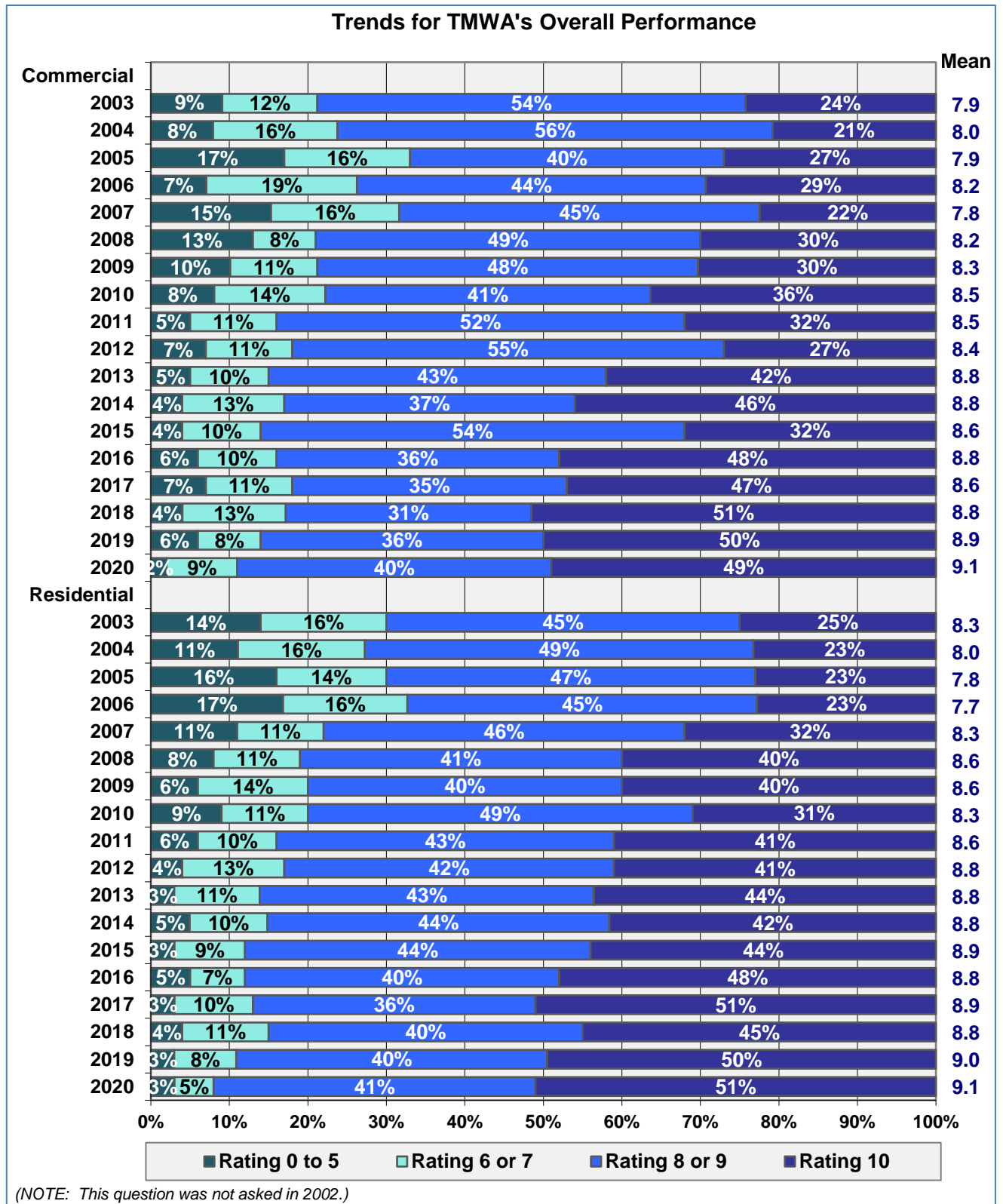


In 2020, ratings did not change significantly for: (1) maintaining an adequate, uninterrupted water supply, (2) providing a bill that is easy to read and understand, or (3) TMWA's overall performance.

**2020 Performance Ratings by Commercial & Residential Customers
(Mean Scores on a Scale from 0 "Very Poor Job" to 10 "Excellent Job")**



In 2020, as in the three prior waves, commercial and residential customers provided statistically similar ratings for all ten specific performance measures, as well as the overall performance rating.

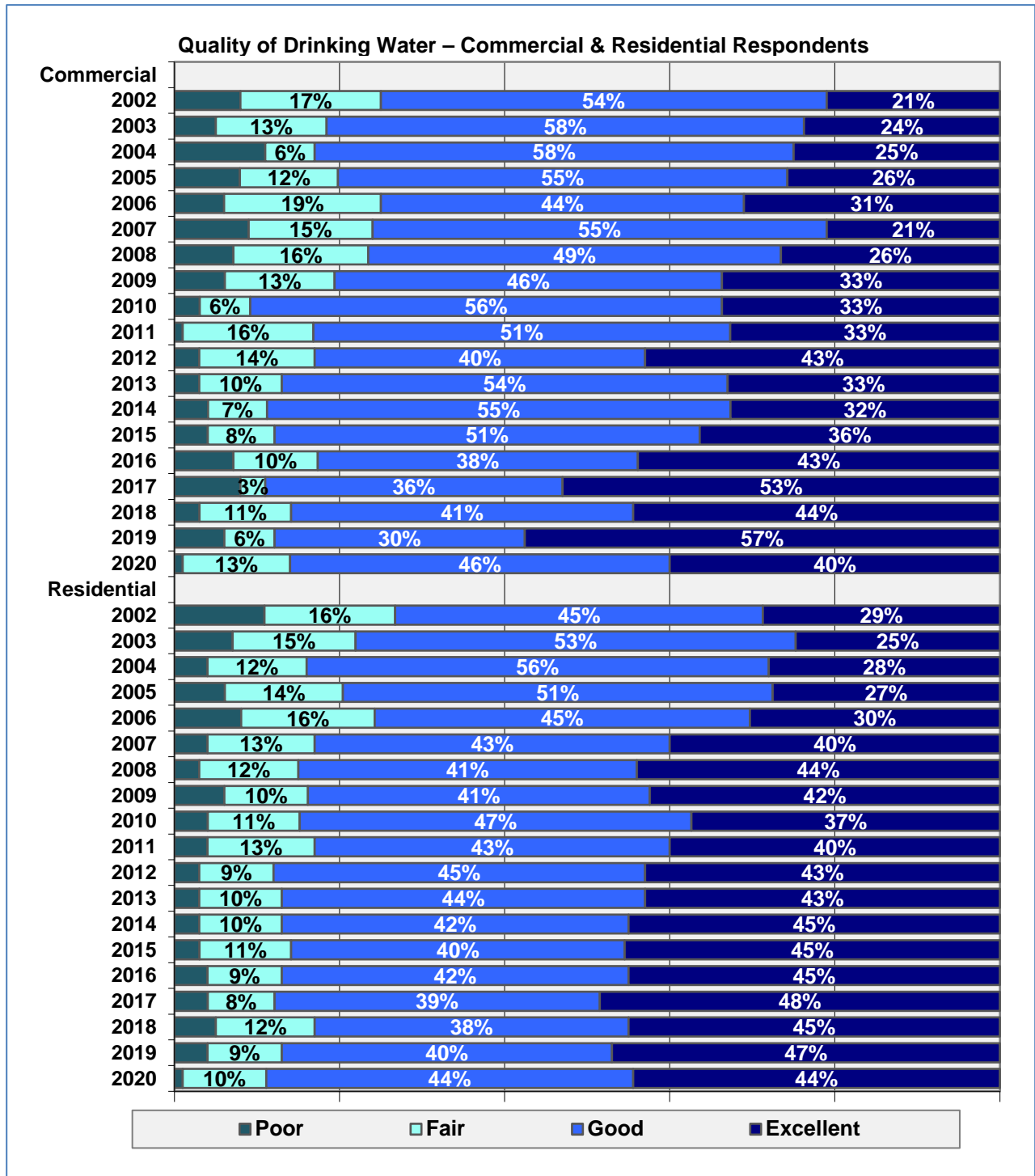


In 2020, 89% of commercial respondents and 92% of residential respondents provided an overall performance score of an 8 or higher on the 0-to-10 scale. Commercial and residential customers have had statistically similar performance scores to each other for eight years.

Customer Service

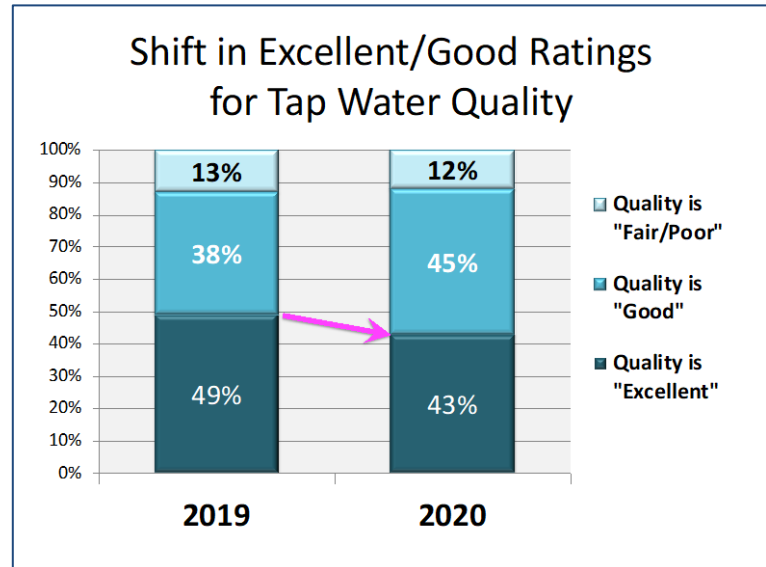
In 2020, just 6% of respondents noticed any changes in their water service in the preceding 12 months. One out of six respondents (17%) had contacted TMWA in the prior 12 months, continuing the downward trend from 20% in 2019, 26% in 2018, and 27% in 2017.

Quality of Drinking Water (Continued on Next Page)



In 2020, 88% of all respondents – including 86% of commercial and 88% of residential respondents – rated drinking water quality as either excellent or good. Overall, there was a statistically significant shift from 2019 to 2020 with excellent ratings decreasing 6 points (from 49% to 43%) and good ratings increasing 7 points (38% to 45%). This swing was driven by the Q4-2020 (April-June) results, when there were substantially more good ratings (60%) than excellent ratings (23%).

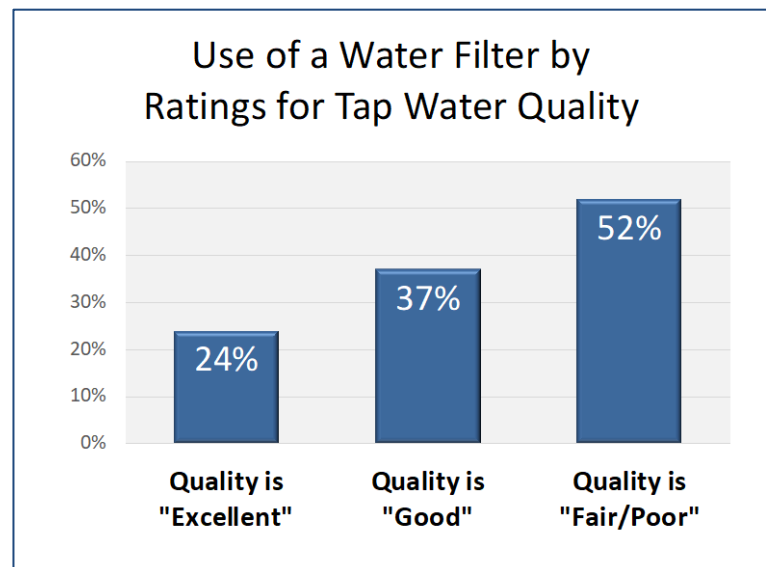
In general, homeowners were more likely to rate the water quality as excellent (50%) rather than good (38%), while renters were more likely to rate the water quality as good (60%) rather than excellent (29%).



Perceptions of drinking water quality continued to be strongly related to overall satisfaction. In 2020, 77% of respondents who rated the drinking water quality as excellent were totally satisfied with TMWA, as compared to 50% of those who rated the drinking water quality as good, and just 27% of those who rated the quality as fair or poor.

While most respondents (76%) noticed no difference in drinking water quality compared to one year ago; 22% reported that the quality was better, and 2% said it was worse. Between 2011 and 2019, consistently less than 7% of respondents indicated that the quality of the drinking water was better than in the prior year; that percentage jumped to 22% in 2020, with at least 9% in every quarter in 2020 reporting that the water was better than in the prior year.

Over half of all respondents reported that the tap water quality was better than that of other cities (58%) and/or that they never have problems with the taste (56%).



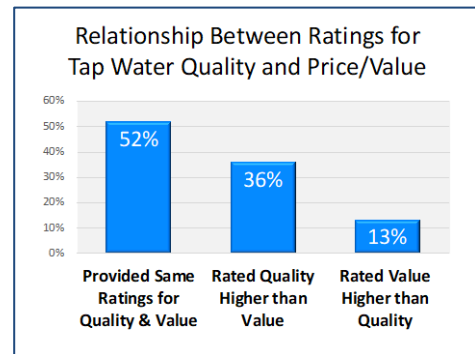
One out of three residential respondents (34%) reported using a water filter in their home for their tap water. The lower the rating for water quality, the more likely they were to have a water filter.

Among those who used a filter, the four main reasons were to improve the taste (24%), to reduce chemicals or residue (22%), for health or safety reasons (19%), and to take advantage of filtered water in the refrigerator (13%). Less common reasons included to soften hard water or to quickly access cold water.

Value for Price

When asked to relate the price of their water bill to the value of the water quality and services received, 28% indicated that they received an excellent value, while 49% rated the value as good, 21% said fair, and just 3% said poor. The percentage who rated the value for price as either excellent or good was 77%; this score has been between 74% and 77% since 2016.

Overall, half (52%) of the respondents provided the same rating (e.g., “excellent”) for both water quality and value for price, while 36% provided a higher rating for quality than for value, and 13% provided a higher rating for value than for quality.

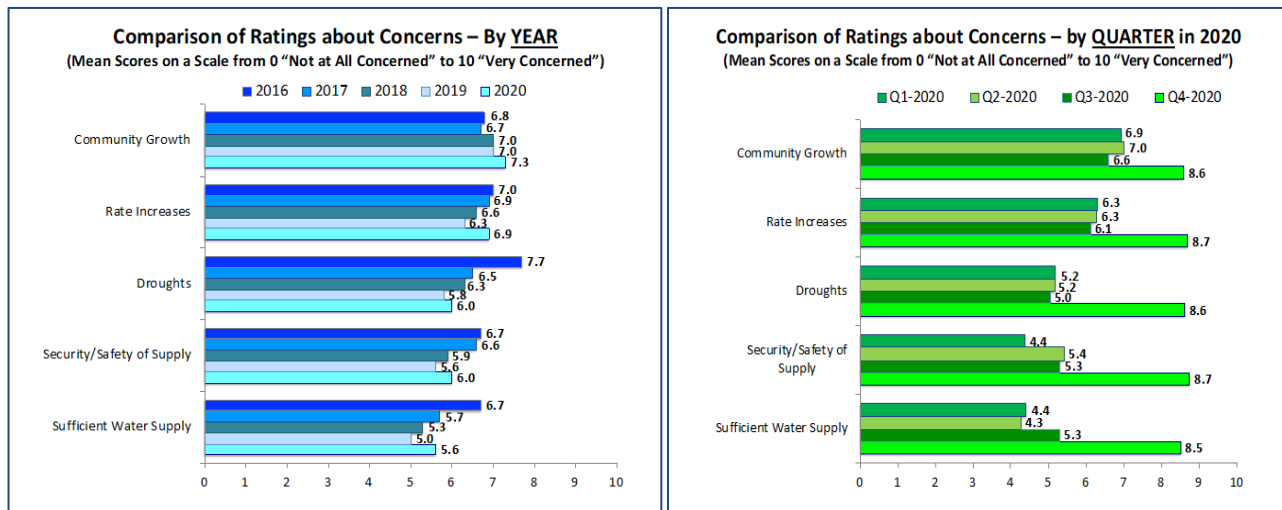


Customers' Concerns

Of the five concerns measured, respondents in 2020 were the most concerned about community growth (7.3) and were the least concerned about having a sufficient water supply (5.6). By contrast, respondents back in 2016 were the most concerned about droughts.

Concern about rate increases rebounded up significantly from 2019 (6.3) to 2020 (6.9), while concern about community growth continued an upward trend (from 6.7 in 2017 to 7.3 in 2020).

By quarter, concern levels jumped up significantly for all five levels of concern in Q4-2020 (April -June), as shown in the chart below on the right. This sharp increase in concern was likely related to the COVID-19 pandemic, including the “Stay at Home” order and the closure of all non-essential businesses during this quarter.



Communication from TMWA

In 2020, two out of three respondents (66%) who receive a bill by mail reported that they read the bill insert at least occasionally, while half (53%) read the message printed on the front page of their bill.

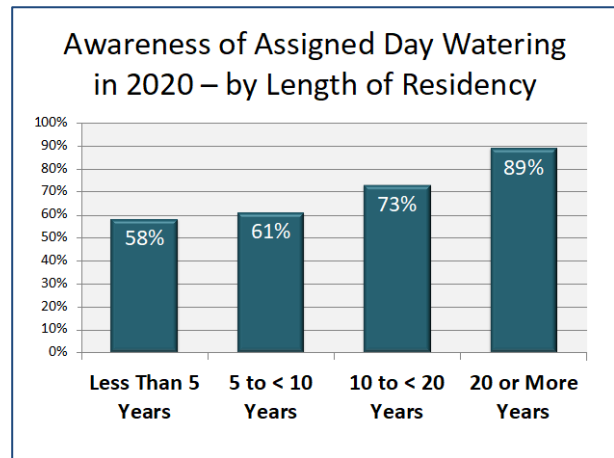
Overall, 28% reported receiving most of their information about the drinking water directly from TMWA, while 37% said that they would *prefer* to receive most of this information directly from TMWA.

Landscaping and Watering

In 2020, 73% of respondents were aware of Assigned Day watering, down from 90% in 2019. This decline was driven primarily by just 39% of respondents being aware of Assigned Day Watering in Q4-2020 (April-June) when more renters and residents of multi-family housing were in the random sample.

In general, homeowners in 2020 were more likely (77%) than were renters (63%) to be aware of Assigned Day watering. Additionally, respondents who lived in single-family homes were substantially more likely (80%) than were those in multi-family housing (49%) to be aware of Assigned Day watering.

Overall, the longer the length of residency, the more likely respondents were to be aware of Assigned Day Watering, as shown in the chart to the right.



In 2020, 53% of respondents reported having a lawn that they water, down from 64% in 2019. Of those with a lawn, 66% stated that they could water 3 days a week, down from 72% in 2019.

Half (51%) of commercial respondents reported that their business has landscaping that it maintains or pays others to maintain, similar to 50% in 2019 and 49% in 2018.

Among the 55% of residential respondents with a lawn, they estimated that, on average, nearly one-third of their yard is lawn (29%), which was statistically similar to 34% in both 2019 and 2018.

Online Account Information

In 2020, 72% of respondents were aware that they could view their TMWA account online, down from 88% in 2019.

Among all respondents – both those who were aware and unaware of their online accounts – 34% had accessed their TMWA account information online; this is down from 39% in 2019 and 41% in both 2018 and 2017, and similar to 32% in 2016.

Among online account users, the mean rating for satisfaction with the online account information system was 9.1 on a scale from 0-to-10, similar to 8.9 last year.

KEY DIFFERENCES BETWEEN GROUPS IN 2020

RESIDENTIAL VERSUS COMMERCIAL:

- **Residential** customers were more likely than were *commercial* customers to:
 - Read the message on the front page of the water bill, and
 - Report getting information about the water primary from TMWA.

GENDER:

- **Men** were more likely than were *women* to:
 - Report that the tap water is better than one year ago.
- **Women** were more likely than were *men* to:
 - Give higher ratings for TMWA: (1) maintaining an adequate water supply, and (2) providing a water bill that is easy to read and understand,
 - Have contacted TMWA, and
 - Be aware of Assigned Day watering and aware they could view their account online.

LENGTH OF RESIDENCY:

- Respondents with **less than 10 years of residency** were more likely than *long-term residents* to:
 - Give higher ratings for TMWA: (1) keeping people informed about water quality, (2) using public input, and (3) providing water that is reasonably priced, and
 - Report that the tap water was better than one year ago.
- Respondents with **20 or more years of residency** were more likely than *newer residents* to:
 - Provide an excellent rating for drinking water quality,
 - Have the *lowest* level of concern about: (1) having a sufficient water supply, (2) droughts, and (3) the security of the water supply,
 - Be aware of Assigned Day watering, have a lawn that they water, and report correctly that they can water their lawn three days a week, and
 - Be aware they could view their TMWA account online.

HOUSEHOLD SIZE (NUMBER OF INHABITANTS):

- Respondents with **at least 3 inhabitants** were more likely than others to:
 - Give the highest rating for TMWA using public input,
 - Report that the tap water was better than one year ago,
 - Be concerned about rate increases and having a sufficient water supply, and
 - Prefer to get information about the water primarily from TMWA.

AGE GROUP:

- **Respondents under age 45** were more likely than were *older* respondents to:
 - Be totally satisfied with TMWA.
 - Provide higher ratings for TMWA: (1) providing water that looks and tastes good, (2) responding to service problems quickly, (3) maintaining an adequate water supply, (4) using public input, and (5) overall performance, and
 - Be aware they could view their account online and to have accessed that account,
- **Respondents in the 45-64 age group** were more likely than *either younger or older* ones to:
 - Be concerned about a sufficient water supply, droughts, and security of the water supply.

- **Respondents age 65 or older** were more likely than were *younger* ones to:
 - Have noticed changes in their water service,
 - Have contacted TMWA, and
 - Report correctly that they can water their lawns three days a week.

INCOME GROUP:

- Respondents with **household incomes under \$50,000** were more likely to:
 - Give higher ratings for TMWA using public input and providing reasonably priced water.
- Respondents with **household incomes of \$100,000 or higher** were more likely to:
 - Have a lawn, but also to report incorrectly that they could water just two days a week.

RACE/ETHNICITY:

- **Minority** respondents were more likely than were *White/Caucasian* respondents to:
 - Prefer to get information about water primarily from TMWA.
- **White/Caucasian** respondents were more likely than were *minority* respondents to:
 - Report that the tap water was better than that of other cities,
 - Read the message printed on the front page of the water bill, and
 - Have a lawn that they water and be aware of Assigned Day watering.

OWN OR RENT HOME:

- Respondents who were **homeowners** were more likely than were *renters* to:
 - Provide an excellent rating for water quality, and
 - Have a lawn that they water and be aware of Assigned Day watering.
- Respondents who were **renters** were more likely than were *homeowners* to:
 - Give higher ratings for TMWA: (1) responding to service problems quickly, (2) keeping people informed, (3) using public input, (4) caring about customers, (5) providing reasonably priced water, and (6) overall performance,
 - Report that the tap water was better than that of other cities,
 - Be concerned about: (1) having a sufficient water supply, (2) droughts, (3) community growth, (4) rate increases, and (5) the security of the water supply, and
 - Report getting information about the water primary from TMWA.

SINGLE-FAMILY OR MULTI-FAMILY RESIDENCE:

- Respondents in **single-family homes** were more likely than were those in *multi-family homes* to:
 - Have a lawn that they water and be aware of Assigned Day watering, and
 - Be aware they could view their TMWA account online.
- Respondents in **multi-family homes** were more likely than were those in *single-family homes* to:
 - Give higher ratings for TMWA providing reasonably priced water,
 - Report that the tap water was better than one year ago,
 - Be concerned about: (1) having a sufficient water supply, (2) droughts, (3) community growth, (4) rate increases, and (5) the security of the water supply, and
 - Report both getting information and preferring to get information about water primarily from TMWA.

SIGNIFICANT CHANGES FROM 2018 TO 2020

SIGNIFICANT INCREASES	2018	2019	2020
Mean Ratings on 0-10 Scale:			
TMWA providing water that is safe/health to drink <i>(Increased from 2018 to 2020)</i>	8.9	9.0	9.2
TMWA providing for the security/safety of the water supply <i>(Increased from 2018 to 2020)</i>	8.7	9.0	9.2
TMWA responding to service problems quickly, effectively <i>(Increased from 2019 to 2020)</i>	8.9	8.9	9.2
TMWA caring about customers <i>(Increased from 2019 to 2020)</i>	8.6	8.7	9.0
TMWA providing water that looks and tastes good <i>(Increased from 2019 to 2020)</i>	8.6	8.6	9.0
TMWA keeping people informed about drinking water <i>(Increased with upward trend from 2018 to 2020)</i>	8.2	8.4	8.8
TMWA providing water that is affordable, reasonably priced <i>(Increased with upward trend from 2018 to 2020)</i>	8.1	8.3	8.8
TMWA using public input in making water related decisions <i>(Increased with upward trend from 2018 to 2020)</i>	7.9	8.0	8.5
Concern about rate increases <i>(Increased from 2019 to 2020)</i>	6.6	6.3	6.9
Percentages:			
Reported water quality was better than one year ago <i>(Increased from 2019 to 2020)</i>	6%	4%	22%
Read message printed on front page of water bill <i>(Decreased from 2018 to 2019, rebounded up in 2020)</i>	57%	46%	53%
Get water information primarily from TMWA <i>(Increased with upward trend from 2018 to 2020)</i>	21%	23%	32%
Prefer to get water information primarily from TMWA <i>(Increased with upward trend from 2018 to 2020)</i>	29%	31%	37%

SIGNIFICANT DECREASES	2018	2019	2020
Percentages:			
Contacted TMWA in prior 12 months <i>(Downward trend from 2018 to 2020)</i>	26%	20%	17%
Rated the water quality as excellent (rather than good) <i>(Decreased from 2019 to 2020)</i>	45%	49%	43%
Have a lawn that they water <i>(Decreased from 2019 to 2020)</i>	63%	64%	53%
Aware of Assigned Day watering <i>(Decreased from 2019 to 2020)</i>	88%	90%	73%
If aware, reported they could water lawn three days a week <i>(Downward trend from 2018 to 2020)</i>	73%	72%	66%
Aware they could view TMWA account information online <i>(Decreased from 2019 to 2020)</i>	85%	88%	72%
Have accessed TMWA account online <i>(Downward trend from 2018 to 2020)</i>	41%	39%	34%



STAFF REPORT

TO: TMWA Standing Advisory Committee
THRU: Mark Foree, General Manager
FROM: Michele Sullivan, Chief Financial Officer/Treasurer
DATE: September 25, 2020
SUBJECT: **Presentation of and discussion, and possible direction to staff regarding preliminary funding plan for Fiscal Years 2021 through 2025**

Recommendation

Recommendation to accept the five-year funding plan as presented. The Board of Directors delayed the next approved 2.5% rate increases from May, 2020 to September, 2020 at the April, 2020 Board meeting due to the pandemic. They then revisited the rate increase at the August, 2020 Board meeting and delayed all three remaining 2.5% increases to May, 2021, May, 2022, and May, 2023. The SAC and the Board will continue to monitor the closing of the funding gap between recurring revenues and the cost of servicing TMWA customers, based on the funding plan annually.

Summary

At the April, 2017 TMWA Board meeting, the TMWA BOD approved Resolution No. 250 which included rate increases of 3% in May, 2017 and May, 2018 and additional rate increases of 2.5% in May, 2019 through 2021 to be brought for reconsideration to the SAC and BOD before they are implemented. Principal payments on Senior Lien debt were deferred in the 2016 Bond Refunding to give TMWA time to bring rates in line with cost of service. Annual principal payments averaging \$11 million annually resumed in 2020, and should be covered by recurring revenue, which is mainly water sales. Increases of 3% in May of 2017 and 2018 were implemented, and the 2.5% rate increase scheduled for May, 2019 was deferred. The three remaining approved increases were deferred until May 2021, May 2022, and May 2023 at the August, 2020 Board meeting.

The 2021-2025 Draft Funding Plan (See *Attachment A*) shows that rate adjustments are still necessary to close the funding gap between recurring revenues and the cost of servicing the customer base. Increases in water sales revenues, hydroelectric revenues, other operating revenues, as well as investment earnings have helped to close some of the funding gap. Higher

than anticipated cash balances over the past few years resulted in higher than originally anticipated investment earnings. One time cash windfalls of \$21.4 million from an insurance settlement related to Farad, and \$9.5 million from banks for releasing them from Forward Delivery Agreements have placed TMWA in a strong cash position; However, the funding gap is projected to be \$10.5M or 8.6% in FY21, and all three of the 2.5% rate increase will be needed to ensure TMWA can maintain critical financial goals which are essential to maintain adequate cash balances and investment grade credit ratings.

This high-level presentation is based upon very detailed financial projections. Assumptions used in these financial projections can be found in **Attachment B**. The funding plan is different from the budget. When staff prepares the budget we must ensure that we have enough expenses projected to cover all reasonable scenarios. Since the funding plan is used to decide whether a rate increase is necessary, it is more conservative in projecting expenses and uses the CIP plan to predict actual spending based on prior years actual spending as a percent of CIP projections. In this report we have focused on how TMWA's original projections from 2017 compared to actual results, and what we project in the 2021-2025 funding plan.

Discussion

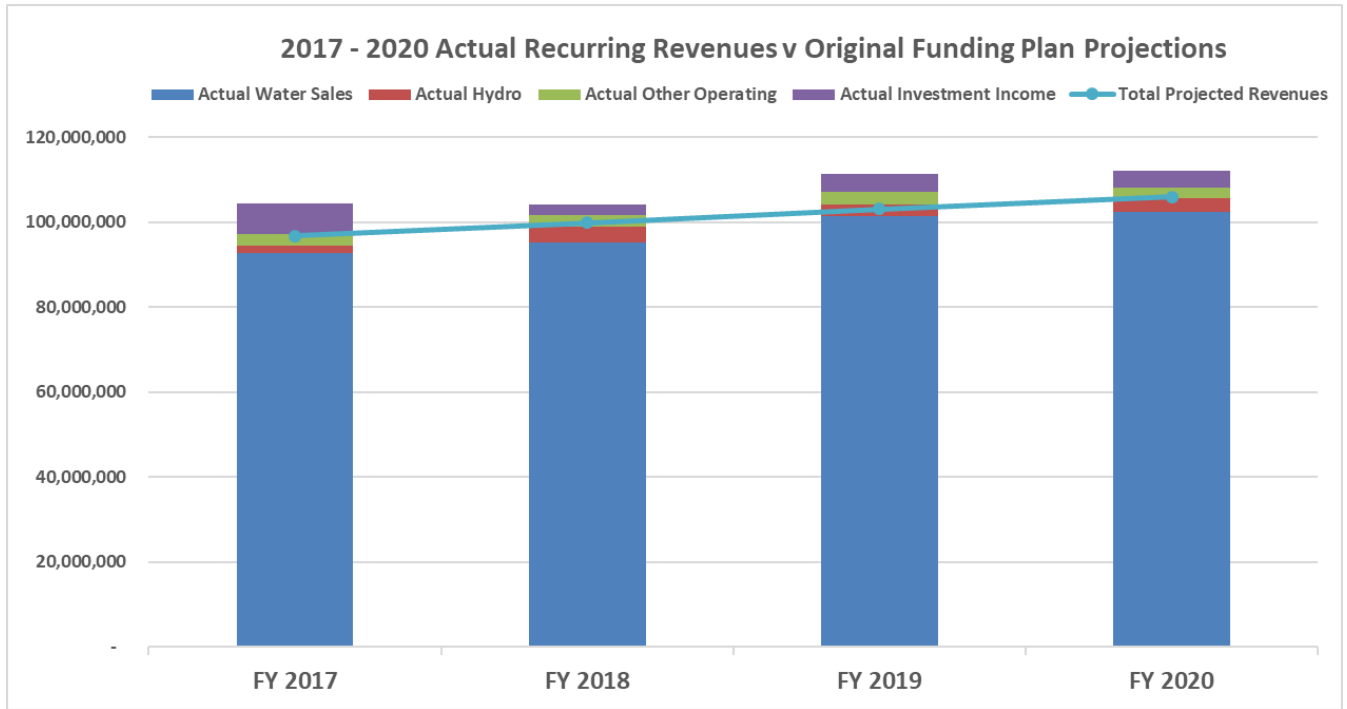
Critical financial goals for TMWA that need to be considered in these funding plans are as follows:

- Maintain recurring revenues sufficient to cover the cost to serve customers.
- Maintain a senior lien coverage (DSC) ratio that not only meets bond covenants (1.25x) but also meets the board designated goal of 1.5x.
- Maintain sufficient cash balances to facilitate the payment for rehabilitative capital projects on a pay-go basis.
- Maintain high investment grade credit ratings to effectively access credit markets.

Funding Plans analyze the ability of TMWA to fund the cost to serve customers which includes operating expenses, principal and interest payments on current outstanding debt related to customers, and all capital improvements presented in the TMWA Capital Improvement Plan (CIP) that relate to maintaining service for current customers from recurring revenues. Recurring revenues are comprised of water sales, hydroelectric revenues, other miscellaneous operating revenues and investment income with water sales making up anywhere from 90 to 95% of recurring revenues. If recurring revenues are less than the cost to serve customers this is referred to as a funding gap.

RECURRING REVENUES

The following graph compares the original projections for recurring revenue presented in the funding plan in fiscal year 2017 to actual results in 2017-2020.



Water Sales Revenue

Over the last four years, water sales revenue has rebounded somewhat from drought levels. Compared to original projections in 2017, when the current rate increase plan was originally adopted, water sales revenue for the four-year period has been 2.2% (average \$2.1 million per year) higher than expected even with the deferral of the 2.5% increase in last two years. It is uncertain whether this trend will continue as it depends mainly on warmer than average weather patterns. The 2021-2025 funding plan is based on average usage per connection over the last 5 years. Growth in connections over the next five years uses projections from the 2020-2040 Water Resource Plan.

Hydroelectric Revenue

Hydroelectric revenues were higher than expected by 28.7% (average \$0.6 million per year) due to the end of the drought which increased river flows during the period. Fiscal year 2018 was a record year for hydro revenue generation at \$3.8 million. In the 2021-2025 funding plan hydroelectric revenues are expected to remain solid for several years due to sufficient Truckee River flows, with only occasional shutdowns for maintenance. This could change later in the funding plan period depending on weather patterns.

Other Operating Revenue

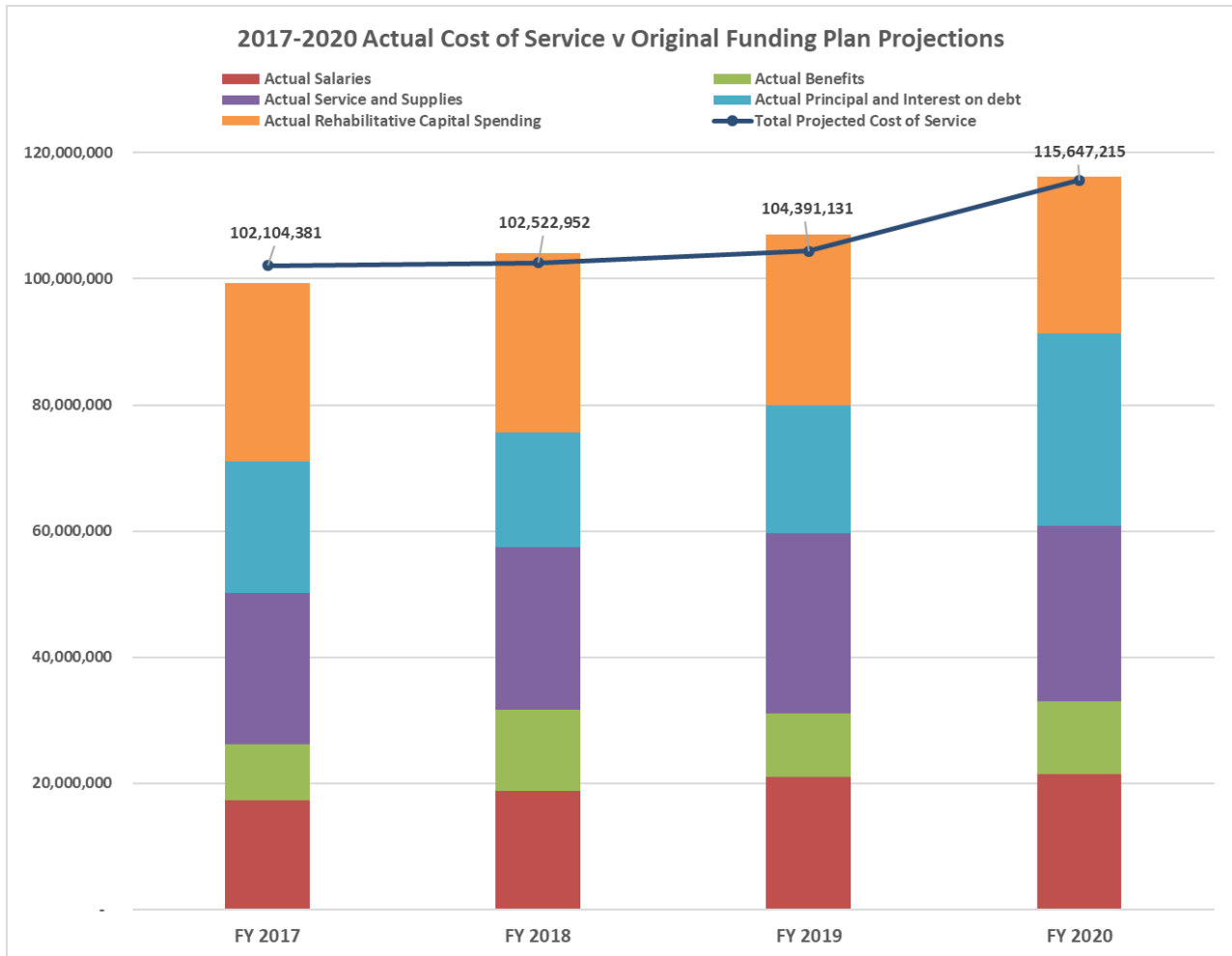
The largest components of other operating revenue are inspection fees, service call charges, late fees, and construction water sales. Compared to original projections, other operating revenue was 14.3% (average \$0.3 million per year) higher than expected. This was mainly due to higher inspection fees and construction water sales due to a rebound in growth in the area. This is the only component of recurring revenue that is slightly affected by growth, as it is necessary for revenue from growth to pay for growth. All other revenue related to growth is considered non-operating.

Investment Income

Investment income has been significantly higher than anticipated in the original funding plan, providing an additional \$14 million dollars over the four year period. This is the greatest fluctuation in total dollars from 2017 original projections in all revenue categories. TMWA had several one-time cash infusions as mentioned earlier which totaled \$30.9 million. Release of the one of the forward delivery agreements provided \$5 million in additional investment income in fiscal year 2017. Higher cash balances, combined with higher interest rates over the period resulted in the significant increase in investment income. Unfortunately, in the upcoming 2021-2025 funding plan, investment income is expected to decline due to much lower interest rates and declining cash balances.

COST OF SERVICE

The following graph compares the original projections for cost of service presented in the funding plan in fiscal year 2017 to actual results in 2017-2020.



Salaries

Salaries expense was 2.3% higher than originally projected in the 2017 funding plan. This fluctuation was mainly in fiscal years 2019 and 2020, and is a combination of overstaffing for retirements and succession planning, hiring due to growth in the service area, and slightly higher than anticipated salary increases. Salaries in the 2021-2025 funding plan include significant turnover due to retirements, and some overstaffing for training in critical positions. There is not a significant overall increase in staffing anticipated (3.5%, or 8 headcount over the five years). Wage increases are forecasted at 2% annually.

Benefits

Benefits expense was actually slightly lower than anticipated due to lower than projected health care premiums, and Post Employment Medical plan cash contributions. A change in accounting principles for the Post Employment Medical plans accounts for a \$3M non-cash adjustment to increase benefits expense in fiscal year 2018. Benefits are expected to increase based on increases in salaries.

Service and Supplies

This category came in lower than projected by 3.1%. Staff works diligently to keep costs as low as possible. In the next five years, there are annual decreases of \$0.6 million beginning in fiscal year 2022 due to implementation of a new Customer Information System which is more economical, annual decreases in fuel costs of \$0.08 million due to the fuel station built onsite at TMWA's Capital Blvd. location, and annual decreases of \$0.2 million in power expenses when the Orr Ditch hydroelectric facility comes online in fiscal year 2023. Increases in costs include operation of the new Mt. Rose treatment plant for \$0.75 million annually beginning early calendar year 2021, as well as increases in fiscal year 2025 for operation costs related a new Advanced Purified Water plant of \$1.0M.

Principal and Interest on Debt

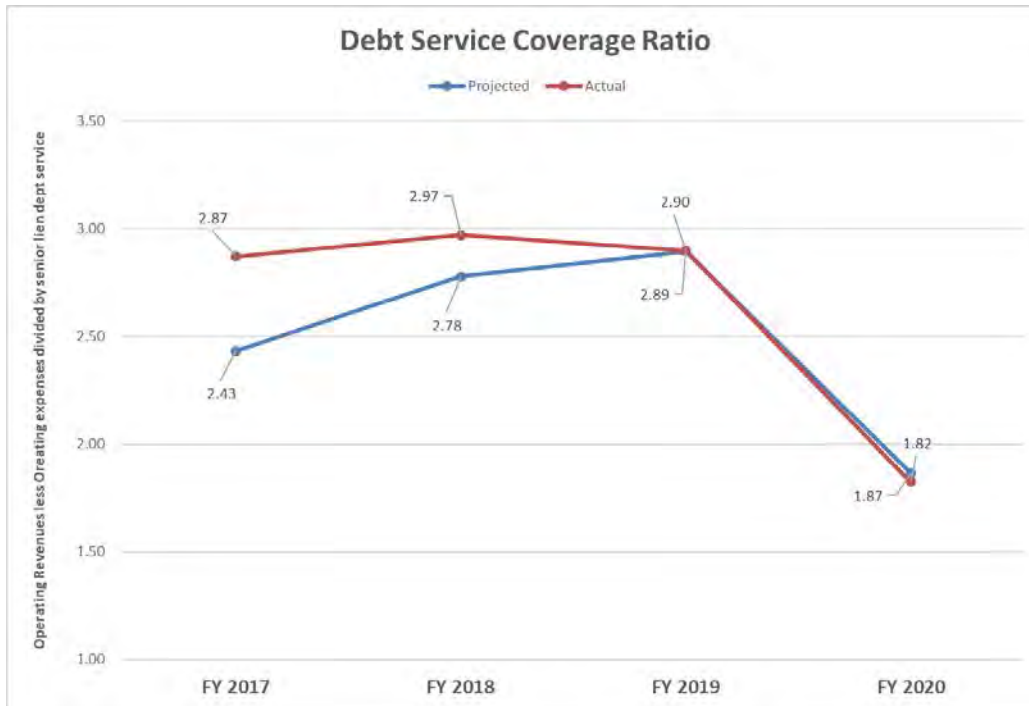
Principal and Interest payments were as expected over the last four years, with a delay of principal payments in fiscal years 2017 through 2019. Principal payments resumed in fiscal year 2020 at approximately \$11 million annually. Those debt payments will continue for the next 20 years.

Rehabilitative Capital Spending

Capital Spending related to maintaining the water system should be covered by customer revenue. Estimates for customer funded capital spending were approximately \$28 million a year in the 2017 funding plan. Actuals were very close in 2017 through 2019, but in fiscal year 2020, \$25 million was spent on maintaining the system, with more spending on developer funded projects. Expected spending in the next five years is \$29 million annually.

DEBT SERVICE COVERAGE RATIO

The debt service coverage (DSC) ratio is an important ratio that is watched by rating agencies, banks and investors. This ratio uses the net operating income (operating revenue less operating expenses) and divides it by the senior lien debt service. TMWA's debt covenants require that we maintain a DSC ratio of 1.25x. The Board has set a goal of 1.5x. The following graph shows the projected DSC ratio from the 2017 plan compared to the actual DSC ratio experienced.



The graph shows that the TMWA DSC ratio was very close to what was anticipated, and dropped dramatically when debt principal payments of \$11 million annually resumed in FY2020. In the new funding plan DSC begins at 1.69x, increasing to 1.99x over the five-year period.

CASH BALANCES

Maintaining sufficient cash balances is critical to maintaining the financial health of TMWA, and is a key factor in maintaining TMWA's credit ratings. When the Board voted to increase the rate stabilization fund in September of 2018, it was part of a financial policy adopted by Resolution 266 to ensure that TMWA maintains adequate cash balances, both restricted and unrestricted. As mentioned earlier, \$30 million in unexpected cash infusions have significantly helped the strength of TMWA's cash position. In the original funding plan we did not do a cash reserve analysis because the policy was not implemented yet. Unrestricted cash balances decreased by \$4.2 million in FY2020 due to principal payments on debt of \$11 million. Over the next five years cash is projected to decrease by \$24.9 million, with unrestricted cash reducing by \$18.0 million. Restricted cash balances in the STMGID reserve fund, the water meter retrofit fund will be fully depleted.

Truckee Meadows Water Authority
2021-2025 Funding Plan with Delayed Rate Increases

<i>TMWA's Revenue Sufficiency and Cost of Service</i>	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Projected Rate Increases	2.5%	2.5%	2.5%	0.0%	0.0%
Operating Expenses	\$ 64,043,977	\$ 65,068,056	\$ 65,295,928	\$ 66,726,575	\$ 68,909,061
Principal and Interest on customer related debt	28,319,475	28,526,029	28,481,716	28,440,408	26,974,801
Rehabilitative Capital Spending	29,223,140	29,223,140	29,223,140	29,223,140	29,223,140
Total Projected Cost of Service	\$ 121,586,592	\$ 122,817,225	\$ 123,000,785	\$ 124,390,123	\$ 125,107,001
Recurring Revenues	\$ 111,108,472	\$ 114,973,290	\$ 118,680,602	\$ 122,016,457	\$ 123,121,344
Surplus (Deficiency)	\$ (10,478,119)	\$ (7,843,934)	\$ (4,320,183)	\$ (2,373,666)	\$ (1,985,658)
Surplus (Deficiency) as a % of Cost of Service	-8.6%	-6.4%	-3.5%	-1.9%	-1.6%
<i>Debt Service Coverage Ratios</i>	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Water Sales Revenues	102,260,229	106,791,802	110,839,082	114,144,950	115,192,946
Hydroelectric Sales	3,193,880	3,190,823	3,222,732	3,254,959	3,287,509
Other Operating Sales	2,800,120	2,343,691	2,107,459	2,076,077	2,050,965
Investment Income	2,854,243	2,646,974	2,511,329	2,540,471	2,589,924
Total Revenues	111,108,472	114,973,290	118,680,602	122,016,457	123,121,344
Operating Expenses	(64,043,977)	(65,068,056)	(65,295,928)	(66,726,575)	(68,909,061)
Net Revenues	47,064,496	49,905,234	53,384,673	55,289,882	54,212,283
Senior Lien Debt Service	27,829,750	28,275,250	28,274,500	28,287,250	27,206,250
Senior Lien DSC	1.69	1.76	1.89	1.95	1.99
Total Sr. Lien and SRF Debt Service	30,250,471	30,695,971	30,695,221	30,707,971	28,954,688
Total Sr. Lien and SRF DSC	1.56	1.63	1.74	1.80	1.87
Total Annual Debt Service incl. TECP Interest	30,577,871	30,788,696	30,745,321	30,707,971	28,954,688
Total Subordinate DSC	1.54	1.62	1.74	1.80	1.87
<i>TMWA's Cash Balances</i>	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Restricted Cash	\$ 52,054,267	\$ 43,440,085	\$ 42,520,795	\$ 43,345,269	\$ 44,318,619
Rate Stabilization Fund	9,596,733	9,953,275	10,205,309	10,367,762	10,460,506
Unrestricted Cash Required by Policy	91,016,603	91,357,962	91,433,920	91,910,802	92,638,296
Required Cash Balances	152,667,603	144,751,322	144,160,025	145,623,833	147,417,422
Total Cash Balance	201,866,022	194,515,525	184,514,351	181,473,608	177,001,439
Difference	\$ 49,198,419	\$ 49,764,202	\$ 40,354,326	\$ 35,849,775	\$ 29,584,018

2021-2025 Draft Funding Plan Assumptions

Operational Assumptions

- 1) Reliance on surface water will continue due to recent weather patterns with groundwater supplies augmenting the surface water treatment plants.
- 2) Fish Springs Ranch (Vidler) groundwater will be made available to the North Valleys reducing reliance on groundwater in the Lemmon Valley Basin. Water flow will be maintained to optimize water quality.
- 3) The Mt. Rose/Galena Surface Water Treatment Plant operational in fiscal year 2021 with operating costs assumed to be \$1000 per mgal with total annual production of 750mg.
- 4) Orr ditch hydro will supply power to the Chalk Bluff treatment plant beginning in fiscal year 2023.

Revenue/Capital Contribution Assumptions

- 1) The Draft Funding Plan anticipates an additional 7,869 service connections over the five-year period. Growth in service connections is equal to growth projections presented in the 2020-2040 Water Resource Plan and is slightly higher than the prior year's funding plan. Growth percentage goes from 1.54% in 2020, decreasing to 0.81% in 2024. Usage is based on patterns over the last five years.
- 2) Hydroelectric sales projections are based on sufficient river flows in 2021 through 2025. Downtime for construction and maintenance of hydro plants is considered.
- 3) Weighted average yield on investable cash is estimated to be 0.7% in fiscal year 2021 rising to 2.85% in fiscal year 2025. These yields are significantly lower than the prior year's funding plan.
- 4) Will serve sales are expected to be approximately \$15.6 million over the ensuing period, and will be used to pay down commercial paper balances.
- 5) Other developer contributions are projected to be \$68.1 million over the ensuing period. This does not include any significant funding to expand a water main to Verdi.

Operating Expense Assumptions

- 1) Wages and salaries increase for IBEW workers are based on the latest contract with the union or 3% in 2021. Thereafter, IBEW increases are budget at 2.0%. MPAT employees increase by 2.75% in 2021, and 2.0% thereafter.
- 2) Headcount was increased by eight in the 2022 budget and is projected to remain steady thereafter. As retirements occur they are offset with other hires.
- 3) Public Employee contribution rates are assumed to remain at 29.25% through 2025.
- 4) Health care premiums and life insurance premiums are assumed to increase 3% annually, with change to employer/employee allocation of costs.

- 5) Workmen's compensation premiums assumed to increase 3% annually.
- 6) Funding for the Truckee River Fund is \$650k in 2021, and \$850k in 2022-2025.
- 7) TMWA's anticipated share of TROA administration expenses is approximately \$360k annually.
- 8) General annual inflation of 1.0% is assumed on most service and supplies.

Debt Management Assumptions

- 1) Tax-exempt commercial paper interest rates are assumed to be 0.4% in fiscal year 2021 increasing to 0.93% in fiscal year 2023. Payments of \$16 million are assumed based on will-serve sales and other revenue to reduce commercial paper to a zero balance before the end of fiscal year 2023.
- 2) No new debt is assumed to be issued during the 2021-2025 period.
- 3) Debt service on developer related funding is assumed to be funded by developer fees.

Treasury Assumptions

- 1) Total cash and investments at the beginning of fiscal year 2021 are \$205.8 million. Of this total \$147.9 million is unrestricted.
- 2) Restricted reserves that were transferred from the South Truckee Meadows General Improvement District (STMGID) are sufficient to fund capital improvements in this former service area through fiscal year 2022.
- 3) Customer funded capital spending from the five-year CIP plan is spread evenly over the five year period to avoid fluctuations in the funding gap. It is assumed that 95% of this spending will be completed.

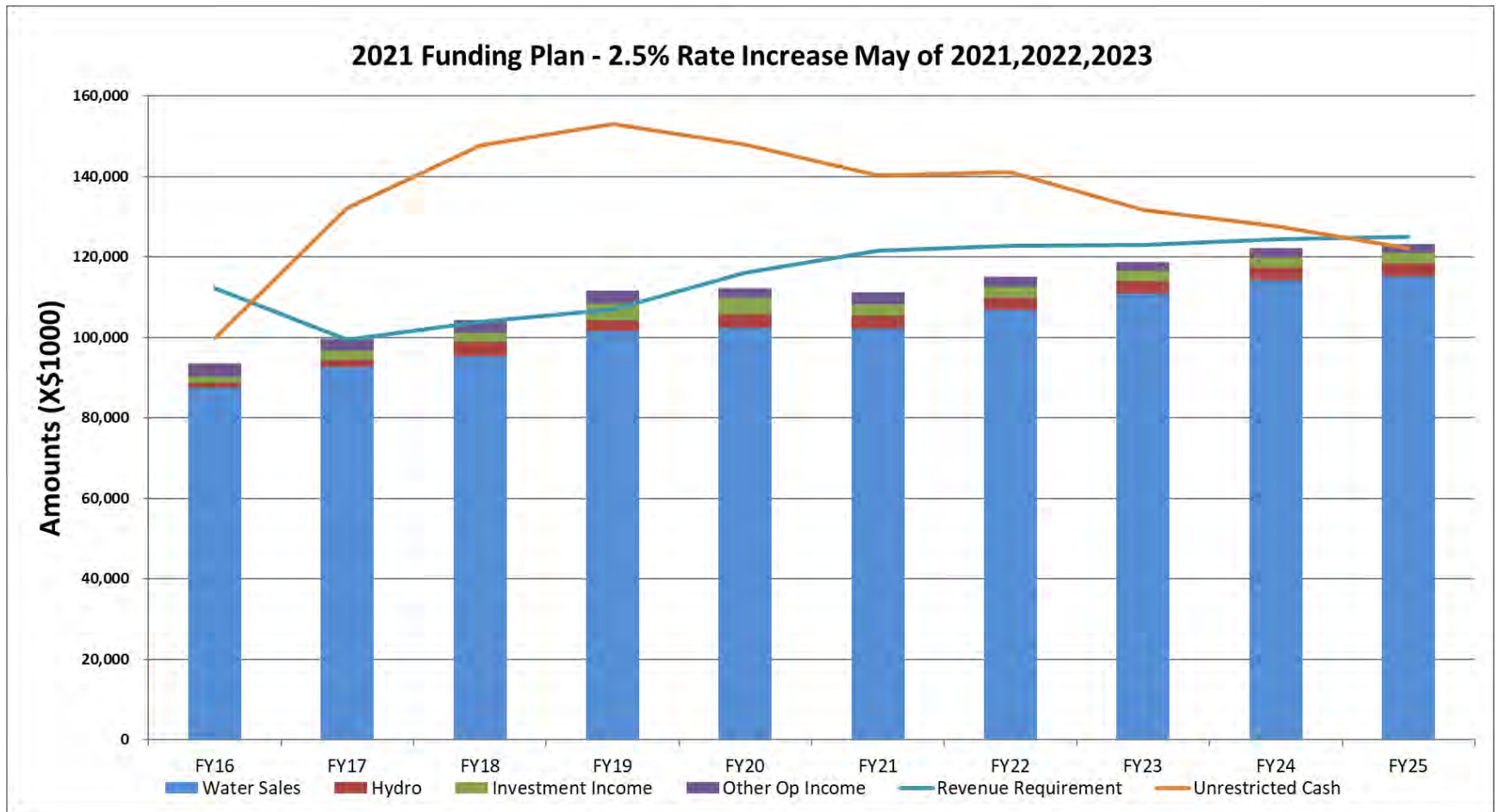
TMWA

Draft Funding Plan 2021-2025

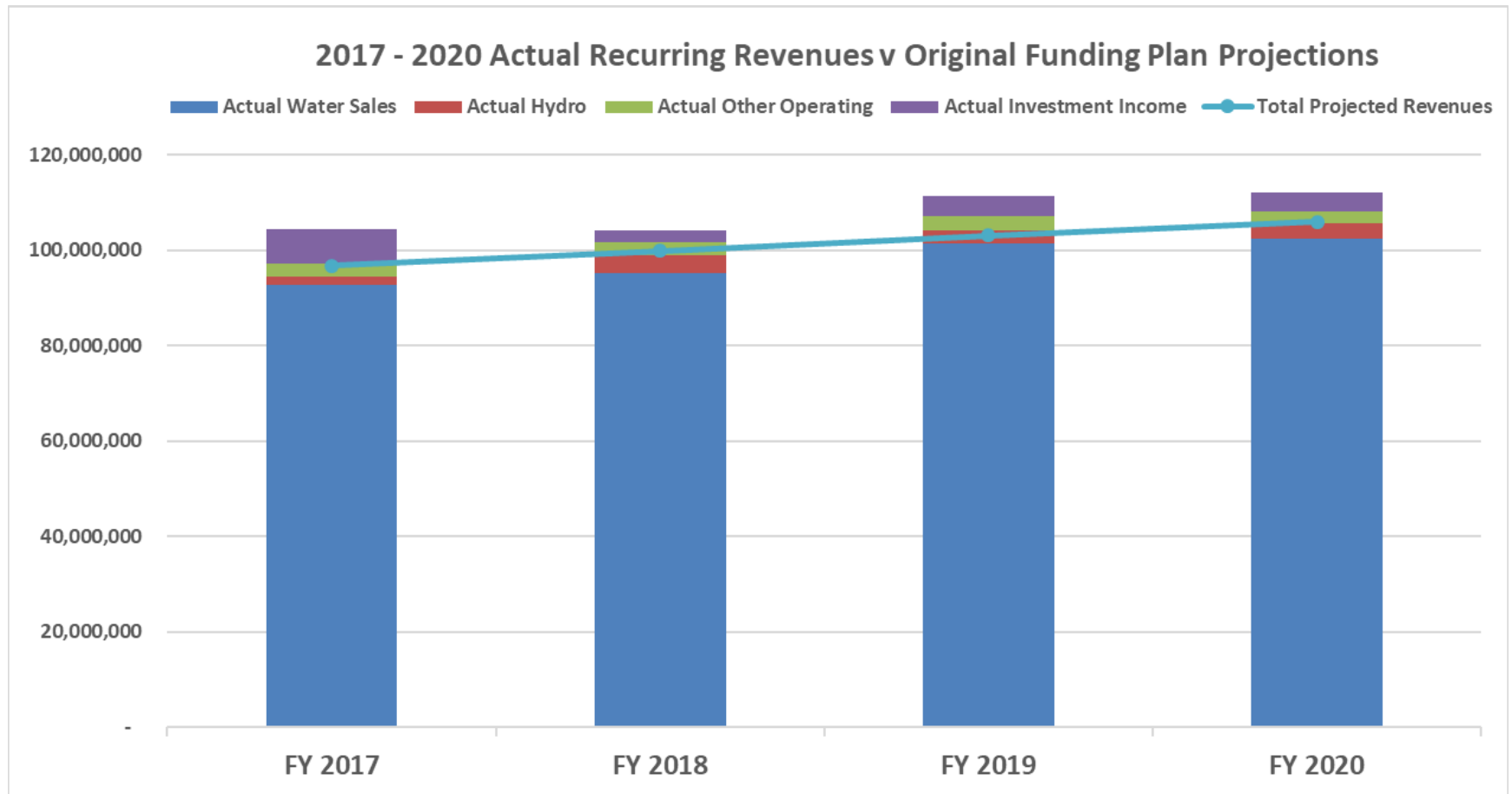


Truckee Meadows Water Authority

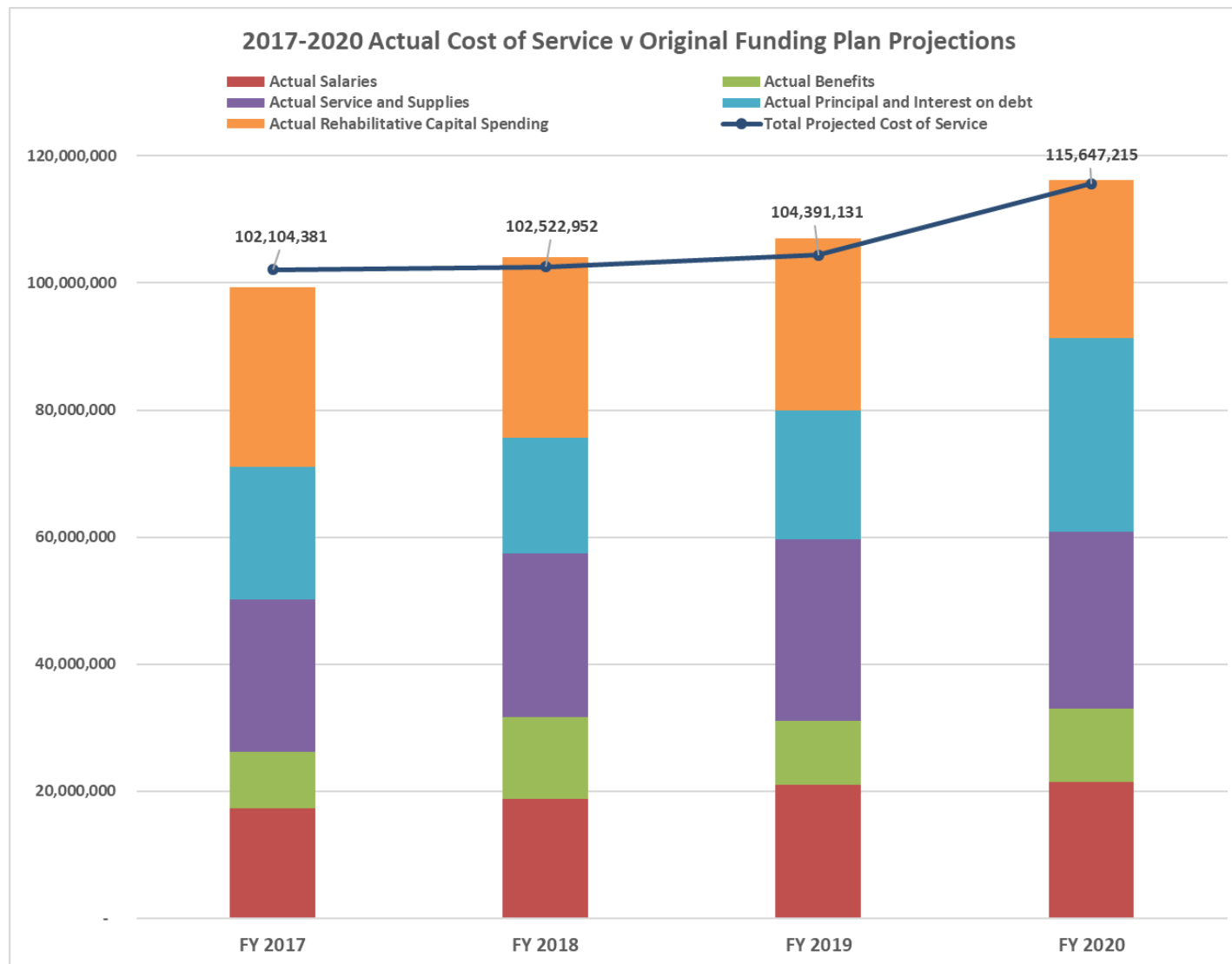
Financial Metrics 2016 - 2025 (Attachment A)



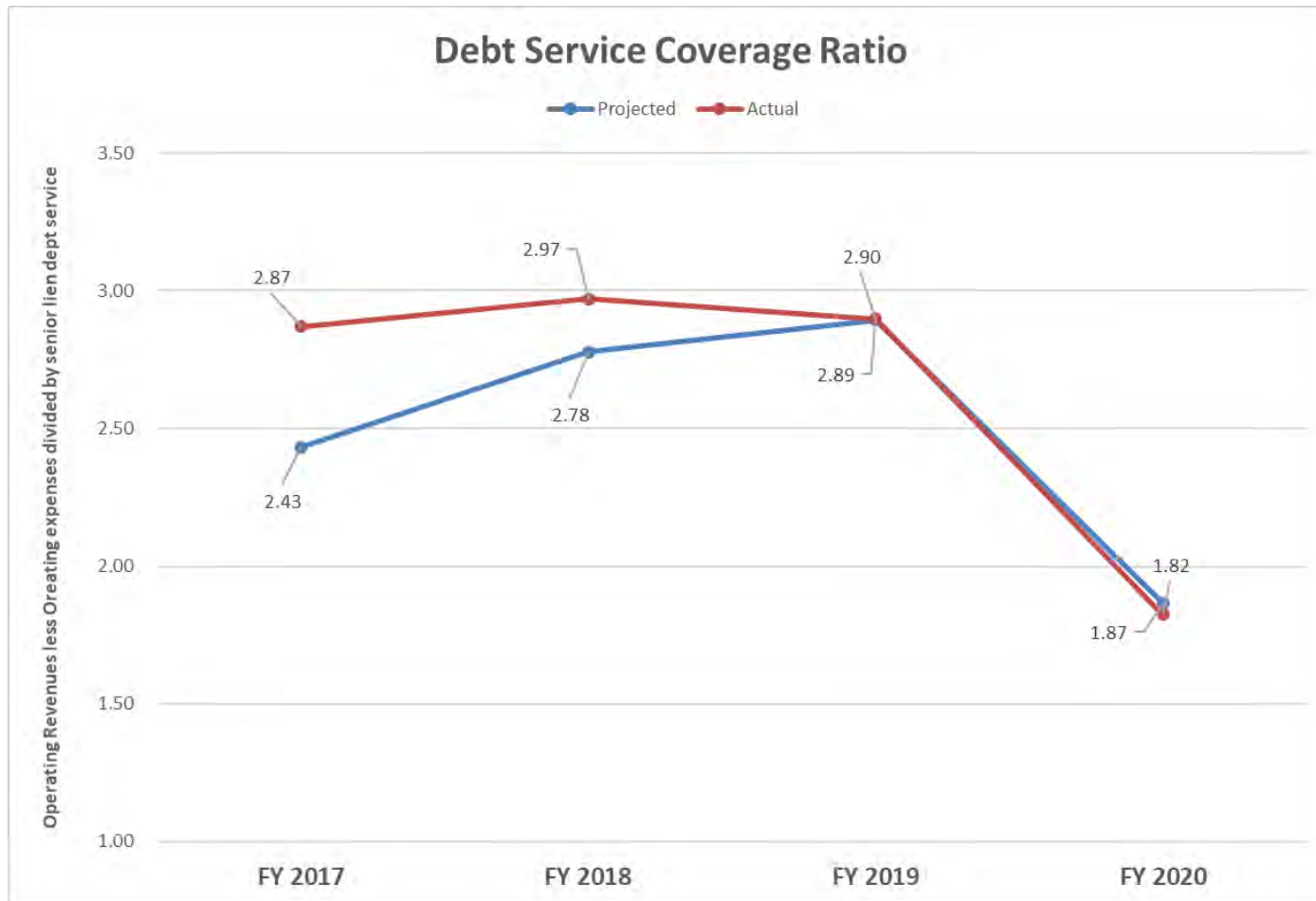
Truckee Meadows Water Authority



Truckee Meadows Water Authority



Truckee Meadows Water Authority



Thank you!
Questions?

Michele Sullivan, CFO
Email: msullivan@tmwa.com



STAFF REPORT

TO: Chairman and Board Members
FROM: Mark Foree, General Manager
DATE: October 5, 2020
SUBJECT: Presentation of TMWA Goals and Objectives results for Fiscal Year 2020

Discussion of Results

Please find attached an at-a-glance summary as well as the detailed measurement results for TMWA's corporate and departmental goals for the 2020 fiscal year. Where appropriate, TMWA uses the American Water Works Association (AWWA) Benchmarking Survey Results or the American Metropolitan Water Association (AMWA) for some of the goals to measure against. Below is a summary highlighting the results for specific organizational and departmental goals that required more detail.

ORGANIZATION OBJECTIVES	
Efficiency	
1	We are close to the top quartile of at least 595 customer accounts per employee (AWWA benchmark) with a result of 587 customer accounts per employee.
2	We met the top quartile of MGD delivered per employee with a result of 0.32 compared to the AWWA benchmark of 0.26
Safety	
1	Safety Incident Rate", had a result of 2.33 average incident rate, which was significantly lower than the benchmark measure of 5.0 for Water Supply & Irrigation Systems; we had five minor injuries with 0 days of work missed due to these minor injuries.
2	<p>The preventable vehicle accidents had a result of 5.97 accidents per 1,000,000 miles driven, which is above the industry average of 4.32; we had *8 minor accidents with very little damage and all vehicles were back in service very soon. 360° walk-around has proven to be a useful tool.</p> <p>*TMWA uses the definition of "collision" established by the Network of Employers for Traffic Safety. The definition of collision does not consider fault or preventability, nor does it establish a monetary threshold for damage. Therefore it is important to note of the 8 collisions factored into the result, one was deemed non-preventable meaning the TMWA drivers actions did not cause nor contribute to the accident and one resulted in cosmetic damage to a TMWA vehicle that did not require repair and therefore no expense to the organization. If these two collisions were removed from the results, we would have been within 0.16 points of meeting the stated goal.</p>

ORGANIZATION OBJECTIVES

Financial

- | | |
|----------|--|
| 3 | We reaffirmed TMWA's Moody's rating of Aa2 stable and S&P rating of AA+ stable. In fall 2019, we were affirmed by Fitch rating of A+ stable. |
| 4 | The goal to maintain a low debt ratio result was 38% putting us between the median and bottom quartile. We improved the result by 8% compared to last fiscal year. |

Natural Resources

- | | |
|----------|---|
| 1 | All reservoirs (including Lake Tahoe) on the Truckee River system were in great shape at or near capacity to start FY2020. TMWA's combined upstream reservoir storage was 37,200 acre-feet at that point (7/1/2019). Opportunities for storing additional water under TROA were limited however almost all of FY2020. TMWA was able to carry-over 18,750 acre-feet of Credit Storage into January 2020. Including Donner and Independence lakes, TMWA's total upstream storage at the start of January 2020 was 32,550 acre-feet. But because upstream federal reservoirs were still pretty much full (and it was determined to be a normal year according to terms of TROA), much of TMWA's Credit Water stored under TROA was either spilled or converted in April 2020. Opportunities to establish more Credit Water this past spring under TROA were limited due to the availability of storage space in the federal reservoirs. Both Donner and Independence lakes did fill in June 2020 however, so TMWA ended the most recent FY with 36,711 acre-feet of combined upstream storage (slightly less than we ended FY2019 with). TMWA was able to establish as much credit storage as possible and fill Donner and Independence lakes while working with numerous local, state and federal agencies to coordinate other releases and exchanges of water in the spirit of TROA throughout FY 2020 to achieve multiple objectives for fish and wildlife, recreation and flood control. |
| 2 | TMWA is focusing its efforts on passive recharge while we work through added permitting and water quality requirements associated with active recharge. TMWA continues to recharge groundwater to support water quality improvement goals. TMWA is working with the Nevada Division of Water Resources and the Nevada Division of Environmental Protection for permit coverage on 27 additional wells. Through conjunctive use, groundwater pumping was reduced by almost 2,500 acre-feet between the Mt. Rose, Spanish Springs, Lemmon Valley and former STMGID areas, and 409 acre-feet was recharged system-wide during FY 2020. |
| 3 | TMWA staff continues to work extensively with stakeholders to implement the return flow management agreement. The Tahoe Reno Industrial Center may start receiving reclaim water in late 2022. |

DEPARTMENT GOALS	
Treatment	
1	There were several factors that impacted our ability to meet the FY18/19 goal including: power expenditures were higher than expected for pumping Fish Springs Ranch wells, substantial increase in primary water treatment chemical and reorganization of expense categories to normalize some capital expenditures as expense spending. The factors are now reflected in the FY19/20 treatment goal which was met this year.
2	Treatment staff continued to challenge itself in meeting the effluent turbidity goal of 0.10 NTU's 95% of the time, and exceeded it by meeting the measure 100% of the time, which is an "outstanding" rating.
Distribution	
5	Hydro generation was maintained at 100%, exceeding the target of 95% availability, and we produced \$3.3 million in revenue during the fiscal year.
Operations	
3	Operations staff worked diligently to achieve its goal of converting 86 (50%) of 172 field sites and stations with modern SCADA control, but only achieved 70, or 41.7%. The shortfall was due to the COVID-19 pandemic hitting our area in the last quarter of FY20.
Customer Service	
2	Due to the COVID-19 pandemic, the average number of non-weather estimates significantly increased from 2.5 per month last fiscal year to 27 per month in FY20. Prior to March 2020 non-weather estimates averaged six per month.
3	Due to the pandemic, TMWA (and all water utilities nationwide) suspended disconnects due to non-payment for at least six months. As such, the average rate for disconnects fell well below our target at 0.16%. Prior to COVID-19 our average rate was 0.24%.
Financial	
4	Staff continues to work toward the AMWA benchmark of \$531 for TMWA's debt per capita. Despite our result of \$849, it is a decrease from \$900 and an improvement of 6% from last fiscal year.
5	The goal of 25% capital spend to total costs was not met due to the commencement of principal payments on TMWA's 2017 Series bonds. These payments are more than \$10m annually and will continue each year going forward until the bonds are paid off.

DEPARTMENT GOALS

Natural Resources

- | | |
|---|---|
| 2 | TMWA staff, a Board member, legal counsel and lobbyists provided updates to TMWA's Legislative Subcommittee. Also, TMWA staff and some Subcommittee members met with legislators regarding TMWA's priorities, draft water resource plan, involvement in working with the Nevada Department of Administration regarding the beneficial use of water from the Marlette Lake water system, TMWA's climate change analysis and interest in potential legislation regarding renewable energy generation. TMWA continues to monitor regulatory action regarding Assembly Bills 30 and 62 from the 2019 session. In addition, TMWA has met with NDEP to address analyzing improvements to the Central Truckee Meadows Remediation District program and the review process with Washoe County Health District for water projects. |
| 5 | TMWA staff continues to collaborate with UNR's Nevada Water Innovation Institute projects. Most notably, analyzing the feasibility of advanced purified water for groundwater augmentation and/or indirect potable reuse. |

Human Resources

- | | |
|---|---|
| 3 | Over the next 5-years, TMWA will see approximately 54 employees retire, hence the result of 24.1%, which is below the median of 20.5%. Staff is working diligently on establishing an efficient succession plan to mitigate any gaps in experience and institutional knowledge with future retirements. |
|---|---|

Engineering & New Business

- | | |
|---|--|
| 2 | Continue to reflect major capital projects completed generally on time and approximately \$1.64 million below budget. |
| 3 | For new business turnaround time goals, TMWA's results remain above the 75% target at an average of 86% for meeting the 30-day turnaround goal, but did not meet the 75% target for the Commercial with Main category with a result of 67%. This was due to nine projects that took between 31-59 days to process and red-line. These projects involved on-site backbone mains that required a "design by red-line" and with all projects submitted at the same time, it was impossible to meeting the primary turnaround goal. We were on average 100% versus the 100% target for meeting the 60-day turnaround goal. |
| 4 | Construction began in October of 2018 with a goal to be in service by Spring 2020. Due to a harsh 18-19 winter and construction delays, the goal has been revised to winter 2020. |
| 5 | Due to COVID-19 and the closure of TMWA offices, staff quickly implemented an unofficial electronic plan submission and review/approval for New Business Projects. The goal of a formal digital submission implementation plan was not met, but the initial process was set up to allow for teleworking while being able to complete the necessary approvals. |



***Truckee Meadows Water Authority
FY 2020
Goals & Objectives
Results***

**TMWA BOARD OF DIRECTORS
MARK FOREE, GENERAL MANAGER**


<Page intentionally left blank>


Contents


GOALS & OBJECTIVES.....	1
ORGANIZATION	1
CUSTOMER SATISFACTION.....	1
EFFICIENCY	1
SAFETY.....	2
FINANCIAL	2
NATURAL RESOURCES	3
DEPARTMENT.....	4
TREATMENT	4
DISTRIBUTION	4
OPERATIONS	5
BUSINESS INFORMATION SERVICES.....	5
CUSTOMER SERVICE.....	6
FINANCIAL	7
NATURAL RESOURCES	8
HUMAN RESOURCES	9
ENGINEERING & NEW BUSINESS.....	10

GOALS & OBJECTIVES

LEGEND:

Completed/On Target: 

In progress: 

Not met: 

ORGANIZATION

CUSTOMER SATISFACTION

	OBJECTIVES	AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Residential Customers Totally or Mostly Satisfied.	71%-81% = Good 82%-86% = Excellent 86% + = Outstanding	% of residential customer's satisfaction	At least 86% residential customer satisfaction	92%
2	Commercial Customers Totally or Mostly Satisfied.	77%-87% = Good 88%-90% = Excellent 90% + = Outstanding	% of commercial customer satisfaction	At least 90% commercial customer satisfaction	93%
3	Meet the Faneuil contract requirement of 80% of calls answered within 35 seconds.		% of calls answered within 35 seconds	80%	Average 19 seconds 100%

EFFICIENCY

	OBJECTIVES	AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Track customer accounts per employee and compare to national benchmark.	Top Quartile = 595 Median = 440 Bottom Quartile = 295	# of accounts per employee	Top quartile	587 accounts per employee
2	Track average MGD delivered per employee and compare to national benchmark.	Top Quartile = 0.26 Median = 0.19 Bottom Quartile = 0.14	Average MGD delivered per employee	Top quartile	0.32

Efficiency Calculations:

Objective 1: $\frac{131,525 \text{ (Customer Accounts)}}{224 \text{ (Employees)}}$

Objective 2: $\frac{73.56 \text{ (Average MGD)}}{224 \text{ (Employees)}}$

SAFETY

	OBJECTIVES	AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Maintain a safety incident rate below the Industry Standard Bureau of Labor Statistics, 2017.	5.0 Average Incident Rate for Water Supply & Irrigation Systems – Local Government	Incident rate	Less than 5.0	2.33
2	Track Collisions Per Million Miles (CPMM) and compare against Network of Employers for Traffic Safety Fleet Safety Benchmark Report (Reporting for North America Only, All Vehicles), 2018.	4.32 per 1,000,000 miles driven.	# of collisions per 1,000,000 miles driven	Less than 4.32	5.97

Safety Calculations:**Objective 1:** 5 (accidents) x 200,000 manhours (1,000,000)

429,997 Total manhours

Objective 2: 8 (collisions) x 1,000,000 miles

1,338,964 Total mileage

FINANCIAL

	OBJECTIVES	AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Meet all bond covenants.		# of bond covenants met	100%	100%
2	Update the 5-year funding plan.		Update completed	100%	100%
3	Preserve or improve TMWA's excellent credit ratings by the two major credit rating bureaus S&P (AA+ stable), Moody's (Aa2 stable), and Fitch (A+ stable).		Maintain or improve credit ratings	AA+ /Aa2 - stable or better	AA+ and Aa2 (and AA Fitch)
4	Maintain a low debt ratio.	Top Quartile = 23% Median = 34% Bottom = 50%	Debt ratio	Median	38%
5	Sustain a minimum of 431 days of cash reserve.	Top Quartile = 431 Median = 313 Bottom = 183	# of days of cash reserve	Top quartile	871
6	Maintain a debt-service coverage ratio of 1.5.	Top Quartile = 2.84 Median = 2.25 Bottom Quartile = 1.88	Debt-service coverage ratio	1.5 or better	1.82
7	Maintain high level of utility's financial effectiveness	Top Quartile: 3.5% Median: 2.5% Bottom Quartile: 1.4%	% return on assets	Median	4.2%

Financial Calculations:

Objective 4:
$$\frac{\$474\text{m (Total liabilities)}}{\$1,236\text{m (Total assets)}}$$

Objective 5:
$$\frac{\$148\text{m (Undesignated cash reserves)}}{\$61\text{m (Total annual operations \& maintenance costs) / 365 days}}$$

Objective 6:
$$\frac{\$108\text{m (Total operating revenue)} + \$4\text{m (Investment earnings)} - \$61\text{m (Total O\&M costs)}}{\$28\text{m (Total debt service)}}$$

Objective 7:
$$\frac{\$52\text{m (Net income)}}{\$1,236\text{m (Total assets)}}$$

NATURAL RESOURCES

OBJECTIVES		MEASURE	TARGET	RESULTS
1	Maximize benefit of TROA implementation.	Maximize upstream storage under TROA within hydrological and operational constraints. Continue to cooperate with TROA stakeholders to develop opportunities to improve reservoir operations and efficient use of water resources.	100%	100%
2	Manage aquifer storage and recovery (ASR) and passive recharge capabilities and operations.	Analyze effectiveness of ASR and passive recharge on a well-by-well basis within each basin. Complete semi-annual report describing ASR and passive recharge goals and results	100%	75%
3	Work with stakeholders to implement return flow management agreement.	Update Board on progress of implementation	100%	90%

DEPARTMENT

TREATMENT

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD		MEASURE	TARGET	RESULTS
1	Meet the treatment costs set according to anticipated production.	If production is at or near: • 26,000 MG • 27,000 MG • 28,000 MG	TMWA cost: • \$593.67/MG • \$571.68/MG • \$551.26/MG	Achieve \$/MG in the respective production category	26kMG=\$593.67/MG 27kMG=\$571.68/MG 28kMG=\$551.26/MG	27kMG=\$502.40
2	Meet the benchmark of 0 (Zero) MCL violations.	0 (Zero) MCL violations		# of MCL violations	0	0
3	Maintain effluent turbidity 95% of the time.	At less than: • 0.30 NTU = EPA Standard • 0.20 NTU = Good; • 0.15 NTU = Excellent; • 0.10 NTU is Outstanding		# of NTU's	≤ 0.10 NTU	≤ 0.10 NTU 100%

Treatment Calculation:

Goal 1: 27,000 MG was produced at a cost of \$502.40/MG

DISTRIBUTION

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD		MEASURE	TARGET	RESULTS
1	Track system reliability by calculating the number of unplanned outages per 1,000 customers and compare to national benchmarks. < 4 hours	Top Quartile = 0.21 Median = 0.76 Bottom Quartile = 2.09		# of unplanned outages/1,000 customers	Median or better	0.02
2	Track system reliability by calculating the number of unplanned outages per 1,000 customers and compare to national benchmarks. 4 – 12 hours	Top Quartile = 0.08 Median = 0.25 Bottom Quartile = 0.69		# of unplanned outages/1,000 customers	Median or better	0.09
3	Track system reliability by calculating the number of planned outages per 1,000 customers and compare to national benchmarks. < 4 hours	Top Quartile = 0.30 Median = 0.91 Bottom Quartile = 1.39		# of planned outages/1,000 customers	Median or better	0.08
4	Track system reliability by calculating the number of planned outages per 1,000 customers and compare to national benchmarks. 4 – 12 hours	Top Quartile = 0.02 Median = 0.20 Bottom Quartile = 0.45		# of planned outages/1,000 customers	Median or better	0.20
5	Maintain 95% Hydro Plant Generation availability when river flow is available for generation (excluding planned maintenance and rehab, weather limitations and catastrophic failures).			% hydro generation availability	95%	100%

Distribution Calculations:

Pre-calculation: # of customers 131,525/1,000 customers = 131.5

Goal 1: Total # of unplanned Disruptions Less than 4 hours / 1,000 Customers – 3/131.5 = 0.02

Goal 2: Total # of unplanned Disruptions 4-12 hours/ 1,000 Customers – 12/131.5 = 0.09

Goal 3: Total # of planned Disruptions Less than 4 hours/ 1,000 Customers – 10/131.5 = 0.08

Goal 4: Total # of planned Disruptions 4-12 hours/ 1,000 Customers – 26/131.5 = 0.20

OPERATIONS

GOALS		MEASURE	TARGET	RESULTS
1	Achieve 100% backflow testing compliance for all new construction and TMWA-owned devices, as well as 100% continued notification for backflow testing compliance for all existing customers.	% of backflow testing for new construction, TMWA-owned devices & existing customers	100%	100%
2	Perform 175 backflow retrofits.	# of backflow retrofits	175 or more	237
3	NEW: Convert 86 of 172 (50%) field sites and stations with SCADA control in an unsupportable Legacy H.M.I. (Human Machine Interface) platform to operate within a supported and modern OMI (Operations Machine Interface) platform.	# of sites & stations converted to OMI	86	70 sites converted
4	NEW: Maintain a 96% level uptime of the OMI (Operations Machine Interface) platform and underlying infrastructure within TMWA's direct purview for the acceptable periods of outage within a 24 hour, 7 day a week, 365 day operational period.	Duration of cumulative outage events <u>should not exceed acceptable outage measurements</u>	Daily: 57 min Weekly: 7 hrs Monthly: 1 day Yearly: 14 days	99.3% Avg Uptime - Day <= 10min Wk <= 1hr Mo. <= 5hr Yr. <= 3days

BUSINESS INFORMATION SERVICES

GOALS		MEASURE	TARGET	RESULTS
1	Complete the mapping of New Business 'as-built' drawings within 7 days or less.	# of days mapping of 'as-built' drawings of 'redline' drawing submittal.	7 days or less	3.79 days
2	Close helpdesk tickets within 48 hours or less.	Average # of hours between the creation and closing of Helpdesk tickets.	48 hours or less	31.74 hours
3	NEW: Provide public access to TMWA New Business project information and status.	% implementation of the external website necessary to display New Business project statuses.	100%	100%

Notes:

Goal 1: 185 projects completed

Goal 3: Project portal tmwa.com was live on May 19, 2020.

CUSTOMER SERVICE

	GOALS	AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Customer Call Center will have an average call handle time of 4 minutes, 30 seconds or less per call.		Average handle time per call	4 min, 30 sec or less	Average 4min 23 sec
2	Achieve a monthly average of 4 non-weather estimates on all meter reads.		Monthly average of non-weather estimates	4/month or less	27/month
3	The fiscal year average for disconnect for non-payment service orders to active accounts will be 0.30% or less.		% average of disconnects for non-payment	0.30% or less	Average- 0.16%
4	The write off to revenue will be 0.25% or less at fiscal year-end.		% of write off to revenue	0.25% or less	Average- 0.11%
5	Hold a minimum of 30 public workshops, tours and/or presentations with a primary focus on responsible water use and education, including Water Leadership workshops and open houses.		# of public workshops and/or tours	30 or more	50
6	Maintain a high level of billing accuracy.	Top Quartile = 1.4 Median = 10.8 Bottom Quartile = 33.8	Billing accuracy rate	Median	0.75%
7	Track percentage of total accounts delinquent.	75 th Percentile: 2.7% Median: 6.0% 25 th Percentile: 14.0%	% of delinquent accounts	Median	1.73%
8	Maintain high level of stakeholder outreach activities.	Top Quartile: 92% Median: 75% Bottom Quartile: 50%	Stakeholder outreach engagement	Top quartile	92%

Customer Service Calculations & Notes:

Goal 5: 24 Tours; 22 Presentation; and 4 Workshops

Goal 6: $\frac{108 \text{ (error-driven billing adjustments)} \times 10,000}{1,436,935 \text{ (bills generated)}}$

Goal 7: $\frac{2,270 \text{ (# of delinquent accounts)}}{131,525 \text{ (Total # of active accounts)}}$

FINANCIAL

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Meet or underspend Capital Commitments as approved by the Board		\$ spent	Met or underspent	\$18.2m (31%) underspent
2	Meet or underspend O&M Budget Commitments		\$ spent	Met or underspent	\$5.8m (9%) underspent
3	Maintain a lean operating ratio	Top Quartile: 45% Median: 59% Bottom Quartile: 70%	% operating ratio	Median	56%
4	Reduce TMWA’s debt per capita based on the American Metropolitan Water Association (AMWA) 2016 Survey.	AMWA Benchmark: \$531 median	TMWA’s debt per capita	Work toward median	\$849
5	Maintain ratio of capital cost to total budgeted costs based on the AMWA 2016 Survey.	AMWA Benchmark: 25% - 50%	% of capital cost to total budgeted costs	25%	21%

Financial Calculations:

Goal 3: \$61m (Total O&M costs)

\$108m (Total operating revenue)

Goal 4: \$370m (Total debt)

436,073 (Population served)

Goal 5: \$25m (Rate funded capital costs)

\$118m (Cost of service)

NATURAL RESOURCES

GOALS		MEASURE	TARGET	RESULTS
1	Increase community awareness and understanding of TROA and its benefit to our area's municipal water supply.	Continue giving presentations to customer/industry groups on TMWA's overall water resource management strategies, including the benefits of TROA, ASR, conservation, and A+ Reclaimed Water feasibility to the area's municipal water supply. Participate in TMWA's Smart About Water Day.	At least 5 presentations	8
2	Review, monitor, and advise the Board regarding issues and activities of the interim legislative session that may affect TMWA. Continue monitoring and stay updated on statewide water law issues.	As necessary, advise the Board regarding issues or activities that may affect TMWA.	100%	100%
3	Continue an active role in maintaining sufficient water rights inventory, analyze purchase opportunities.	Maintain sufficient water rights inventory.	Monthly Board report	100%
4	Turn around new business application water rights work within 5 business days.	# of days turnaround new business application	5 days or less	1 day
5	Remain actively involved with UNR's Nevada Water Innovation Institute projects	Report activities to the Board	100%	100%
6	Respond to customer water usage audit requests within 2 business days and provide monthly conservation report to the Board	# of days between receiving request and completing a water audit	2 days or less	1.1 days

Natural Resources Notes:

Goal 1: TMWA's Smart About Water Day was cancelled due to the pandemic.

Goal 2: Staff held two meetings of Legislative Subcommittee, identified, monitored, and reported on legislative activities potentially impacting TMWA.

Goal 3: Advised Board monthly on water rights inventory.

Goal 4: Average response was less than 1 day.

Goal 6: Average response was 1.1 business days. During the summer, an updated conservation report was submitted to the Board via the General Manager's report each month.

HUMAN RESOURCES

	GOALS	AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Track continuous training for full-time equivalents (FTEs) employees.	Top Quartile: 27.1 Median: 17.1 Bottom Quartile: 10.4	# of continuous training hours per employee	Median or better	25.7
2	Track the number of annual employee FTEs departures per year.	Top Quartile: 4.5% Median: 7.5% Bottom Quartile: 10.6%	# of FTEs departed per year	Median or better	4.5%
3	Track the number of FTEs eligible for retirement	Top Quartile: 14.3% Median: 20.5% Bottom Quartile: 34.1%	#of FTEs eligible for retirement	Median or better	24.1%

Human Resources Calculations:**Goal 1:** 5,767 (Total training hours completed)

224 (Total # of FTEs)**Goal 2:** 10 (# of regular employee departures)

224 (Total # of FTEs)**Goal 3:** 54 (# of regular employees eligible for retirement in the next 5 yrs)

224 (Total # of FTEs)

ENGINEERING & NEW BUSINESS

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET	RESULTS
1	Continue cooperative coordination with Agencies and complete projects on schedule. Survey agency satisfaction with utility coordination effort.	1 = Unacceptable 2 = Needs Improvement 3 = Good 4 = Commendable 5 = Outstanding	Average response rate	4 or higher	4.53
2	Deliver required in-service dates for major capital projects on/under budget.	<ul style="list-style-type: none"> Mt Rose WTP – Oct 2020 Kings Row 1 BPS – June 2020 Gear, Vine and Washington Main Replacements – March 2020 Boomtown System Improvements – June 2020 	\$17,750,000	Met or underspent	\$16,111,984
3	Continue to measure and report new business turnaround times. Project Category A) Commercial with Main B) Commercial Service C) Subdivision	Number of Projects and turnaround times: 75% ≤ 30 days 100% ≤ 60 days	% turnaround in ≤ 30 days	75%	A) 67%
			% turnaround in ≤ 60 days	100%	B) 99% C) 93%
					A) 100% B) 100% C) 100%
4	Complete construction of Mt. Rose Water Treatment Plant (WTP) with goal to be fully-operational by fall of 2020.		Meet in-service date.	100%	90%
5	NEW: Create an implementation plan for allowing digital plan submission and review/approval for New Business Projects.		% complete	100%	50%

Engineering & New Business Notes:

Goal 1: Survey the satisfaction of the appropriate coordinators at the City of Reno, City of Sparks, Regional Transportation Commission, NV Energy, NDOT and Washoe County with TMWA's Street & Highway Program.

*A total of 4 survey responses were received for FY2020

Goal 2: Project Highlights

PROJECT	SCHEDULE	BUDGET	EXPENDED
Mt. Rose WTP	Individual equipment startup has begun. Full plant startup will likely not occur in October but likely late November, early December. Budget FY19 was \$10.5M and expended \$9.0M. Budget FY20 \$11M and expended \$12.5M.	\$11,000,000	\$12,465,462
Kings Row 1 BPS	Met June 2020 in service date. Demo of old Kings Row 1 BPS finished August 2020.	\$2,200,000	\$2,121,484
Gear, Vine and Washington Main Replacements	May 2020 in service.	\$2,000,000	\$1,315,998
Boomtown System Improvements	The majority of the well improvements have been delayed until the connection to surface water and booster station is completed.	\$2,550,000	\$209,040
TOTAL:		\$17,750,000	\$16,111,984

Goal 3: # of calendar days from application to first red-line review completed.

Project Category		# Projects	Avg. Days	<=30 days	<=60 days
A	Comm w/Main	46	25.6	67%	100%
B	Comm Services	100	11.2	99%	100%
C	Subdivision	30	20.8	93%	100%



STAFF REPORT

TO: Chairman and Board Members
FROM: Mark Foree, General Manager
DATE: October 7, 2020
SUBJECT: Discussion and action, and possible direction to staff on the proposed TMWA Goals and Objectives for Fiscal Year 2021

RECOMMENDATION

Staff recommends that the Board adopt the Goals and Objectives for Fiscal Year 2021 as recommended and presented in this report. Where appropriate, TMWA uses the American Water Works Association (AWWA) Benchmarking Survey Results, 2019 Edition, and other published industry standards, if available.

DISCUSSION OF PROPOSED GOALS

For discussion, attached are TMWA's proposed organization and departmental goals and objectives for this fiscal year. Updated goals are noted in yellow, new goals are noted in red, and benchmarks are updated when a new edition of the AWWA Benchmarking Survey Results, as well as industry standards, are available.



Truckee Meadows Water Authority

Proposed FY 2021 Goals & Objectives

*TMWA BOARD OF DIRECTORS
MARK FOREE, GENERAL MANAGER*

<Page intentionally left blank>

Contents

GOALS & OBJECTIVES.....	2
ORGANIZATION	2
CUSTOMER SATISFACTION.....	2
EFFICIENCY	2
SAFETY.....	2
FINANCE	2
NATURAL RESOURCES.....	3
DEPARTMENT.....	4
TREATMENT	4
DISTRIBUTION	4
OPERATIONS	5
CUSTOMER SERVICE.....	5
BUSINESS INFORMATION SERVICES.....	6
HUMAN RESOURCES	6
FINANCIAL	6
NATURAL RESOURCES.....	7
ENGINEERING & NEW BUSINESS	7

GOALS & OBJECTIVES

ORGANIZATION

OBJECTIVES		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET
CUSTOMER SATISFACTION				
1	Residential Customers Totally or Mostly Satisfied.	71%-81% = Good 82%-86% = Excellent 86% + = Outstanding	% of residential customer's satisfaction	86%
2	Commercial Customers Totally or Mostly Satisfied.	77%-87% = Good 88%-90% = Excellent 90% + = Outstanding	% of commercial customer satisfaction	90%
3	Meet the Faneuil contract requirement of 80% of calls answered within 35 seconds.		% of calls answered within 35 seconds	80%
EFFICIENCY				
1	Track customer accounts per employee and compare to national benchmark.	75 th Percentile = 585 Median = 424 25 th Percentile = 321	# of accounts per employee	Top quartile
2	Track average MGD delivered per employee and compare to national benchmark.	75 th Percentile = 0.27 Median = 0.20 25 th Percentile = 0.16	Average MGD delivered per employee	Top quartile
SAFETY				
1	Maintain a safety incident rate below the Industry Standard Bureau of Labor Statistics, 2018.	5.3 Average Incident Rate for Water Supply & Irrigation Systems – Local Government	Incident rate	≤ 5.3
2	Track Collisions Per Million Miles (CPMM) and compare against Network of Employers for Traffic Safety Fleet Safety Benchmark Report (Reporting for North America Only, All Vehicles), 2019.	4.64 per 1,000,000 miles driven.	# of collisions per 1,000,000 miles driven	≤ 4.64
FINANCE				
1	Meet all bond covenants.		# of bond covenants met	100%
2	Update the 5-year funding plan.		Update completed	100%
3	Preserve or improve TMWA's excellent credit ratings by the three major credit rating bureaus S&P (AA+ stable), Moody's (Aa2 stable) and Fitch (AA positive)		Maintain or improve credit ratings	AA+ /Aa2 - stable or better

OBJECTIVES		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET
FINANCE (continued)				
4	Maintain a low debt ratio.	75 th Percentile = 26% Median = 39% 25 th Percentile = 55%	Debt ratio	Median
5	Sustain a minimum of 490 days of cash reserve.	75 th Percentile = 490 Median = 348 25 th Percentile = 251	# of days of cash reserve	Top quartile
6	Maintain a debt-service coverage ratio of 1.5.	75 th Percentile = 3.13 Median = 2.49 25 th Percentile = 1.99	Debt-service coverage ratio	1.5 or better
7	Maintain high level of utility's financial effectiveness	75 th Percentile: 3.2% Median: 2.5% 25 th Percentile: 1.7%	% return on assets	Median
NATURAL RESOURCES				
1	Maximize benefit of TROA implementation.	Maximize upstream storage under TROA within hydrological and operational constraints. Continue to cooperate with TROA stakeholders to develop opportunities to improve reservoir operations and efficient use of water resources.		100%
2	Manage aquifer storage and recovery (ASR) and passive recharge capabilities and operations.	Analyze effectiveness of ASR and passive recharge on a well-by-well basis within each basin. Complete semi-annual report describing ASR and passive recharge goals and results		100%
3	Work with stakeholders to implement return flow management agreement.	Update Board on progress of implementation		100%
4	NEW: Collaborate with City of Reno on the A+ Advanced Purified Water Demonstration Project at American Flat.	Bring forth local agreement(s) between TMWA and City of Reno.		100%

DEPARTMENT

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD		MEASURE	TARGET
TREATMENT					
1	Meet the treatment costs set according to anticipated production.	If production is at or near: <ul style="list-style-type: none">• 26,000 MG• 27,000 MG• 28,000 MG	TMWA cost: <ul style="list-style-type: none">• \$625.28/MG• \$602.12/MG• \$580.62/MG	Achieve \$/MG in the respective production category	26kMG=\$625.28/MG 27kMG=\$602.12/MG 28kMG=\$580.62/MG
2	Meet the benchmark of 0 (Zero) MCL violations.	0 (Zero) MCL violations		# of MCL violations	0
3	Maintain effluent turbidity 95% of the time.	At less than: <ul style="list-style-type: none">• 0.30 NTU = EPA Standard• 0.20 NTU = Good;• 0.15 NTU = Excellent;• 0.10 NTU is Outstanding		# of NTU’s	≤ 0.10 NTU
DISTRIBUTION					
1	Track system reliability by calculating the number of unplanned outages per 1,000 customers and compare to national benchmarks. < 4 hours	75 th Percentile = 0.18 Median = 0.42 25 th Percentile = 1.67		# of unplanned outages/1,000 customers	Median or better
2	Track system reliability by calculating the number of unplanned outages per 1,000 customers and compare to national benchmarks. 4 – 12 hours	75 th Percentile = 0.07 Median = 0.15 25 th Percentile = 0.50		# of unplanned outages/1,000 customers	Median or better
3	Track system reliability by calculating the number of planned outages per 1,000 customers and compare to national benchmarks. < 4 hours	75 th Percentile = 0.21 Median = 0.40 25 th Percentile = 1.54		# of planned outages/1,000 customers	Median or better
4	Track system reliability by calculating the number of planned outages per 1,000 customers and compare to national benchmarks. 4 – 12 hours	75 th Percentile = 0.07 Median = 0.25 25 th Percentile = 0.50		# of planned outages/1,000 customers	Median or better
5	Maintain 95% Hydro Plant Generation availability when river flow is available for generation (excluding planned maintenance and rehab, weather limitations and catastrophic failures).			% hydro generation availability	95%

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET
OPERATIONS				
1	Achieve 100% backflow testing compliance for all new construction and TMWA-owned devices, as well as 100% continued notification for backflow testing compliance for all existing customers.		% of backflow testing for new construction, TMWA-owned devices & existing customers	100%
2	Perform 175 backflow retrofits.		# of backflow retrofits	≥ 175
3	Convert 90 of the remaining-field sites and stations that contain SCADA control used in a Legacy H.M.I. (Human Machine Interface) platform to operate within a supported and modern OMI (Operations Machine Interface) platform.		# of sites & stations converted to OMI	90
4	Maintain a 96% level uptime of the OMI (Operations Machine Interface) platform and underlying infrastructure within TMWA's direct purview within a 24 hour, 7 day a week, 365 day operational period.		Cumulative system uptime is not to fall below target percentage within the operational period	96%
CUSTOMER SERVICE				
1	Customer Call Center will have an average call handle time of 4 minutes, 30 seconds or less per call.		Average handle time per call	≤ 4 min, 30 seconds
2	The fiscal year average for disconnect for non-payment service orders to active accounts will be 0.30% or less.		% average of disconnects for non-payment	≤ 0.30%
3	The write off to revenue will be 0.25% or less at fiscal year-end.		% of write off to revenue	≤ 0.25%
4	Hold a minimum of 30 public workshops, tours and/or presentations with a primary focus on responsible water use and education, including Water Leadership workshops and open houses.		# of public workshops and/or tours	≥ 30
5	Maintain a high level of billing accuracy.	75 th Percentile = 1.8 Median = 9.8 25 th Percentile = 17.7	Billing accuracy rate	Median
6	Track percentage of total accounts delinquent in FY 2019	75 th Percentile: 2.9% Median: 8.0% 25 th Percentile: 14.05	% of delinquent accounts	Median
7	Maintain high level of stakeholder outreach activities.	75 th Percentile: 92% Median: 83% 25 th Percentile: 50%	Stakeholder outreach engagement	92%
8	NEW: Track the number of customer service complaints (complaints/population served).	75 th Percentile: 0.2 Median: 0.5 25 th Percentile: 1.1	# of customer complaints	0.2
9	NEW: Track the percentage of bills issued that were estimated for both residential and commercial customers.	Residential: 75 th Percentile: 1.0% Median: 0.5% 25 th Percentile: 0.1% Commercial: 75 th Percentile: 0.6% Median: 0.2% 25 th Percentile: 0.0%	% of estimated bills issued	Residential: 0.1% Commercial: 0.0%

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET
BUSINESS INFORMATION SERVICES				
1	Complete the mapping of New Business 'as-built' drawings within 7 days or less.		# of days mapping of 'as-built' drawings of 'redline' drawing submittal	≤ 7 days
2	Close helpdesk tickets within 48 hours or less.		Average # of hours between the creation and closing of Helpdesk tickets	≤ 48 hours
3	NEW: Develop processes and tools necessary to further leverage GIS as TMWA's primary asset database.		% implementation of processes and tools necessary to track and update "intradoc" assets	100%
4	NEW: Replace and upgrade TMWA's physical access control system (employee badge readers) at 5 locations prior to June 30, 2021		% replacement of physical access control system at 5 locations	100%
5	NEW: Implement and configure new Customer Information System (CIS) and interfaces (15) necessary to go-live prior to June 30, 2021.		% implementation of new Customer Information System (CIS)	100%
HUMAN RESOURCES				
1	Track continuous training for full-time equivalents (FTEs) employees.	75 th Percentile: 25.2 Median: 17.0 25 th Percentile: 10.5	# of continuous training hours per employee	Median or better
2	Track the number of annual employee FTEs departures per year.	75 th Percentile: 5.3% Median: 8.6% 25 th Percentile: 11.3%	# of FTEs departed per year	Median or better
3	Track the number of FTEs eligible for retirement.	75 th Percentile: 15.2% Median: 22.9% 25 th Percentile: 34.8%	#of FTEs eligible for retirement	Median or better
FINANCIAL				
1	Meet or underspend Capital Commitments as approved by the Board.		\$ spent	Met or underspent
2	Meet or underspend O&M Budget Commitments.		\$ spent	Met or underspent
3	Maintain a lean operating ratio.	75 th Percentile: 46% Median: 56% 25 th Percentile: 66%	% operating ratio	Median
4	Reduce TMWA's debt per capita based on industry standards.	Benchmark: \$500-\$550	TMWA's debt per capita	Work toward industry standards
5	Maintain ratio of capital cost to total budgeted costs based on industry standards.	Benchmark: 25% - 50%	% of capital cost to total budgeted costs	25%

GOALS		AWWA BENCHMARK/ INDUSTRY STANDARD	MEASURE	TARGET
NATURAL RESOURCES				
1	Increase community awareness and understanding of TROA and its benefit to our area's municipal water supply.	Continue giving presentations to customer/industry groups on TMWA's overall water resource management strategies, including the benefits of TROA, ASR, conservation, and A+ Reclaimed Water feasibility to the area's municipal water supply.		≥ 5 presentations
2	Review, monitor, and advise the Board regarding issues and activities of the 2021 legislative session that may affect TMWA. Continue monitoring and stay updated on statewide water law issues.	As necessary, advise the Board regarding issues or activities that may affect TMWA.		100%
3	Continue an active role in maintaining sufficient water rights inventory, analyze purchase opportunities.	Maintain sufficient water rights inventory.		Monthly Board reports
4	Turn around new business application water rights work within 5 business days.	# of days turnaround new business application		≤ 5 days
5	Remain actively involved with UNR's Nevada Water Innovation Institute projects.	Report activities to the Board		100%
6	Respond to customer water usage audit requests within 2 business days and provide monthly conservation report to the Board.	# of days between receiving request and completing a water audit		≤ 2 days
ENGINEERING & NEW BUSINESS				
1	Continue cooperative coordination with Agencies and complete projects on schedule. Survey agency satisfaction with utility coordination effort.	1 = Unacceptable 2 = Needs Improvement 3 = Good 4 = Commendable 5 = Outstanding	Average response rate	≥ 4 rating
2	Deliver required in-service dates for major capital projects on/under budget.	<ul style="list-style-type: none"> • Roberts/Wilson/Moran Main Replacements - \$2,340,000. Apr 2021 • Boomtown to TMWA Connection - \$1,900,000. Mar 2021 • Spanish Springs Main Replacements - \$2,300,000. Nov 2020 • Mt. Rose WTP - \$4,000,000. Dec 2020 • Washoe Flume Reconstruction - \$1,400,000. April 2021 	\$11,900,000	Met or underspent
3	Continue to measure and report new business turnaround times. Project Category A) Commercial with Main B) Commercial Service C) Subdivision	Number of Projects and turnaround times: 75% ≤ 30 days 100% ≤ 60 days	% turnaround in ≤ 30 days	75%
			% turnaround in ≤ 60 days	100%
4	Formalize and improve digital plan submission and review/approval for New Business Projects including new digital signature regulations from the Nevada State Board of Engineers.		% complete	100%



STAFF REPORT

TO: Board of Directors
FROM: Mark Foree, General Manager
DATE: October 12, 2020
SUBJECT: **General Manager's Report**

Attached please find the written reports from the Management team including the Operations Report (*Attachment A*), the Water Resource and the Annexation Activity Report (*Attachment B*), the Customer Services Report (*Attachment C*), and the Monthly Conservation Report (*Attachment D*).

Also, included in your agenda packet are press clippings from September 9, 2020 through October 14, 2020.



STAFF REPORT

TO: Board of Directors
THRU: Mark Foree, General Manager
FROM: Scott Estes, Director of Engineering
BY: Bill Hauck, Water Supply Administrator
DATE: Oct 14, 2020
SUBJECT: Oct 2020 Operations Report

Summary

- The water supply outlook for the region is good
- Lake Tahoe is still more than ½ full @ 54% of maximum capacity
- Combined upstream reservoir storage is also in good shape @ 52% of maximum capacity
- Customer demands are dropping off which is typical for this time of the year
- Hydroelectric revenue for September 2020 was \$249,169

(A) Water Supply

- **River Flows** - Truckee River flows at the CA/NV state line are normal for this time of year. Discharge was approximately 465 cubic feet per second (CFS) this morning.
- **Reservoir Storage** - Overall Truckee River reservoir storage is 52% of capacity (as of 10/14). The elevation of Lake Tahoe is 6226.28 feet (2.82' below legal maximum storage elevation). Storage values for each reservoir as of 10/14 are as follows:

Reservoir	Current Storage (Acre-Feet)	% of Capacity (Percent)
Tahoe	399,000	54%
Boca	8,178	20%
Donner	7,198	76%
Independence	11,941	68%
Prosser	11,341	38%
Stampede	115,501	51%

In addition to approximately 19,140 acre-feet of storage in Donner and Independence reservoirs, TMWA had about 15,850 acre-feet of water stored between Lake Tahoe, Boca and Stampede reservoirs under the terms of TROA. TMWA's total combined upstream reservoir storage is approximately 34,990 acre-feet as of 10/14.

- **Outlook** - The water supply outlook for this region is still on solid footing as Lake Tahoe storage is at 54% of capacity and total upstream reservoir storage on the Truckee River system is at 52% of capacity. This is a good position to be in as we begin our approach into the winter months ahead. Strong upstream carry-over storage levels will help to ensure that the Truckee River flows normally for the foreseeable future.

(B) Water Production

- **Demand** - TMWA's customer demand averaged 99 million gallons per day last week (10/5-10/11). Overall, surface water is providing about 83% of our supply and groundwater the other 17%.

(C) Hydro Production

Generation - Average Truckee River flow at Farad (CA/NV state line) for the month of September 2020 averaged 493 CFS. The Fleish and Verdi power plants were on-line the entire month and 100% available. The Washoe Power plant which was taken out of service on April 23rd due to a catastrophic flume failure is still off-line. The plant will remain out of service through the fall and into the winter months as the flume is rebuilt. Monthly statistics are as follows:

Hydro Plant	Days On-Line	Generation (Megawatt hours)	Est. Revenue (Dollars)	Est. Revenue (Dollars/Day)
Fleish	30	1,791	\$ 132,430	\$ 4,414
Verdi	30	1,593	\$ 116,739	\$ 3,891
Washoe	0	0	\$ 0	\$ 0
Totals	60	3,384	\$ 249,169	\$ 8,305



STAFF REPORT

TO: Chairman and Board Members
THRU: Mark Foree, General Manager
FROM: John Zimmerman, Manager, Water Resources
DATE: October 14, 2020
SUBJECT: Report Water Resources and Annexation Activity

RULE 7

Rule 7 water resource purchases and will-serve commitment sales against purchased water resources through this reporting period:

Beginning Balance		4,094.14 AF
Purchases of water rights	8.75 AF	
Refunds	0.00 AF	
Sales	– 59.99 AF	
Adjustments	– 0.00 AF	
Ending Balance		4,042.90 AF

Price per acre foot at report date: \$7,700

FISH SPRINGS RANCH, LLC GROUNDWATER RESOURCES

Through the merger of Washoe County's water utility, TMWA assumed a Water Banking and Trust Agreement with Fish Springs Ranch, LLC, a subsidiary of Vidler. Under the Agreement, TMWA holds record title to the groundwater rights for the benefit of Fish Springs. Fish Springs may sell and assign its interest in these groundwater rights to third parties for dedication to TMWA for a will-serve commitment in Areas where TMWA can deliver groundwater from the Fish Springs groundwater basin. Currently, TMWA can deliver Fish Springs groundwater to Area 10 only (Stead-Silver Lake-Lemmon Valley). The following is a summary of Fish Springs' resources.

Beginning Balance		7,733.91 AF
Committed water rights	– 34.60 AF	
Ending Balance		7,699.31 AF

Price per acre foot at report date: \$41,500 (for SFR and MFR); \$36,000 (for all other services)¹

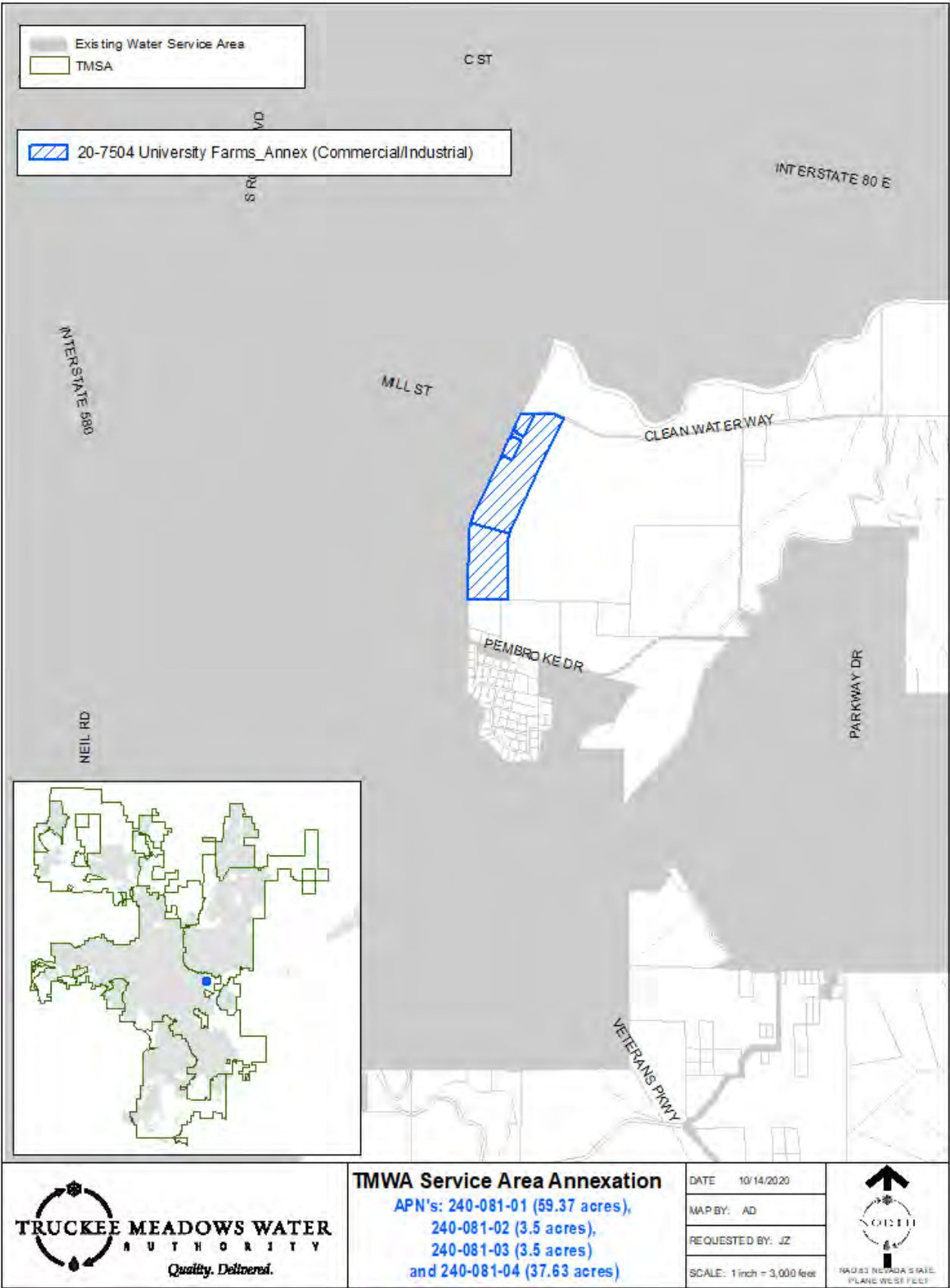
¹ Price reflects avoided cost of Truckee River water right related fees and TMWA Supply & Treatment WSF charge.

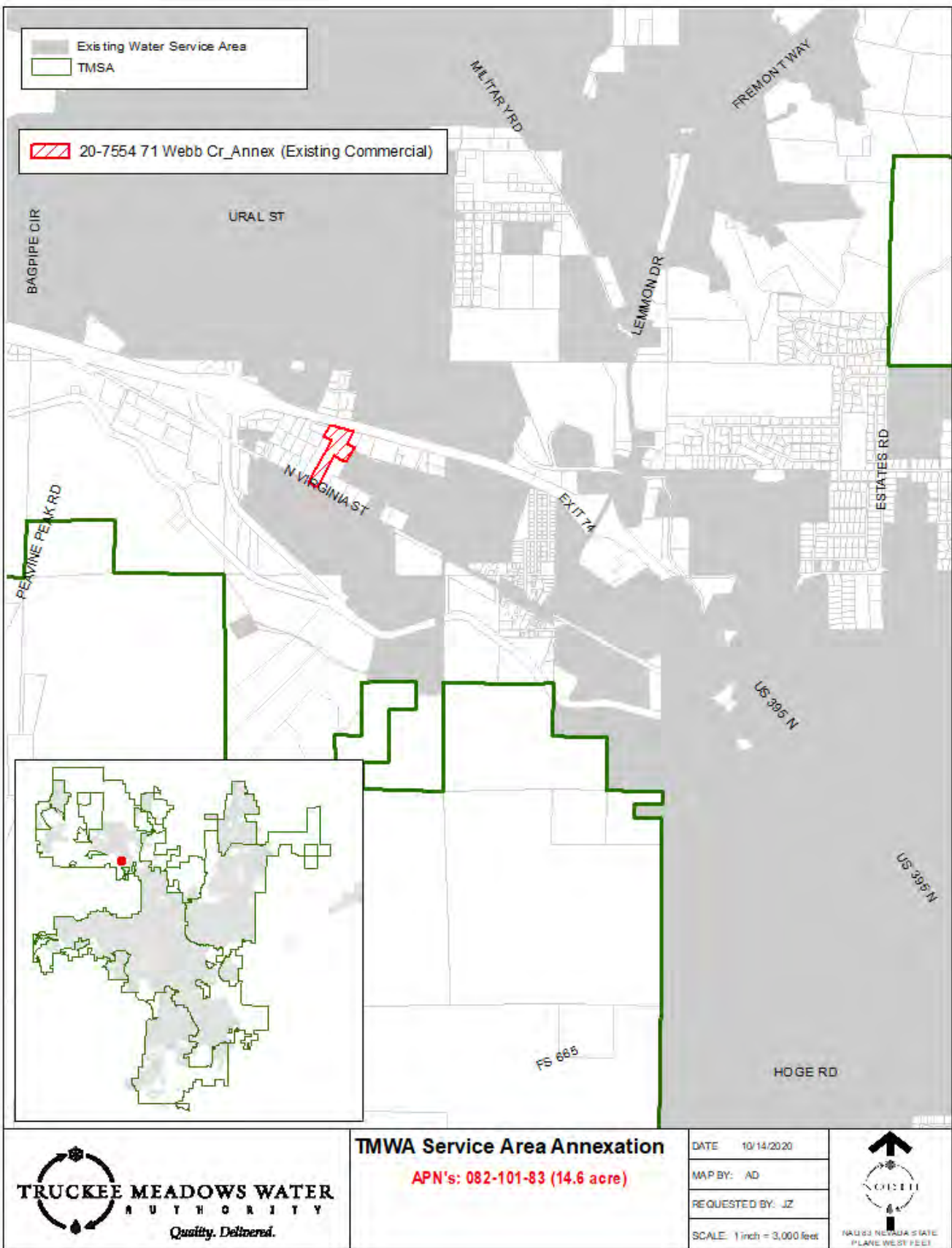
WATER SERVICE AREA ANNEXATIONS

There have been two commercial/industrial annexations since the date of the last Board meeting (see attached maps).

INTERRUPTIBLE LARGE VOLUME NON-POTABLE SERVICE

None this reporting period. The ILVNPS service to Somerset Golf & Country Club for temporary irrigation provided 100 acre-feet as per the contract and has ended.







STAFF REPORT

TO: Board of Directors
THRU: Mark Foree, General Manager
FROM: Marci Westlake, Manager Customer Service
DATE: October 21, 2020
SUBJECT: **September Customer Service Report**

The following is a summary of Customer Service activity for September 2020.

Ombudsman

- Customer called regarding neighbor cutting through their line during construction, New Business called back and took care of the customer.
- Customer called regarding not being able to get through to the call center, we called them back.

Communications

No Customer Outreach for September.

Conservation (2020 Calendar year to date)

- 1,455 Water Watcher Contacts
- 1,270 Water Usage Reviews

Customer Calls – September—Information not available

- -- phone calls handled
- Average handling time -- minutes, - seconds per call
- Average speed of answer --seconds per call

Billing –September

- 133,568 bills issued.
- 27 (0.00%) corrected bills.
- 23,623 customers (18%) have signed up for paperless billing to date.

Service Orders –September (% is rounded)

- 7,643 service orders taken
- 4,071 (53%) move-ins / move-outs
- 144 (2%) cut-out-for-non-payment and cut-in after receiving payments, including deposits and checks for tamper only
- 408 (6%) zero consumption meter checks
- 929 (12%) re-read meters
- 1,011 (13%) new meter sets and meter/register/ERT exchanges and equipment checks
- 427 (6%) problems / emergencies, including cut-out for customer repairs, dirty water, no water, leaks, pressure complaints, safety issues, installing water meter blankets, etc.
- 158 (2%) high-bill complaints / audit and water usage review requests
- 495 (6%) various other service orders

Remittance – September

- 27,422 mailed-in payments
- 26,760 electronic payments
- 38,027 payments via RapidPay (EFT)
- 19,338 one-time bank account payments
- 6,711 credit card payments
- 195 store payments
- 1,054 payments via drop box or at front desk

- **Collections –September**

- 8,524 accounts received a late charge
- Mailed 2,068 10-day delinquent notices, 0.02% of accounts
- Mailed 0 48-hour delinquent notices, 0% of accounts
- 0 accounts eligible for disconnect
- 0 accounts were disconnected (including accounts that had been disconnected-for-non-payment that presented NSF checks for their reconnection)
- 0.14% write-off to revenue

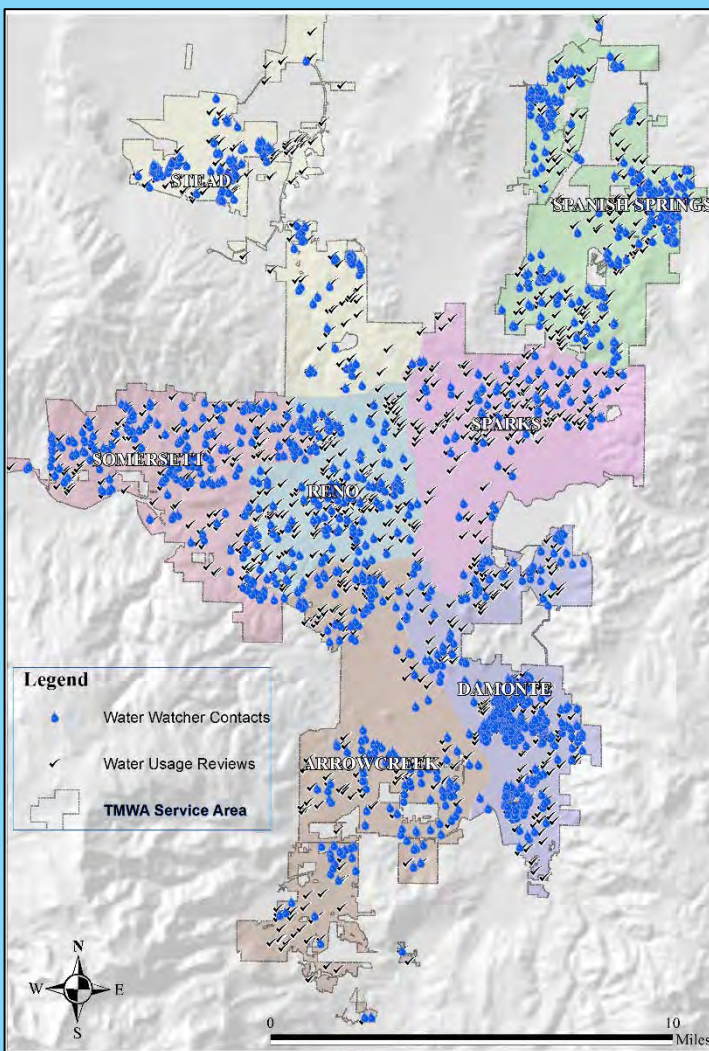
Meter Statistics – Fiscal Year to Date

- 0 Meter retrofits completed
- 1,484 Meter exchanges completed
- 715 New business meter sets completed
- 129,976 Meters currently installed

MONTHLY CONSERVATION REPORT – September 2020

SUMMARY –Well, here we are - the end of another season. It was interesting to say the least. We weren't able to create the impression on the community we typically would make during the summer, but we were still there to help folks save water and deal with their leaks. All in all, a great effort by all, given the restrictions. Nothing else to say except - bring on 2021! Seriously, please do... – **Conservation Dept.**

CONSERVATION EDUCATIONAL OUTREACH MAP



Water Watcher Contact Initiation Type

Drive-bys	839
Deliveries	9
Hotline Reports	185
Email Reports	422
Total	1455

Watering Violations Observed

Waste	359
Wrong Day	535
Wrong Time	48
Total	942

Water Watcher Actions Taken

Educational Visits	181
A.M. Letters	0
Courtesy Calls	1226
No Actions	45
Total	1452

Efficiency Devices Supplied

Faucet Aerators	0
Hose Timers	16
Nozzles	12
Low-flow Shower heads	0
Tree Root Feeder	0
Total	28

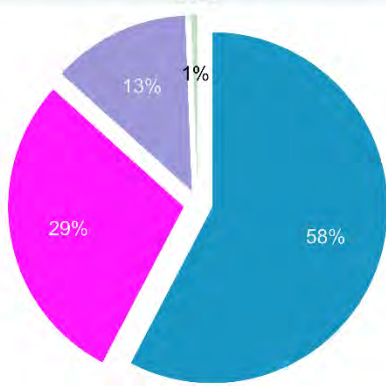
Other Conservation Actions

Water Usage Reviews	1270
Tree Care Visits	102
Total	1372

Attendees at Workshops /Tours

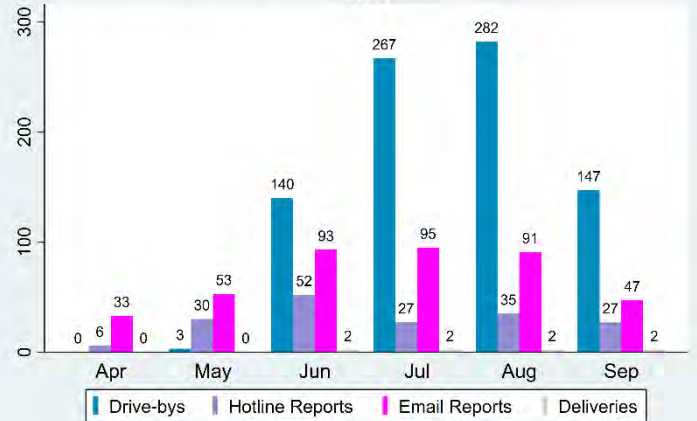
Irrigation System Start-up Workshop #1	CANCELED
Irrigation System Start-up Workshop #2	CANCELED
Landscape Planning & Design Workshop	CANCELED
Tree Care Workshop	CANCELED
Drip System Maintenance Workshop	CANCELED
Walking Tour - Valley Wood Park #1	13
Sprinkler System Maintenance Workshop	CANCELED
Walking Tour - River School Farm	CANCELED
Walking Tour, Part 2 - Valley Wood Park #2	CANCELED
Winterize Your Irrigation System Workshop #1	19
Winterize Your Irrigation System Workshop #2	
Winterize Your Irrigation System Workshop #3	
Winterize Your Irrigation System Workshop #4	
Total	32

Water Watcher Contact Initiation
2020



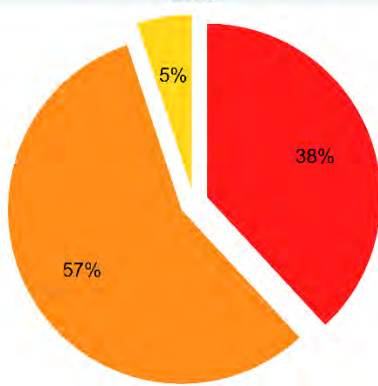
Drive Bys Email Reports Hotline Reports Deliveries

Water Watcher Contact Initiation
2020



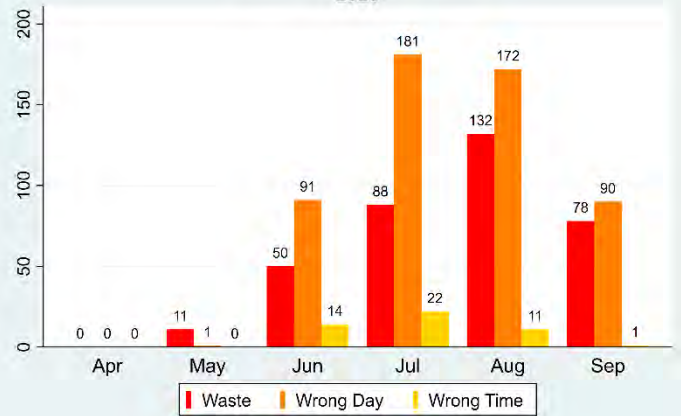
Drive-bys Hotline Reports Email Reports Deliveries

Water Violations Observed
2020



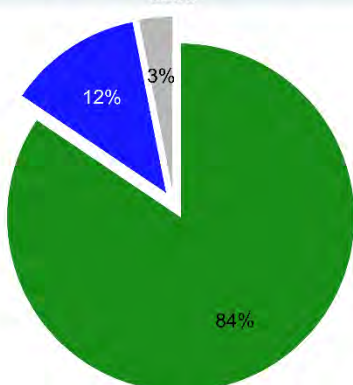
Waste Wrong Day Wrong Time

Water Violations Observed
2020



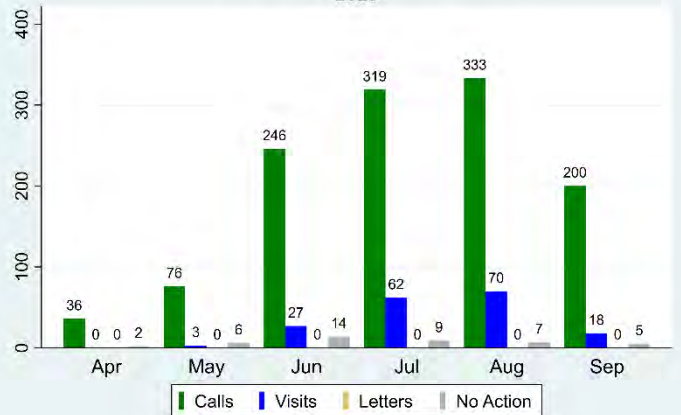
Waste Wrong Day Wrong Time

Water Watcher Actions Taken
2020



Calls Visits Letters No Action

Water Watcher Actions Taken
2020



Calls Visits Letters No Action



TMWA Board Meeting

Wednesday, October 21, 2020

Press Clippings

September 9, 2020 – October 14, 2020



Gulling Booster Pump Station



WaterNews

Circle of Blue [<https://soundcloud.com/circleofblue>] · Fires In The West Damage W...

By Brett Walton, Circle of Blue

Western Wildfires Damage, Contaminate Drinking Water Systems

September 11, 2020 / in Water News, WEF / by Brett Walton

As they tear through forests and developed areas, fires in California, Oregon, and Washington have destroyed water infrastructure and released chemical contaminants.



The CZU Lightning Complex Fire burned through the forests of Santa Cruz County, California. The fire damaged water infrastructure for San Lorenzo Valley Water District. Photo courtesy of Carly Blanchard/SLVWD

The American West is in flames, ablaze in one of the region's worst fire episodes in the last hundred years.

More than 300,000 acres burned in Washington state on Monday, twice the total acres that burned in all of 2019.

In Oregon, the small towns of Detroit and Gates were leveled by wind-fueled flames racing down Santiam Canyon. As of Thursday night, a half million people in the state lived in areas under evacuation orders or alerts.

In California, where a record 3.1 million acres [<https://www.fire.ca.gov/incidents/>] have burned this year, thick banks of smoke enveloped the Bay Area, obscuring mid-day skies with an eerie orange hue. The U.S. Forest Service, citing extreme fire risk, earlier this week closed all national forests in the central and southern parts of the state to visitors.

Taking refuge in hotels, emergency centers, or with family, many people do not yet know whether their homes are still standing. Where evacuation orders have been lifted, the damage is readily apparent. Not only have houses and businesses been scorched. Essential public infrastructure has been destroyed. That includes drinking water systems, which in some cases are showing signs of contamination from chemicals released during the fires.

State and local agencies say they are still surveying water system damage and do not have precise information at this time. The Oregon Health Authority said that it has heard of a number of small water systems along the Interstate 5 corridor between Ashland and Medford that have been destroyed. The Washington State Department of Health says that 11 water systems lost pressure during power outages connected to fires in that state. Their customers are being advised to boil their water or use bottled water for drinking.

One of the most severe examples is the San Lorenzo Valley Water District, which serves parts of inland Santa Cruz County, in central California. More than 7 miles of an HDPE plastic water supply pipeline were destroyed in the CZU Lightning Complex Fire, according to Rick Rogers, the district manager. The pipe was primarily located above ground. Most of the district's water system was spared in the fire that started on August 16, and the district has switched to backup water sources, including groundwater. But Rogers listed other infrastructure impairments: damage to booster pumps, transmission mains, tanks, intakes, water meters, and sampling stations in certain areas. The preliminary, back-of-the-envelope damage estimate is \$10 million.

Parts of the district have been under a Do Not Drink/Do Not Boil advisory since August 29 due to benzene contamination. Very few water samples have been tested so far — several dozen [https://www.slwd.com/sites/g/files/vyhlf1176/f/uploads/lab_d from 25 points in the distribution system — but one taken on September 4 revealed benzene contamination above the state drinking water standard, which is 1 microgram per liter. The sample measured 2.7micrograms per liter.

Earlier this week, the district lifted the Do Not Drink/Do Not Boil order for parts of the service area that did not show benzene contamination, but staff said they did not know when the all-clear sign would be flashed district-wide. "This is a marathon, not a sprint," Nate Gillespie, San Lorenzo Valley water treatment and system supervisor, said during an online meeting on September 3.

A New Era

The destruction and contamination of drinking water systems is a new and unsettling chapter in the story of wildfires in the West. Past fires have burned watersheds, depositing into reservoirs debris [<https://www.circleofblue.org/2013/world/wildfire-and-watersheds/>] and ash that interfere with the water-treatment process. Now, subdivisions are burning, putting the plumbing itself at risk.

Nine of the 12 most destructive wildfires [https://www.fire.ca.gov/media/11417/top20_destruction.pdf] in California history, measured by the number of structures that burned, have occurred since 2015. As housing developments expand into areas vulnerable to fire and a warming planet increases the likelihood of large conflagrations, water managers and regulators expect to be dealing with the risks to drinking water systems for years to come.

"Since about 2015 we started seeing fires that quickly wipe out large sections of community, and it seems like every year since then we've seen one fire or the other that has done this, so I fear that it is something we're going to be living with," Stefan Cajina of the State Water Resources Control Board's Division of Drinking Water told Circle of Blue.

In addition to San Lorenzo Valley, a Do Not Drink advisory was also issued by Big Basin Water Company [<http://www.bigbasinwater.com/>] because of damage from the CZU Lightning Complex Fire.

The first instance of fire-related benzene contamination of a public water system in California happened in Santa Rosa, in 2017. The next year the town of Paradise was nearly obliterated by the Camp Fire, which, in addition to killing 85 people, destroyed 90 percent of the town's structures and inflicted substantial damage

[<https://www.circleofblue.org/2019/united-states/severe-drinking-water-contamination-surfaces-after-brutal-camp-fire/>] to the drinking water system.

Kevin Phillips, formerly the manager of Paradise Irrigation District and now the town manager, told Circle of Blue that the capital cost of rebuilding the water system and replacing contaminated pipes has reached \$150 million.

Andrew Whelton, an associate professor of civil and environmental engineering at Purdue University, helped Paradise officials assess the condition of their system after the Camp Fire. He is worried about the thoroughness of post-fire drinking water assessments in other areas.

"The question is, will the safety of those systems be determined appropriately or will substandard approaches be applied and systems put back in use and people won't know if they are receiving safe water or unsafe water?" Whelton told Circle of Blue.

Drinking water systems can be contaminated by fire in several ways. When pipes break, water pressure drops, which can draw in pollutants from the soil, groundwater, and air, including organic chemicals in smoke. Plastic components of a water system — pipes, meters, valves — can also burn and release chemicals into the water system. These volatile and semi-volatile organic chemicals can vaporize out of water. Short-term exposure can cause dizziness, while long-term exposure can cause anemia or leukemia.

San Lorenzo Valley officials issued their Do Not Drink/Do Not Boil advisory in consultation with the state Division of Drinking Water. Cajina is the chief of the division's north coastal section, which includes San Lorenzo Valley.

"We recommended that they not use terminology like 'Do not use,'" Cajina said. "If they say, 'Do not use,' then it becomes unclear if people can even do things like use water for basic sanitation or firefighting. And that was certainly not the message we wanted to give. Also we had no evidence that there was going to be anything beyond the normal type of contamination you expect when a system depressurizes."

The Do Not Drink/Do Not Boil advisory was issued before any water samples had been tested. Cajina said the determination was made based on an analysis of water flows in the system, which areas had lost pressure, and where the fires had burned. He said that district officials acted proactively by closing valves and physically isolating parts of the system before the flames arrived, actions that prevented potentially contaminated water from spreading through the pipes.

After finding benzene, Cajina said that the district, based on the state's recommendations, revised the language on its public notice. The changes noted that residents in the affected area should limit use of hot water, limit shower time, not take baths, and not use hot tubs or swimming pools — all activities that could vaporize the chemicals.

The district is sampling water only from the distribution system and other points that it operates. Individual homes, which are not being tested, could still be at risk of contamination from their service lines, depending on their proximity to the fire, said James Furtado, director of operations, during the September 3 meeting.

Towns whose pipes are contaminated have two choices, Whelton said. They can flush out the contaminants or replace the pipes. The best course of action depends on the extent of contamination and the pipe material, he said. Plastic pipes hold organic chemicals like benzene more tightly than steel. Whelton said that, in an analysis from the Camp Fire, a plastic pipe that had severe benzene contamination took more than nine months to reach the point where the pipe supplied water that met the California drinking water standard.

Phillips and Cajina also recommended quickly and repeatedly flushing water in one direction through the system to clear contaminants.

San Lorenzo Valley is aiming to repair its system as quickly as possible in order to get water flowing to all homes in the district. For speed, some plastic components are being reinstalled. A conversation about whether those materials are most suitable for the long-term is a conversation that will happen after the emergency period, Rogers said.

"We are looking at putting these facilities back and hardening them against fire," Rogers said. "The district does not want to put them back and go through this again."

Whelton agreed that this new era of fire risk should give authorities reason to reevaluate their infrastructure choices.

"Should plastic pipe have been installed above ground in a forest that is prone to wildfires? No," Whelton said, referring to the San Lorenzo Valley water supply line that burned. "Unless you expect to have to replace that under a situation where it is damaged. These discussions need to be happening in state capitols and communities that make infrastructure selection decisions."

This story has been updated to reflect more accurate information from Oregon officials about the number of people in evacuation zones.

Brett Walton

[\[https://www.circleofblue.org/author/brett/\]](https://www.circleofblue.org/author/brett/)

[\[https://www.circleofblue.org/author/brett/\]](https://www.circleofblue.org/author/brett/)

Brett writes about agriculture, energy, infrastructure, and the politics and economics of water in the United States. He also writes the [Federal Water Tap](https://www.circleofblue.org/water-tap/)

[\[https://www.circleofblue.org/water-tap/\]](https://www.circleofblue.org/water-tap/), Circle of Blue's weekly digest of U.S. government water news. He is the winner of two Society of Environmental Journalists reporting awards, one of the top honors in American environmental journalism: [first place for explanatory reporting for a series on septic system pollution in the United States](https://www.circleofblue.org/2016/world/brettwalton/) [\[https://www.circleofblue.org/2016/world/brettwalton/\]](https://www.circleofblue.org/2016/world/brettwalton/) (2016) and third place for beat reporting in a small market (2014). He received the Sierra Club's Distinguished Service Award in 2018. Brett lives in Seattle, where he hikes the mountains and bakes pies. [Contact Brett Walton](https://www.circleofblue.org/contactbrettwalton/) [\[https://www.circleofblue.org/contactbrettwalton/\]](https://www.circleofblue.org/contactbrettwalton/)



FOR IMMEDIATE RELEASE: Sept. 8, 2020

Media contact: Rahkia Nance, rnance@wef.org, 17036842400 ext. 7218

Water Utilities Commended for Transformational Programming

ALEXANDRIA, Va. – The forward-thinking initiatives of 65 water utilities are being recognized as they reimagine partnering and engagement, watershed stewardship, and recovery of resources such as water, energy, and nutrients.

The Utility of the Future Today recognition program celebrates the achievements of water utilities that transform from a traditional wastewater treatment system to a resource recovery center and leader in the overall sustainability and resilience of the communities they serve.

Utility of the Future Today was launched in 2016 by the National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), The Water Research Foundation (WRF) and the WaterReuse Association, with input from the U.S. Environmental Protection Agency (EPA).

The Utility of the Future concept is being promoted as water systems around the world are transforming operations through innovation and technology. The 65 utilities recognized this year are recovering resources from wastewater, leading community engagement, forming unique partnerships, and building an internal culture of innovation.

"The transformational approach to utility management each of the Utility of Future Today honorees has shown benefits communities in several significant ways," said WEF President Jackie Jarrell. "We are delighted to celebrate the impact of these utilities and proud to recognize their leadership in water sector innovation."

These utilities are being recognized for the first time:

- Anne Arundel County (Md.) Department of Public Works, Bureau of Utility Operations
- Austin Water (Austin, Texas)
- Capitol Region Watershed District (St. Paul, Minn.)
- Central Arkansas Water (Little Rock, Ark.)
- City of Altamonte Springs (Altamonte Springs, Fla.)
- City of Berryville Wastewater Treatment Plant (Berryville, Ark.)
- City of Boca Raton Utility Services (Boca Raton, Fla.)
- City of Edmonds (Edmonds, Wash.)
- City of Oceanside (Oceanside, Calif.)
- City of Pismo Beach (Pismo Beach, Calif.)
- City of Portland Bureau of Environmental Services (Portland, Ore.)
- City of Zeeland Clean Water Plant (Zeeland, Mich.)
- Douglasville-Douglas County Water and Sewer Authority (Douglasville, Ga.)
- Eastern Municipal Water District (Perris, Calif.)
- EPCOR USA (Phoenix, Ariz.)
- Global Water Resources (Phoenix, Ariz.)
- Holland Board of Public Works (Grand Rapids, Mich.)
- Irvine Ranch Water District (Irvine, Calif.)
- Kinross Charter Township (Grand Rapids, Mich.)
- Lehigh County Authority (Allentown, Pa.)
- Los Angeles Department of Water and Power (Los Angeles, Calif.)
- McAllen Public Utility (McAllen, Texas)
- Moulton Niguel Water District (Aliso Viejo, Calif.)
- Orange County Utilities (Orlando, Florida)
- Padre Dam Municipal Water District (Santee, Calif.)

- Puttman Infrastructure, Inc. (Portland, Oregon)
- Ray Bullard Water Reclamation Facility (West Melbourne, Fla.)
- San Marcos Wastewater Treatment Plant (San Marcos, Texas)
- Silicon Valley Clean Water (Redwood City, Calif.)
- South Platte Renewal Partners (Englewood, Colo.)
- Southern Nevada Water Authority (Las Vegas, Nevada)
- The Oakland County Water Resources Commissioner's Office (Waterford, Mich.)
- Truckee Meadows Water Authority (Reno, Nev.)
- Water Replenishment District (Lakewood, Calif.)
- West Basin Municipal Water District (Carson, Calif.)

These utilities are being recognized for a second year but for a new area of performance:

- City of San Luis Obispo Utilities Department (San Luis Obispo, Calif.)
- City of Tacoma, Environmental Services Department, Wastewater Utility (Tacoma, Wash.)
- Fairfax County Wastewater Management (Lorton, Va.)
- Glenbard Wastewater Authority (Glen Ellyn, Ill.)
- Hampton Roads Sanitation District (Virginia Beach, Va.)
- LA Sanitation and Environment (Los Angeles, Calif.)
- Metropolitan Council (St. Paul, Minn.)
- Metropolitan Water Reclamation District of Greater Chicago (Chicago, Ill.)
- Narragansett Bay Commission (Providence, R.I.)
- Pima County Regional Wastewater Reclamation Department (Tucson, Ariz.)
- Spartanburg Water (Spartanburg, S.C.)
- University Area Joint Authority (State College, Pa.)
- Benton Harbor-St. Joseph Joint Wastewater Treatment Plant (St. Joseph, Mich.)
- Western Monmouth Utilities Authority (Manalapan, N.J.)
- Broward County Water and Wastewater Operations – North Regional Wastewater Treatment Plant (Pompano Beach, Fla.)
- Watercare Services Ltd (Auckland, New Zealand)

These utilities are being recognized for a third year and in a new area of performance:

- Albuquerque Bernalillo County Water Utility Authority (Albuquerque, N.M.)
- Delta Diablo, (Antioch, Calif.)
- Great Lakes Water Authority (Detroit, Mich.)
- Houston Water (Houston, Texas)
- King County Wastewater Treatment Division, Seattle, Wash.
- Orange County Sanitation District (Fountain Valley, Calif.)
- San Francisco Public Utilities (San Francisco, Calif.)
- Toho Water Authority (Kissimmee, Fla.)
- Renewable Water Resources (Greenville, S.C.)

These utilities are being recognized for a fourth year and in a new area of performance:

- Charlotte Water (Charlotte, N.C.)
- City of St. Cloud Public Utilities (St. Cloud, Minn.)
- City of Tucson Water (Tucson, Ariz.)

These utilities are being recognized for a fifth year and in a new area of performance:

- City of Fayetteville (Fayetteville, Ark.)
- Clean Water Services (Hillsboro, Ore.)

Honorees will be recognized during a pre-recorded awards ceremony on Oct. 9 at 11 a.m. ET during [WEFTEC Connect](#).

To learn more, visit <https://www.wef.org/utility-of-the-future> or contact UtilityRecognition@wef.org.

###

About WEF

The Water Environment Federation is a not-for-profit technical and educational organization of 35,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals, enrich the expertise of water professionals, increase the awareness of the impact and value of water, and provide a platform for water sector innovation. To learn more, visit www.wef.org.

WEF Media Contact: Rahkia Nance, 703.684.2400, ext. 7218 rnance@wef.org

About NACWA

For nearly 50 years, the National Association of Clean Water Agencies (NACWA) has been the nation's recognized leader in legislative, regulatory and legal advocacy on the full spectrum of clean water issues. NACWA represents public wastewater and stormwater agencies of all sizes nationwide. Our unique and growing network strengthens the advocacy voice for all member utilities, and ensures they have the tools necessary to provide affordable and sustainable clean water for all. Our vision is to represent every utility as a NACWA member, helping to build a strong and sustainable clean water future. For more information, visit us at www.nacwa.org. NACWA Media Contact: David Zielonka, 202.981.3786, dzielonka@nacwa.org

About WRF

The Water Research Foundation (WRF) is the world's leading research organization advancing the science of all water to meet the evolving needs of its subscribers and the water sector. WRF is a nonprofit, educational organization that funds, manages, and publishes research on the technology, operation, and management of drinking water, wastewater, reuse, and stormwater systems—all in pursuit of protection of public health and the environment. WRF represents approximately 1,200 subscribers, hosts an online research library of more than 2,300 completed projects valued at \$700 million, manages an innovation platform (LIFT Link) with a database of more than 140 innovative technologies, and supports the world's largest body of stormwater best practice data.

For more information, visit www.waterrf.org.

WRF Media Contact: Lexie Vean, 303.717.2848, lvean@waterrf.org

About the WaterReuse Association

The WaterReuse Association is the nation's only trade association solely dedicated to advancing laws, policy, funding, and public acceptance of recycled water. The WaterReuse Association represents a coalition of utilities that recycle water, businesses that support the development of recycled water projects, and users of recycled water. Our members are incorporating water reuse into their water management strategies as a proven method for ensuring a safe, reliable, locally controlled water supply. To learn more, visit www.watereuse.org.

WaterReuse Media Contact: Zachary Dorsey, 571.445.5503, zdorsey@watereuse.org

VOICES | Opinion *This piece expresses the views of its author(s), separate from those of this publication.*

Action needed to keep Tahoe blue | Goodman Collins

Darcie Goodman Collins

Published 11:38 a.m. PT Sep. 15, 2020

Subscribe: Read local news and views with a 99-cent subscription to the RGJ

This opinion column was submitted by Darcie Goodman Collins, Ph.D., CEO of the League to Save Lake Tahoe.

For many, Lake Tahoe is a refuge. It's a place to escape, unwind and recharge. Yet the recent Lake Tahoe Summit made one thing crystal-clear: to keep Tahoe blue, we can't afford to take a vacation from protecting the lake we love. When it comes to tackling Tahoe's aquatic invasive weed problem, inaction could spell disaster.

Aquatic invasive weeds are underwater plants that don't naturally occur in the lake. Unintentionally introduced to Tahoe decades ago, they threaten to destroy Lake Tahoe's native ecology, pristine water quality and world-famous clarity, while also impacting our enjoyment of the lake we love.

For more than eight years, the League to Save Lake Tahoe has been deeply involved in efforts to control Tahoe's aquatic weed problem where it's most severe: the Tahoe Keys. With more than 90% of its 172 acres of lagoons infested, this planned community developed on the South Shore in the 1960s is ground zero for the invasive weed problem in Lake Tahoe. And the infestation is spreading. More than 100 acres of the lake itself are now infested with weeds.

The tools on hand are not sufficient to treat a problem as big and complex as in the Keys. Testing innovative technologies and new combinations of treatments — including UV light, laminar flow aeration and targeted herbicides — will show us how to overcome the challenge. Crucially, the new tools must not only be effective, they must be safe for the Lake Tahoe environment and everyone who enjoys it.

Enter the proposed Tahoe Keys Lagoons Aquatic Weed Control Methods Test. As its name suggests, the test is not a full-scale project; it is a highly regulated, three-year trial of all available methods and combinations of treatments. At the heart of this proposal is a novel approach: a one-time test application of EPA-approved herbicides at low concentrations in dead-end lagoons to knock down the weeds, followed by nonchemical treatments to keep the population in check for the long term. If proven successful, Tahoe can continue to serve as a global model for sustainable environmental protections.

The League to Save Lake Tahoe is concerned about the potential use of herbicides at the Lake. For 63 years, we have defended Big Blue from all threats to its famously clear waters — and aquatic invasive weeds pose the greatest ecological threat today. If science shows the test can be conducted safely, we must try. Failing to take control of the problem now puts all of Lake Tahoe at even greater risk.

Currently, the application for the test is undergoing a rigorous scientific review and public consultation process, including an "antidegradation analysis" to assess even the slightest risk from limited herbicide use. The process has produced one of the most extensive environmental impact reports/statements ever compiled for a small-scale testing project. It includes multiple layers of protections, mitigations and monitoring to protect human and environmental health.

While we await the completion of the environmental review, one thing is as clear as Lake Tahoe's waters: if we do nothing, the problem will get worse. To keep Tahoe blue, we must tackle the invasive weeds problem in the Tahoe Keys now.

For more information, visit TahoeKeysWeeds.org.

The League to Save Lake Tahoe — also known as Keep Tahoe Blue — the oldest and largest environmental organization dedicated to protecting the health and clarity of Lake Tahoe.



(/)

(</multimedia/nasatv/index.html>)
NASA TV

Search

Latest

Related



Earth (</topics/earth/index.html>)

(/sites/default/files/thumbnails/image/denisemoyle_nevadafarmer_glow_by_g_photography_0.jpg)

Sept. 15, 2020

Transforming Water Management in the U.S. West with NASA Data

Building upon more than two decades of research, a new web-based platform called OpenET (<https://etdata.org/>) will soon be putting NASA data in the hands of farmers, water managers and conservation groups to accelerate improvements and innovations in water management. OpenET uses publicly available data and open source models to provide satellite-based information on evapotranspiration (the "ET" in OpenET) in areas as small as a quarter of an acre and at daily, monthly and yearly intervals.

Evapotranspiration is the process by which water is transferred from the land to the atmosphere, by water leaving the soil (evaporation) and water lost through plant leaves and stems (transpiration). Evapotranspiration is an important measure of how much water is used or "consumed" by agricultural crops and other plants.

In the arid western United States, where the majority of water used by people is for irrigation to grow crops, having an accurate measure of evapotranspiration is critical to balancing water supplies and water demand. Until OpenET, there has not been an operational system for measuring and distributing evapotranspiration data at the scale of individual fields across the western United States. OpenET will be available to the public next year, supplying evapotranspiration data across 17 western states.



(</sites/default/files/thumbnails/image/evapotranspiration.gif>)

Evapotranspiration is the process by which water is transferred from the land to the atmosphere, by water leaving the soil (evaporation) and water lost through plant leaves and stems (transpiration).

Credits: NASA/Goddard Space Flight Center Conceptual Image Lab

()

"What OpenET offers is a way for people to better understand their water usage and, more importantly, their water loss through evapotranspiration," said Denise Moyle, an alfalfa farmer in Diamond Valley, Nevada, and an OpenET collaborator. "Giving farmers and other water managers better information is the greatest value of OpenET."

The OpenET platform is being developed through a unique collaboration of scientists, farmers and water managers from across the western United States, as well as software engineers specializing in data access and visualization for large Earth observation datasets.

Led by NASA, the nonprofit Environmental Defense Fund (EDF (<https://www.edf.org/>)), the Desert Research Institute (DRI (<https://www.dri.edu/>)) and data applications developer HabitatSeven (<https://habitatseven.com/>), with funding from the Water Funder Initiative (<https://www.waterfunder.org/>) and in-kind support from Google Earth Engine (<https://earthengine.google.com/>), OpenET primarily uses satellite datasets from the Landsat program (https://www.nasa.gov/mission_pages/landsat/main/index.html), which is a partnership between NASA and the U.S. Geological Survey (USGS (<https://www.usgs.gov/>)). Additional data comes from NASA's Terra and Aqua satellites, the National Oceanic and Atmospheric Administration (NOAA (<https://www.noaa.gov/>)) GOES (<https://www.star.nesdis.noaa.gov/GOES/index.php>) series of satellites and others.

"OpenET will empower farmers and water managers across the West to build more accurate water budgets and identify stress, resulting in a more resilient system for agriculture, people and ecosystems," said Maurice Hall, head of EDF's Western Water program. "We envision OpenET leveling the playing field by providing the same trusted data to all types of users, from the small farmer to regional water planners."

(/sites/default/files/thumbnails/image/openet_screenshot.png)

A screenshot of the OpenET interface.

Credits: NASA

()

California's Delta Watermaster Michael George is responsible for administering water rights within the Sacramento-San Joaquin River Delta, which supplies drinking water to more than 25 million Californians and helps irrigate 3 million acres of farmland. For him, the development of OpenET signals an exciting opportunity for the future of water in the West.

"OpenET represents a game-changing leap forward for water management," George said. "It will help landowners and water managers in the Bay-Delta save millions of dollars that would otherwise have to be spent on water meters to more accurately measure water use, as required by state law."

In addition to helping Delta farmers save costs, OpenET data will improve water management in the area, according to Forrest Melton, program scientist for NASA's Western Water Applications Office (<https://wwao.jpl.nasa.gov/>). He is also with the NASA Ames Research Center (<https://www.nasa.gov/ames>) Cooperative for Research in Earth Science and Technology (ARC-CREST (<https://www.arc-crest.org/>)).

"The importance of careful, data-driven water management in the Delta and other regions can't be overstated," he explained. "In addition to supplying water for drinking and growing food, the Delta provides critical habitat for endangered species. For a water manager, trying to balance all of these demands is almost impossible without accurate, timely data."

The OpenET team is currently collaborating with water users on several case studies across the West. In California's Central Valley, the Rosedale-Rio Bravo Water Storage District is already starting to use OpenET data as the foundation for an online water accounting and trading platform to help farmers in the district manage groundwater sustainably. In Colorado, high-altitude ranchers will be using OpenET as they experiment with different irrigation strategies to conserve water.

(/sites/default/files/thumbnails/image/denise_moyle_nevadafarmer_glow_by_g_photography_0.jpg)

Nevada farmer Denise Moyle will use OpenET to plan irrigation of her alfalfa fields.

Credits: Photo courtesy of Glow by G Photography

Landsat science team member Justin Huntington of DRI emphasized the value of getting this type of early feedback on the OpenET system from future users. "Working closely with farmers and water managers on the design of OpenET has given us invaluable insights into how to best make ET data available to support water management in Diamond Valley and other basins across the West," he said.

Because the OpenET system uses open source software and open data sources, it will help water managers establish an agreed upon measure of evapotranspiration across agricultural areas, said Melton. Different estimates of evapotranspiration have previously been a source of confusion for water managers, he said, explaining that water users and managers currently have to evaluate a variety of methodologies to measure water use and evapotranspiration, which often leads to different numbers and debates over accuracy.

OpenET provides a solution to those debates, said project manager Robyn Grimm. "OpenET brings together several well-established methods for calculating evapotranspiration from satellite data onto a single platform so that everyone who makes decisions about water can work from the same playbook, using the same consistent, trusted data," said Grimm, who is also a senior manager at EDF.

The need for a resource like OpenET is also pressing beyond California and across the American West, Melton said.

"Our water supplies in the West are crucial to providing food for the country and beyond, and yet these supplies are under increasing levels of stress," Melton said. "OpenET will provide the data we need to address the challenge of water scarcity facing many agricultural regions around the world and ensure we have enough water for generations to come."

By Maddie Ecker, NASA Earth Applied Sciences (<https://appliedsciences.nasa.gov/>)

Last Updated: Sept. 15, 2020

Editor: Aries Keck

Tags: Ames Research Center (</centers/ames/home/index.html>), Benefits to You (</topics/benefits/index.html>), Earth (</topics/earth/index.html>), Goddard Space Flight Center (</centers/goddard/home/index.html>), Landsat (http://www.nasa.gov/mission_pages/landsat/main/index.html), Landsat 8 (http://www.nasa.gov/mission_pages/landsat/main/index.html), Water (</subject/3135/water>)



National Aeronautics and Space Administration
Page Last Updated: Sept. 15, 2020
NASA Official: Brian Dunbar

No Fear Act (<https://www.nasa.gov/offices/odeo/no-fear-act>)

FOIA (<https://www.nasa.gov/FOIA>)

Privacy (https://www.nasa.gov/about/highlights/HP_Privacy.html)

Office of Inspector General (<https://oig.nasa.gov/>)

Office of Special Counsel (<https://osc.gov/>)

Agency Financial Reports (<https://www.nasa.gov/news/budget/index.html>)

Contact NASA (<https://www.nasa.gov/about/contact/index.html>)

Water Connections

A housing developer and a powerful water utility, locked into past contracts, are caught in a fight, playing out in hydrologic reports and hearing rooms, over what might seem a simple question: How much water is there?

COYOTE SPRING VALLEY, NEV. — Five wells punch the scorching Nevada desert.

Water in this area is locked underneath the ground. It flows silently and invisibly as part of an aquifer stretching roughly 50,000 square-miles. Much of this water collected here thousands of years ago when lakes covered most of Nevada. Now wells are summoning it for human use. The problem is there's not enough to go around.

At the center of this tension are the five wells.

A housing developer, Coyote Springs Investment, owns four wells, planted to one day pump water for a sprawling new community in the desert, filling the highway stretch about 50 miles northeast of Las Vegas. The remaining well belongs to the Southern Nevada Water Authority.

Coyote Springs wants to pump its wells. The water authority wants to keep most of it in the ground.

The five wells mark divergent interests with a history intertwined by a similar goal: development and the need to secure the water to make it happen. But today the housing developer and the powerful water utility, locked into past contracts, are caught in a fight, playing out in hydrologic reports and hearing rooms, over what might seem a simple question: How much water is there?

That answer is complicated by how much is at stake — a Colorado River tributary, the survival of an endangered Nevada fish and the future of development in a sweeping area outside Las Vegas.

In the early 2000s, during a period of rapid growth, Southern Nevada politicians gave Coyote Springs their blessing to develop a new community, spanning two counties (Clark and Lincoln) on empty land about 50 miles outside of Las Vegas. Thousands of homes. Golfing. Shopping. Gambling. They would call the community Coyote Springs, named for the valley it occupied.

On a recent hot August morning, what was once planned as a Palm Springs in Nevada is still mostly empty. Two temporary street signs, for CS Parkway and F Street, mark an intersection that has yet to be paved. At least \$200 million in infrastructure — flood control, fiber optics, a detention basin and wastewater treatment plants — lies around both sides of the highway. Most of it goes unused, with one exception: A well-manicured golf course meant to attract homebuyers.

But there are no homes. State officials won't allow it, and it has everything to do with the wells.

There was a time, not long ago, when all the political juice appeared to be flowing to Coyote Springs. Then it slowed to a trickle. Political momentum only gets you so far where water is scarce — and Las Vegas has its supply on the line. At least that's how Coyote Springs sees it.

"Someone doesn't want us to develop," says Emilia Cargill, chief operating officer for Coyote Springs Investment. "How do you stop someone from developing? You take their water away."

In the past two years, Coyote Springs has taken the issue to court. In 2018, it sued an arm of the water authority with claims including slander and breach of contract. It has sued the state twice. In August, Coyote Springs accused state officials of taking their property: the right to use their water.

The fight over Coyote Springs is about the collision of water, science and politics. And it reflects a broader tension facing Nevada and the modern West, a reckoning with a past in which water officials handed out legal rights to use an unsustainable amount of water: first come, first serve.

In Nevada and elsewhere, the problem is made more severe because the law developed to view rivers and groundwater as separate stores of water, despite generations of science and observations showing that the two often act as one. In places like Coyote Spring Valley, this paradigm led past officials to overestimate the amount of water rights available to hand out.

Nevada's water statutes follow a similar framework used across the West. That framework is meant to settle disputes, inevitable in a region where aridity is its defining character. Yet state regulators often face serious barriers to enforcing the rulebook in a manner that is cut-and-dry.

Today regulators recognize the issue, and they are trying to tackle the problem.

But the solutions are challenging and even collaborative deals to rein in overuse end up in court. Local judges weigh in, then many decisions are appealed to the Nevada Supreme Court, which often has the final say. Every watershed is different. Yet the future, in most cases, looks similar.

Someone is going to get less water than once promised.

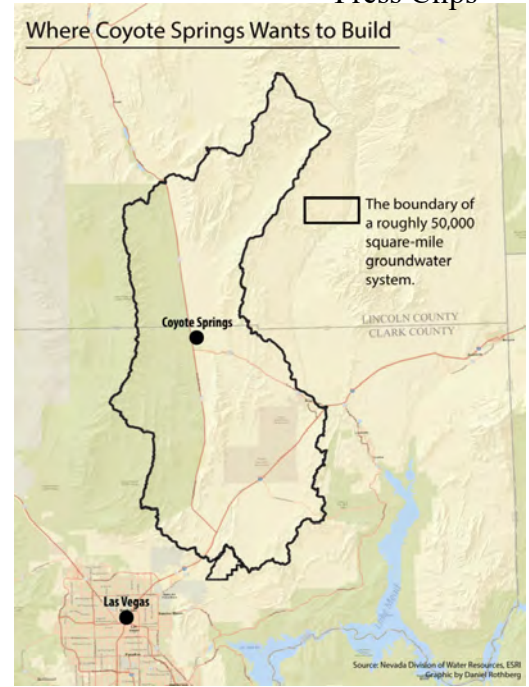
Warm springs, hot drought

Drive a dozen miles away from Coyote Springs and the landscape changes dramatically. State Route 168 sits on top of the expansive aquifer. At this stretch of highway looks like the rest of the desert. It's hot. There's not much water. Then you arrive at the Muddy River Springs area.

The creosote bushes and prickly desert vegetation give way to palm trees and honey mesquite as groundwater discharges into a series of springs, enough to create a small river in the desert.



The Muddy River Springs area from State Route 168 on Aug. 13, 2020. (Jeff Scheid/
The Nevada Independent)



The narrow Muddy River flows beside rural communities, a former coal plant and agricultural operations, before joining with the Colorado River and emptying into Lake Mead, which stores water for sprawling cities, farms and businesses in Arizona, California, Nevada and Mexico.

The water authority owns or leases the rights to most of the Muddy River. Officials store that water in Lake Mead, making this humble tributary a critical part of Las Vegas' water portfolio.

"The water that we use on both the Muddy and Virgin River to [store] in Lake Mead is probably, next to our Colorado River allocation, the most important allocation of water that we have," says Colby Pellegrino, who serves as the water authority's deputy general manager for resources.

Because groundwater feeds the Muddy River, the river's flows are modeled to decrease as more wells are turned on and an increasing amount of water is pumped out of the ground.

Different hydrologists offer different models for this behavior. But enough is known about the hydrology that state officials ruled in June that there was a significant degree of connection: When too much groundwater is pumped up, less water makes it to the springs and the river.

The dispute is over how much is too much.

Each year, divers put on snorkels, enter the protected springs and assess the health of the dace habitat. In August, divers reported a 78 percent increase from last year, a jump to 2,342 dace.

But Donnelly, the water authority and federal wildlife managers are still worried that additional groundwater pumping would reverse gains made through habitat restoration at the springs. And there is evidence to back up their claims.

Increased groundwater pumping during a stress test in the mid-2010s led to a decline in several high elevation springs, according to stream pumping data. Drawing on that data, the U.S. Department of Interior concluded in 2013 that at least two springs could dry up within three years if higher levels of pumping were to continue.

"The spring levels went down with the pumping," Donnelly said. "And they haven't recovered."

"This is your ultimate example of surface and groundwater as the same resource," he added.

Reversal of fortune

Golf carts sit in a neat row at the parking lot for Coyote Springs. Military jets from the Air Force's Nevada Test and Training Range, tucked behind the mountains, can be heard circling nearby. The \$40 million golf course, a splash of green in the desert, was built to attract homebuyers.

Behind the golf carts is a pro shop, and behind the pro shop is Cargill's office. On one wall is a map of groundwater in the region (all arrows point to Lake Mead). And taped to Cargill's computer is a section from a ruling issued by Nevada's top water regulator (why they can't build homes).

"It's all owing down to Lake Mead," Cargill says, nodding to the annotated map posted to a wall. "And who benefits from water going into Lake Mead? Southern Nevada Water Authority."

Coyote Springs believes there are a few geologic caveats to that owl pattern.

In preparation for a hearing last year, Coyote Springs commissioned a geophysics consultant to study the geology within the aquifer. The analysis argues that geologic structures on the west side of the valley trap water. The finding, Coyote Springs asserts, means that they can pump groundwater without it directly affecting the springs. Simply put, there is water to build homes.

Many models show the aquifer, known as the Lower White River Flow System, behaving as a “bathtub.” If you remove one gallon of water in one area, you leave the whole aquifer with less. That is, if you pump water at Coyote Springs, you are likely to affect surface water miles away.

“Our argument is that that’s not true — that there are a lot of places where there are faults or slips or strikes underground,” Cargill said, noting the visible geologic formations in the valley.

Still, enough is known about the aquifer that Nevada’s top water official, State Engineer Tim Wilson, ruled in June that the “best available data” did not support Coyote Springs assertion, even if geologic variations exist. Two days later, Wilson’s office again denied its plans to build.

In August, Coyote Springs sued the state, alleging that the state engineer’s office made a series of decisions that resulted in an “unconstitutional taking” of the water rights it needs to develop. The court filing said the state’s own science supported more groundwater pumping in the area.

Over the past year, it has accused local agencies, which once helped move the project forward, of doing the same. The fight is no longer only about hydrologic modeling. It is also about politics.

As the water purveyor for Coyote Springs, top officials at the water authority, in addition to the Clark County Commission, carry legal sway over whether homebuilding can move forward.

Past Clark County Commissions supported the project, approving a development agreement and entitlements throughout the past two decades. In 2018, the County Commission, then chaired by Gov. Steve Sisolak, approved a zoning change and tentative map for 575 single family lots. Former Sen. Richard Bryan represented Coyote Springs before the commission.

At the time, county attorney Robert Warhola said the approval was “not going to go anywhere unless they resolve the water issue.” State water officials would still have to sign off on the plan.

Today Clark County appears to be backing away. In January, county officials started a process to acquire Coyote Springs’ land, according to records requested by *The Nevada Independent*.

Coyote Springs overlaps with critical habitat for the Mojave desert tortoise. Because the Mojave desert tortoise is listed as threatened under the Endangered Species Act, the county is required to offset — or conserve — a certain amount of acreage in order to permit new development. As Las Vegas looks to [expand along the I-15 to California](#), it needs to protect more tortoise habitat. In Coyote Springs, the county believed it had a willing seller.

An acquisition of Coyote Springs would also be a win for conservationists, too. Since the project was first proposed, groups, including the Sierra Club, have raised concerns that a faraway community would affect air quality, increase vehicle emissions and encourage sprawl.

According to a draft proposal, the acquisition was part of a phased approach to buy land from Coyote Springs and move development plans away from building a sprawling town 50 miles away, one that might conflict with the Air Force’s operations.

The acquisition would effectively unwind development plans that had originally been pushed by one of the state’s most powerful lobbyists, Harvey Whittemore, and supported by some of the state’s top politicians, including former Senate Majority Leader Harry Reid. Whittemore was imprisoned in 2014 for giving illegal campaign contributions to Reid, allegations stemming from a legal feud with his former business partners, Bay Area developers Thomas Seeno and Albert Seeno Jr.

Former Clark County Commissioner Chris Giunchigliani was the only vote against the zoning change and tentative map in 2018. Coyote Springs, she said, offers insight into how developers could push forward a project without the commission weighing the long-term impacts, especially in the boom years.

“It’s a perfect example of bad public policy being advanced just because we knew someone,” said Giunchigliani, who was elected to the commission in 2006 after serving in the Legislature.

In April, the proposed acquisition appeared on a draft agenda for the County Commission’s approval. The item proposed acquiring roughly 6,900 acres of Coyote Springs’ land, with the Air Force, for about \$35 million. Then the item was abruptly taken off the agenda. Cargill sent a letter to Marci Henson, director of the Clark County Department of Environment and Sustainability denying the county’s offer.

Cargill wrote that there was “significant disagreement” over the proposed acquisition, including the valuation and a disregard for development rights issued by the county.

Coyote Springs, Cargill writes in the letter, was “gravely concerned” that entities, including the state engineer, the Las Vegas Valley Water District, the Southern Nevada Water Authority and Clark County, “have, and continue to, individually and collectively take actions in bad faith” to stop the development, drive down the market price and effectively “take” away their property.

In an emailed reply, Henson said she was “surprised by the letter,” writing that the “tone and content bear no relationship to our previous discussions and communications.”

As part of the email chain requested by *The Nevada Independent*, Henson said Coyote Springs had not been “truthful” about being a willing seller. In response, Cargill wrote that the developers “take offense with Clark County’s assertion.” She then said the county had not been “forthright” either.

Divergent interests

The proposed acquisition was not only about the land. It was also about the water.

According to a draft of the county's proposed acquisition, the water authority expressed interest in buying Coyote Springs water rights to protect the Moapa dace. Such a move would eliminate increased groundwater pumping, a threat to surface water: the springs and the river.

Where the groundwater gives way to springs, Coyote Springs and the Southern Nevada Water Authority's interests part ways. Coyote Springs is still focused on pumping more groundwater. Today the water authority is focused on maintaining the flows of the Muddy River, where it owns and leases rights to water — water that is stored in Lake Mead.

The water authority is also invested in the Moapa dace's recovery. Reliant on steady spring flow, the two-inch fish is considered an indicator species for the watershed's overall health.

"We as water managers know that if you have an endangered species issue, you have a water supply issue if that endangered species is using the same source of supply as you are," Pellegrino said.

For years, Southern Nevada politicians, the water authority and Coyote Springs appeared to be working hand-in-hand on developing Las Vegas, the water wells and securing water to construct new homes in the fast-growing region. In the 1990s, the water authority even purchased millions of gallons in water rights from Coyote Springs to augment its relatively small Colorado River allocation.

"When Coyote Springs was a big issue — or expected to set the world on its ear — two things were going on," said Michael Green, an associate history professor at UNLV who has studied the development of southern Nevada. "One was that the [housing] boom seemed constant."

The other had to do with different attitudes about the limits on water.

"We know more about the trends in water availability than we did 25 years ago," he said. "The thought that we have the water or we can get the water was in people's minds."

In the 1980s, Las Vegas officials placed their bets on groundwater in the Coyote Spring Valley. At the time, the land belonged to Aerojet, an aerospace company that wanted to test rockets.

"We were going to buy all of Aerojet," said Pat Mulroy, who played a key role in the agreements and deals involving Coyote Springs the water authority's former general manager. "We were going to buy the whole thing, kit and caboodle."

But everyone's bets on groundwater in the valley were off; the sustainable supply was small.

As the groundwater showed its limits, the water authority turned to surface water on the Muddy River, acquiring water rights through purchases or leases.

For Coyote Springs, this created an inevitable conflict.

As their water purveyor, Las Vegas officials were charged with deciding whether Coyote Springs could pump its water. At the same time, they have a stake in seeing less pumping, not more, to protect the groundwater-fed flows of the Muddy River.

Since 2017, the water authority — along with state officials — have raised concerns about Coyote Springs' efforts to use its water rights. Las Vegas water officials contend that the responsible choice, as a water provider, was to take action before Coyote Springs built homes, given the ongoing concerns about groundwater use.

But Cargill said that the water authority is "conflicted" between its multiple roles. She added that state and local agencies should have considered the water scarcity issues before entitling the project, a process that gave the developers the belief that they were allowed to build.

TIMELINE OF RECENT ISSUES

- **April 2017:** The Las Vegas Valley Water District expresses concern that "any substantial volume of water" running through Coyote Springs' wells could impair spring flow for the Moapa dace and Muddy River rights, most of which the water authority owns or leases. Water authority officials brought their concerns to Nevada's top water official, the state engineer.
- **May 2018:** Albert Seeno III, a Bay Area and Reno developer behind Coyote Springs, became personally involved, talking to then-State Engineer Jason King. According to Coyote Springs lawyers, King told Seeno "not to spend one dollar more on the Coyote Springs Development Project and that processing of [its development] maps had stopped."
- **September 2018:** Per a court settlement, King conditionally approved subdivision maps if Coyote Springs could prove that the groundwater could be pumped sustainably.
- **September-October 2019:** The state engineer held hearings on the hydrology of the area after water users in the region submitted exhaustive hydrologic reports and modeling.
- **June 2020:** After a new order on the issue, declaring that the region had less available groundwater than once previously thought, the state again recommended denial of development maps.

"We had entitlements," Cargill said. "We had permissions to build. That's why we bought the water. That's why we bought the land. That's why we spent the money. We wouldn't have spent what we've spent and continue to spend on a daily basis if we hadn't had assurances that we were going to be able to develop."

Records show that the limits to groundwater supply were well-established. For this reason, Wilson, the state engineer, as well as other water authority officials, have dismissed claims that Coyote Springs was short-changed or not informed of the scarcity issues in the area.

"The water issues out there had been known for a very long time," Wilson said.

Over the years, as Coyote Springs progressed through the local planning process, developers were warned repeatedly, Mulroy said. But they remained convinced the water was there. If Coyote Springs wants to develop today, "they're going to have to bring water in from somewhere," Mulroy added.

The Southern Nevada Water Authority's MX-5 well and associated facilities in Coyote Spring Valley on Aug. 13, 2020. The well is named for when the federal government sought this land for its MX Missile Program. (Jeff Scheid/The Nevada Independent)

A long path forward

The fight over water at Coyote Spring Valley is long from over.

In June, the state engineer's office issued an order capping regional groundwater pumping at 8,000 acre-feet (an agricultural term describing the amount of water that can fill one acre to a depth of one foot). It's twice the cap that the water authority had hoped for, but it's far less than the roughly 30,000 acre-feet that Coyote Springs had suggested was available.

The cap means that the vast majority of groundwater rights in the area — about 31,000 acre-feet — are going to have to be restrained. The question now is how to do that equitably.

A large amount of water in the Muddy River watershed is controlled by the Moapa Valley Water District, which provides service to the Moapa Valley Band of Paiutes and two rural communities.

Should water used to serve existing communities be prioritized?

The path toward a resolution to decide who can use their groundwater — when, where and how much — reflects a complicated future, not only for Coyote Springs but in areas across Nevada, where past state officials routinely issued more water on paper than there is water to go around.

Correcting this problem is challenging. Decisions to appropriate, and over-appropriate, water were made decades ago. State officials did not always incorporate the same values, especially around protecting the environment, that policymakers consider now. And to top the issue, regulators are constrained by a system of agreements, entitlements and plans that were approved in the past.

The state engineer's order recognizes the connection between groundwater and surface water, and it proposes an approach that aims to look at the whole puzzle, not just the puzzle pieces.

But nearly everyone involved in the area found something to disagree with. At least ten water users — companies and government agencies — are participating in a judicial review in Las Vegas district court.

"I don't think the litigation's ending any time soon," Pellegrino said.

Pellegrino's hope, though, is that litigation will yield to collaboration. As an example, she cited the Colorado River, where water users with competing interests and constituencies have opted to enter into collaborative agreements rather than gamble on the results of a lengthy fight in court.

"There is a path forward for the people who are using water [and] for the people who have water to come together, kind of like we do on the Colorado River, and say 'Now that we know what the quantity of water is that we're working with, how are we going to make this work,'" she said.

As the court battles continue, Coyote Springs remains focused on building homes.

"That's what we do as a company," Cargill said. "We're not in the business of running golf courses. That's not what we do. We're not in the business of running a tortoise habitat. That's not what we do. We build homes. We build communities. We build infrastructure. We build shopping centers. That's what we do as a company. We run casinos. That's what we do."

And Coyote Springs has more rights to water. The groundwater is not its only source. About one hundred miles to the northeast, Coyote Springs owns ranches in Lake Valley near the small town of Pioche.

In December 2008, the state engineer approved a plan allowing Coyote Springs to export a portion of its ranch-water to the new desert community. Although the state's order placed limits on the exportation proposal, it allowed for piping 11,300 acre-feet of water, enough water to supply tens of thousands of new homes.

But "that water wasn't intended to be the first water used," Cargill said.

"That water was intended to be the next water used," she added.

Any such effort to import the Lake Valley water would be years away, requiring new permits and adding significant costs.

Yet even in Lake Valley, more than a hundred miles away from Las Vegas, the future is complicated by the past. The water authority has its own storied presence in this area.

Starting in 1989, Las Vegas water officials filed for groundwater rights and purchased ranches in eastern Nevada with the goal of building a roughly 250-mile pipeline that could supplement its Colorado River supply. Coyote Springs and the water authority even have overlapping grazing permits.

In 2008, Coyote Springs testified that its plan was to import its Lake Valley water through the Las Vegas pipeline. But after years of pushback from rural communities, tribes and environmentalists, the water authority shelved its plans for the pipeline this year, another setback for Coyote Springs.

Still, when asked if Coyote Springs was looking at Lake Valley, Cargill replied: "One fight at a time."

Part II of this series, "New Rules," will focus on how the problem developed and future fixes.

This story was supported by a grant from [The Water Desk](#), an independent journalism initiative based at the University of Colorado Boulder's [Center for Environmental Journalism](#).

The Nevada Independent is a 501(c)3 nonprofit news organization. We are committed to transparency and disclose all our donors. The following people or entities mentioned in this article are financial supporters of our work:

- Center for Biological Diversity - \$100.00
- Chris Giunchigliani - \$1,445.00
- Emilia Cargill - \$540.00
- Friends for Harry Reid - \$16,500.00
- Harvey Whittemore - \$105.00
- Michael Green - \$490.00
- NV Energy - \$208,650.00
- Patricia Mulroy - \$750.00
- Patrick Donnelly - \$575.00
- Richard Bryan - \$2,150.00
- Steve Sisolak - \$3,200.00

And the fear is once Coyote Springs and other groundwater users crank up the spigot, it could one day leave Las Vegas with less water, despite having rights that were issued prior to 1920.

Groundwater pumping at Coyote Spring Valley is not the only threat. Other interests, including the Moapa Valley Band of Paiutes, the Moapa Valley Water District, the Mormon Church, NV Energy and the Southern Nevada Water Authority itself, have rights to capture groundwater.

Last year, the water authority argued that the area could only sustain a little more than half of what is currently used, almost one-tenth of the volume that businesses have the right to use.

Their estimate comes as the West faces a drier future. Scientists say a climate change signal is already evident in [decreasing the flows](#) of the Colorado River, the primary water source for the Las Vegas Valley. With warming temperatures, water managers in seven states that use the Colorado River are all figuring out how to firm up existing supplies while doing more with less.

Las Vegas, with the Muddy River, is no exception.

In the Muddy River Springs area, palm trees provide a respite from the summer heat. As Patrick Donnelly, the state director for the Center for Biological Diversity, comments on the unique smell of a riparian area in the desert, he has his eyes on another pressing concern.

Centuries ago, a two-inch fish made its one and only home in the warm springs that form the Muddy River. By 1967, the Moapa dace was listed under the Endangered Species Act, as humans severely constrained and altered its habitat, first by the flooding of Lake Mead with the Hoover Dam, then with the introduction of non-native fish and the creation of resorts and ranches.

Groundwater pumping directly near the springs, in addition to diversions, also threatened the dace. Donnelly's group, along with the water authority and the U.S. Fish and Wildlife Service, have argued that turning on more wells would threaten a recovering dace population.

NV Energy likely to shut off power for Incline Village residents Friday due to fire danger

by Ben Margiott

Wednesday, September 16th 2020

NV Energy to shut off power for Incline Village customers Friday because of fire danger

RENO, Nev. (News 4 & Fox 11) — NV Energy announced it will likely shut off power for Incline Village residents Friday morning as strong winds and dry conditions are expected to increase



"This timeframe includes an estimate of how long it will take our crews to inspect our power lines for damage after weather conditions have ended before safely restoring power," officials said.

The likely outage comes after experts predict strong winds, low humidity, dry vegetation and other factors that could create dangerous conditions if a fire were to spark.

According to the National Weather Service, a fire weather watch will be in effect from Thursday morning to Friday night.

The outages have become routine for fire-prone areas in California, which is experiencing one of the worst fire seasons in state history.

A drive-thru Customer Resource Center will be available at Diamond Peak Ski Resort located at 1210 Ski Way, Incline Village, NV 89451 from 9 a.m. to 6 p.m. The CRC will offer charging devices, light snacks, water and outage updates.

If you are going to be affected by the power shutoff, here are [some tips from NV Energy](#):

If you or permanent members of your household is dependent on electrically operated medical equipment, we encourage you to enroll in our Green Cross program. You'll receive advance notification of any planned outage and work to restore power as quickly as possible during an unexpected outage.

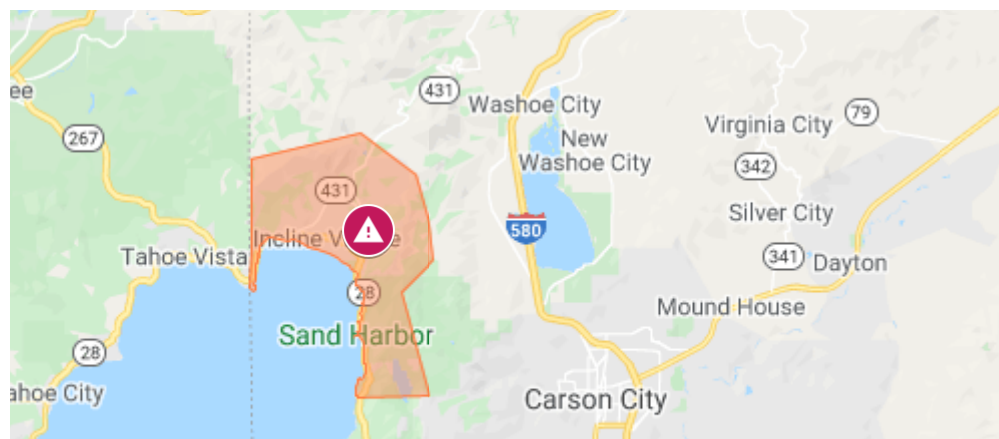
- Know your PSOM Zone and location of nearest [Customer Resource Center](#)
- If impacted by a PSOM event, please unlock your back yard gate if near one of our power lines to help our crews inspect lines as part of our efforts to restore power
- Identify backup charging methods for phones, including a cell phone charger that can be used in the car
- Have a personal safety plan in place for every member of your household including pets and livestock.
- Keep hard copies of emergency numbers and other important contacts
- Know how to manually open your garage door
- Identify multiple people who can provide support and assistance in operating equipment, including opening a garage door, during an outage
- Build or restock your emergency kit with flashlights, fresh batteries, first-aid supplies, food and bottled water per the guidelines found at [ready.gov](#).
- Understand how to safely operate any backup generators, and ensure they are ready Have an alternate plan for storing medications that require refrigeration or using medical devices that need power
- Freeze water in old milk or soda bottles, then place them in the refrigerator when the power goes out
- Sign up for emergency alerts from your county so that you can be informed of other wildfire safety-related update

It would be the first public safety outage since the power [company announced it was starting the program last summer](#).

According to NV Energy's website, the power outage is 'highly likely' to happen starting at 7:00 a.m. on Friday, September 18 and will affect more than 8,700 customers. If it happens, it's expected to last 11 hours.

Incline PSOM zone ☆

This map was created by a user. [Learn how to create your own.](#)



Search Site



Experts Say Drought, Wildfire Risk to Persist Across Much of US This Fall

TRAVIS BUBENIK September 17, 2020



A tree casts embers as the North Complex Fire burns in Plumas National Forest, Calif., on Monday. (AP Photo/Noah Berger)

(CN) — As historic wildfires continue to [burn](#) across California, Oregon and other Western states, government climate experts say much of the U.S. is likely to see persistent drought conditions and fire risk alongside continued above-average temperatures through the fall.

During a [briefing](#) Thursday, forecasters with the National Oceanic and Atmospheric Administration said that while wetter conditions are expected to bring some drought relief to parts of the Pacific Northwest and New England in the months ahead, drought conditions are likely to persist or even worsen in Central and Southern California and across the Southwest.

“That would certainly elevate the chances for continued elevated wildfire risk,” Brad Pugh, a meteorologist with NOAA’s Climate Prediction Center, told reporters.

The forecast comes amid a year of unusually warm temperatures across the U.S. and much of the world. NOAA says 2020 is “virtually certain” to rank as one of the five warmest years on record since 1880.

This year is also likely to become one of the costliest years on record for damages from natural disasters that [scientists say](#) are becoming more intense because of climate change.

“The United States has a high likelihood of trying — or even perhaps breaking — the 40-plus year annual record for highest number of U.S. billion-dollar disasters to affect the country,” NOAA climatologist Adam Smith said during Thursday’s briefing.

The agency defines “billion-dollar” disasters as those where damages reached or surpassed \$1 billion. The U.S. saw 14 of those events last year that raked up \$45.4 billion in damages, [according to NOAA](#).

Smith said the nation saw 10 billion-dollar disasters just through June, a number that doesn’t count the flurry of wildfire activity that began in August.

“We have a lot of fire season still ahead of us,” he said.

While many recent headlines about disasters have centered on wildfires and [hurricanes](#), the rare “derecho” wind storm that [blasted](#) across the Midwest in August also significantly contributed to nature’s destructive toll this year.

According to NOAA, the storm affected more than 10 million acres of mostly corn crops across Iowa, a figure that represents 43% of the state’s total crops.

“Just the crop losses alone are in the billions of dollars,” Smith said.

The role of climate change in natural disasters, particularly when it comes to wildfires, has recently become embroiled in the U.S. presidential election. President Donald Trump has repeatedly denied or dismissed the expertise of scientists who have [linked](#) climate change to the conditions that enabled this year’s fires. Former Vice President Joe Biden has meanwhile [slammed](#) Trump for what the Democratic challenger called the president’s “path of indifference” on climate change.

Though the coronavirus pandemic led to a [brief, record-breaking](#) drop in climate change-causing carbon emissions earlier this year as economies shut down and global travel slowed to a crawl, those emissions had already rebounded by early June to near pre-pandemic levels, according to a recent climate [report](#) from the United Nations and other organizations.

Notably, even with the pandemic’s continued drag on the global economy, NOAA experts said Thursday that last month was still the second warmest August on record, yet another sign that the pandemic has not significantly slowed the pace of climate change.

An official website of the United States government.

We've made some changes to [EPA.gov](https://www.epa.gov). If the information you are looking for is not here, you may be able to find it on the [EPA Web Archive](#) or the [January 19, 2017 Web Snapshot](#).



News Releases from Region 09

U.S. EPA Announces \$69 Million WIFIA Loan for Innovative Water Recycling Project in Oceanside, CA Nationally, EPA's 27 WIFIA loans are helping finance more than \$12 billion in water infrastructure projects

09/17/2020

Contact Information:

Soledad Calvino (calvino.maria@epa.gov)

415-972-3512

Oceanside, Calif. – Today, at an event with Oceanside Mayor Peter Weiss, U.S. Representative Mike Levin and other officials, U.S. Environmental Protection Agency (EPA) Assistant Administrator for Water David Ross announced a \$69 million Water Infrastructure Finance and Innovation Act (WIFIA) loan to help finance the Pure Water Oceanside Project. This innovative water reuse project will purify recycled water to create a new source of high-quality drinking water that is clean, safe, drought-proof and sustainable while benefitting the environment by reducing discharges into the ocean.

“EPA’s support for this project illustrates two agency priorities as we work to

meet 21st century water demands—reusing the water that we have and revamping our nation’s water infrastructure,” **said EPA Assistant Administrator for Water David Ross.** “With WIFIA’s support, Pure Water Oceanside will be a landmark project as EPA looks to foster additional innovative water reuse strategies and infrastructure investments across the country.”

The Pure Water Oceanside Project will enhance the city’s water system by constructing a new advanced water purification facility and expanding the existing recycled water distribution system. The Project will supply Mission Basin with an additional 4.5 million gallons per day (MGD) of highly purified water that will improve overall water quality in the aquifer, relieve over-pumping conditions and reduce discharges to the Pacific Ocean. The project will also reduce the demand for imported water by providing a local, drought-proof water supply produced by the city.

“By improving water infrastructure, we are improving the quality of life and public health in our communities,” said EPA Pacific Southwest Regional Administrator John Busterud. “Through the WIFIA loan program, EPA is happy to support the Pure Water Oceanside Project in ensuring access to clean and safe drinking water for decades to come.”

“I am proud and excited for the City of Oceanside and everyone who has worked so hard on the Pure Water Oceanside project. Now more than ever, it’s critically important that we diversify our water supply. Thanks to Pure Water Oceanside, the City of Oceanside, and this EPA loan, we are one step closer to achieving that independence,” said U.S. Representative Mike Levin (CA). “This is an extraordinary milestone and will make a huge difference for countless families in North County. The cooperation between local, state, and federal governments is truly impressive, and I’ll continue to support this project in any way I can.”

“The City of Oceanside is proud to be a leader in sustainability and water reliability. Pure Water Oceanside marks the next big step for our City as the project will safeguard against drought, reduce our dependence on imported water, and create an exceptionally pure drinking water supply,” **said Oceanside Mayor Peter Weiss**. “I appreciate the U.S. EPA in their funding support as it is a critical aspect for Oceanside’s ability to continue to improve our local water supplies while minimizing our impact to our rate payers.”

The water reuse benefits of this project highlight commitments made under the National Water Reuse Action Plan—a collaborative effort and the first initiative of its magnitude aimed at strengthening the sustainability, security and resilience of our nation’s water resources. The Action Plan frames the business case that water reuse is a viable and growing means of supporting our economy and improving the availability of freshwater for farmers, industry, communities, and ecosystems. The Action Plan identifies 37 specific actions across 11 strategic themes, including highlighting the potential for EPA’s WIFIA loan program to help finance water reuse projects.

WIFIA is providing financial support at a critical time as the federal government, EPA, and the water sector work together to help mitigate the public health and financial impacts of COVID-19. This project will cost \$158 million, and EPA’s WIFIA loan will finance nearly half of that figure. The remaining project funds will come from a combination of grants, water system revenue backed obligations, and system funds. The WIFIA loan will save the City of Oceanside an estimated \$24 million compared to typical market financing. Project construction and operation are expected to create 622 jobs. Since the beginning of March 2020, WIFIA has closed eleven loans and updated three existing loans with lower interest rates. These recent efforts by EPA’s WIFIA program will save ratepayers over \$1 billion compared to typical market financing. Since the first WIFIA loan closed in April 2018, EPA has issued 27 WIFIA loans totaling \$5.7 billion in credit assistance to help finance \$12 billion for water infrastructure projects while creating 26,800 jobs and saving ratepayers \$2.6 billion.

Background on WIFIA

Established by the Water Infrastructure Finance and Innovation Act of 2014, the WIFIA program is a federal loan and guarantee program administered by EPA. WIFIA’s aim is to accelerate investment in the nation’s water infrastructure by providing long-term, low-cost supplemental credit assistance for regionally and nationally significant projects. The WIFIA program has an active pipeline of pending applications for projects that will result in billions of dollars in water infrastructure investment and thousands of jobs.

EPA is currently accepting Letters of Interest for FY 2020. Approximately \$5 billion in financing is available. For more information about the FY 2020 selection process, visit: <https://www.epa.gov/wifia/wifia-funding-currently-available>.

For more information about the WIFIA program’s accomplishments through 2019, visit: <https://www.epa.gov/newsreleases/epa-announces-first-wifia-annual-report-highlighting-35-billion-infrastructure-funding>.

Learn more about EPA’s [Pacific Southwest Region](#). Connect with us on [Facebook](#) and on [Twitter](#).

LAST UPDATED ON SEPTEMBER 17, 2020

Home > News > Homelessness > **Governor's Bowl Park slated for permanent e**

HOMELESSNESS

Governor's Bowl Park slated for permanent emer

By Bob Conrad | September 18, 2020

People living in a homeless camp in downtown Reno had to vacate the area early June 3 as RPD moved in to clean the area. Image: Eric Marks



The Reno City Council next week is scheduled to consider a resolution for the purchase of Governor Bowl Park, at East 7th Street near the Spaghetti Bowl, to be used as regional shelter to house those experiencing homelessness.

“The region needs to move quickly to secure an alternative location for a new emergency homeless shelter site,” city staff said. “Local agency staff have identified the Governor’s Bowl Park as the preferred location. This site is ideally located, offers the space to accommodate adequate shelter capacity, and is properly zoned. Developing a regional shelter site at the location will benefit the entire region.”

The need is immediate since the 4th Street shelter, which opened a month ago, can only be used temporarily. “What we need to do is find a longer-term site that’s larger and more suitable for additional sheltering,” Arlo Stockholm, the City of Reno’s acting assistant city manager, said in August. “We’re going to need to make some decisions around October time and start assembly of a new, larger facility then—or else winterize the facility if we don’t have a longer-term site ready to go.

The regional homeless advisory board, comprising county and city officials from Sparks and Reno, support the use of Governor’s Bowl Park for the emergency shelter.

“To expedite acquisition, the parties have tentatively agreed to reserve portions of the property that adjo 80 and I-580 for possible future freeway use,” Stockham said in a report to the homeless advisory board. “leaves a somewhat smaller, but still adequate, site for future homeless facilities. Initial plans are for 46,00 [square feet] of shelter space, which reflects the estimated space needed to address impacts of COVID-19

If local governments purchase the site for the shelter, expected by year’s end, construction is anticipated take about eight weeks. A special use permit for the project will take three months.

Homelessness increasing

Reno’s homeless population continues to grow. The region’s point-in-time count for 2020, which docume the region’s homeless population, shows a 76% increase in those experiencing homelessness in just one year.

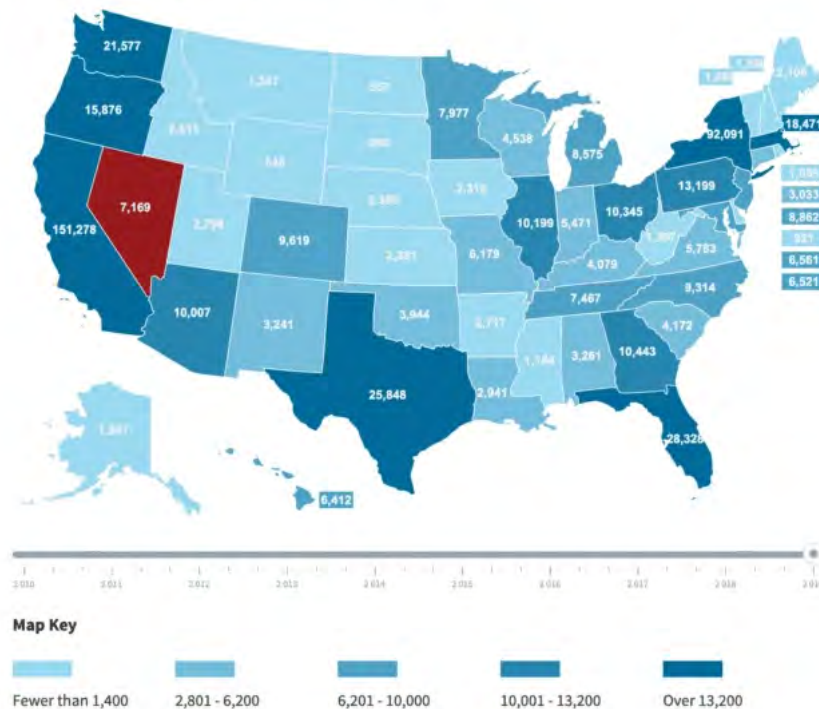
Evidence is aplenty. Tents and encampments are seen throughout the Reno area, especially along the Truckee River.

According to the city, “459 individuals generally recreate during the day and stay overnight in parks, open spaces, sidewalks, abandoned buildings, and other locations, and are at higher risk of injury and possible exposure to and propagation of negative public health illnesses.”

It’s a problem [affecting larger cities on the West Coast](#) with low-paying jobs and unaffordable housing determined to be contributing factors.

“It’s really a longstanding challenge Reno has had—and we’re not alone,” Stockham said. “Cities all over country are grappling with this. The homeless population is significant and expected to rise as a result of COVID. You add that to essentially doubling the space requirements—which is necessary for COVID safet and cities all over the country are scrambling for emergency solutions.”

Total People Experiencing Homelessness





BOB CONRAD

Bob Conrad is co-founder of This Is Reno, which he manages as publisher and executive editor. He also works part time for the University of Nevada, Reno.



Save my name, email, and website in this browser for the next time I comment.

* This Is Reno only publishes comments by those who include real first and last names. Anonymous comments and comments using fake names will not be published. By using this form, you agree to abide by our commenting policy found linked at bottom of this page, and you agree with the storage and handling of your data by this website.

KTMB Truckee River cleanup is on Saturday



The Truckee River in Sparks, Nev., taken July 14, 2009. (AP Photo/Scott Sady)

By Staff

Published: Sep. 20, 2020 at 3:08 PM PDT

RENO, Nev. (KOLO) - The 17th annual Keep Truckee Meadows Beatifical Truckee River Cleanup is Saturday, Sept. 26.

People can sign up to volunteer here: <https://www.ktmb.org/volunteer>.

Due to increased safety measures, volunteers are limited so people need to sign up in advance. As of Sunday, almost all spots were filled.

KTMB has produced a COVID-related safety protocol video and requires masks while volunteering. Updated safety information is on the website when people sign up to volunteer.

This year, KTMB will include tributaries and streams to the Truckee River. KTMB's cleanups over the summer were able to remove more than 77,000 pounds of trash and 31,000 pounds of green waste to improve the health and safety of the ecosystems.

"The Truckee River is an extremely important resource for our community," said Christi Cakiroglu, KTMB executive director. "It not only provides the majority of local drinking water, but endless opportunities for recreation, tourism and more. Our Truckee River Cleanup Day, as well as our year-round cleanup efforts, are an important piece to the puzzle of keeping our river clean year-round."



News

[Back to list \(/news\)](#)

Announcing the Launch of the Water Equity Network

This extraordinary year has put a sharp focus on how inequity affects a community's well-being. The COVID-19 virus has highlighted how interconnected we are, but we are definitely not all "in the same boat" as we navigate these waters. In a time of pandemic, intensifying climate change, and growing awareness of racial inequities, we see clearly that people in vulnerable communities experience worse outcomes in terms of health and well-being, employment, and access to the basic needs of food, water, and housing. We know that these disparate outcomes are underpinned by systemic racism and classism in our cities and their systems of operation—and that includes our water systems.

As anchor institutions in their communities, water utilities can play a significant role in advancing water equity—but they can't do it alone! Cross-sector collaboration among utilities, community organizations, environmental groups, philanthropy, and other local stakeholders is key to building thriving, equitable water systems and communities. And we can all learn from and support one another in this work.

To that end, the US Water Alliance is excited to announce the launch of the Water Equity Network (<http://uswateralliance.org/waterequitynetwork>). This network builds on our two-year Water Equity Taskforce (<http://uswateralliance.org/initiatives/water-equity/taskforce>) effort, seven cities came together to build cross-sector teams and create roadmaps for advancing water equity in their communities. These teams focused on the three pillars of water equity outlined in our national briefing paper, *An Equitable Water Future*: (http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf)

- Ensuring all people have access to clean, safe, affordable water service,
- Maximizing the community and economic benefits of water infrastructure investment, and
- Fostering community resilience in the face of a changing climate.

The Water Equity Network is a nationwide community of practice where cities can share best practices—including COVID-19 response strategies—in real time, engage in cross-city coaching and mentoring, and advance equitable water management. Network members will have an opportunity to build trusting relationships with diverse local partners to tackle water equity issues, and they'll engage with other city teams facing similar issues to share ideas and solutions.

Join the Alliance

Membership in the US Water Alliance is a unique opportunity to join a network of cutting edge leaders, participate in exclusive peer-to-peer exchange opportunities, enhance your organizational effectiveness, and play an influential role in water policy and stewardship **Join Us > (/about/become-member)**

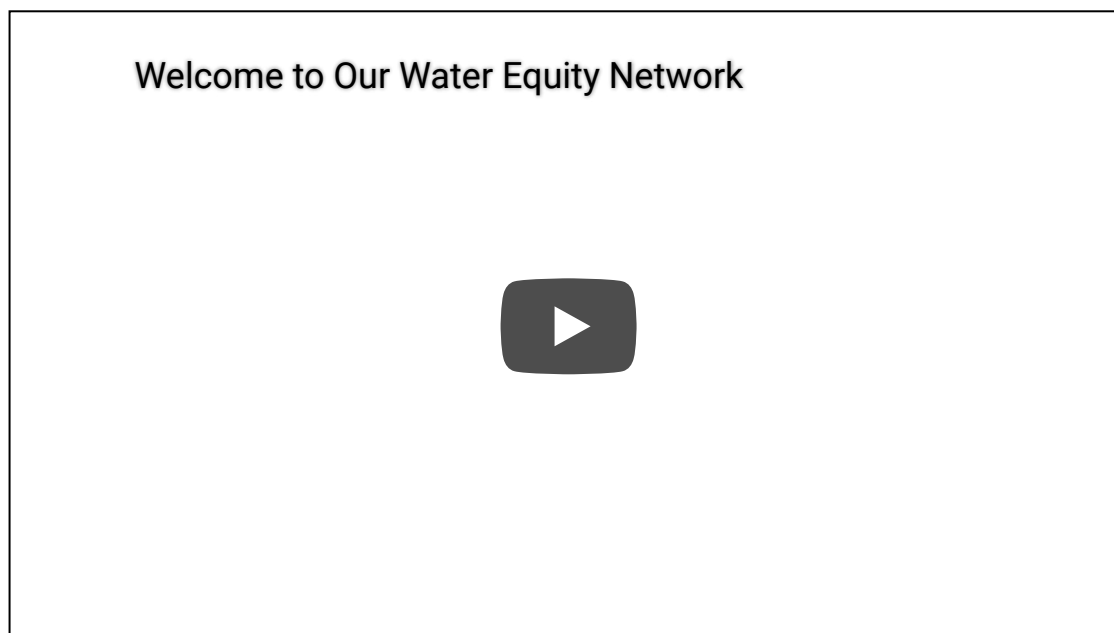
Contact Us

(415) 921-9010

info@uswateralliance.org (mailto:info@uswateralliance.org)

1010 Vermont Ave NW, Suite 1100
Washington, DC 20005

1970 Broadway, Suite 950
Oakland, CA 94612



One Water, One Future

©2020 US Water Alliance.
All rights reserved.

[Privacy Policy \(/privacy-policy\)](/privacy-policy)

Follow Us

[\(https://www.facebook.com/thevalueofwater/\)](https://www.facebook.com/thevalueofwater/)

[\(https://twitter.com/USWaterAlliance\)](https://twitter.com/USWaterAlliance)

[\(mailto:info@uswateralliance.org\)](mailto:info@uswateralliance.org) [\(https](https://www.uswateralliance.org/)

City of Reno looks for options as homelessness keeps climbing Press Clips

by Karsen Buschjost

Tuesday, September 22nd 2020

Governor's Bowl Park off of 7th Street could be turned into a large homeless shelter. The City of Reno says nearly 1,000 people are homeless now.

RENO, Nev. (News 4 & Fox 11) — Reno City Council members held a special meeting Tuesday as the city's homeless population has reached nearly 1,000.

The 2020 regional [Point in Time \(PIT\)](#) count identified 459 unsheltered people and an additional 514 people in emergency shelters. The COVID-19 pandemic has impacted housing security and reduced capacity at existing shelters around the city.

Now the city is looking at [Governor's Bowl Park](#) off of 7th street downtown as an option for a large homeless shelter.

"What we lack is a large enough site for a no barrier shelter that meets the needs" says Arlo Stockham, acting assistant city manager for City of Reno.

ADVERTISING

The shelter could be up to 46,000 square feet, double the size of any other shelter in Reno. The city must first purchase the land from the state which will cost \$2.2 million, according to documents. The shelter itself would cost \$5.8 million. Today members agreed to move forward with the purchase of the land.

The city says it needs to act quickly in converting the property, aiming to have it built some time in the winter. A key portion of funding needs to be used before the new year.

"The current expiration of CARES money is January 1st," says Stockham. "We are really needing that CARES money to fund this facility."

City officials say the Reno Events Center would not suffice as a potential option as it provided a "less than adequate" situation that resulted in people experiencing homelessness on the streets for the majority of the day.

For more on the acquisition of Governor's Bowl Park, click [here](#).

Reinforced Concrete Pipe Installed in Reno Stormwater System

Following engineering analysis to confirm shortcomings with the existing drainage, Atkins North America designed a 5,600-ft. stormwater management system using reinforced concrete pipe and elliptical reinforced concrete pipe in Reno, Nevada.

September 23, 2020

[Rinker Materials](#)

**CONCRETE
CONTRACTOR.**



Atkins North America, Inc. designed a robust 5,600-ft. stormwater management system using reinforced concrete pipe (RCP) and elliptical reinforced concrete pipe (ERCP) from Rinker Materials capable of handling future major flood events.

Rinker Materials



When the drainage system built in the 1950s and 1960s failed to protect homes and business on the west side of Reno from flooding caused by a storm in 2014, the city took action.

Following comprehensive engineering analysis to confirm shortcomings with the existing drainage, Atkins North America, Inc. designed a robust 5,600-ft. stormwater management system using reinforced concrete pipe (RCP) and elliptical reinforced concrete pipe (ERCP) from Rinker Materials capable of handling future major flood events. Installed by Q&D Construction in the existing infrastructure along Fourth Street and Stoker Avenue, the \$5.4 million project was completed on budget and ahead of schedule in August 2019.

Installed by Q&D Construction in the existing infrastructure along Fourth Street and Stoker Avenue, the \$5.4 million project was completed on budget and ahead of schedule in August 2019. Rinker Materials

In recalling the 2014 storm that sparked one of Reno's largest infrastructure projects in the past decade, John Flansberg, director of Reno Public Works says, "That (the storm) caused the intersection to be unavailable for traffic use, and obviously it's an important corridor for traffic. It brought a lot of sediment and actually inundated a local hotel."



Q&D Construction project manager Daniel March added, "The water was just overrunning people's driveways, overrunning yards. It's like there wasn't a drainage system here. It was just a smaller system."

In addition to RCP and ERCP ranging from 36 in. to 48 in., the new stormwater management system features catch basins and an outlet into the Truckee River. Designed to quickly and efficiently capture and relocate high volumes of stormwater, the system helps minimize potential flood damage from the intersection of Seventh Street and Rey Street and end at the Truckee River at Dickerson Road and Chism Street.



The maximum design flow capacity for the project was about 113 cfs for the five year storm with a maximum RCP capacity of 219 cfs.

Installing the new stormwater management system in the existing infrastructure saved time and money, while limiting disruption to businesses and residents.

As an added benefit, the stormwater runoff from Interstate 80 that will be conveyed through the new stormwater management system facilitated a cost-sharing agreement on the project with the Nevada Department of Transportation (NDOT).

Construction of the project began in February 2019 and involved seamless collaboration across many public and private agencies including the city of Reno, AT&T, Carson-Truckee Water Conservation District, Charter Spectrum, Kinder Morgan, NDOT, Nevada Division of Environmental Protection, Nevada Division of State Lands, NV Energy, Orr Ditch Water Company, Truckee Meadows Water Authority, U.S. Army Corps of Engineers and Union Pacific Railroad.

According to the city of Reno, "The new improvements will increase capacity to the entire drainage system and provide a direct benefit to the businesses and residents in the watershed, as well as water quality benefits to the Truckee River."



Construction of the project began in February 2019 and involved seamless collaboration across many public and private agencies.

HOMELESSNESS

City to ramp up homeless camp cleanups, enforce no-camping ordinances

By Bob Conrad | September 24, 2020



Reno Police launched an early morning cleanup of a homeless encampment in downtown Reno. Image: Isaac Hoops

Mayor Hillary Schieve said Tuesday she wants an emergency declared in relation to homelessness in the area, particularly for encampments along the Truckee River. She said environmental contamination and health hazards associated with the encampments need to be immediately addressed. The city therefore is going to again ramp up cleanup efforts and enforce no-camping ordinances at City Plaza and along the Truckee River.

The Reno City Council approved on Tuesday a resolution to build an emergency shelter for those experiencing homelessness in the region. The shelter is slated to be constructed at Governor's Bowl Park. It is scheduled to be built early next year.

"It basically takes up the whole ball field," Stockham said. "We are far from alone in dealing with these challenges right now. This is kind of the norm, and it's worse in many cities."

The structure will cost about \$100 a square foot. Site preparation will be the bulk of the expense, Stockham told the city council.

Time is of the essence with winter approaching, Stockham added, but the first deadline to start construction in time for winter has passed. That means the facility will not be in place before cold temperatures set in. It will be located [near the new temporary emergency shelter](#).

The project will be funded by CARES Act money from the federal government. The city will share the cost with Sparks and Washoe County.

Now, Mayor Schieve said the river is in crisis and something needs to be done. She called for an emergency declaration in the hope of receiving additional funding to deal with the problem. (Stockham said he was unsure if this was possible.)

"People sleeping along the river is not safe, and we can no longer allow that to happen," Schieve said. "It's dangerous. It's a public safety hazard. It's long overdue."

Service requests to the city, as well as hazardous waste calls, are spiking, city officials said. The city was hit with [hazard violations six times by the Washoe County Health District](#). Citizen complaints about conditions at encampments led to the district issuing the violations.

The city has also received 1,300 requests for service related to homeless camps.

"The waste collection has been a little startling," said the city Senior Management Analyst Cynthia Esparza. "Coming into this position, I've never seen that much collection for yards of waste. I actually had to Google what that amounts to."

It's 2,209 yards of waste and 416 gallons of biohazard.

City approves resolution for new emergency shelter at Governor's Bowl Park



"It's dangerous. It's a public safety hazard. It's long overdue."

“The safety issues associated with the encampments have really grown and outweigh the safety considerations related to COVID,” said Arlo Stockham, assistant city manager.

He cited the month of April when the city stopped cleanups of homeless camps. Conditions became unsafe. There was a murder under the Wells Avenue overpass. More recently, res started at camps have caused public safety concerns.

“Reno Fire ghters are dealing with a signi cant increase in human caused res among our vulnerable homeless population,” the Reno Fire ghters Association posted Sept. 21 on Twitter. “These res consist of warming and cooking res, and res that are impacting residents and businesses.”

“*Reno Fire ghters are dealing with a signi cant increase in human caused res among our vulnerable homeless population. These res consist of warming and cooking res, and res that are impacting residents and businesses. [pic.twitter.com/2yyiWmnqFq](https://twitter.com/2yyiWmnqFq)*
— Reno Fire ghters (@RenoFire ghter) September 21, 2020

Stockham said the city will resume “clean and safe operations,” particularly along the river.

“It’s gotten really bad; it’s gotten really unsafe,” he said. “Sparks and Washoe are doing the same, and that in some ways has pushed more [people] to the City of Reno.”

Comments at yesterday’s City Council meeting made clear city of cials are now more openly pushing for the cleanups. Of cials in the past have sent mixed messages on the issue of camp sweeps and citations issued by the Reno Police Department.

City spokesperson Jon Humbert in June said it was Reno Police discretion to issue citations to those living along the river near Wells Avenue, but [homeless advocates said the city rarely if ever has issued citations](#).

HOMELESS

HOMELESS SHELTER

HOMELESSNESS

RENO CITY COUNCIL



BOB CONRAD

Bob Conrad is co-founder of This Is Reno, which he manages as publisher and executive editor. He also works part time for the University of Nevada, Reno.

[globe](#) [f](#) [t](#) [@](#) [in](#)

3 COMMENTS



RACHEL RAKACZKY

September 26, 2020 - 7:38 pm

Here we go again. Instead of providing dumpsters and outhouses for those forced to live on the streets, they just shoo them away from public view and start the process of building new camps elsewhere, only to have residents complain about THAT. When are we going to start treating the homeless like PEOPLE and not a nuisance? Sorry they are so unpleasant to look at, but imagine how they must feel living it. A little compassion and common sense can go a long way here. These people don’t want to live in your crappy, dangerous, crowded shelters that are only available for sleeping anyway. They still have to cart their stuff around during the day, so what have you accomplished besides more hardship for those already suffering? So tired of this constant merry-go-round of negligence.



DONNA L MILLER

September 24, 2020 - 1:43 pm

Thank you for addressing this problem. Are we helping nevada resident? I do not think we should try to help others from other states. We should help them get back to the state that they came from. I am retired I hope the funds use on taking care of all the homeless , will not cute funding for nevada senior.



PETER NEUMANN

September 24, 2020 - 9:04 am

Mayor Schieve is absolutely correct that the homeless camps along the Truckee River and in Public plazas are a dangerous safety hazard. They are dangerous not only to the general public but to the campers themselves. And if an epidemic of Covid-19 breaks out among the homeless people who have decided to congregate along the Truckee River in Washoe County, our hospitals and health care system will be overpowered. This is a public health emergency and we are all going to need to meet it. Our government agencies must deal with it, and the taxpayers must pay for it with, regrettably, paying higher taxes. Nobody likes paying taxes, but we are truly facing a crisis and we must bail ourselves out of it. I doubt if the Trump administration will help.

Lemmon Drive to close for two days

By ThisIsReno | September 26, 2020

Lemmon Drive will be closed to through-traffic for two days, Sept. 29 and 30, as crews work to remove concrete barriers placed by the county for flood mitigation.

“Given the progress of [flood mitigation] efforts, the barriers are now being removed,” the county said in statement.

Removal of the barriers begins at 6 a.m. Sept. 29 between Deodar Way and Nectar Street. The City of Reno reroute traffic on Military Road while work is completed.

Drivers are advised to allow extra time to get to their destinations due to the closures.

The closure section is marked in the map below.



LEMMON VALLEY

WASHOE COUNTY



THISISRENO

This Is Reno is your source for independent, online Reno news and events since 2009. We are locally owned and operated. #thisisreno



September 28, 2020

After Clean Water Act change, uncertainty reigns over water protections

The Trump administration's revision of which waterways are protected creates regulatory uncertainty, especially in arid places.
by [Ariana Brocious](#) [TWEET](#) [SHARE](#)



Water in the Rillito River following a monsoon storm. July 23, 2020
Christopher Conover/AZPM

Listen
-1:44

In June, the Trump administration's [new version](#) of which waters are protected under the Clean Water Act took effect. The new rule is an about-face from the Obama-era regulations, and Arizona state regulators are trying to make sense of it.

The Trump administration significantly narrowed the definition of what qualifies for protection under the Clean Water Act, which means the majority of waterways in Arizona--those that flow only after rain or snow--no longer get such protection.

The new rule stipulates that "relatively permanent waters" that are perennial or intermittent but connect to a traditionally navigable water, like a river, are protected. But defining which waterways are permanent enough is proving tricky, especially since the federal government hasn't provided the data for that yet.

The new Navigable Waters Protection Rule does require Clean Water Act permits for point-source discharges to waterways that are protected, known as "waters of the U.S." That means, for example, that a power plant that discharges into the Colorado River needs a permit. But, in an example provided by ADEQ during an informational webinar, the Kingman-Hilltop and Willcox Wastewater treatment plants don't need permits because they don't connect to any relatively permanent waterways.

Arizona's Department of Environmental Quality is trying to make the process a bit clearer for those who hold Clean Water Act permits in the state. Part of that work involves creating a map of the so-called "flow regime" of all the waterways in Arizona, using data from multiple sources. Flow regime is basically how much water is in a given stream over the course of the year, and is supposed to be based on a 30-year average of data. Still, about 80% of stream segments on the ADEQ map don't have defined flow regime yet. ADEQ said they will continue to work on the map and expect some additional federal guidance from the Environmental Protection Agency and Army Corps of Engineers, though those departments have not said when they will release such tools.

ADEQ has also developed what they're calling a "tool kit" to help permit-holders decide whether they need a Clean Water Act permit under the new rule. The department is also working on a state-level set of surface water protection regulations, which it currently lacks. Pima County Regional Flood Control District is regulated by the Clean Water Act and ensures compliance with the federal law. For its part, the district is continuing to operate under the regulations in place before the rule change, according to Director and Chief Engineer Suzanne Shields.

[VIEW LARGER](#) A map of flow regime designations created by ADEQ to help clarify which waterways in Arizona still require protection and permits under the Clean Water Act. As of mid-September, the status of 80% of the state's streams are still undetermined.

Courtesy ADEQ

"And the reasons why we're doing that is because say I start designing a project and I need a 404 permit from the [Army] Corps [of Engineers] for disturbance of 'waters of the U.S.' It may take me two years to get the project designed. And there's already been some lawsuits filed on this definition of waters so I can't take the risk of getting to the end of the two years and then suddenly it is a regulated water," Shields said.

She said one complicating matter in terms of gathering data for Pima County is that most rivers like the Rillito or Pantano are so wide that stream gauges don't catch small flows, because they're set to register floods like those after monsoons.

The Santa Cruz River from Camino del Cerro downstream to the county line is defined as a traditionally navigable water, Shields said. "But then my question would be, is something like the Rillito and Sabino Canyon, that flow fairly regularly, are they also 'waters of the U.S.' or not? And there's no way I can answer that question, let alone any of the other ephemeral streams."

Shields said ADEQ is expecting permittees like Pima County to determine whether streams are "waters of the U.S." or not, even though she said locally they don't have the authority to make those decisions. Her department will continue to follow the determinations of the Army Corps of Engineers.

ADEQ said in an email that "like other regulations, such as the Clean Air Act or building codes, businesses can decide if they will apply for a [Clean Water Act] permit, however, if they do not obtain a permit and ADEQ or EPA determine the facility is subject to the CWA, any appropriate compliance and enforcement action would be taken." ADEQ did not make anyone available for an interview.

Shields said other industries she regularly works with, like construction and mining, also seem to be staying the course of permitting prior to the Trump administration's rule change, because so much uncertainty remains and violating CWA protections can be quite risky. She said this rule change has also complicated the county's storm water system permit process.

"I've been working in this industry since 1976 and the definition of Clean Water Act regulations, especially what is a 'waters of the U.S.', it's just a revolving door. It's changing constantly and I think this change makes it even more unclear and more uncertain as to what's being regulated and what's not," Shields said.

Several lawsuits have already been filed against the Trump administration's rule.

[VIEW LARGER](#) A flowchart taken from ADEQ's "tool kit" to help permit holders know if they still need a Clean Water Act permit under the new rule authored by the Trump administration which took effect in June 2020.

Courtesy ADEQ

MORE: [Arizona](#), [Pima County](#), [Environment](#), [News](#), [Water](#)

YOU MAY ALSO LIKE:



[NPS closes route to Quitobaquito Springs](#) [Latest lawsuit against Fort Huachuca over San Pedro water use seeks documents](#) [Supervisor questions county ban on employee contributions](#)

By posting comments, you agree to our [Comment Policy](#)

AZPM encourages comments, but comments that contain *profanity, unrelated information, threats, libel, defamatory statements, obscenities, pornography* or that violate the law are not allowed. Comments that *promote commercial products or services* are not allowed. Comments in violation of this policy will be removed. Continued posting of comments that violate this policy will result in the commenter being banned from the site.

By submitting your comments, you hereby give AZPM the right to post your comments and potentially use them in any other form of media operated by this institution.

CONNECT

[Newsletter](#) [Facebook](#) [Twitter](#) [News Twitter](#) [Instagram](#) [YouTube](#)

ABOUT

[Addresses / Phone Numbers](#) [Employment](#) [Staff Directory](#) [Code of Ethics](#) [Editorial Standards](#) [Diversity Statement](#) [Equal Opportunity Report](#) [Pressroom](#) [Signal Coverage](#) [Maps](#) [Contact Us](#)

SUPPORT

[Donate](#) [Membership](#) [Underwriting](#) [Leadership Society](#) [Donate a Car](#) [Volunteer](#)

COMPLIANCE

[FCC Public Files](#) [Public File Contact](#) [Financial Reports](#) [Annual Reports](#) [CPB SAS Employment Section](#) [Open Meeting Policy](#) [CAB Meeting Calendar](#) [Arizona Board of Regents](#) [Privacy Policy](#)

Arizona Public Media broadcast stations are licensed to the Arizona Board of Regents. Arizona Public Media and AZPM are registered trademarks of the Arizona Board of Regents.

NEWS

Dive teams remove 8,183 pounds of trash from Tahoe and Donner lakes

By ThisIsReno | September 28, 2020



A diver collects underwater litter from Lake Tahoe during a Clean Up The Lake effort. Image: Clean Up The Lake

Plastics, ropes, aluminum cans, clothing and tires are among the nearly 8,200 pounds of small litter removed this summer from Donner Lake and six miles of Lake Tahoe's sub-surface shoreline.

The underwater clean-ups were spearheaded by Colin West and his staff and volunteers from Clean Up The Lake, a nonprofit whose mission is to complete a clean-up of all 72 miles of Lake Tahoe's shoreline. The organization is also working with scientists from the UC Davis Tahoe Environmental Research Center (TERC) and Desert Research Institute (DRI) to better understand issues related to trash and microplastics in the environment and work to address those issues from their roots.

"In comparison to next year's 72-mile SCUBA clean-up of Lake Tahoe, these smaller scale clean-ups gave us the opportunity to practice our craft and fine tune our strategies, while also removing a substantial amount of trash from both Lake Tahoe and Donner Lake," said West. "Our organization now feels even more ready for what awaits us on the 72-mile SCUBA clean up next year."

Dive teams began their work in June and July 2020 and covered the full eight miles of Donner Lake's shoreline up to depths of 25 feet, removing all of the small trash items they could find. That resulted in 5,151.5 pounds of trash removed.

At Lake Tahoe, the team focused on six miles of shoreline near popular recreational areas including Nevada Beach, Zephyr Cove and Secret Beach near Incline Village, recovering 2,238 pounds of trash. Even more litter was removed in previous dives.

Some litter was too large for divers to remove, and will require winches or cranes to extricate it from the water. Divers used the Wildnote App, an archeological surveying software, to pinpoint those locations with GPS for future clean up. They also GPS-marked and photographed historical items that remain in the lake to report those to local authorities.

Conducting the clean-ups are no small feat. West and his team have developed a strategic approach to conducting the efforts, and use a team of SCUBA divers, free divers and snorkelers. Those in the water are supported on the surface by people in kayaks, zodiacs, jet skis and boats.

This summer's clean-ups were funded through a grant from license plate funds and sub-grants from the U.S. Environmental Protection Agency and Nevada Department of Environmental Protection.



Litter cleaned up from day one of efforts at Nevada Beach.

Image: Clean Up The Lake

THISISRENO



This Is Reno is your source for independent, online Reno news and events since 2009. We are locally owned and operated. #thisisreno



Krishna Pagilla has been elected a fellow of the ASCE

The election honors Pagilla's more than 25 years of experience in water and wastewater treatment engineering, water resource recovery, water reuse, and environmental molecular biology and biotechnology.

Research & Innovation | September 28, 2020

Curtis Vickers

Pagilla serves as the Ralph E. and Rose A. Hoeper Engineering Professor and Chair of the Department of Civil and Environmental Engineering



[Share to Facebook](#)
[Share to Twitter](#)

After receiving his Ph.D. in environmental engineering from University of California, Berkeley in 1994, Department of Civil and Environmental Engineering Chair Krishna Pagilla has embarked on a career that, to date, has resulted in more than 200 publications and more than \$10 million in research grant funding. Most recently, he received an award of \$1.8 million to study COVID-19 prevalence through wastewater surveillance.

In recognition of these accomplishments, the American Society of Civil Engineers (ASCE) has elected him as a fellow. The honor is given to only 3 percent of its membership of 150,000 engineering professionals.

"Being a civil and environmental engineer, this recognition by ASCE as a Fellow is a proud moment in my career."

About the honor, Pagilla said, "Being a civil and environmental engineer, this recognition by ASCE as a Fellow is a proud moment in my career. I hope it adds to the visibility of the CEE department and the University as having as many top-rated faculty in the nation as we do."

Pagilla's career has been marked by his efforts to unite stakeholders in pursuit of a common goal to make the world safer and more sustainable. His work has been performed with funding from the USEPA, USDA, NSF, WE&RF (now WRF), USDOE, USBOR, to name a few, and he is the Founding Director of the Nevada Water Innovation Institute, which brings together six public entities and the University to drive innovation in the water sector.

Among the many accomplishments of the NWII is the OneWater Nevada program, which seeks to return potable water from the wastewater system to ground water in just a few hours. The project involves the Truckee Meadows Water Authority (TMWA), the City of Reno, the City of Sparks, Washoe County, and the Western Regional Water Commission, and it is led by one of Pagilla's students, Lydia Peri, emerging resources program administrator at TMWA.

"Krishna Pagilla is incredible," Peri said of the Ralph E. & Rose Hooper Engineering Professor. "He has brought so much to the University and created such a link between the University and the agencies. The NWII is key to the partnerships in OneWater Nevada. I am fortunate to be working with him on this project."

Even as Pagilla has mentored 40 M.S. and doctoral students like Peri, he has served as the President of Illinois Water Environment Association (2012-13) and as the Chair of the USA National Committee of International Water Association (IWA) (2016-19). He currently serves as the President of the Nevada Water Environment Association.

Through his leadership, he has earned many honors, including the Camp Applied Research Prize by the Water Environment Federation (WEF) (2013), the Fair Outstanding Educator Medal (WEF, 2013), the McKee Groundwater Sustainable Use Award (WEF, 2019), the ASCE Student Organization Award for Excellence in Teaching and Mentoring (2011), and the International Honor Award (US Department of Agriculture, 2000). He is also an elected Fellow of WEF and IWA.

"Krishna is a consummate professional," College of Engineering Dean Manos Maragakis said. "His passion for the sustainable use of water is matched only by his passion to help everyone around him excel. He is a true mentor to his students while earning a well-deserved stellar reputation the world over as a researcher of the highest level. His contributions to the University and the engineering community cannot be overstated. This recognition is well-deserved."

Related Links

- [The Department of Civil & Environmental Engineering](#)
- [Nevada Water Innovation Institute](#)

[Research & Innovation](#) | Sept

WALKER LAKE – THE LEGAL SAGA CONTINUES WITH THE ENDGAME IN QUESTION

By **Brian Bahouth** - September 29, 2020



An abandoned fishing boat far from the water line on the east shore of Walker Lake. Lake level has dropped roughly 150 feet since agricultural diversions of water from the Walker River began in the early 20th century -photo: CC BY-NC-SA 4.0 Bob Tregilus Photography

Walker Lake, one of 3 endorheic lakes in the western United States, at one time supported an essential fishery and ecosystem for the Walker River Paiute tribe and the regional tourist economy.

Rare terminal lakes have no outflow, and lake levels are a balance between inflow and evaporation.

The Walker River flows more than 100 miles, west to east, to get to Walker Lake. The Walker begins high in the Sierra Nevada in California and passes through what has become one of Nevada's most productive agricultural regions.

Agriculture in the Walker River watershed owes its existence to diversions of Walker River water, and as a result, the river has been over-appropriated for more than 100 years. One hundred twenty-five years ago, the level of Walker Lake was more than 150 feet higher than it is today.

More than 500 water rights holders along the Walker River and a series of reservoirs have deprived Walker Lake of inflow since the turn of the last century, and the lake has died by degrees while the region's agricultural industry has thrived.

A massive population of giant Lahontan cutthroat trout would swim from the lake up into the Walker River to spawn every spring. The number of trout was large and robust enough to support a commercial fishing operation and the Walker River Paiute tribe, but those days are long gone.

The reflection of nearby Mount Grant in lake water is as striking as ever, but in 2020, Walker Lake is a saline puddle by contrast to its former state. According to river flow data from the United States Geological Survey, there is currently almost no water flowing into Walker Lake, a common condition.

Today, where the riverbed meets the lake is an ooze of mud. The lake is all but biologically dead.

But a decades-old public trust lawsuit made a move forward in its glacial process through federal courts last week, and lake advocates are hopeful Walker Lake, a cornerstone of the regional economy and ecology, can one day be revived.

On this edition of the Wild Hare, we hear from Glenn Bunch, president of the Walker Lake Working Group and Simeon Herskovits, an attorney for a public-interest law firm Advocates for the Community and the Environment. Herskovits is the lead attorney representing in the public trust case that seeks to restore and maintain Walker Lake.

(See music and sound design credits below podcast transcript)

What Happened to the River Water?

The Smith Valley is about 50 miles east of the obtuse angle on the Nevada/California border. Most of the valley is in Lyon County and some is in Douglas County. According to the Nevada Department of Agriculture, nearly 500 farms and ranches in Lyon County add roughly \$330 million dollars a year to the local economy. Groundwater is widely used for irrigation, but much of regional farming activity is dependent on Walker River water.

Legal battles date to 1919. The dam to expand Topaz Lake was built in 1922. A mountain meadow became Bridgeport Reservoir in 1924, and more water was diverted from the river. Construction of the reservoirs on the Walker River came with associated drops in the level of Walker Lake. The 1936 Walker River Decree established nearly 500 water rights on the river.

"A Walker Lake Paviotso," 1924 – photo: Edward S. Curtis/Library of Congress

Glenn Bunch is the president of the Walker Lake Working Group and says he and his children grew up swimming and recreating on Walker Lake. Bunch became involved in the effort to save the lake when it became apparent that the economic and ecological heart of the community was literally dying.

Bunch said a working group formed in the 1980s but failed to reach a resolution that would help the lake.

Senator Harry Reid convened another series of meetings in the 1990s, and lake advocates pushed for farmers and ranchers to use sprinkler systems instead of flood irrigation to save more water for the river.

According to Bunch, the water savings did not make it back into the river but meant more acreage under cultivation.

"There was another group of meetings that we started through Senator Reid, and we met for like 5 years with that one. And finally, when we got to the bottom of that, what we needed to do to try to alleviate the problem was, let's see if we can find a happy medium. You guys in ag go to sprinkling, and instead of using 100 percent of your water right, let's get part of it to the lake.

"So they bought some sprinklers to do some testing on it and showed them it could be done," Bunch explained. "Well, instead of them letting that water go down the river to the lake, they increased the size of their fields to put more land under irrigation because, 'hey, look at this, we can use the same amount of water in a bigger area and have more crops.' So that really didn't work well for us," Bunch said.

The [Walker Basin Conservancy](#) also secured money to help improve river bed efficiency so less water would be lost to the ground and evaporation and more would stay in the river and ultimately the lake. Once again, the lake's needs were ignored, said Bunch.

"We started meeting with them, as far as the working group went in '94. I was on the task force before then, but we've been meeting with them (farmers and ranchers) trying to work out some kind of an agreement.

"They would come and tell us if you could find some money and fix this riverbed, if you could find some money and straighten the river here, there would be more water flow down it.

"And so the Walker Basin Conservancy, funded by Senator Reid, had some money, and they started working with straightening the river beds and realigning them and all of that, but still no water has increased coming to the lake.

"What it's done is, it has increased the flows to them (ranchers and farmers), to be able to use more for what they're doing," Bunch said.

"Paviotso house at Walker Lake," 1924 - photo: Edward S. Curtis/Library of Congress

In 1994, Mineral County and the Walker Lake Working Group filed the ongoing public trust lawsuit.

The public trust doctrine is an old system of law that ensures the public's right to access and use natural resources. The doctrine requires that the government hold certain resources in the public trust for the benefit of the people.

Simeon Herskovits is an attorney for the public-interest law firm Advocates for the Community and the Environment. Herskovits is the lead attorney representing in the public trust case that seeks to restore and maintain Walker Lake.

Over years, the case has proceeded through the federal district court or decree court. The merits of the case have gradually come into focus. The presiding judge died. Judge Robert Jones took over the case and dismissed the public trust claim for what Herskovits says were erroneous reasons.

"He did the same to the water rights claims that the Walker River Paiute tribe and the United States Government had asserted," Herskovits said. "So all of that went to the Ninth Circuit (Court of Appeals). And that's how this came to the point where a particular question, the Ninth Circuit reversed Judge Jones on a number of the bases of his dismissal of the public trust claim and then sent this, sent really two questions to the Nevada Supreme Court."

"Walker Lake Level 1969" by 666isMONEY ♥ & is licensed under CC BY-SA 2.0

The initial question for Nevada's highest court was broad in scope. Does the public trust doctrine apply to water rights already adjudicated or allocated under the prior appropriation system of water rights and to what extent?

"The Nevada Supreme Court answered that question in the negative, well, partially in the positive and partially in the negative," Herskovits said. "It said that the public trust doctrine applies to all water rights and waters in the state of Nevada, including those water rights that are previously settled or adjudicated, or in some other way allocated under the state statutory system, or more generally, the prior appropriation system of water law."

"But then it said in the negative, that the application of the public trust doctrine to those rights did not allow for a reallocation of those rights. The court did not go beyond that and say that other forms of managing a water resource such as a groundwater basin or a river system ... there are many ways in which that can be done."

Herskovits says the state Supreme Court has provided enough information for the 9th Circuit Court to send the case back to the district court where the merits of the public trust claim can be fully, and maybe finally, addressed. Ultimately, the decree court could mandate how water is managed in the Walker River basin to ensure the lake is protected under the public trust doctrine.

"There is much authority, both in statutory law and previous case law from Nevada, making it crystal clear that the state, and generally that means the State Engineer in Nevada, has the authority and a duty to manage those water resources and water rights in such a way as to protect the public or general welfare and as the Nevada State Supreme Court, characterized it, consistently fulfilling or protecting the public trust in the administration of water rights."

But Herskovits was clear to say that he would not presume how the 9th Circuit Court or the district court would rule, and more, he would not venture a timeline for the legal process to play itself out.

Buying Land and Water Rights

In recent years, the Walker Basin Conservancy has purchased land and associated water rights with the intention of adding the water to the lake but has yet to be able to redirect the water.

"The Walker Basin Conservancy has purchased 46 percent of enough water from willing sellers to try to help save the lake," Bunch said. "They haven't been able to get it all yet, but they bought 46 percent."

"But this is all tied up in the State Engineer's office. He's only let like 1 percent come through because he has to hold public hearings on whether or not ag wants this water to come down (to the lake).

"The Conservancy purchased the water from willing sellers, so hopefully that some of these decisions that come out of Supreme Court and also hopefully come out of the district court will inform the State Engineer. This water that has been purchased can go to the lake. It is purchased for the lake by these people from a willing seller, so send it. So we're hoping that's the way it comes out."

Tourism revenue and the ecological health of the lake are related. With majestic Mount Grant as a 12,000-foot tall backdrop, Bunch says the fishing is good even though there aren't any fish.

"At one time there was a study done by the state. And at that time that the study was done, I want to say it was in the mid '90s. Fifty, 55 percent of the economy of Mineral County is based off the lake, came from Walker Lake, from people fishing, from people waterskiing, from people buying fuel, from people buying food, to go out and enjoy Walker Lake.

"Well now that the fishing has dropped off ... well, fishing is still good, you just don't catch anything because there's no fish here.

"Until we got the last two years, we've had good water, we've had some water come in and it's brought the lake back up a ways ... I think it's come up 10 feet total in two years.

"With the freshwater laying on top of the saline water, and then this year with the COVID closures of all lakes and reservoirs, Walker Lake stayed open. We had a big influx of people find that the lake was still here and it's still good to go and can still ... with the fresh water that we've received, it was okay to go swimming in and swimming and boating so the usage picked back up, but nothing like it used to be."

The Walker River Paiute tribe has the senior water rights on the river dating to 1859 and is pursuing its own settlement regarding Walker River water. Are the aims of the public trust lawsuit and the tribe's legal goals in conflict or consort?

"Generally speaking, the relationship between Mineral County and the Walker Lake Working Group have been pursuing this public trust claim and the tribe has been pursuing its own appropriative water rights claim is a very friendly, cooperative one," Herskovits said. "And although the objectives of our separate claims are different, they're largely harmonious.

"The lake is of tremendous importance and significance to the tribe. And I think in the tribe's view probably, it's accurate, they are the original, ultimate stewards of Walker Lake, and to them it was sacred and something to be maintained and respected and cherished. So they're, I think, very interested in seeing the lake restored."

"Shores of Walker Lake - Paviotso," 1924 - photo: Edward S. Curtis/Library of Congress

Should the district federal court reapportion water rights under the public trust doctrine, would the tribe's water rights be compromised?

"I think that the tribe has the senior most water rights in the basin. And our view is that it would not be appropriate or necessary for the tribe's water rights, because the tribe arguably has very meager water rights for its ultimate needs or potential uses already, but it has the most senior water rights, I'm not sure that there would need to be any kind of modification that would affect or restrict those water rights," Herskovits said.

What the courts will ultimately decide is at this point uncertain, though Herskovits was willing to speculate that the public trust claim will in no way diminish the tribe's present and future claims on Walker River water.

"The types of management regime changes, the remedies that we hope will be considered and ultimately implemented by the district court in this case, I don't think they would undermine or impair or in any way lessen the tribes water rights, either the water rights that they already have or any new water rights they might obtain through their own claim.

"So I don't think there's anything mutually inconsistent and I would think that pretty much all the remedies we seek under the public trust doctrine would be neutral or would enhance parts of the river that would benefit the tribe and the reservation."

It is Simeone Herskovits' job to fully plumb the gory legal details of the Walker Lake public trust case. But before our interview ended, Herskovits wanted to make sure to emphasize that the lake is much more than briefs, testimony and court rulings.

"I want to emphasize what a remarkable resource Walker Lake was," Herskovits said. "It still is extraordinarily beautiful. But it's lost a great deal of its biological functionality and its recreational functionality and of course, economic utility, because of its degradation, because of the deprivation of even a modest, minimally adequate level of inflow.

"I think it's really a high priority, it ought to be a high priority, to find a way without imposing impermissible harms, or outright elimination of water rights, wholesale, but in a way that is reasonable with regard to the upstream users of water interest, but still acknowledges and restores the lake so that it can be a beautiful and useful and valuable natural resource in a very arid state and part of the country."

Music credits as reported to the Public Radio Exchange, in order of appearance:

Ambient recording of the Walker River and other non-musical recordings by Brian Bahouth

Song: Summer Lightning
Artist: Boards of Canada
Album: Tomorrow's Harvest
Label: Warp
Date: 2013
Duration: 1:26

Song: White Cyclosa
Artist: Boards of Canada
Album: Tomorrow's Harvest
Label: Warp
Date: 2013
Duration: 2:33

Song: Eyesdown
Artist: Boards of Canada
Album: Tomorrow's Harvest
Label: Warp
Date: 2013
Duration: 2:13

Song: New Seeds
Artist: Boards of Canada
Album: Tomorrow's Harvest
Label: Warp
Date: 2013
Duration: 1:37

Song: Animals
Artist: Boards of Canada
Album: Tomorrow's Harvest
Label: Warp
Date: 2013
Duration: 1:32

Sky Vision examines the nation's largest horizontal fish passage at Derby Dam

by Sky Vision Drone Team

Wednesday, September 30th 2020



Derby Dam Fish Gate Commission-3_RTAG.jpg



Watch News 4-Fox 11's Sky Vision Drone Team examine the new Truckee River fish passage at Derby Dam east of Reno, NV. The Construction of the nation's largest horizontal fish screen is completed at Derby Dam, supporting recovery of threatened Lahontan Cutthroat Trout. The Derby Dam Fish Screen helps the Bureau of Reclamation fulfill its mission to provide reliable water in an environmentally sound manner. This project restores watershed connectivity, supports fish movement along the Truckee River and promotes the recovery of the federally threatened Lahontan Cutthroat Trout, as well as agriculture, fishing and recreation in western Nevada.

This \$34 million project was completed in just over one year. The screen provides access to important upstream rearing and spawning habitat for threatened Lahontan Cutthroat Trout for the first time since 1905.

The Derby Dam Fish Screen is the result of two decades of concentrated efforts by Reclamation working with the U.S. Fish and Wildlife Service's Lahontan National Fish Hatchery Complex and Pyramid Lake Paiute Tribe to restore connectivity for the threatened Lahontan Cutthroat Trout. The fish, once thought to be extinct, can now successfully move from Pyramid Lake, past Derby Dam, for spawning.

Reclamation entered into a cooperative agreement with Farmers Conservation Alliance (FCA) to design, construct and commission a horizontal fish screen. The Fish Screen allows fish to safely pass around Derby Dam, accessing their historic habitat along much of the Truckee River.

The construction of Derby Dam, completed in 1905, was one of the first projects of the newly formed U.S. Reclamation Service (now Bureau of Reclamation) organized under the Reclamation Act of 1902. Today, Reclamation oversees infrastructure that delivers water to more than 31 million people and provides one out of five western farmers with irrigation water for 10 million acres of farmland.

Sky Vision operates in partnership with the Reno-Tahoe Auto Group.

NEWS

Reno wraps up ninth-driest water year in recorded history

Amy Alonzo Reno Gazette Journal

Published 2:02 p.m. PT Oct. 1, 2020

If you're someone who waits for a rainstorm to wash your car, the 2019-2020 water year likely left your vehicle pretty dirty – it was the ninth-driest water year on record in Reno since 1888, according to the National Weather Service.

The city received just 3.94 inches of rain – about 53 percent of normal – during the water year, which spans from Oct. 1 to Sept. 30.

The city received more than a quarter-inch of precipitation in a 24-hour period on just two days during the water year – Dec. 1, when 0.56 inches of rain were measured, and Dec. 7, when 0.75 inches of rain were measured.

“December was pretty wet around here, then we really dried out again,” said Dawn Johnson, a meteorologist with the National Weather Service. “The summer was drier than normal; we didn’t get as much thunderstorm activity as normal in town.”

The city had just 44 days of rain, down from its usual average of 50 days.

“In October we only had a trace, so that started things off really quite dry, and then we had just four-tenths of an inch in November,” Johnson said.

The previous driest years in the city’s history are: 2011-12; 2006-07; 2000-01; 1980-81; 1965-66; 1947-48; 1923-24; and 1892-93.

Looking to the future, Johnson said “time will tell” if the next year will bring more rain.

“El Nino and La Nina typically will have strong impacts on northern and southern regions (such as the Pacific Northwest and southern California). When you are in the middle, there is very little correlation,” Johnson said. “It’s not a good indicator for us.”

The weather service is tracking Hurricane Maria in the Pacific, and the storm could bring some rain to the region in mid-October, she said.

“Right now, we’re about 10-15 degrees above normal and it’s just dry. We have some hope coming in the second week of the month, but there is a lot of uncertainty,” she said.

Amy Alonzo covers the outdoors, recreation and environment for Nevada and Lake Tahoe. Reach her at aalonzo@gannett.com or (775) 741-8588. Here's how you can support ongoing coverage and local journalism.

New Rule

THE CONNECTION

NEW RULES

The situation playing out along the Muddy River is not unique across the Southwest and in the Colorado River Basin. As climate change and overuse reduce water supplies, the gap between “paper water” (the legal right to use water) and “actual water” (what’s available) is widening.

OVERTON, Nev. — More than three decades ago, Joe Davis landed a part-time job installing pipes for the Moapa Valley Water District. When he took the job, his grandfather gave him a piece of advice: “Keep your nose clean and do anything you are asked.” Davis followed it.

His responsibilities soon included waking up early every Tuesday morning to buck hay for the district’s general manager, who would sell the bales in Las Vegas and return to town with pipe.

“On the way back,” Davis said, “that’s when he would pick up pipe for the community.”

Overton sits in the Moapa Valley, one of only a few rural farming areas left in Clark County, the state’s most populous county.

Irrigation ditches line the road, built to serve the agricultural fields that are tucked behind homes, gas stations and stores. Alongside the town, the groundwater-fed Muddy River flows through a narrow channel toward Lake Mead, about a dozen miles away.

The Muddy River is the valley’s lifeblood, and it’s at risk.

In this area of Clark County, businesses, developers and local governments have state permits to pump large amounts of water from the ground. But using all the permitted water could cause the Muddy River to eventually shrink, dry up springs and leave long-term ecological damage.

In the area that the Moapa Valley Water District serves, water users are facing an uncomfortable future: People are going to have to use less water than they were once promised. Over the last century, state regulators handed out more groundwater rights than there was water available. Today state officials say that only a fraction of those rights can be used, which could mean cuts.

“We’ve reached the conclusion that there really isn’t as much water as we thought,” Davis said.

The situation playing out along the Muddy River is not unique across the Southwest and in the Colorado River Basin. As climate change and overuse reduce water supplies, the gap between “paper water” (the legal right to use water) and “actual water” (what’s available) is widening.

Dozens of groundwater basins in Nevada are over-appropriated, meaning there are more rights to water than there is water to go around. Starting next week, state water officials plan to [hold a dozen hearings across rural Nevada](#) on a flurry of more than 50 proposed orders meant to stop this issue from getting worse, designating numerous areas as needing additional management.

By appropriating so many water rights, many view the state as being at fault, issuing too many rights in a rush to develop. Others say regulators did the best they could with the data they had at the time. Science has evolved to better estimate groundwater availability, and water rights are not always guaranteed. In the West, most rights can be cutoff in times of scarcity or shortage.

In the years since he took the job laying pipe, Davis has worked his way up through the ranks to become the Moapa Valley Water District’s general manager. His job depends as much on a technical background as it does on a strong knowledge of a place and its people.

Overton, where the district is headquartered, is still a small community. The district serves about 8,500 residents over a 79 square-mile area that includes the Moapa River Indian Reservation.

Driving through the district’s service territory on a hot August morning, Davis stops to wave at customers and friends. He believes existing communities should be guarded against any drastic cuts.

Under a strict reading of Nevada water law, the district is at risk of seeing its groundwater rights cut off. It could pursue alternative supplies, but that’s a costly proposition for a small operation.

“I’m not asking for the moon,” Davis said. “I’m using this amount of water, and I know I need to maintain that amount of water. Now how do we take [that information] and make that happen?”

More rights than water

On paper, individuals, businesses and governments in the area have rights to use more than 39,700 acre-feet of water from a roughly 50,000 square-mile aquifer every year. About 9,000 acre-feet of water has been pumped in recent years, but there are proposals to increase use.

An acre-foot is the amount of water that can fill about a football field to a depth of one foot. If water users actually filled 39,700 football fields each year, the environmental consequences would be devastating.

In June, Nevada’s top water regulator, State Engineer Tim Wilson, ruled that groundwater use should not exceed a 8,000 acre-feet cap. That means, at most, only about 20 percent of all permitted water rights can be used across the expansive groundwater system.



The exterior of the Moapa Valley Water District in Overton on Aug. 13, 2020. (Jeff Scheid/The Nevada Independent)

If too much groundwater is withdrawn, Wilson ruled, it would diminish the springs that form the headwaters of the Muddy River, eventually shrinking a narrow tributary of the Colorado River. Las Vegas water officials store Muddy River water in Lake Mead to bolster their water supply.

Pumping, regulators worry, could also be devastating for the Moapa dace, an endangered fish that has evolved around the warm headwater springs that come from the groundwater.

The state's ruling [emerged from a conflict](#) between the Southern Nevada Water Authority, which owns or leases water on the Muddy River, and Coyote Springs Investment, a housing developer determined to tap into the aquifer to build a new town about 35 miles from the Moapa Valley.

Yet Coyote Springs is only a subplot in a larger ongoing dispute over water. A broad range of Southern Nevada players with conflicting interests own water rights in the aquifer.

The Moapa Band of Paiutes own water rights, as does NV Energy. The Mormon Church owns water rights, as do natural gas generators at the Apex Industrial Park in North Las Vegas. The Moapa Valley Water District owns water rights, as does the Southern Nevada Water Authority.

The water is used for multiple reasons: for farms, for drinking water, for power plants and for industry. Water users often cut deals with each other, but no one wants to give up their rights.

The state's new ruling — placing a cap on the water — puts many of these rights at risk, and for everyone involved, it sets new rules for a future that uses less water than people once planned.

Even in this arid land, Greg Anderson, the vice chairman of the Moapa Band of Paiutes, can tell where the water is and isn't by looking toward the ground underneath his feet.

"You can tell where water's at in this desert," he said. "Even though it looks so dry, you see a few plants that are greener than others. That's where the water's at."

What locals and Nevada's statutes refer to as the Muddy River used to be called the Moapa. "Pah" means water, and Moapa means muddy water, Anderson notes. For centuries, the Southern Paiutes, or Nuwu people, relied on the river for drinking water and to irrigate crops.

"That river means a lot to our people," he said. "That's us."

In the early 1800s, Spanish raids devastated the Moapa band, and Mormon settlement in the 1840s displaced the Moapa band from its territory — and its water. By 1873, President Ulysses S. Grant had taken executive action to establish a reservation that spanned more than two million acres. These lands included the Muddy River and what is now Gold Butte National Monument.

It took only one year for the federal government to break its word. In 1875, Congress stripped the reservation of all but 1,000 acres and relocated it so as not to interfere with any claims made by white settlers or mining speculators, [according to a history](#) compiled by the tribe's lawyers.

Displacement in the 19th Century pushed the tribe away from the irrigable land. A history on the tribe's website said that "people were forced to flee into the desert and farming was disrupted."

The 20th Century would only see more development encroach upon what little land and water the federal government left the tribe. Water was quickly divided up. By 1920, the entire river was allocated in a court decree, with the tribe only getting rights to a small fraction of the water.

As more development came into the area, state water officials began issuing rights to pump groundwater across a vast 50,000 square-mile area. Over the next century, water officials with the state engineer's office would issue far more water rights in the region than was sustainable.

"We have to use [water] for economic development," Anderson said. "We understand that."

But he is concerned that the overuse of the groundwater could leave a "trickle" in the river.

The history of water rights in the area provides a map of how the area developed.

Amid a flurry of industrial development and proposed municipal development in the 1980s, the amount of permitted water rights dated more than quadrupled, increasing from about 7,100 acre-feet in 1981 to 31,600 acre-feet in 1989, according to an analysis compiled by the state.

Old rules, new playbook

The state has several tools to fix the problem, and all of them are weighed against an ultimate hammer: curtailment. State regulators have worked to avoid curtailment, and for good reason.

Nevada's water statutes follow a similar framework used in other Western states. That rulebook is meant to settle disputes, inevitable in a region where aridity is its defining character. The law says that those with the oldest water rights are the most protected from having their rights cut.

In cases where an area is over-appropriated or water use is unsustainable, the statutes allow state regulators to curtail water rights. A strict curtailment would cut off the newest water rights in an area to meet the state's estimate for how much water is available.

In this case, a curtailment might mean cutting off nearly 29,000 acre-feet of water rights, rights issued after 1983, that exceed the state's 8,000 acre-foot cap on cumulative groundwater use.

Such a move could have far-reaching effects on the economy, curtailing water that is currently being used by the Moapa Valley Water District and making it difficult for the tribe to use its water for commercial development. Such a move could also affect parts of the Apex Industrial Park.

Curtailment might sound like an orderly resolution to the problem, but it is blind to realities on the ground. In the Muddy River area, those likely to be cut off first are using most of the water.

Across the aquifer, groundwater users with greater legal protection — those before the 1983 cutoff — use about a third of the water. Groundwater users with less legal protection — those after the 1983 cutoff — account for most of the water use, according to the state's analysis.

Nothing illustrates those challenges more vividly than a decommissioned coal-fired power plant. The former Reid Gardner Generating Station sits outside of the Moapa Band of Paiutes' reservation land. It was built in 1965, and it required significant amounts of water to run its steam turbines.

In 2015, the plant's owners, NV Energy and the California Department of Water Resources, paid the tribe \$4.3 million to settle claims alleging coal ash pollution and Clean Water Act violations. Two years later, NV Energy announced that it had decommissioned the power plant's last unit.

But NV Energy kept its water rights. Even with the coal plant offline, the rights remain valuable assets on the electric utility's books to sell and lease. NV Energy's water rights are particularly valuable because most of them predate the 1983 cutoff. Some of their rights date back to 1949.

Generally, Western water law requires that water users forfeit rights if they do not use them. In reality, it doesn't always work this way. There are numerous loopholes to the provision. Water users are allowed to apply for extensions to keep their water right, even if they are not using it.

Micheline Fairbank, a deputy state engineer, said reconciling current use with older water rights remains an open question, one the community should be involved in answering.

“I don’t have a crystal ball to predict how that question gets answered,” Fairbank said.

Nevada’s water law is based on the Doctrine of Prior Appropriation. It has three main elements:

- **First in time, first in use:** Those with water rights issued first in time have the priority to use water in times of scarcity or shortages.
- **Beneficial use:** Water must be put to beneficial use. Acceptable beneficial uses include using the water for drinking water, agriculture, commercial activities and mining.
- **Water must be used:** Water rights must be used and developed or the owner of a water right risks losing their water right.

In an interview this summer, Wilson, the state engineer, did not commit to how the state plans to move forward with managing the fact that there are more rights to water on paper than there is available water. In an interview, officials stressed that they favor community-driven solutions.

Until policy decisions are made, there is uncertainty about what happens next. The 1983 cutoff date itself could be called into question or changed as the state engineer’s office makes decisions about how to manage water rights in the area.

“All along, it has kind of been a two step process,” Fairbank said. “Number one, let’s establish the baseline and the science. Step two then would be the policy and management positions.”

Water users could devise a groundwater plan or what is known as a conjunctive management plan aimed at creating more flexibility about where, when and how water rights could be used.

In watersheds across the arid Southwest, including in the Muddy River basin, addressing the problem is made even more challenging because the legal systems for managing groundwater and surface water developed separately, even though the two sources of water often act as one.

Elizabeth Koebele, an assistant professor at UNR who studies water governance, says irrigators — those closest to the water — tend to understand this, but there is a disconnect with the law.

“Water users,” Koebele said, “seem to recognize that there is a connection between surface water and groundwater, and that is not matching up to how we manage these watersheds.”

Nevada’s groundwater laws are already more restrictive than neighboring states. Sean Hood, an attorney for Fennimore Craig, said Nevada started regulating groundwater long before other states like Arizona and California, which is in the early phases of managing groundwater.

“Historically, Arizona and California were like the wild wild West,” he said.

Yet even in a state that has long-regulated aquifers, state officials are being forced to grapple with how to claw back past appropriations in areas like the Muddy River.

Nevada statutes offer a limited set of tools, and in recent years, state water officials have tested their flexibility in rulings and decisions that seek to fix the problem. But officials are often caught between what the statute says and how the court interprets them.

Already, the state’s June ruling on the Muddy River is tied up in litigation.

In addition to imposing a cap, the state’s order changed the rules in another critical way. The order, a result of hydrologic reports and public hearings, defined a larger geographic boundary for the aquifer, changing whether many water users still have priority rights.

Among the claims pending before the court, water users have argued that the state acted in an “arbitrary and capricious” manner, ruling beyond what Nevada’s statutes allow.

In a joint-filing, lawyers for a gypsum manufacturer and a landfill at the Apex Industrial Park said the order was made “in violation of constitutional or statutory provisions.”

‘Existing communities’

Sitting inside an air-conditioned conference room at the Moapa Valley Water District on a warm August morning, Davis, the district’s general manager, is clear about his goal.

For years, Clark County has ranked as one of the fastest growing counties in the United States. But Davis said that the Moapa Valley, unlike other areas, has no ambitions for major growth. That’s not why he wants to protect the district’s groundwater rights.

“I’m not looking to expand,” Davis said in August. “I’m not looking to grow. I’m not looking to get large. We just need to make sure that we’re able to take and maintain what we have.”

“By the same token,” he added, “you can’t have a community shrink.”

Both the water district and the Moapa Band of Paiutes, the two existing communities in the area, have rights to groundwater at risk of curtailment under a strict application of the law.

Davis said it was important to recognize that the community has existed since the mid-1800s. His community extended even farther into the valley until the Hoover Dam created Lake Mead, which submerged the town of St. Thomas and forced its residents to resettle.

“I think that an existing community has to have more standing over somebody that does not exist yet,” Davis said, noting that other state plans have exempted municipal uses.

Until the litigation ends, it’s hard to determine what’s at stake for many water users.

Despite battling in court, the water users in the area are already tied together by countless deals and contracts. They lease water to each other. They sell water to each other. They even enter into future understandings about *what could happen*. In similar cases across the West, conflict can make way for collaboration — but sometimes it takes time.

“The big picture is there is less water,” Koebele said. “We need to work together more.”

In some cases, the cost of participating in litigation becomes its own barrier.

Davis said the district ended up having to change its rate structure and approve another rate increase to keep up with repairs on the system and expected legal costs.

“We haven’t seen any legal costs yet that are going to equal what’s happening right now,” he said. “It’s just astronomical, what it’s going to cost us compared to what our budget actually is.”

“It’s that you can’t afford not to,” he added. “But you can’t afford to.”

Part III of this series, ‘Cutting Back,’ will examine possible solutions under the law.

This story was supported by a grant from [The Water Desk](#), an independent journalism initiative based at the University of Colorado Boulder’s [Center for Environmental Journalism](#).

The Nevada Independent is a 501(c)3 nonprofit news organization. We are committed to transparency and disclose all our donors. The following people or entities mentioned in this article are financial supporters of our work:

- Elizabeth Koebele - \$100.00
- NV Energy - \$208,650.00

In doing so, state regulators not only issued too many rights. They double-counted them.

Extensive science, modeling and pump tests show that the groundwater in the region feeds the Muddy River and the headwater springs for the Moapa dace. The water in the ground, in many cases, [is the water in the river](#).

And pumping too much of it could reduce the river’s natural flow. After more than a century, state officials finally put the brakes on the problem in 2002. [The state ruled](#) that it would award no additional water rights in the area, pending the outcome of a pump test. Today state officials want to go one step further, but they must make some difficult choices.

Drought conditions impacting Truckee reservoirs

by Eric DoBroka

Tuesday, October 6th 2020

We certainly need to see our weather pattern change as most of Nevada is in now in severe to extreme drought. Each week over the past three months the drought conditions have been getting worse.

It comes as no surprise that the drought has intensified over the summer. This has only made our wildfires worse. Additionally, it's also dropping our water levels at the reservoirs.

Our main sources of water in the Truckee Meadows are Lake Tahoe as well as Boca, Stampede and Prosser reservoirs.

Right now Stampede reservoir is currently the lowest of them. It's down significantly from last year, sitting at almost half capacity.

ADVERTISING

But it's not time to worry yet since the other reservoirs, including Tahoe, are much closer to maximum capacity. They can still handle an average to slightly below average winter.

As we approach the winter season water, managers assess the capacity and in normal cases need to make room for future rain and snow additions.

"If we have a wet winter this year, things should rebound nicely all around. If we have another dry winter, as we get into spring and next summer, that's when we'll start to see and hear about the drought impacts," said DRI Climatologist Dan McEvoy.

But this year, only Prosser will be drained as the other reservoirs are sitting low enough.

However, it's a different story for the Carson River.

Other parts of Nevada like Fallon, need a wet winter to avoid a drought next summer. Some of these impacts would be mostly for agriculture and then the nearby forests.

"We're at a point now where we're lower in both of those reservoirs than we have been in a few years. And we're at similar levels as we were to in 2012. That was the first year of our big four-year drought there," continued McEvoy.

What's very interesting is that in the past decade there hasn't been much stability, as we have swung between extreme drought and some of the best water years.

Overall, the water levels at the reservoirs are still in okay shape as of now, pending on this upcoming winter.

Reclamation Announces Partnership Celebrates the Restoration of Truckee River Fish Passage to Press Clips
Historical Spawning Grounds – Supports Threatened Lahontan Cutthroat Trout

Last Updated: Tuesday, 06 October 2020

05:31 Published: Tuesday, 06 October 2020

05:31 [1](#)



Nation's largest horizontal fish screen at Derby Dam

Credit: BOR

Construction of the nation's largest horizontal fish screen is completed at Derby Dam, supporting recovery of threatened Lahontan Cutthroat Trout

October 6, 2020 - SPARKS, Nev. – Last week, the Bureau of Reclamation joined its partners, U.S. Fish and Wildlife Service and Farmers Conservation Alliance, to celebrate the completion of the Derby Dam Fish Screen Project. The infrastructure modernization project at Derby Dam will provide Lahontan Cutthroat Trout access to natural spawning grounds for the first time since 1905.

The Derby Dam Fish Screen project supports fish movement along the Truckee River and provides access to important upstream habitat for threatened Lahontan Cutthroat Trout. It also provides benefits to agriculture, fishing and recreation in western Nevada. The construction phase of the project began in September 2019, and in all supported nearly 400 jobs over the past five years.

"Modernizing our infrastructure is a top priority for Reclamation," said Reclamation Commissioner Brenda Burman. "Updating the 115-year old Derby Dam with the nation's largest horizontal fish screen is especially exciting. Not only will the project provide new fish passage for the Lahontan cutthroat trout to reach native spawning grounds, it also provides new efficiencies for dam operations and deliveries--a true win-win. I know how meaningful this project is to the local community and our partners; we are pleased that all the pieces aligned so nicely to accommodate the completion of construction in one year's time. A big thank you and congratulations to all of our partners for achieving this great milestone."

The Derby Dam Fish Screen is the result of two decades of concentrated efforts by Reclamation working with the Service's Lahontan National Fish Hatchery Complex and Pyramid Lake Paiute Tribe to restore connectivity for the threatened Lahontan Cutthroat Trout. The fish, once thought to be extinct, can now successfully move from Pyramid Lake, past Derby Dam, for spawning.

"The Service is thrilled to finally have the Derby Dam fish screen completed. The addition of this fish screen to the existing water infrastructure will allow the iconic Lahontan cutthroat trout to once again travel beyond the dam and complete its natural migration route for the first time in more than a century. Not only is this a significant step forward in the recovery of this species, but the passage of Lahontan cutthroat trout above Derby Dam will re-establish unique recreational angling opportunities in the Reno/Sparks area. I want to thank our partners, the Bureau of Reclamation, Pyramid Lake Paiute Tribe and Farmers Conservation Alliance, for their commitment to making this fish screen a reality," said Paul Souza, Pacific Southwest regional director for the U.S. Fish and Wildlife Service.

Reclamation entered into a cooperative agreement with Farmers Conservation Alliance to design, construct and commission a horizontal fish screen. The fish screen allows fish to safely pass around Derby Dam, accessing their historic habitat along much of the Truckee River.

“We’re excited about the completion of this Farmers Screen on the Derby Dam. This is our largest installation to date, and the 50th screen we have installed across seven western states,” **said Julie O’Shea, executive director of Farmers Conservation Alliance.** “However, we are the most proud of being a part of this amazing story. There have been so many individuals dedicated to this project. Seeing our technology help to realize the vision shared by Reclamation, the Fish and Wildlife Service, and the Pyramid Lake Paiute Tribe to improve fish movement on the Truckee River is the reason we invented the screen in the first place. For a project of this size to be completed in just 12 months speaks to the dedication of not only our project team, but also on the ground partners like the Truckee-Carson Irrigation District.”

The construction of Derby Dam, completed in 1905, was one of the first projects of the newly formed U.S. Reclamation Service, now Bureau of Reclamation, organized under the Reclamation Act of 1902. Today, Reclamation oversees infrastructure that delivers water to more than 31 million people and provides one out of five western farmers with irrigation water for 10 million acres of farmland. Source: BOR



Announcement | October 7, 2020

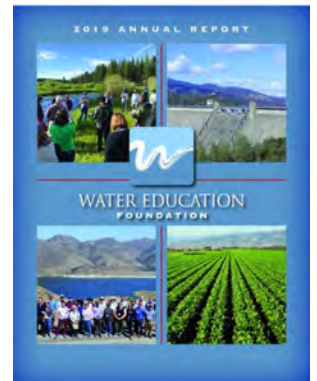
2019 ANNUAL REPORT RECAPS WATER EDUCATION EFFORTS IN CALIFORNIA AND THE WEST

WATER EDUCATION FOUNDATION REPORT HIGHLIGHTS YEAR OF ACCOMPLISHMENT; GRATITUDE TO SUPPORTERS

The Water Education Foundation's just-released [2019 Annual Report](#) takes readers along to see the array of educational events, trainings and articles we produced last year to create a better understanding of water resources in California and the Southwest.

The Annual Report, whose release was delayed due to impacts from the COVID-19 pandemic, recaps the Foundation's efforts for the year in words and photos.

Those efforts included workshops and conferences; [tours](#) of critical watersheds in California and along the lower Colorado River; [Project WET](#)'s teacher training programs; the Foundation's [Water Leaders](#) program; and its flagship publication, [Western Water](#).



The report also highlights the Foundation's:

- Invitation-only biennial **Colorado River Symposium** in Santa Fe that featured keynote addresses by Reclamation Commissioner Brenda Burman and former Interior Secretary Bruce Babbitt.
- Annual **Water Summit**, which featured California Natural Resources Secretary Wade Crowfoot as the keynote speaker. The Summit examined groundwater sustainability efforts in California and the emerging nexus of wildfire and water in the wildland-urban interface.
- Two separate tours to explore resource challenges along different areas of the water-short California coast.

The report recognizes the Foundation's [board of directors](#) and the many supporters whose contributions allow us to do this work.

You can read the Annual Report [here](#).

Hydrology Data Tool Helps Users Manage Water Resources, Protect Infrastructure

October 7, 2020



FOR IMMEDIATE RELEASE

Photo credit: Edwin Johansson.

Sankar Arumugam
sankar_arumugam@ncsu.edu

Sudarshana Mukhopadhyay
sm2798@cornell.edu

Matt Shipman
matt_shipman@ncsu.edu

River systems are essential resources for everything from drinking water supply to power generation – but these systems are also hydrologically complex, and it is not always clear how water flow data from various monitoring points relates to any specific piece of infrastructure. Researchers from Cornell University and North Carolina State University have now developed a tool that draws from multiple databases to give water resource managers and infrastructure users the information they need to make informed decisions about water use on river networks.

“A streamgage tells you what the water level is at a specific point in the river – but that’s not really enough information,” says Sankar Arumugam, co-author of a paper on the work and a professor of civil engineering at NC State. “If you are an infrastructure operator, what you really need to know is how long it will take for that water-level information to be relevant to your infrastructure. How far away is the streamgage from your water intake along the river path, not just as the crow flies? How closely connected are those two things, hydrologically?”

“This information is important for managing water systems efficiently, for ensuring that infrastructure – such as power plants – are able to continue operating, and for protecting the infrastructure,” says Sudarshana Mukhopadhyay, first author of the paper and currently a postdoctoral researcher at Cornell University. “The information is particularly important during extreme conditions, such as flooding or drought.

“All of that data already exists, it’s just scattered across separate databases. We’ve developed an algorithm that efficiently pulls all of that information into one place and accounts for how the streamgages and the various infrastructure sites are hydrologically connected over a large watershed,” says Mukhopadhyay, who worked on the research as a Ph.D. student at NC State.

To demonstrate the tool’s utility, the researchers used the algorithm to create a connectivity network demonstrating the interconnectedness of about 1,400 reservoirs and 1,600 streamgages in the upper and lower Colorado River basins.

For this network, the algorithm used data from three sources: topographic information from the U.S. Geological Survey’s (USGS) National Hydrographic Dataset; streamgages from the USGS National Water Information System; and reservoir data from the National Inventory of Dams.

"This is a tool that can be used by power plant operators, reservoir operators, water resource managers – really it's for anyone who draws water from the river system," Mukhopadhyay says. "It can inform them about river conditions both upstream and downstream, and help them make decisions about where they should draw water from the system."

The researchers have also made a template publicly available, allowing anyone to develop similar connectivity networks for other watersheds.

"It should be fairly easy for water resources professionals," Mukhopadhyay says.

"We are currently working on a national version, which we think will help us better understand all of the ways that river basins connect infrastructures across the country," Arumugam says.

The paper, "[Developing the hydrological dependency structure between streamgage and reservoir networks](#)," is published open-access in the journal *Scientific Data*. The paper was co-authored by Chandramauli Awasthi, a Ph.D. student at NC State.

The work was done with support from the National Science Foundation, under grants 1823111 and 1442909; and from the USGS Powell Center Working Group Project "A global synthesis of land-surface fluxes under natural and human-altered watersheds using the Budyko framework."

-shipman-

Note to Editors: The study abstract follows.

"Developing the hydrological dependency structure between streamgage and reservoir networks"

Authors: Sudarshana Mukhopadhyay, Cornell University; A. Sankarasubramanian and Chandramauli Awasthi, North Carolina State University

Published: Oct. 1, *Scientific Data*

DOI: 10.1038/s41597-020-00660-6

Abstract: Reliable operation of physical infrastructures such as reservoirs, dikes, nuclear power plants positioned along a river network depends on monitoring riverine conditions and infrastructure interdependency with the river network, especially during hydrologic extremes. Developing this cascading interdependency between the riverine conditions and infrastructures for a large watershed is challenging, as conventional tools (e.g., watershed delineation) do not provide the relative topographic information on infrastructures along the river network. Here, we present a generic geo-processing tool that systematically combines three geospatial layers: topographic information from the National Hydrographic Dataset (NHDPlusV2), streamgages from the USGS National Water Information System, and reservoirs from the National Inventory of Dams, to develop the interdependency between reservoirs and streamgages along the river network for upper and lower Colorado River Basin (CRB) resulting in River and Infrastructure Connectivity Network (RICON) that shows the said interdependency as a concise edge list for the CRB. Another contribution of this study is an algorithm for developing the cascading interdependency between infrastructure and riverine networks to support their management and operation.

Categories: [Driving Food, Water and Energy Solutions](#), [Harnessing Data for Decision Making](#), [News Releases](#), [Research and Innovation](#)

Tags: [civil engineering](#), [college of engineering](#), [research news](#)



In California, Latinos More Likely To Be Drinking Nitrate-Polluted Water

By [Anne Weir Schechinger](#), Senior Analyst of Economics

Wednesday, October 7, 2020

In California's San Joaquin Valley, the nation's leading agricultural region, Latinos make up the [great majority of farmworkers](#).

They are also disproportionately likely to live in communities where drinking water supplies are contaminated with elevated levels of nitrate, a toxic chemical that primarily comes from polluted farm runoff.

Nitrate contamination of drinking water is widespread in California: Tests by utilities have detected some level of nitrate in the nished water supplies for more than two-thirds of [all Californians](#). But it's worst in the eight counties of the San Joaquin Valley,¹ and worse still in majority-Latino communities in those counties.

EWG analyzed California State Water Resources Control Board data on the Valley communities with nitrate levels in drinking water meeting or exceeding the federal legal limit. We found that almost six in 10 are majority-Latino. Latinos are also a majority in Valley communities with nitrate at or above half the legal limit, which is linked to increased risk of cancer and other diseases.

Under the federal Safe Drinking Water Act, the legal limit for nitrate (measured as nitrogen) in community water systems is 10 milligrams per liter, or mg/L. This limit was set based on a 1962 U.S.

Public Health Service recommendation to guard against so-called [blue baby syndrome](#), a potentially fatal condition that starves infants of oxygen if they ingest too much nitrate. But [more recent studies](#) show strong evidence of an increased risk of colorectal cancer, thyroid disease and neural tube birth defects at levels of 5 mg/L or even lower.

The chart below shows the 20 Valley community water systems with the highest average levels of nitrate contamination between 2003 and 2017, and the percentage of residents who identified as Latino in the 2018 American Community Survey, for the census block group where each water system was located.²

San Joaquin Valley Community Water Systems With the Worst Nitrate Contamination

System Name	2003-2017 Nitrate Average in mg/L	Percent Latinos in Census Block Group
Rodriguez Labor Camp	27.3	81.8%
Tony Morris/Morris Dairy	23.5	58.8%
Sierra Mutual Water Company	21.5	36.0%
Soults Mutual Water Company	16.7	73.3%
Beverly Grand Mutual Water	16.7	78.2%
East Wilson Road Water Company	13.1	79.4%
Lemon Cove Water Company	12.8	18.6%
Sierra Vista Association	12.7	60.1%
Wilson Road Water Community	12.6	73.6%
San Joaquin Estates Mutual Water Company	12.2	41.5%
Del Oro River Island Service Territory #2	11.7	50.3%
Faith Home Teen Ranch	10.5	25.0%
El Monte Village Mobile Home Park	10.4	20.7%
Plainview Mutual Water Company, Central Water	10.2	81.8%
Son Shines Properties	9.9	32.1%
Hillview Water Company, Raymond	9.6	16.3%
Lake Success Mobile Lodge	9.6	50.3%
Triple R Mutual Water Company	9.5	13.2%
R.S. Mutual Water Company	9.4	2.7%

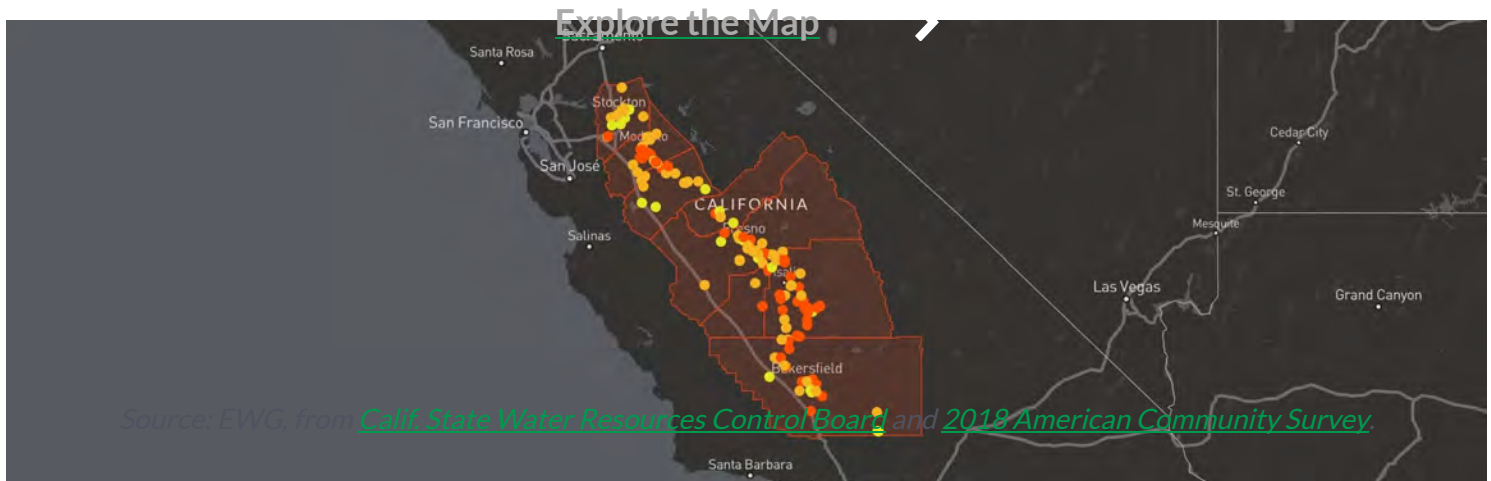
System Name	2003-2017 Nitrate Average in mg/L	Percent Latinos in Census Block Group
East Orosi Community Services District	9.3	80.3%

Source: EWG, from [Calif. State Water Resources Control Board](#) and [2018 American Community Survey](#).

Between 2003 and 2017, tests detected elevated levels of nitrate in the nished water of hundreds of the state's towns and cities located in census block groups where the population was 50 percent Latino or higher:

- 415 majority-Latino community water systems serving more than 9 million people tested at or above 3 mg/L.³
- 318 systems serving 8.1 million people tested at or above 5 mg/L.
- 140 systems serving 5.25 million people tested at or above 10 mg/L.

This interactive map shows all San Joaquin Valley community water systems with a majority-Latino population that had elevated levels of nitrate in the period analyzed. Clicking on a point brings up information for the census block group where the community water system is located. The percentage of Latino population and 2018 mean household income are given for each census block group.



As nitrate levels rise, the likelihood that a community is majority-Latino also goes up. Thirty-ve percent of all California communities with nitrate levels of 3 mg/L or more were majority-Latino, but that went up to 38 percent for communities that tested at or above 5 mg/L, and 42 percent that tested at or above 10 mg/L.

Contamination in the San Joaquin Valley

For decades, small communities in the San Joaquin Valley that are home to many Latino farmworkers have had dangerous levels of nitrate in their water. These laborers work by day in the same elds that pollute the water they use at night at home. In many of these communities, levels of nitrate and other contaminants are so high that residents must buy bottled water for cooking and drinking.

The San Joaquin Valley has been hit disproportionately hard by COVID-19. As of the last week of August, there had been more than 110,000 [confirmed cases](#) in the eight Valley counties alone –almost one in six of all cases in the state. Latinos are also disproportionately affected by the pandemic: They are about 40 percent of California’s population but make up about 60 percent of COVID-19 cases. In the pandemic-triggered economic crisis, it’s even harder to have to pay for both contaminated tap water and clean bottled drinking water.

In the San Joaquin Valley, between 2003 and 2017:

- 199 majority-Latino systems, serving almost 2.3 million people, tested at or above 3 mg/L. Ninety-one percent of these systems rely on groundwater as their source of drinking water.
- 157 systems serving 2.2 million people tested at or above 5 mg/L.
- 69 systems serving close to 1.5 million people tested at or above 10 mg/L.

In the Valley, 50 percent of communities with nitrate levels of 3 mg/L or more were majority-Latino. That goes up to 53 percent of communities that tested at or above 5 mg/L, and 56 percent that tested at or above 10 mg/L.

Most of the majority-Latino communities struggling with nitrate were also low-income. Of the communities with elevated nitrate, 98 percent, serving almost 2.3 million people, were in a census block group with a 2018 average household income below the state’s average income. The average

income across all majority-Latino communities in the Valley with elevated nitrate was \$49,367, less than half of the state's average of \$101,493.

Of all majority-Latino communities in the Valley with elevated nitrate, 65 percent – 130 communities serving almost 956,000 people – had contamination that got worse between 2003 and 2017.

Although nitrate pollution can also come from wastewater treatment plants and septic systems, agriculture is the main source of nitrate in California's drinking water. In the San Joaquin Valley, more than 90 percent of nitrate in the [groundwater](#) comes from agriculture, which is by far the biggest business in the Valley, whose farmers produce more than half of the state's [agricultural](#) products.

When nitrogen fertilizer and animal manure are applied to farm fields, rain washes nitrogen off fields and into sources of drinking water. Irrigation is a main culprit for nitrate contamination of groundwater: The water from extensive irrigation of cropland forces nitrogen from fertilizer and manure into and through soil to pollute groundwater.

Case Studies in the San Joaquin Valley

East Orosi

East Orosi, an unincorporated community in Tulare County, uses groundwater as its drinking water source, and the water system serves around 700 people. The community has struggled with high nitrate levels for many years.

EWG's analysis shows that East Orosi had annual nitrate averages above 10 mg/L, the legal limit, in nine of the 15 years between 2003 and 2017, and that every year's average was above 5 mg/L. Over that period, the community's nitrate levels grew by 53 percent.

[Most residents](#) of East Orosi are low-income farmworkers and their families. As of the 2010 census, 94.1 percent of residents were Latino. And as of 2018, East Orosi was located in a census block group with an average income of \$62,703, compared with the state average of \$101,493.

Because nitrate levels are so high, water costs hit residents' [wallets](#) twice – for the unsafe water from their taps and for bottled water that is safe to drink.

East Orosi is surrounded by farmland.

Source: Esri basemap



Woodville

Woodville, also in Tulare County, gets its drinking water from groundwater, and the water system serves around 1,673 people. In each of the 15 years between 2003 and 2017, Woodville had annual nitrate averages above 5 mg/L, and in 2017 the average was 9.4 mg/L, just under the legal limit. Over that period, the town's nitrate levels grew by almost a third.

Most of the people who live in Woodville are also low-income farmworkers. As of the 2010 census, 88.8 percent of residents were Latino. And as of 2018, Woodville was located in a census block group with an average income of \$38,254.

Woodville has high nitrate levels in the water because the town is encircled by dairies. Manure from the dairies wreaks havoc on the water in the two wells the town uses. Because groundwater levels have dropped, to tap into cleaner water supplies, the system has been forced to continuously drill wells deeper and deeper. At one point, one of the wells collapsed because water levels were too low, and that damage cost \$70,000 to x.



Large dairies and agricultural elds can be seen just outside of Woodville.

Source: Esri basemap

Ceres

Ceres, in Stanislaus County, also gets its drinking water from groundwater, and the water system serves 47,754 people. Ceres had annual nitrate averages above 5 mg/L in each of the 15 years between 2003 and 2017, except for 2004, when the average was 4.5 mg/L. During that period, the town's nitrate levels grew by 31 percent.

As of the 2010 census, 56 percent of people in Ceres were Latino. In the 2018 census block group that includes Ceres, 75.6 percent of residents are Latino. Average income in that block group is much lower than the state average: \$57,953, compared with \$101,493.

Residents of the town have long had to use bottled water for cooking and drinking. Although nitrate levels have been high for many years, it's not the only drinking water contaminant in Ceres' water. Arsenic and a pesticide chemical called [1,2,3 TCP](#), linked to cancer, have also been found in the city's water. And the water is expensive: Last year, [Gov. Gavin Newsom](#) noted that people in Ceres pay more for their water than those in Beverly Hills.



Ceres is flanked by farm fields to its east, south and west.

Source: Esri basemap

Solutions

Widespread nitrate contamination of drinking water in California is a complex problem. Solving it will require tougher farm regulations and a lot of money to clean up polluted water systems. In 2019, the state established the [Safe and Affordable Drinking Water Fund](#), which was intended to provide \$130 million a year for the next decade to communities to help rebuild or improve drinking water infrastructure.

But the pandemic-triggered economic crisis has put the money on hold. Because of [how it is funded](#), it's uncertain how much money will go into it.

State and local agencies also have plans to [address pollution](#) from farms. But these plans rely on [monitoring](#) fertilizer and manure use, and it will be [decades](#) before any regulation of agricultural activities gets put in place. Real regulations on farm pollution and dedicated funding for water systems that won't disappear in an economic downturn are needed to fix this statewide problem.

Notes

¹ Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare.

² People who identify as Hispanic or Latino can be of any race.

³ The U.S. [Environmental Protection Agency](#) says: “While nitrate does occur naturally in groundwater, concentrations greater than 3 mg/L generally indicate contamination (Madison and Brunett, 1985), and a more recent nationwide study found that concentrations over 1 mg/L nitrate indicate human activity” (Dubrovsky et al. 2010).

EWG.org | EWG's Guide to Sunscreens | EWG's Food Scores | EWG's Guide to Healthy
Cleaning | EWG's Shopper's Guide to Pesticides in Produce™

Copyright © 2007-2020, EWG. All Rights Reserved. Privacy Policy | Legal Disclaimer

Key Indicators Discovered of Climate Change's Impact on California Water Supply

Oct 07, 2020



Lake Oroville is the second largest man-made lake in California. A new study could help water managers deal with climate change.

AUSTIN, Texas — Determining how climate change is affecting water supplies is difficult in a state like California that swings between floods and droughts, but a new study has found that climate models agree on key metrics that could help water managers in the Golden State.

In the new study, scientists at The University of Texas at Austin in collaboration with the Union of Concerned Scientists found that leading climate projections used by the state strongly agree that climate change will shift the timing and intensity of rainfall and the health of the state's snowpack in ways that will make water management more difficult during the coming decades.

The findings are significant both because of their implications for California's future water supply and the fact that scientists found that the 10 climate models most widely used in state decision-making agree on the key metrics. In many cases, regional and state water managers have been hesitant to use climate models for future management decisions because the models often disagree on the regional effects of large-scale climate change, particularly average precipitation changes. But scientists in this study found that the models agreed at least 80% of the time on hydrological metrics that are more important for water management, said lead author Geeta Persad, an assistant professor at UT Austin's Jackson School of Geosciences.

"The point we make in our paper is if you think about the type of shifts that matter to water managers, it's typically these much more complicated aspects of the hydroclimate like how long the wet season is or how extreme the most extreme event is or how frequent high-risk events are," Persad said. "And these are the types of hydroclimate metrics where we see much higher agreement across climate projections."

The study was published in the journal [*Climatic Change*](#). It focuses on 10 global climate models that have been identified to have the best performance at representing climate conditions in California.

"Collectively, these findings suggest that decision-makers and water managers may find greater consistency in climate projections by looking beyond average conditions and focusing specifically upon the extreme drought and flood events that are most likely to stress water systems and infrastructure in the first place," said co-author Daniel Swain, a climate scientist at the University of California, Los Angeles. "These findings also suggest that California is likely to experience a large increase in both year-to-year and even season-to-season water variability in a warming climate — which has significant implications for everything from wildfire risk to groundwater sustainability to flood insurance policies."

In the paper, the scientists illustrated the effects on water supply during the next several decades in two case studies — Scott Valley in Northern California and Lake Oroville, which is about 80 miles north of Sacramento. They looked at Scott Valley because it is one of the few basins in California with a publicly accessible groundwater model. They chose Lake Oroville because it is the second largest reservoir in the state, and its stability has come under scrutiny since the Oroville Dam spillway was damaged during intense flooding in 2017.

By looking solely at changes in extreme precipitation shown by the climate models, and holding constant all other meteorological conditions and the availability and cost of surface and groundwater, the team, led by co-author Claire Kouba at the University of California, Davis, found a significant increase in the need for irrigation water throughout the Scott Valley even without a change in total rainfall. The study points out that this trend could be more pronounced in other areas of the state.

In the case of Lake Oroville, the projected hydroclimate shifts led to an average decline in water stored in the reservoir of about 17% over the year, with losses greatest in September and October when the reservoir is at its lowest levels.

Although the study examined only California's water supply, the researchers said that similar analysis looking beyond changes in average precipitation is worth pursuing in other regions with emerging water management challenges.

This study has been released in conjunction with a [report](#) from the Union of Concerned Scientists, where Persad previously held an appointment as a senior climate scientist. The UCS report further explores options for changing water management practices in response to a changing climate. The study was partially supported by funding from The Water Foundation and Environment Now.

San Antonio Water System Smart Meters Could Be Coming To Your Neighborhood



ELIZABETH RUIZ
OCT 7, 2020 @ 6:47AM



Photo: San Antonio Water System Facebook

SAN ANTONIO (KTSA News) -San Antonio Water System smart meters could be coming to your neighborhood.

The SAWS board has approved vendor contracts to move forward with a pilot program for Advanced Metering Infrastructure, which is aimed at improving meter reading and billing capabilities. Currently, the 550,000 SAWS water meters are read manually once a month by about 70 meter readers.

The utility's Connect H2O program will enable you to monitor your water use in near real time, reducing the chance of a surprise bill. You'll also be notified more quickly if a leak is detected.

The SAWS board on Tuesday approved contracts with ITRON for the AMI system, Vanguard Utility Service for meter installation and SmartWorks for meter data management and analytics.

SAWS plans to pilot the technology in three separate test areas across the city starting in March. If the pilot program is successful, full system deployment is projected to begin in 2022 and will take approximately four years. At that point, customers will be able to receive alerts that will notify them by email or text if the system detects continuous water use

"These technology improvements will greatly improve the customers' understanding of their water use and assist them in budgeting for their water bill. Long term, this will result in savings, as well as better planning ability for our customers," said SAWS Chair Jelynn LeBlanc Burley.



[Careers](#) • [Our Stations](#) • [About Us](#) • [Advertise With Us](#) • [Contact Us](#) •

[Privacy Policy](#) • [Terms Of Use](#) • [Contest Rules](#) • [EEO Report](#) •

[KTSA Public Inspection File](#) ⓘ

ALPHAMEDIA
ON-AIR . ONLINE . ON-SITE

© 2020 Alpha Media LLC.
All Rights Reserved.

BY CRISTINA TUSER | OCT 07, 2020

WALL STREET TO TRADE WATER AS A COMMODITY

Wall Street will start trading water as a commodity



Wall Street is going to start trading futures contracts on the state's water supply.

These contracts are the first of their kind in the U.S. and are being created by CME Group Inc., the world's largest futures exchange, reported Mint.

According to CME, the contracts are being created to allow California's big water consumers to hedge against surging prices. The contracts can also act as a benchmark that signals how acute water scarcity is becoming.

Almost two-thirds of the world's population is expected to face water shortages by 2025, according to the CME.

"Water scarcity is certainly one of the biggest challenges facing communities and individuals today across the globe, where currently about 2 billion people are already living in countries experiencing high water stress," said Tim McCourt, the global head of equity index and alternative investment products at CME, in an interview.

Advertisement

Wall Street took significant note of the potential for water after investor Michael Burry drew attention to the commodity 10 years ago. Burry spoke about investing in farmland with "water on site."

"It's really a unique mechanism for investors themselves and California to be able to at the very least understand and price the risk and potentially hedge the risk of water price volatility said Carter Malloy founder and chief executive officer of AcreTrader, a farmland investing platform.

Water preservation and distribution could become increasingly attractive, according to CME.

Climate advocates have warned for the potential of water wars as competition increases between needs from agriculture, energy and growing cities, reported Mint. Food production in particular could be vulnerable since drought makes it difficult to grow crops in many parts of the world.

CME's contract is tied to the \$1.1 billion California water market and will launch late this year, pending regulatory review. The contract will be based on the Nasdaq Veles California Water Index, reported Mint.

"What we really wanted to be able to do was firstly to provide clear and transparent rules-based information to the marketplace," said Patrick Wolf, a senior manager for Nasdaq Global Indexes.

Read related content about water shortages:

- World Bank and U.N. Claim 40% of World Population Affected by Water Scarcity (<https://www.wwdmag.com/trends-forecasts/world-bank-and-un-claim-40-world-population-affected-water-scarcity>)
- Iraq Seeks to Ease Water Shortage (<https://www.wwdmag.com/iraq-seeks-ease-water-shortage>)
- Austin, Texas, Faces Water Shortages & Boil Mandate (<https://www.wwdmag.com/day-zero/austin-texas-faces-water-shortages-boil-mandate>)

The Water & Wastes Digest staff invites industry professionals to nominate the water and wastewater projects they deem most remarkable and innovative for recognition in the Annual Reference Guide issue.

All projects must have been in the design or construction phase over the last 18 months.

Top Projects Nomination Form (</top-projects-nomination>)

Industrial Top Projects (<http://www.wwdmag.com/industrial-top-projects-nomination>)

CURRENT ISSUE

(/september-2020)

September 2020 (/september-2020)



SWS

(<https://www.estormwater.com/>)

WWD

(<https://www.wwdmag.com/industrial>)

WQP

(<https://www.wqpmag.com/>)

©2020 Scranton Gillette Communications. All Rights Reserved

Sitemap (<https://www.wwdmag.com/sitemap.xml>) | Privacy Policy

(<https://sgccompanies.com/privacy-policy>) | Terms & Conditions

(<https://www.wwdmag.com/terms-and-conditions>)



Legislative Session Brings New State Laws on Water and Climate Change for 2021

Published: October 08, 2020

California's 2020 legislative session came to an end Sept. 30 with several new bills signed into law that will impact water operations and the Department of Water Resources (DWR).

This year, while the Legislature responded to the impacts of the COVID-19 pandemic, passing legislation focused on statewide health, economic, and employment impacts, lawmakers also passed several water and climate change-related bills that will take effect in 2021.

They include:

[Assembly Bill 2800](#) makes the Climate-Safe Infrastructure Working Group permanent. The group, which was set to expire in January 2021, is made up of scientists, engineers, and architects, and is tasked with examining how to best integrate climate science into state infrastructure design, planning, and implementation.

[Assembly Bill 838](#) provides the Mossdale Tract, located in San Joaquin County, a three-year extension to achieve appropriate flood protection for an urban area. Moving the deadline from 2025 to 2028, allows local agencies to continue issuing property development permits, the revenue from which will provide local funding needed to achieve the required flood protection level. The legislation allows DWR to require the San Joaquin Area Flood Control Agency to contribute its fair and reasonable share of any property damage caused by a flood under certain conditions during the extension period.

[Senate Bill 974](#) establishes an exemption from some state environmental review requirements for projects that would improve drinking water quality and water supply reliability within disadvantaged communities. The exemption will last until 2028 and specifically apply to projects that consist solely of the installation, repair, or reconstruction of water infrastructure.

[Senate Bill 1320](#) directs the State Office of Planning and Research to prepare a California-specific climate change assessment on the impacts and risks of climate change and identify potential solutions to inform legislative policy. The legislation will also require an update on the assessment every five years. Climate change continues to have a significant impact on our natural resources including our water supply. Having the most up to date science and data will assist in planning efforts at the state, regional, and local level.

The California State Legislature has adjourned for the year and will return for a new session in January 2021.

60-year-old man drowns after trying to save his dog from flume along trail near Verdi

by Mackenzie Walters, KRNV

Saturday, October 10th 2020



60-year-old man drowns after trying to save his dog from flume along trail near Verdi. (KRNV)

RENO, Nev. (News 4 & Fox 11) — A man is dead after drowning in an attempt to save his dog after it jumped into a flume along the Tahoe-Pyramid trail near Verdi Saturday.

According to Washoe County Sheriff's office, a 60-year-old man was biking with some friends and his dog when his dog jumped into the flume.

The man jumped in after the dog to try and save it.

Washoe County Search and Rescue recovered the man's body, where it was then determined that he drowned.

Home > Sponsored > Brekhus: Two aspects to solving Reno's homelessness (sponsored)

SPONSORED

Brekhus: Two aspects to solving Reno's homelessness (sponsored)

By ThisIsReno | October 12, 2020

By Jenny Brekhus, Reno City Councilwoman



Reno Police launched an early morning cleanup of a homeless encampment in downtown Reno. Image: Isaac Hoops

The growing number of unsheltered persons is challenging Reno and urban areas across the country. The causes are complex as the diverse personal stories of those experiencing homelessness. Housing affordability, while a separate issue, contributes to the cost burdens that too many households experience. After eight years on the Reno City Council, however, I have come to view the issue of homelessness as having two distinct aspects.

First, Reno must manage the impacts of homelessness on our parks, along the river corridor, and on city streets and sidewalks. These shared spaces must remain safe and inviting to the public.

A related concern is the public safety danger posed by homeless encampments. Ward 1 residents have shared frightening videos with me of nighttime residents putting structures and lives at risk in riverfront neighborhoods and West Fourth Street trailer parks. Last winter our police chief showed me a map identifying the locations of recent encampments, illustrating just how widespread the risk had become.

Other than preparing for and participating in Council meetings, I devote the most time to responding to Ward 1 residents' concerns about encampments. More often than not, the City's response is to require the relocation or removal of camps, followed by site clean-up, including of biohazards like human waste and used syringes. Encampments along the Truckee River threaten our drinking water and the health of the river corridor.

And while violence in and around homeless encampments is rare, it is also a concern. Most tragic is the plight of unsheltered persons suffering and dying in encampments.

The courts have ruled that government can relocate camps when shelter bed space is available, as there was, for example, for a period this summer when space was available for 33 out of 39 days. However, even with the ability to offer a person space in a shelter, the increase in encampments outpaced the City's capacity to respond, despite the growing financial commitment the City has made to addressing encampments over the past two years.

“Without additional funding, Reno and the region will remain unable to adequately address the issue of homelessness.”

Acknowledging that managing encampments is primarily a City responsibility, I'll now turn to the other major aspect of the homelessness issue: preventing it when possible and helping persons who are homeless attain shelter.

While many people expect the City of Reno to address this issue, it is the government entity with the fewest resources for tackling the core issues and finding long-term solutions. I've come to realize that the issue is so encompassing that all levels of government – city, county, state and federal – must raise their commitment to reach solutions.

My history working on homeless issues in Reno goes back to 1998 when, as a city planner, I was assigned to draft a zoning ordinance for the regulation of homeless shelters. I was surprised to learn then that no publicly-supported emergency shelter existed.

Several years later, under the leadership of former Mayor Bob Cashell, the Community Assistance Center (CAC) was built on Record Street. There was, however, uneasiness at city hall about Reno taking on the lead role. This is because in Nevada, county governments receive state and federal funding for social services and are thus much better positioned to provide services to people at-risk of or experiencing homelessness. In southern Nevada, homeless services are a regional focus of Clark County. When Washoe County would not address the need for an emergency shelter, Reno stepped into this role and led the way in paying for construction and operation of the CAC.

Reno continued to provide primary financial support for operation for the CAC until the Great Recession, when Reno laid off about a third of its workforce, including many public safety staff. With the downturn, Washoe County upped their financial commitment and today pays \$2.8 million to Reno's \$900,000 and Sparks' \$400,000 for shelter operations. Despite this financial arrangement, and though Washoe County has recently taken on responsibility for sheltering service-receptive women and their children, Reno remains the lead entity for operation of the emergency shelters for men, which constitute the majority of the region's unsheltered population.

Even when the CAC was built, there was growing nationwide acknowledgement that the root causes of homelessness – stagnant wages, employment insecurity, health care costs, housing affordability, trauma, drug addiction and mental health illness – require a comprehensive approach. The U.S. Veterans Administration, with a health care system that includes social workers and provides housing vouchers and other assistance, has largely eliminated homelessness among the population it serves. Their model shows homelessness can be solved.

The federal government has not extended this commitment to the general population. With the exception of economic rescue spending during the Great Recession and now during the pandemic, the federal government has instead retreated over the past 40 years from programs to help local governments respond to problems like homelessness. Perhaps the most realistically impactful contributions toward reducing homelessness that one can hope for from the federal government are expanded healthcare under Medicaid and similar programs to broaden coverage for mental illness.

At a state level, Nevada's low taxes, and the limited amount of time the Legislature spends in session, constrain the state's ability to craft policy and provide resources to address homelessness. In 2019, the Legislature did not dedicate any new resources for this purpose and in the special pandemic session this past summer, budget cuts were made to programs that provide services like behavioral health that benefit the homeless population.

Without additional funding, Reno and the region will remain unable to adequately address the issue of homelessness.

I am confident that many Ward 1 residents who contact me about encampments would be supportive of targeted public investment to help these members of our society to relocate from our public spaces and get the assistance that they need to move on to better living conditions.

The City of Reno erected a temporary emergency homeless shelter on East Fourth Street in August 2020 to accommodate individuals while following social distancing guidelines. A more permanent shelter is planned for the Governor's Bowl nearby. Image: Jeri Davis



In 2021, the Legislature will struggle with the pandemic's impact on its revenues and will be more focused on state budget areas like education than on solving issues perceived as local, like homelessness. Reno residents who want to see homelessness addressed should let their state representatives understand the importance of the issue to them as constituents, and urge legislators to provide assistance.

Given these state and federal limitations, the best short-term option for addressing Reno's growing homelessness crisis is to seek assistance from Washoe County. The County Commission has at their discretion an unexercised revenue source known as the General Services Tax, a tax on vehicle registrations that could generate approximately \$14 million a year.

I have asked the Reno City Council to formally request that Washoe County institute this tax. Doing so could provide dedicated funding for Washoe County to, for example, employ additional social workers to bring unsheltered people in from the streets, pay for transitional housing so people can leave emergency shelters, and provide job-seeking assistance, mental health counseling and addiction programs.

In addition to asking Washoe County to tap this source of funding, Reno must also look to Washoe County to take on the lead role for the provision of services to the homeless, including the operation of emergency shelters for men. Washoe County is the local government entity responsible for providing social and health services to Washoe County residents, and it should lead the region's efforts to address homelessness.

I challenge anyone, including my political opponent who has made homelessness his signature campaign issue, to specify how the needle can move on this issue without additional dedicated financial resources. While philanthropy, the non-profit sector and faith-based organizations are important contributors, the magnitude of the challenge is beyond their capacity to close the gap.

The COVID-19 pandemic has created an urgent push to add emergency shelter space both to socially distance people needing shelter space and to serve the growing number of persons who end themselves on the streets or the Truckee River after losing their housing due to income or job loss. It is imperative that the Board of County Commissioners create this revenue stream to provide services at existing, and any additional, facilities. It is simply not within the City of Reno's ability to do so without deep cuts to core services like public safety, the maintenance of critical infrastructure, or parks and recreation programs.



Jenny Brekhuis has been twice elected to represent Ward 1 on the Reno City Council and is running for a third term in the Nov. 3 general election. Prior to pursuing a seat on the Reno City Council, Jenny worked as a planner for the City of Reno and temporarily, with the Nevada Housing Division. She has also taught urban planning classes at both TMCC and UNR. Jenny holds dual masters' degrees from the University of New Mexico in public administration and community and regional planning.

This post is paid content and does not represent the views of ThisIsReno. Want to promote your business, event, or issue? [Consider a sponsored post.](#)

CITY OF RENO

HOMELESSNESS

RENO CITY COUNCIL

WASHOE COUNTY



THISISRENO

This Is Reno is your source for independent, online Reno news and events since 2009. We are locally owned and operated. #thisisreno

