CITY OF SANTA CRUZ
City Hall
809 Center Street
Santa Cruz, California 95060

WATER COMMISSION

Regular Meeting

January 4, 2021

7:00 P.M. GENERAL BUSINESS AND MATTERS OF PUBLIC INTEREST, COUNCIL CHAMBERS/ZOOM

COVID-19 ANNOUNCEMENT: This meeting will be held via teleconference ONLY.

In order to minimize exposure to COVID-19 and to comply with the social distancing suggestion, the Council Chambers will not be open to the public. The meeting may be viewed remotely, using the following sources:

Online: https://ecm.cityofsantacruz.com/OnBaseAgendaOnline/Meetings/Search?dropid=4&mtids=124

Facebook Live: https://www.facebook.com/SantaCruzWaterDepartment/?epa=SEARCH_BOX

PUBLIC COMMENT:
If you wish to comment during on items 1-7 during the meeting, please see information below:

- **Call any of the numbers below. If one number is busy, try the next one. Keep trying until connected.**
  +1 669 900 9128
  +1 346 248 7799
  +1 253 215 8782
  +1 301 715 8592
  +1 312 626 6799
  +1 646 558 8656
- Enter the meeting ID number: **934 4976 1477**
- When prompted for a Participant ID, press #.
- Press *9 on your phone to "raise your hand" when the Chair calls for public comment.
  - It will be your turn to speak when the Chair unmutes you. You will hear an announcement that you have been unmuted. The timer will then be set to three minutes.
  - You may hang up once you have commented on your item of interest.
  - If you wish to speak on another item, two things may occur:
    1) If the number of callers waiting exceeds capacity, you will be disconnected and you will need to call back closer to when the item you wish to comment on will be heard, or

2) You will be placed back in the queue and you should press *9 to “raise your hand” when you wish to comment on a new item.

NOTE: If you wish to view or listen to the meeting and don’t wish to comment on an item, you can do so at any time via the Facebook link or over the phone via Zoom.

The City of Santa Cruz does not discriminate against persons with disabilities. Out of consideration for people with chemical sensitivities, please attend the meeting fragrance free. Upon request, the agenda can be provided in a format to accommodate special needs. Additionally, if you wish to attend this public meeting and will require assistance such as an interpreter for American Sign Language, Spanish, or other special equipment, please call Water Administration at 831-420-5200 at least five days in advance so that arrangements can be made. The Cal-Relay system number: 1-800-735-2922.

APPEALS: Any person who believes that a final action of this advisory body has been taken in error may appeal that decision to the City Council. Appeals must be in writing, setting forth the nature of the action and the basis upon which the action is considered to be in error, and addressed to the City Council in care of the City Clerk.

Other - Appeals must be received by the City Clerk within ten (10) calendar days following the date of the action from which such appeal is being taken. An appeal must be accompanied by a fifty dollar ($50) filing fee.

Call to Order

Roll Call

Presentation

Statements of Disqualification - Section 607 of the City Charter states that ...All members present at any meeting must vote unless disqualified, in which case the disqualification shall be publicly declared and a record thereof made. The City of Santa Cruz has adopted a Conflict of Interest Code, and Section 8 of that Code states that no person shall make or participate in a governmental decision which he or she knows or has reason to know will have a reasonably foreseeable material financial effect distinguishable from its effect on the public generally.

Oral Communications

Announcements

Consent Agenda - Consent Agenda (Pages 1.1 – 5.8) Items on the consent agenda are considered to be routine in nature and will be acted upon in one motion. Specific items may be removed by members of the advisory body or public for separate consideration and discussion. Routine items that will be found on the consent agenda are City Council Items Affecting Water, Water Commission Minutes, Information Items, Documents for Future Meetings, and Items initiated by members for Future Agendas. If one of these categories is not listed on the Consent Agenda then those items are not available for action.

1. City Council Actions Affecting Water (Page 1.1)

   That the Water Commission accept the City Council actions affecting the Water Department.

2. Water Commission Minutes from December 7, 2020 (Pages 2.1 - 2.6)

Approve the December 7, 2020 Water Commission Minutes.

3. Water Commission Meeting Schedule for 2021 (Page 3.1)

Approve the Water Commission meeting schedule for 2021.

4. 2021 Water Commission Work Plan (Page 4.1 – 4.2)

Approve the 2021 Water Commission Work Plan.

5. Quarterly Update on the Water Supply Augmentation Strategy (WSAS) (Pages 5.1 – 5.8)

Receive information regarding the status of the various components of the Water Supply Augmentation Strategy and supporting studies and provide feedback.

Items Removed from the Consent Agenda

General Business (Pages 6.1 – 7.57) Any document related to an agenda item for the General Business of this meeting distributed to the Water Commission less than 72 hours before this meeting is available for inspection at the Water Administration Office, 212 Locust Street, Suite A, Santa Cruz, California. These documents will also be available for review at the Water Commission meeting with the display copy at the rear of the Council Chambers.

6. 2019 AWWA Water Audit, Assessment of Distribution System Water Losses and the Status of Non-Revenue Water Management Planning (Pages 6.1 - 6.27)

That the Water Commission receive information and a presentation regarding the 2019 AWWA Water Audit and the assessment of water losses on the distribution system to inform future decision-making support for the development of our annual Non-Revenue Water Management Program.

7. Final Draft, Updated Water Shortage Contingency Plan (Pages 7.1 - 7.57)

Approve the final draft of the 2020 Update to the Water Shortage Contingency Plan and recommend its adoption by the Santa Cruz City Council.

Subcommittee/Advisory Body Oral Reports

8. Santa Cruz Mid-County Groundwater Agency

9. Santa Margarita Groundwater Agency

10. Ad Hoc Financial Planning Committee

Director's Oral Report

Information Items

Adjournment

WATER COMMISSION
INFORMATION REPORT

DATE: 12/23/2020

AGENDA OF: January 4, 2021

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: City Council Actions Affecting the Water Department

RECOMMENDATION: That the Water Commission accept the City Council actions affecting the Water Department.

BACKGROUND/DISCUSSION:

December 8, 2020

Richard Heath & Associates Contract Amendment (WT)

Motion **carried** authorizing the Water Director to execute Contract Amendment No. 1 in the amount of $75,000 with Richard Heath & Associates to fund the Energy and Water Savings Assistance Program in a form to be approved by the City Attorney and to authorize the Water Director to execute future contract amendments within the approved budget.

Resolution to Apply for State Water Resources Control Board Funding for the Facilities Improvement Project at the Graham Hill Water Treatment Plant (WT)

Resolution No. NS-29,756 was adopted authorizing the Water Department to apply for State Water Resources Control Board (SWRCB) funding for the Facilities Improvement Project at the Graham Hill Water Treatment Plant in a form to be approved by the City Attorney.

PROPOSED MOTION: Motion to accept the City Council actions affecting the Water Department.

ATTACHMENTS: None.

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Water Commission
7:00 p.m. – December 7, 2020
Council Chambers/Zoom Teleconference
809 Center Street, Santa Cruz

Water Department

Summary of a Water Commission Meeting

Call to Order: 7:00 PM

Roll Call

Present: D. Engfer (Chair) (via Zoom), S. Ryan (Vice-Chair) (via Zoom), J. Mekis (via Zoom), A. Páramo (via Zoom), D. Schwarm (via Zoom), W. Wadlow (via Zoom), L. Wilshusen (via Zoom)

Absent: None

Staff: R. Menard, Water Director (via Zoom); D. Baum, Water Chief Financial Officer (via Zoom); C. Coburn, Deputy Director/Operations Manager (via Zoom); M. Kaping, Management Analyst (via Zoom); H. Luckenbach, Deputy Director/Engineering Manager (via Zoom); K. Fitzgerald, Administrative Assistant III (via Zoom)

Others: 3 members of the public (via Zoom)

Statements of Disqualification: None.

Oral Communications: None.

Announcements:

Consent Agenda

1. City Council Items Affecting the Water Department

2. Water Commission Minutes From November 2, 2020

Chair Engfer pulled Item 3 for further discussion.

Commissioner Mekis moved the Consent Agenda as amended. Commissioner Wilshusen seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

Items pulled from the Consent Agenda

3. FY 2021 1st Quarter Financial Report

Why does the current status for the Mid County New Wells show "as not initiated" on the chart on page 17?

- All the ASR work being performed to date, to determine the feasibility of ASR project(s) is being funded from the ASR Planning project. Full-scale project implementation (permitting, design and construction) will be funded out of the other four ASR projects that are currently shown as uninitiated.

Has the water consumption increased in FY21 as shown in the graph on page 16?

- There is an error on this chart; consumption has actually decreased by .6% and total consumption should be closer to the 668 million gallon mark for the first quarter of fiscal year 2021. The total for FY 2018 has also been revised to 744 million gallons. We will make this correction and replace the report after the meeting.

Can staff clarify the Grand Total numbers at the bottom of the chart on page 18?

- There is an error in the source formula on the Subtotal Infrastructure Resiliency and Climate Adaptation line that is causing the grand total numbers to be inaccurate.

One member of the public commented.

Commissioner Mekis moved the staff recommendation on Item 3. Commissioner Wadlow seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

General Business

4. Informational Presentation on the Affordability of Santa Cruz's Water and Wastewater Rates

Ms. Menard introduced Mr. David Mitchell from M.Cubed for the presentation on the affordability of Santa Cruz's Current Water and Wastewater Rates.

The poverty prevalence appears to be higher on the west side of Santa Cruz, which is typically considered to be more affluent but has a high concentration of student housing and UCSC students, some of whom may be more affluent or receive support in addition to any income they report. Is it possible to differentiate between low-income students and those who may be more affluent or are receiving financial help?

- Mr. Mitchell responded that there is a possibility if the census data is reviewed but is still challenging because even those students who are receiving financial help or come from affluent backgrounds will still show as low income because they are not reporting an income. Similarly, retirees with significant assets but little reportable annual income may also present an analytic challenge.

- Ms. Menard commented that during a recent study for Integrated Regional Water Management planning, water shutoffs due to non-payment were not seen or concentrated in the student housing area.

What can be done to address disparities in the population that will be affected by higher water rates with regards to Prop 218 limitations?

- Prop 218 does not allow for cross-subsidies to customers based on whether they can afford to pay the bill. AB 401 has provided some suggestions for how the Department might develop a program that can help low-income customers.
- If the affordability issue is to be tackled, the first step is to analyze and understand affordability issues in the community which will help define local problems and help to determine how any program that might be proposed would help those in the community who may not have the resources to pay for utility services.

Commissioners commented that within the UCSC student group, while some do not come from low-income backgrounds, many other students are undertaking large amounts of debt and higher rates may be contributing to student's needs for larger loans.

What time period is the data on housing costs based on?

- Mr. Mitchell responded that the estimates come from the last five years of data but they do not reflect the changes in the market since the COVID-19 pandemic. The data does reflect that the cost of housing in Santa Cruz was high before the pandemic began.

Commissioners commented that some California special district utilities have sought out alternative sources of funding, for example property taxes or sales taxes, that are not covered by Prop 218 restrictions to fund assistance programs for low-income ratepayers.

Is there an opportunity to use monies from System Development Charges (SDC) to fund programs that can assist low-income ratepayers?

- That use of those funds is not currently allowed by the municipal code. Section 16.14.040 includes the following language:

  (c) Use of Charge Revenues. System development charge revenues shall be placed in a separate and special account and such revenues, along with any interest earnings on that account, shall be used exclusively for the following purposes:
  (1) To pay for the city's future construction of system expansion and improvements to be financed by system development charge revenues;
  (2) To reimburse developers who have installed system development financed water facilities which are larger than needed for the certain development and are subject to the terms of a reimbursement agreement; or
  (3) To pay for water conservation programs approved by the city council which have the net effect of increasing the amount of water supply available for allocation to new or additional demand.

  Further, if revisions were made to the municipal code language to allow such a use, the high degree of variability in the annual amount of SDCs collected might create sustainability issues for an ongoing program requiring ongoing funding.

5. Recommendations on System Development Charges, Elevation Surcharge, and Eliminating the Outside City Surcharge

Ms. Menard introduced Sanjay Guar from Raftelis for the discussion of the recommendations on system development charges, the elevation surcharge, and eliminating the outside city surcharge.

Have there been any interactions with local groups that are developing low-cost housing, such as Housing Matters, to see if the SDC recommendation is conducive to their objective of building affordable housing?

- There have not been any recent discussions with these groups.

Do developers have to petition to for a waiver or deferrals of SDCs?

- Yes, if a developer has a qualifying affordabile housing project, a request for a waiver can be made and the Council determines whether to approve it.

Please explain why newer projects like the ASR Mid County New Wells were included in Table C-1: 11-Year Totals of Capital Improvement Projects on page 95.

- The rationale behind this is that we have existing infrastructure that is deficient which is a reliability problem regardless of how many new developments enter the system

Will developers who have already paid the higher SDC have an opportunity to get money back if the new SDC rates are passed and the developers have not begun construction?

- There may be an opportunity for this, but as of now payments for most of the upcoming developments have not been submitted.

Commissioners commended staff for recommending to City Council that the outside-city surcharge should be eliminated.

One member of the public commented.

Commissioner Wilshusen moved the staff recommendation that the Water Commission recommend to the City Council that they adopt, as part of the 2022 water rate-setting process, the updated system development charges, to be implemented as soon as possible, the updated elevation surcharge, and that the outside city surcharge should be eliminated. Commissioner Ryan seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

6. Presentation on Analysis of Costs of Water Transfers to Soquel Creek Water District

Mr. Sanjay Gaur from Raftelis presented on the Analysis of Costs of Water Transfers to Soquel Creek Water District.

Has this proposed agreement been reviewed by the District?

- Yes.

How does the recommended rate of $1,925 per million gallons compare to the general cost of water for the District?

- The District's general cost for producing water out of their groundwater wells is around $175 per acre-foot (about $537 per million gallons).

Mr. Gaur commented that when comparing these numbers, the costs being discussed are related to costs for the infrastructure that is needed to deliver the water, so the $175 per acre-foot is not an equal comparison to the $1,925 per million gallons.

What is the general cost of water generated with the Pure Water Soquel project?

- We do not have the exact figures at this time.

Ms. Menard commented that the source for the water that is transferred is not reliable and transfers are contingent on whether there is enough water to transfer. These characteristics make water supply for transfer an interruptable supply which has a lower value than a more reliable supply.

Will the higher price point in this proposal deter the District from accepting water from the City?

- Not necessarily. For clarification, this is the price for exchanges under the Pilot agreement and excludes transfers or exchanges during emergencies, such as the PG&E Public Safety Power Shutdown events (PSPS) last year.

Ms. Luckenbach commented that Phase 1 of the Pilot study was focused on analyzing impacts on the District's water quality as well as assessing operational issues that either agency experienced. Phase 2 will be focused on the opportunities and constraints of bringing water back into the City's system.

How are other costs such as administrative or operational costs being considered or factored into the wheeling rate?

- We have not decided whether or how to allocate portions of the operation and maintenance or marginal costs. The focus of this agreement is not really full-cost recovery, but how we can build resiliency and a future supply that the City and the District can pull from during times of drought.

Commissioners commented that costs of water should be comparable to what the next acre-foot of water might cost.

Have the costs for the District to receive water been factored into this analysis?

- Thus far only an analysis of the City's cost to send water to the District has been analyzed.

Subcommittee/Advisory Body Oral Reports

7. Santa Cruz Mid-County Groundwater Agency (MGA)

The MGA had a meeting on November 19th and approved several general business items: a contract with M&A for planning and technical services for groundwater sustainability plan implementation and reporting; approved a resolution for Proposition 68 grant implementation; and took action on selecting an approach for monitoring and data management in the basin. The next meeting will be held on the third Monday in March and will be quarterly after that.

8. Santa Margarita Groundwater Agency (SMGWA)
The SMGWA met on November 16th and had a substantial conversation about the role of the agency in future projects and management actions. There was a private well owner stakeholder meeting last week. The next meeting will be held on December 9th.

9. Ad Hoc Financial Planning Committee
The group had a meeting on November 17th and reviewed the initial results of the CIP modeling work and included estimated impacts on rates. A fourth scenario was also added that modeled a "no CIP" situation. The next meeting will be held on December 15th.

Director's Oral Report: Ms. Menard reported that the rain caused some turbidity in the river as was expected and we are waiting on the volatile organic compounds analysis. The lack of rain is allowing us more time to mitigate hazard removal and clear fire debris. PG&E's illegal tree removal actions have impacted the Laguna watershed though the impacts are unknown at this point. John Ricker, the Water Resources Director for the County of Santa Cruz, is retiring and Sierra Ryan has been named the interim Water Resources Director. There has been discussion of a County-led project to develop fire hydrants on the treated water line along the North Coast. The next meeting will be held on January 4th, 2021.

Adjournment Meeting adjourned at 9:31 PM.

Respectfully submitted,

Katy Fitzgerald, Staff

WATER COMMISSION
INFORMATION REPORT

DATE: 12/23/2020

AGENDA OF: January 4, 2021

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: Water Commission Meeting Schedule for 2021

RECOMMENDATION: Approve the Water Commission meeting schedule for 2021.

BACKGROUND/DISCUSSION: In accordance with local health and safety guidelines regarding the COVID-19 pandemic, all meetings are scheduled to be held remotely until further notice.

January 2021
(01-04-20)

February 2021
(02-01-21)

March 2021
(03-01-21)

April 2021
(04-05-21)

May 2021
(05-03-21)

June 2021
(06-07-21)

July 2021
(07-05-21) (*Observed 4th of July Holiday*)

August 2021
(08-02-21)

September 2021
(09-06-20) (*Labor Day holiday)*

October 2021
(10-04-21)

November 2021
(11-01-21)

December 2021
(12-06-21)

FISCAL IMPACT: None

PROPOSED MOTION: Motion to approve the Water Commission meeting schedule for 2021.

ATTACHMENTS: None.

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WORKING DRAFT

Water Commission Work Plan – December 2020 Update for Calendar Year 2021

(12/20/2020)

Major Water Commission Work Plan Item	Anticipated City Council Action on Water Commission Recommendations
January 4, 2021	
➢ WSAS Quarterly Update	➢
➢ Recommendation on Water Shortage Contingency Plan	➢ February 23 – Council action on updated Water Shortage Contingency Plan
➢ Presentation on 2019 water loss audit	➢
February 1, 2021	
➢ FY 21 2nd Quarter Financials	➢
➢ Overview of FY 21 CIP projects and project plans for FY 22 CIP	➢
➢ Future Revenue Requirements – Presentation of the work of the Water Commission Ad Hoc Subcommittee on Revenue Requirements	➢ See March City Council Water Policy Agenda
➢ Summer Water Supply Forecast – first look (information item – consent)	➢
➢ Urban Water Management Plan -- Presentation of Preliminary Long Term Demand Forecast	➢
March 1, 2021	
➢ Urban Water Management Plan – Approach and assumptions for Drought Risk Assessment and Water Supply Reliability Assessment	➢ Tentative: March 16th – City Council presentations on Water Policy Issues with City Council action on water policy issues: ○ Inside-Outside Rate Differential ○ Elevation surcharge ○ Future Revenue Requirements ○ Water Pricing Objectives ○ Water Rate Structure Design ○ Possible action to explore moving the IRF (capital related revenue collection) to the property tax
➢ Urban Water Management Plan – Conservation and Demand Management	
➢ Water Rates – rate design alternatives and property tax options	
April 5, 2021	
➢ FY 21 3rd Quarter Financials	➢ April 13 – Council action on summer 2021 water restrictions if needed
➢ Summer Water Supply Forecast – Recommendation	➢
➢ WSAS Quarterly Report	➢
➢ Water Rates – 1st look – rate structure and preliminary rates	➢
May 3, 2021	
➢ FY 22 Budget and CIP – First Look	➢
➢ Rate Design Recommendations	➢
➢ 1st look – Drought Risk Assessment and Water Supply Reliability Assessment	➢
June 7, 2021	
➢ FY 22 Budget and CIP – Recommendation to Council	➢ Council Action on City Budget and CIP June 8th or 22nd
➢ Urban Water Management Plan – revised long term demand forecast incorporating proposed water rates	➢ Tentative – June 22nd – Council Action on Water Rate Structure Design
July 5, 2021 -- to be rescheduled to a to be determined date	
➢ Draft Comprehensive Water Rate Study and Cost of Service Analysis	➢
➢ WSAS Quarterly Report	➢
August 2, 2021	
➢ Water Rates -- Water Commission Recommendations to Council	➢ August 24th -- Council action on proposed rates and initiation of the Prop 218 process (September 1 to October 15 protest period)
➢ Urban Water Management Plan – Status Report	➢
September 6, 2021 -- to be rescheduled to a to be determined date	
➢ WSAS Decision Making – Update on vulnerability analysis and supply options analysis	➢
➢	➢
October 4, 2021	
➢ WSAS Quarterly Report	➢ October 26 – City Council Public Hearing On Water Rates
➢ Urban Water Management Plan Recommendations to Council	➢
November 1, 2021	
➢ FY 21 4th Quarter Financials and FY 22 1st Quarter Financial	➢ City Council action to adopt the Urban Water Management Plan
➢	➢

December 6, 2021	
➢	➢
January 3, 2022	
➢ **WSAS Quarterly Report**	➢

Things to add –

UWMP – Long Term Demand Forecast, Supply Reliability Analysis, Affordability

Quarterly WSAS and Financials

Water Rates – rate options, revenue requirements, rate design, rates, affordability analysis

Supply selection – TBL+, Climate vulnerability analysis,

WATER COMMISSION
INFORMATION REPORT

DATE: 12/21/2020

AGENDA OF:	January 4, 2021
TO:	Water Commission
FROM:	Heidi Luckenbach, Deputy Director/Engineering Manager
SUBJECT:	Quarterly Update on the Water Supply Augmentation Strategy (WSAS)

RECOMMENDATION: Receive information regarding the status of the various components of the Water Supply Augmentation Strategy and supporting studies and provide feedback.

BACKGROUND and DISCUSSION: Following the completion of the Water Supply Advisory Committee (WSAC) process, the City Council accepted the Final Report on Agreements and Recommendations that included a detailed Implementation Plan and Adaptive Management Strategy. The WSAC work was adopted as part of the 2015 Urban Water Management Plan and is currently referred to as the Water Supply Augmentation Strategy (WSAS) that includes an Implementation Work Plan (Work Plan).

As per the WSAC Final Agreements and Recommendations, the Water Commission shall receive quarterly updates on the status of the various elements of the recommended plan. This is the twentieth quarterly update.

The content and format of this report will continue to be modified to provide a comprehensive overview of the progress, findings, obstacles, etc. of the various elements of work. Outstanding request(s) by the Commission include:

- Provide an ongoing narrative and/or spreadsheet showing the nexus between water supply projects specifically spelled out in the WSAC report and other projects and studies being performed by the Water Department. Ongoing and reported on below under the work of Raucher LLC, Water Supply Augmentation Implementation Plan.

The Water Supply Augmentation Strategy (WSAS) consists of the following elements as defined by the WSAC:

- Element 0: Demand Management. Implementation of the Long Term Water Conservation Master Plan is foundational to the WSAS.
- Element 1: In Lieu. This alternative could include the sale of water to other agencies with or without the assumption of additional water back to the City during droughts.

- Element 2: Aquifer Storage and Recovery. Evaluations of both the Mid-County and Santa Margarita Groundwater Basins are being conducted.
- Element 3: Advanced Treated Recycled Water or Seawater Desalination.

Progress and status of the various WSAS-related work are described in detail below as well as that of other projects related to but not explicitly mentioned in the WSAS.

ELEMENT 0: DEMAND MANAGEMENT

Overview: Element 0 of the City's Water Supply Augmentation Strategy consists of ongoing demand management activities. The primary goal of this element is to generate an additional 200 to 250 million gallons per year in demand reduction by year 2035 from expanded water conservation.

Summary: The Water Conservation section has been actively working on the following projects:

- Finalizing the Water Shortage Contingency Plan. This will be presented to the Commission at their January 2021 meeting.

- Meter Replacement Program. Conservation staff have been working with Customer Service on the overall meter replacement plan. Work has included reviewing documents developed by our consultant, Jacobs Engineering, for the installation of the project as well as the draft Badger Meter sole-source materials proposal.

- Water Loss Control Program (No. 1). This item will be presented to the Commission at their January 20201 meeting.

- Water and Energy-Saving Assistance Program (No. 6). This program offers free toilet replacement to qualifying low-income households, in conjunction with free weatherization and energy efficiency services funded by PG&E. This program has been successfully implemented in our service area. Field work resumed for the second half of calendar year 2020 and the program will continue until at least the end of the current fiscal year. However, the most recent Stay at Home Order may impact this program.

Next Steps: M.Cubed (David Mitchell) has been hired to update the Water Department's water demand projections; a preliminary forecast will be completed and shared with the Commission at Commission's February 2021 meeting. Together with M.Cubed, staff is also assessing the Water Conservation Master Plan to better understand the degree to which current system demand demonstrates that the WSAC reduction goal for the 20 year timeframe has already been met, and if so, what the implications of this outcome are to future projects and programs.

ELEMENT 1: WATER TRANSFERS AND/OR WATER EXCHANGES

Overview: This work is considering the feasibility of sending excess City surface water to neighboring agencies for the purpose of passively recharging the groundwater basin(s). In-Lieu is now described as follows.

- Water Transfers: Selling treated surface water to neighboring agencies for the purpose of augmenting their own water supplies and possibly (passively) recharging the groundwater basin if less groundwater was used by the neighboring agencies.
- Water Exchanges: Negotiating an agreement whereby treated surface water provided to neighboring agencies would, by allowing the groundwater basins to recharge, provide additional groundwater back to the City during water supply shortages.

Summary: As previously mentioned, due to the lack of rainfall this past year, water supply conditions and the water available from the north coast sources, Phase II of water transfers ended on January 31, 2020. The total volume of water transferred last year was 33.7 million gallons and averaged roughly 0.6 million gallons per day.

The City and SqCWD (the District) have been discussing the possibility of extending the agreement for an additional five-year term. The only specific change to the terms of the existing agreement would be to amend the price from the current figure of $1000 per million gallons to $1930 per million gallons, the (rounded) figure developed in the City's recently completed analysis of the cost of providing water transfers to the District under the operating terms and conditions that the two agencies have experienced during exercise of the current agreement. (This material was presented by Raftelis to the Water Commission at their December 2020 meeting.)

Next Steps: Once the modified term is agreed to by staff from the City and SqCWD, staff will prepare an agenda report recommending extending the agreement for City Council action at one of the Council's meetings in January or February 2021. Assuming that the two agencies take action to extend the agreement, City and District staff will work to refine study objectives for future transfers, building on the knowledge and experience gained during the initial pilot transfers. The Agreement's recital section includes high-level objectives that remain relevant and collaborative efforts of our staffs will provide some details of issues and opportunities that could be explored during the next phase of transfers conducted under this agreement.

Contract Update(s)
Purchase Order Agreement with SqCWD for cost-sharing of Water Quality Sampling and Development of Water Quality Results Technical Memorandum (TM).

- PO Opened: January 2017 (Phase 1 Bench-scale work)
- Project Partner(s): Soquel Creek Water District
- Engaged Stakeholders: None at this time.
- Original PO Amount: $60,000
- PO Change Order (Phase 2 Water Quality Monitoring/Pilot Test): $45,000
- Amount Spent: $76,349
- Amount Remaining: $28,651

ELEMENT 2: AQUIFER STORAGE AND RECOVERY

Overview: Aquifer Storage and Recovery (ASR) is being evaluated as a form of actively recharging the groundwater basin(s). Work in this area includes the Mid-County Groundwater Basin (MCGB) and the Santa Margarita Groundwater Basin (SMGWB).

Summary: The City contracted with Pueblo Water Resources (Pueblo) in 2016 for Phase I of the three-phase program to evaluate the feasibility of (and potentially implement) ASR as a water supply alternative. Phase I consists of higher-level feasibility work; i.e., site-specific injection capacity and geochemical analyses, groundwater modeling and development of a pilot test program. Phase II includes the pilot testing and Phase III would be project implementation.

The groundwater modeling component of Phase I is ongoing and will continue through the completion of Phase II as part of the iterative process to ensuring project success. No additional groundwater modeling scenarios were performed in the last quarter and Pueblo is currently finalizing the Phase I ASR Groundwater Modeling Technical Memorandum, summarizing the groundwater modeling scenarios and findings to date. As is noted below under Element 3, several modeling runs are being considered to better understand the benefits of additional wells that use recycled water instead of surface water. This work is contracted under Pueblo, but reported under Element 3.

Phase II work at the Beltz 8 site was put on hold prior to commencement of Cycle 3 of the ASR pilot until further data collection and evaluation could be completed to ensure that adverse leaching or dissolution of Arsenic (As) was not occurring. In October, Pueblo submitted the Final Technical Memorandum documenting the geochemical interaction analysis at Beltz 8, which recommended that the City proceed with a modified ASR Cycle 3 to further investigate Arsenic behavior at the site. Staff are coordinating with City Operations to schedule ASR Cycle 3 and currently anticipate a start date in March 2021.

Sustainable Groundwater Management Act
Work continues on the development of the Santa Margarita Groundwater Basin's Groundwater Sustainability Plan, and opportunities for ASR to play a role in both basin recovery and development of drought supply for use by water utilities, including the City of Santa Cruz.

Next Steps: Work over the next few months will include:

- Continue working with Pueblo to finalize the Technical Memorandum documenting results of the previous groundwater modeling work.
- Work with Department Operations staff to finalize a schedule for starting Cycle 3 of the Beltz 8 pilot study.
- Work with Pueblo and Montgomery & Associates for the development of possible modeling scenarios of a project in the Santa Margarita Groundwater Basin.

Contract Update(s):
Consultant: Pueblo Water Resources (Pueblo) – Phase I

- Contract Signed: February 2016
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz, Scotts Valley Water District, San Lorenzo Valley Water District
- Original Contract Amount: $446,370
- Contract Amendment No. 1: $377,615
- Contract Amendment No. 2: $35,000
- Contract Amendment No. 3: $193,390 (for IPR modeling but funded by Recycled water)
- Amount Spent: $ 733,762
- Amount Remaining: $ 318,613

Consultant: Pueblo Water Resources (Pueblo) – ASR Phase II – Beltz 12 ASR Pilot Test

- Contract Signed: October 2018
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz
- Original Contract Amount: $458,085
- Amount Spent: $433,796
- Amount Remaining: $24,289
- Status: Complete.

Consultant: Pueblo Water Resources (Pueblo) – ASR Phase II – Beltz 8 ASR Pilot Test

- Contract Signed: January 2020
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz
- Original Contract Amount: $1,051,945
- Contract Amendment No. 1 (Increase in monitoring well depth): $47,172
- Contract Amendment No. 2: $133,104
- Amount Spent: $927,706
- Amount Remaining: $304,515
- Status: Delayed – Duration unknown at this time. Staff is tracking possible delays related to the outcomes of Cycle 3 pilot testing at Beltz 8.

ELEMENT 3: ADVANCED TREATED RECYCLED WATER AND DESALINATION

Overview: Advanced Treated Recycled Water and Desalination were included within the same Element with the intention that, following feasibility-level work, just one would proceed for further evaluation and preliminary design.

Summary:
Phase 1: Kennedy Jenks was hired in 2016 for Phase 1 of a study that evaluated beneficial uses of treated wastewater as both a water supply as well as other options such as irrigation that may or may not result in supply augmentation. Phase 1 was a fairly broad study that developed supply augmentation alternatives to sufficient levels of detail to be able to compare and contrast with the desalination alternative. In November 2018, City Council took action to prioritize recycled water over desalination.

Phase 2: Building on the work developed in Phase 1, Phase 2 is developing more detail about those alternatives showing potential for augmenting water supply. The Phase 2 Recycled Water Study will also incorporate work being performed by both Scotts Valley Water District, Soquel Creek Water District, and the Santa Margarita Groundwater Agency. Work began on Phase 2 following the Council approval in December 2019. In May 2020, City Council approved Contract Amendment Number 1 that incorporates the work of Raucher LLC and the Hydrosystems Research Group (HG, led by Dr. Casey Brown at the University of Massachusetts Amherst). In November 2020, the City executed Contract Amendment Number 3 with Pueblo for groundwater modeling of groundwater injection wells that would use appropriately-treated recycled water.

The following summarizes the work performed in the last quarter.

Development of Alternatives

Staff has been working with Pueblo to refine the groundwater recharge alternatives using Advanced Treated Wastewater (ATW). At this point the focus is in the Mid-County Groundwater Basin. The modeling objective is to be able to compare the costs/benefits of using surface water and ATW for basin replenishment.

Discussions with other agencies

- The City is contracting with Black & Veatch for the design of elements of a future tertiary treatment facility that would meet the Water Department's recycled water objectives. Black & Veatch is the design partner of Soquel Creek Water District's Pure Water Soquel (PWS) Design-Build (DB) team for the treatment plants located at the City's Wastewater Treatment Facility (WWTF) and their Chanticleer facility. This ~$40,000 contract designs the piping and other below-ground infrastructure that would be constructed as part of the PWS project so that no additional below-ground impacts at the WWTF would occur. Construction will be contracted through an amendment to the PWS DB contract.

- Staff from the Water and Public Works Departments worked with the PWS team to finalize the "City of Santa Cruz Non-Potable Reuse Engineering Report" that was submitted to the State Water Resources Control Board, Division of Drinking Water Recycled Water Unit together with PWS' Engineer Report on December 18, 2020. The primary purpose of the Santa Cruz Non-Potable Reuse Engineering Report (ER) is to obtain conditional approval for the filter and UV processes during start-up and commissioning of the PWS plant at the WWTF. These processes will be used in the future for off-site uses (e.g. irrigation of La Barranca Park) and must pass specific testing. DDW will only conduct their reviews with an approved ER. If the City did not do the ER and received DDW approvals now, we would have to do so in the future without any support from the DB team. Once the City has off-site uses we can either amend this ER or submit an ER specific to off-site uses; either way, onsite inspections and approvals would not need to be revisited.

Contract Update(s):

Consultant: Kennedy Jenks, Recycled Water Feasibility Study – Phase 2

- Contract Signed: December 20, 2019
- Project Partners: City Public Works
- Engaged Stakeholders: Scotts Valley Water District, Soquel Creek Water District, County of Santa Cruz
- Original Contract Amount: $260,000
- Contract Amendment No. 1: $496,205
- Contract Amendment No. 2: Administrative only
- Amount Spent: $151,408
- Amount Remaining: $604,797
- Schedule: Contract is seeing an ongoing ~4-5 month delay due issues now related to groundwater modeling. Final RWFS Report: July 2021; Water Supply Augmentation Implementation Plan: December 2021 (needs to be updated).

OTHER

Water Supply Augmentation Implementation Plan
The work being performed by Raucher LLC and the University of Massachusetts Amherst (UMass) group will be summarized in four topic areas as follows. This is a high-level summary of work with more detail provided throughout the next year as work increases.

Water System Model and Resilience Assessment: Develop a water system model and identify challenging climate and system demand scenarios

A significant portion of the current work is being performed in this area, developing the new water system model. UMass staff is working closely with City staff and consultants (Shawn Chartrand and Gary Fiske) to develop a water supply model capable of performing numerous scenarios in short amounts of time. This item is scheduled to be complete in April 2021.

Triple Bottom Line (TBL): Assessment of the relevant water supply enhancement options, applying relevant evaluation criteria

Activities involve collecting information about each alternative, defining the criteria, and setting up the framework for the TBL analysis. This item may be delayed, awaiting the results of some groundwater modeling.

Vulnerability Assessment and Adaption Planning: Integration of decision scaling analysis of climate change and other critical uncertainties and associated risks for future water supply reliability

This work has not yet begun.

Water Supply Augmentation Implementation Plan (WSAIP): Develop an adaptive management-based plan based on the previous work

Staff is working with Raucher LLC to draft the framework of the WSAIP, documenting the WSAIP objectives and approach. Initial draft documents include background, objectives and approach, as well as the framework for alternatives, criteria and thresholds.

Source Water Monitoring
The enhanced data collection activities previously outlined have continued. In addition, in response to the CZU Lightning Complex Fire, Production staff developed a temporary Standard Operating Procedure (SOP) for turning the San Lorenzo River in or out of production following storm events. Historically, Water Treatment Operators turn out the San Lorenzo River during storm events when certain turbidity thresholds were met. The temporary SOP built from these existing procedures to require enhanced water quality monitoring and decision making by senior staff before the river can be put back into service.

In part because of the temporary SOP, but also because of ongoing work to replace the water main on Ocean Street Extension, the system was operated on the reservoir so far during this year's storm events. Following the storm events, Liddell Spring was brought back into service. However, the SLR has been offline longer than normal following storm events because of

increased color and turbidity. More recently, the SLR has been out of service to support salmonid migration flows triggered by December's storm events. Data collected in rain events during November and December will help inform future decision-making about post-fire water quality issues in the San Lorenzo River and North Coast sources as we look to balance water quality concerns with long-term supply requirements.

Santa Cruz Water Rights Project
This project involves the modification of existing City water rights to increase the flexibility of the water system by improving the City's ability to utilize surface water within existing allocations. In addition to improved flexibility, the success of this project is necessary to facilitate future water supply projects.

Work is continuing on the development of the Draft Environmental Impact Report. The project description has been finalized and the Draft Environmental Impact Report (EIR) is well underway. A presentation to the Water Commission on the updated project description was provided at the Commission's October 2020 meeting.

Revised change petitions and Underground Storage Supplements were submitted to State Water Resources Control Board (SWRCB) in August, and staff has met with SWRCB staff to review the submittals. Public noticing by SWRCB of the petitions is expected in early 2021. The Draft EIR is on schedule to be circulated for public review in spring 2021, and the Final EIR is expected to be completed in fall 2021.

Outreach and Communication
Outreach during this quarter has included the following:

- Monthly email newsletters to WSAC email list.
- Director Menard as guest lecturer in environmental studies at UCSC.
- KSBW news story on post-fire water quality
- City on a Hill story on post-fire water quality
- SCMU Review, fall issue
- Weekly project updates to GHWTP and Ocean Street Extension neighbors.

FISCAL IMPACT: None.

PROPOSED MOTION: Receive information on the Water Supply Augmentation Strategy, Quarterly Work Plan Update.

ATTACHMENT(S):
None.

WATER COMMISSION
INFORMATION REPORT

DATE: 12/30/2020

AGENDA OF: January 4, 2021

TO: Water Commission

FROM: Neal Christen, Water Conservation Representative

SUBJECT: 2019 AWWA Water Audit, Assessment of Distribution System Water Losses and the Status of Non-Revenue Water Management Planning

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RECOMMENDATION: That the Water Commission receive information and a presentation regarding the 2019 AWWA Water Audit and the assessment of water losses on the distribution system to inform future decision-making support for the development of our annual Non-Revenue Water Management Program.

BACKGROUND: Water Conservation staff has been completing annual American Water Works Association (AWWA) water audits of the distribution system since 1999. The top-down auditing activity was a voluntary water utility best management practice (BMP) that used a general approach to accounting for known volumes of water production, consumption and approved uses to produce estimates of the unaccounted volumes of real and apparent losses.

During the recent drought, and with the realization of widespread water supply reliability issues throughout the state, there was a significant increase in interest at the state level in gaining a better understanding the magnitude of potable water losses occurring in distribution systems in order to support the development of regulations for urban water suppliers to reduce water losses. The enhanced focus on distribution system water losses was one of many components that informed the "Making Conservation a Way of Life" legislation.

Overview of What Water System Audit Activities

In 2015, the Department partnered with Water Systems Optimization, Inc. (WSO) to provide technical assistance with assessing our auditing practices, evaluating our levels of real and apparent water losses and developing a work plan that would position the Department for compliance with potential new regulatory requirements. The WSO contract provided objective guidance for improving the quality of data inputs to help increase the validity of our annual estimations of water losses.

Beginning in 2015, the Department's Water Conservation staff has worked with WSO to develop annual Non-Revenue Water Management programs and audit procedures. The scope of the contracts consists of professional and technical support in developing work plans, project design

and implementation, conducting data analysis, training staff and providing support for the Level 1 Validation Certification process. The focus of much of this work has been on refining data collection procedures to improve the validity of the annual water audit and the resulting estimates of volumes of water losses. Some of the notable projects that exemplify a high level of intra-departmental collaboration and support are as follows:

- **Production Meter Accuracy Testing:** A volumetric accuracy test was designed and implemented to test the accuracy of the San Lorenzo River and Newell Creek production meters at the Graham Hill Water Treatment Plant (GHWTP). The GHWTP was isolated from the distribution system during operation and the Finished Water Tank was used to measure the volume of water production for comparison with the meter readings collected during the test. This procedure was necessarily time-limited due to the need to meet system water demands by producing water from the plant and required the coordination and collaboration of Water Production, Water Distribution, Water Engineering and Customer Service staff.

- **Small Meter Accuracy Testing:** The design and implementation of a small meter testing program were completed by the Meter Shop staff with field support from Water Distribution staff. A random and statistically representative sample of small meters (5/8”-1.5”) is selected, removed from service, bench tested at three flow rates and the data is collected for analysis.

- **Large Meter Accuracy Testing:** Meter shop staff formalized a large meter testing program that specifically looked at system meters with higher usage and, therefore greater impact on revenue generation. Annually, approximately twenty-five large meters are field-tested by a contracted and certified large meter tester. The meters that experience the highest throughput are tested annually in addition to randomly selected large meters. The meter accuracy testing contributes to the development of a more robust data set across the large meter class size range (2”- 10”).

- **Acoustic Leak Detection Surveying:** Survey transects were developed to inform the acoustic leak detection for field surveys that have been completed on approximately 200 miles of treated water mains and appurtenances throughout the service area. The survey is an industry-standard technique that is used to find leaks in the distribution system that are not readily discoverable due to geology and various soil conditions that keep leaking water from coming to the surface. Water Engineering, Water Distribution and Customer Service staff provided support to WSO staff in developing the transects and providing field verification and support during the surveys.

- **Beltz 12 Meter Accuracy Testing**: A volumetric meter accuracy test procedure was developed and executed by Water Production staff. The Beltz 12 water treatment facility was operated in reverse using water from the distribution system to fill the Finished Water Tank. The tank volume was referenced against the meter registration for accuracy analysis.

- **Billing System Analysis:** WSO staff coordinated with Customer Service and Information Technology staff to conduct a thorough review of raw billing information for a calendar

year period to survey for billing errors and assess the overall integrity of our meter data collection and billing procedures.

Collectively, these types of Non-Revenue Water Management projects have contributed to a much more refined accounting of the processes that are inherent to our water system, production, consumption, water uses and the respective forms of water losses. As the regulatory environment continues to evolve and the corresponding pressure intensifies on utilities to minimize water losses, it is likely that more robust Non-Revenue Water Management programs and activities will have an integral role in defining policies and procedures at the utility level that are designed to monitor and appropriately engage water losses when determined necessary.

New and Evolving Regulatory Requirements

As anticipated, in 2016, then Governor Jerry Brown signed SB 555 which established the requirement for urban retail water suppliers to complete and submit to the Department of Water Resources (DWR), annual AWWA Water Audits of the treated water distribution system. Further, the new regulation required that the audit be validated by an independent third party and achieve a minimum standard of Level 1 Validation certification. The independent, third-party review and certification of the annual audits were implemented to improve the quality of the data that informs the annual water audits as well as to enhance the validity of estimated volumes of water losses.

Compliance by urban water retailers with the Level 1 Validation Certification requirement and the improved annual water audit data sets would be used as a foundation for a secondary regulatory component of SB 555, the development of a Cost-Benefit Analysis Model to be used in setting a Water Loss Performance Standard. At the direction of the State Board, DWR staff collaborated with UC research organizations and various stakeholders to develop the regulatory framework for the Cost-Benefit Analysis Model and the corresponding Water Loss Performance Standard (gallons/service connection/day). DWR staff is working to finalize the rule-making process during the first quarter of 2021. Implementation of the Water Loss Performance Standard and related requirements will occur on a phased timeline between 2022 and 2028.

DISCUSSION: In September of 2020, Water Conservation staff submitted its completed 2019 AWWA Water Audit for Level 1 Validation review and received the required certification.

In 2019, the audit indicated that the distribution system continues to operate at a relatively low level of water leakage and loss with a total volume of estimated water losses of 226 MG. This estimated volume of lost water has been further divided into categories of Real Losses at 160 MG which is loss associated with physical leakage in the distribution system and Apparent Losses at 66 MG which is water delivered to the customer that is not registered as billed consumption due to metering under-registration and to a lesser extent, billing system-related errors.

In addition to the estimates of the different types of losses that occur in the distribution system, the water audit software being used in the audit process produces a Data Validity Score and assigns the water utility a Data Validity Level (I-V). This information provides an informative framework for evaluating areas for potential improvement for both the overall improvement of the auditing process and water loss control planning.

Since the implementation of the Level 1 Validation requirement, the Department's annual water audits have scored within a range consistent with a Data Validity Level III. This level of success has been achieved through extensive training, consultant support in establishing annual water loss control programs and improvements in data collection that required a high level of collaboration from staff throughout the Department.

Although the data validity level of our annual water audits is considered sufficient for achieving Level 1 Validation certification, our 2019 Data Validity Score (66) declined slightly from previous audit years and it serves as a reminder that, at minimum, the procedures for auditing our system require consistent attention, and there are opportunities for potential improvement in the area of data collection. The AWWA Water Loss Control Planning Guide below is a useful tool to identify functional focus areas for improvement.

Water Loss Control Planning Guide

	Water Audit Data Validity Level / Score				
Functional Focus Area	**Level I** (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Going forward the State Board and DWR are working on the second provision of SB 555, which requires the development of a model that generates a semi-customized water loss performance standard metric for each utility and provides an analysis of cost-effective intervention strategies to reduce real losses on the system to an economically realistic level of leakage. The model under development is based on three categories of data: utility water audit data, default or supplier-specific data and Water Board determined values. Most notable of the outputs of the draft model is the calculated volume of leakage per service connection per day (gal/conn/day). The water loss metric, called the Water Loss Performance Standard, is specific to the estimated volume of real losses that occur in our distribution system.

For the Santa Cruz system, the preliminary version of the model calculated the Department's Water Loss Performance Standard benchmark for compliance by 2028 at 18 gal/conn/day of real losses on the distribution system. The Department's performance for this metric using 2019 AWWA Water Audit results produced a value of 17.5 gal/conn/day of real losses.

In the near term, preceding the likely full compliance milestone in 2028, there are required supplemental questionnaires due to DWR at phased intervals leading up to the full compliance. The questionnaires inquire about utility activities to reduce the volume of real losses and focus on: 1) Data Quality & Apparent Losses, 2) Pressure Management and 3) Asset Management topics.

The supplemental questionnaires are being designed at least in part to prompt utilities to evaluate areas for continuous improvement in order to reduce real losses to an economically realistic low level of leakage.

FISCAL IMPACT: No additional impact, Non-Revenue Water Management program activities have been included in the Water Conservation budgets since 2015. The annual contracts have ranged in cost ($30k - $60k).

PROPOSED MOTION: None.

ATTACHMENTS:
Attachment 1 - 2019 AWWA Water Audit
Attachment 2 - 2019 Level 1 Validation Certificate
Attachment 3 - SB555 Water Loss Performance Standards: Overview and Timeline
Attachment 4 - 2019 AWWA Water Audit, Water Loss Assessment & Non-Revenue Water Management Presentation

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Santa Cruz Water Department (4410010)
Reporting Year: 2019 (1/2019 - 12/2019)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

	Grading	Value		Pcnt:	Value:	
Volume from own sources:	5	2,673.244	MG/Yr			MG/Yr
Water imported:	n/a		MG/Yr			MG/Yr
Water exported:	5	68.433	MG/Yr	9		MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 2,604.811 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

	Grading	Value		Pcnt:	Value:	
Billed metered:	6	2,344.106	MG/Yr			
Billed unmetered:	10	0.328	MG/Yr			
Unbilled metered:	9	15.413	MG/Yr			
Unbilled unmetered:	8	19.235	MG/Yr		19.235	MG/Yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 2,379.082 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 225.729 MG/Yr

Apparent Losses

	Grading	Value		Pcnt:	Value:	
Unauthorized consumption:		6.512	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

	Grading	Value				
Customer metering inaccuracies:	6	53.977	MG/Yr		53.977	MG/Yr
Systematic data handling errors:		5.860	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 66.349 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 159.380 MG/Yr

WATER LOSSES: 225.729 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 260.377 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

	Grading	Value	
Length of mains:	9	270.7	miles
Number of active AND inactive service connections:	8	24,745	
Service connection density:		91	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

	Grading	Value	
Average operating pressure:	5	91.0	psi

COST DATA

	Grading	Value	
Total annual cost of operating water system:	10	$29,187,880	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$11.07	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$553.46	$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 66 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Variable production cost (applied to Real Losses)

Level 1 Validation Certificate

This document verifies that the Level 1 Validation process was completed. The session details and audit review outcomes are included here.

This certificate is required for submission – alongside the Level 1 validated water audit software file – to the California Department of Water Resources.

Call Date: 9/8/2020

Water Supplier

Supplier Name:	City of Santa Cruz
Supplier Participants:	Neal Christen

Validator

Validator:	Isabel Szendrey, Water Systems Optimization
Validator Qualifications:	Water Audit Validator Certificate from the AWWA California Nevada Section

Key Audit Metrics

Data Validity Score:	66	
ILI:	0.93	
Real Loss:	17.65	gal / conn / day
Apparent Loss:	7.35	gal / conn / day
Non-Revenue Water as Percent of Cost of Operating System:	3.7%	

Certification Statement by Validator

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

Level 1 Validation – Water Supplier Confirmation

This document confirms participation in and endorsement of the Level 1 Validation as completed.

This acknowledgement is required for submission – alongside your Level 1 validated water audit software file – to the California Department of Water Resources.

Water Supplier Name:	City of Santa Cruz Water Department
Water Supplier Public Water System ID:	4410010
Water Audit Period:	CY 2019

Water Audit & Water Loss Improvement Steps

Steps taken in the audit period timeframe to increase data source accuracy, reduce real losses, and/or reduce apparent losses, as informed by the water audit.

Developed and executed a volumetric meter accuracry test of the water system intertie meter with our adjacent water agency.

Developed and executed a volumetric meter accuracy test of the meter at our Beltz 12 Well treatment plant.

Continuation of our revenue-based large meter accuracy testing program.

Routine annual calibration of our production meter instrumentation.

Certification Statement by Water Supplier Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Executive Name (print):	Rosemary Menard
Executive Position:	Water Director
Signature:	
Date	09/22/2020

Water Loss Performance Standards: Overview and Timeline

Regulatory framework

2020	Adoption of regulation for urban retail water suppliers[1]

Summary of the proposed regulatory framework

- Compliance with individual volumetric standards based on economic model for leak detection and repair actions by 2028.
- Post-2028 compliance with volumetric standards on a three-year average basis with an allowed variation of 5 gallons per connection per day over three years.
- Compliance includes responses to questions on (a) water loss data quality in 2022, and feasibility of (b) pressure management and (c) systematic asset management in 2024.
- Off-ramp process for suppliers with low real loss and high data quality.
- Adjustment process to include changes to underlying supplier data in the economic model.
- Variance process to accommodate non-compliance due to adverse economic conditions.

Post-Adoption Implementation

July 1, 2022	*Suppliers shall meet requirements for data submission requirements* Suppliers submit responses to questions on metering practices and data handling that influence data quality for water loss audits. *Suppliers may request adjustments to their standards* Suppliers will be required to provide supporting documentation on proposed system-specific data by this date. *Suppliers may request an off-ramp if they meet data quality criteria* Suppliers will be required to meet data quality criteria to verify their real loss level by this date.
January 1, 2024	*Inclusion of allowable water loss volume in Urban Water Use Objective* Suppliers calculate their urban water use objective (pursuant to AB 1668 and SB 606, 2018), including the assigned water loss standard.
July 1, 2024	*Submit responses on feasibility of water loss control approaches* Suppliers submit responses to questions on the feasibility of implementing: ▪ Pressure management ▪ Prioritized and systematic asset management
July 1, 2027	*Submit updated responses on feasibility of water loss control approaches* Suppliers submit responses to additional questions based on field experience on the feasibility of implementing: ▪ Pressure management ▪ Prioritized and systematic asset management
January 1, 2028	*Water loss reduction* Suppliers begin compliance with volumetric standard for 2028 on a three-year average basis with an allowed variation of 5 gallons per connection per day of the supplier's volumetric standard within the three years.

[1] "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

Next steps and tentative timeline

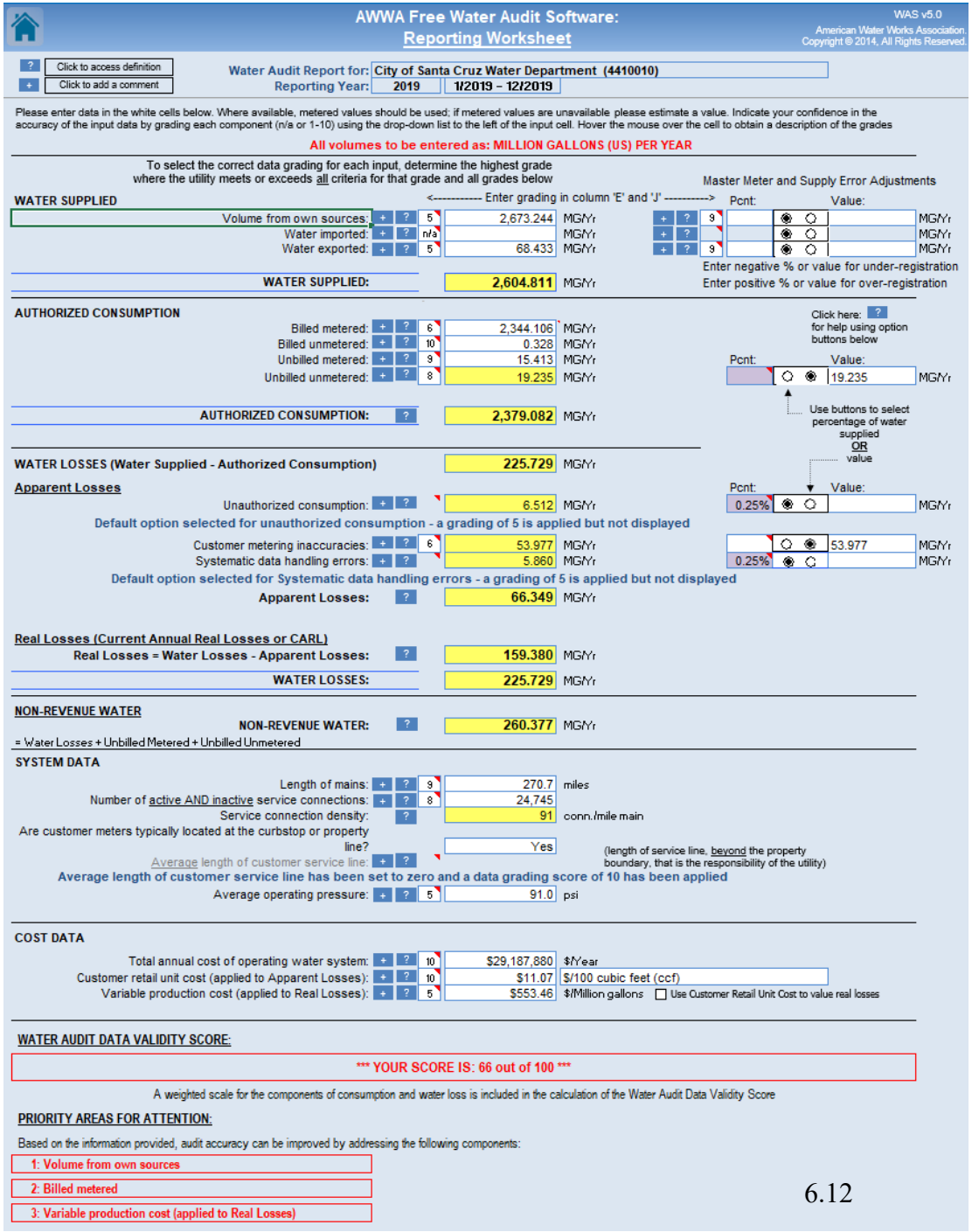
Mid-April, 2020	Publicly release proposed draft economic model, draft regulatory framework and draft data submission requirements
May 1, 2020	▪ Conduct stakeholder meeting to overview draft economic model, draft framework and draft data submission requirements ▪ Begin formal comment period (pre-rulemaking)
Mid-May, 2020	End of comment period
June 1, 2020	Initiate formal rulemaking
November 2020	Potential adoption of regulation

2019 AWWA Water Audit, Water Loss Assessment & Non-Revenue Water Management

Neal Christen, Water Conservation Representative

Our Water, Our Future

CITY OF SANTA CRUZ Water Department



AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.
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Click to access definition
Click to add a comment

Water Audit Report for: City of Santa Cruz Water Department (4410010)
Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

				Pcnt:	Value:	
Volume from own sources:	5	2,673.244	MG/Yr			MG/Yr
Water imported:	n/a		MG/Yr			MG/Yr
Water exported:	5	68.433	MG/Yr			MG/Yr
WATER SUPPLIED:		2,604.811	MG/Yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: for help using option buttons below

			Pcnt:	Value:	
Billed metered:	6	2,344.106	MG/Yr		
Billed unmetered:	10	0.328	MG/Yr		
Unbilled metered:	9	15.413	MG/Yr		
Unbilled unmetered:	8	19.235	MG/Yr		19.235 MG/Yr
AUTHORIZED CONSUMPTION:		2,379.082	MG/Yr		

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption) 225.729 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		6.512	MG/Yr	0.25%	MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	53.977	MG/Yr	53.977	MG/Yr
Systematic data handling errors:		5.860	MG/Yr	0.25%	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 66.349 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 159.380 MG/Yr

WATER LOSSES: 225.729 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 260.377 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	270.7	miles
Number of active AND inactive service connections:	8	24,745	
Service connection density:		91	conn./mile main
Are customer meters typically located at the curbstop or property line?		Yes	
Average length of customer service line:			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	5	91.0	psi

COST DATA

Total annual cost of operating water system:	10	$29,187,880	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$11.07	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$553.46	$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 66 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Variable production cost (applied to Real Losses)

6.12

2019 AWWA Water Audit

Water Supplied (2.60 Billion Gallons)

Authorized Consumption (2.38 Billion Gallons)

Water Losses (226 MG)

Apparent Losses (66 MG)

Real Losses (159 MG)

Non-Revenue Water (260 MG)

Data Validity Score (66)

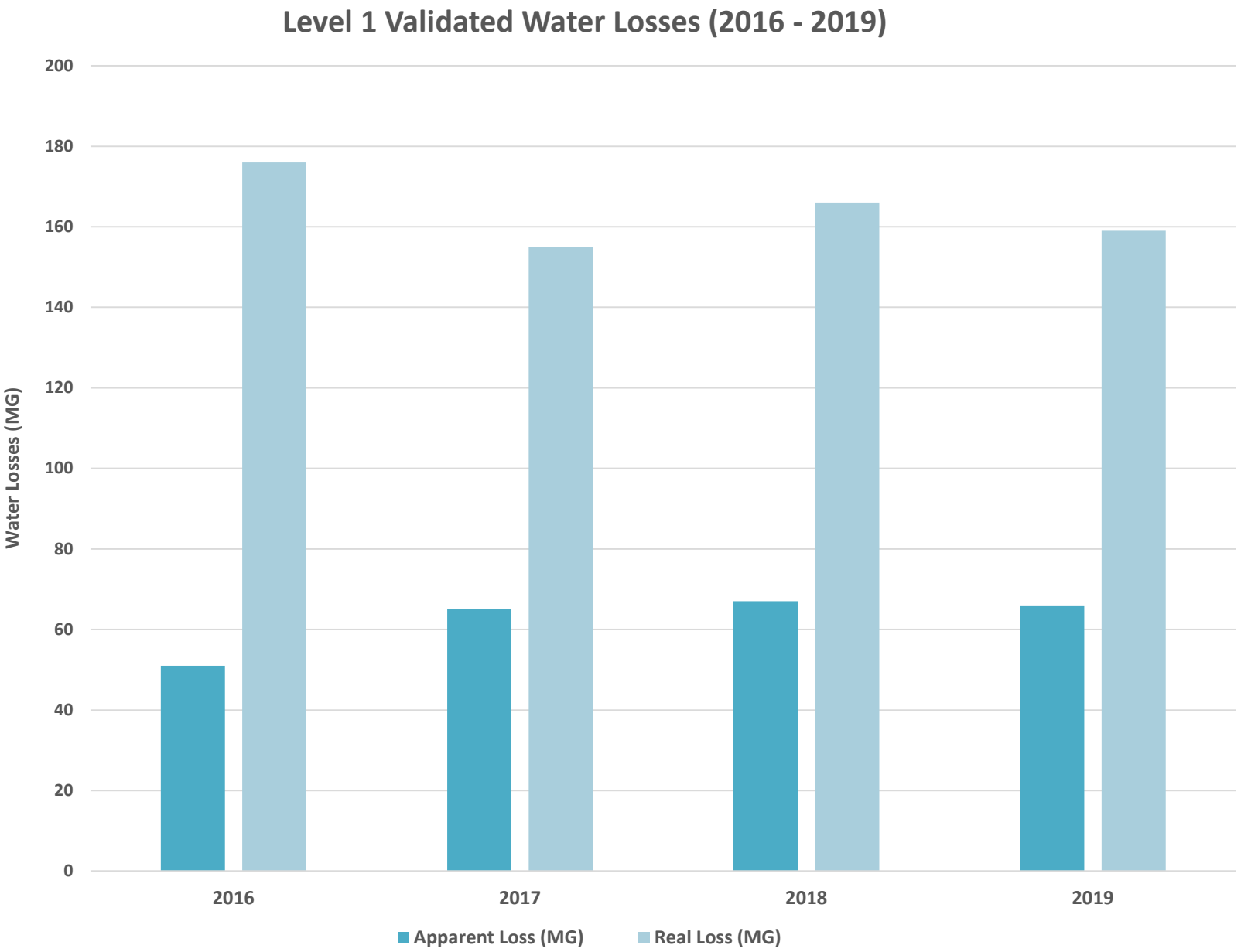
2019 Water Audit – Water Balance

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	City of Santa Cruz Water Department (4410010)	
Reporting Year:	2019	1/2019 - 12/2019
Data Validity Score:	66	

Own Sources (Adjusted for known errors) 2,673.244	System Input 2,673.244	Water Exported 68.433			Billed Water Exported	Revenue Water 68.433
		Water Supplied 2,604.811	Authorized Consumption 2,379.082	Billed Authorized Consumption 2,344.434	Billed Metered Consumption (water exported is removed) 2,344.106	Revenue Water 2,344.434
					Billed Unmetered Consumption 0.328	
				Unbilled Authorized Consumption 34.648	Unbilled Metered Consumption 15.413	Non-Revenue Water (NRW) 260.377
					Unbilled Unmetered Consumption 19.235	
			Water Losses 225.729	Apparent Losses 66.349	Unauthorized Consumption 6.512	
					Customer Metering Inaccuracies 53.977	
					Systematic Data Handling Errors 5.860	
Water Imported 0.000				Real Losses 159.380	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	


Level 1 Validated Water Losses (2016 - 2019)
Water Losses (MG)
200
180
160
140
120
100
80
60
40
20
0
2016
2017
2018
2019
Apparent Loss (MG)
Real Loss (MG)

2019 Water Audit Performance Indicators

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: City of Santa Cruz Water Department (4410010)
Reporting Year: 2019 | 1/2019 - 12/2019

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 66 out of 100 ***

System Attributes:

	Apparent Losses:	66.349	MG/Yr
+	Real Losses:	159.380	MG/Yr
=	**Water Losses:**	**225.729**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	171.93	MG/Yr
	Annual cost of Apparent Losses:	$981,866	
	Annual cost of Real Losses:	$88,211	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	10.0%	
	Non-revenue water as percent by cost of operating system:	3.7%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	7.35	gallons/connection/day
	Real Losses per service connection per day:	17.65	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.19	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	159.38	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.93	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Understanding the Components of Real Losses

Background Leakage
Unreported and un-detectable using traditional acoustic equipment.

Tools
- Pressure Reduction
- Main and service replacement
- Reduction in the number of joints and fittings

Unreported Leakage
Often does not surface but is detectable using traditional acoustic equipment.

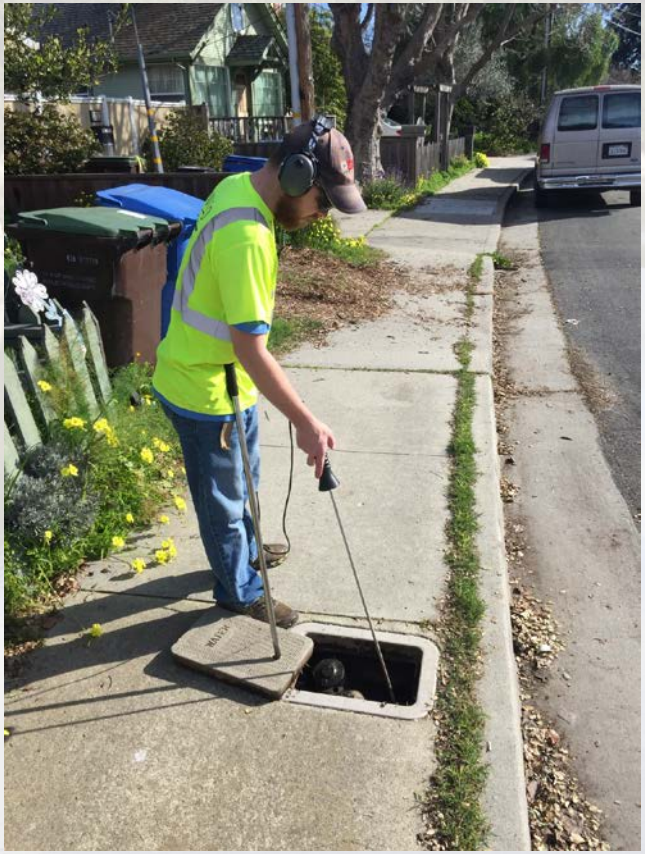
Tools
- Pressure Reduction
- Main and service replacement
- Reduction in the number of joints and fittings
- Proactive Leak Detection

Reported Leakage
Often surfaces and is reported by public or utility workers.

Tools
- Pressure Reduction
- Main and service replacement
- Optimized repair time

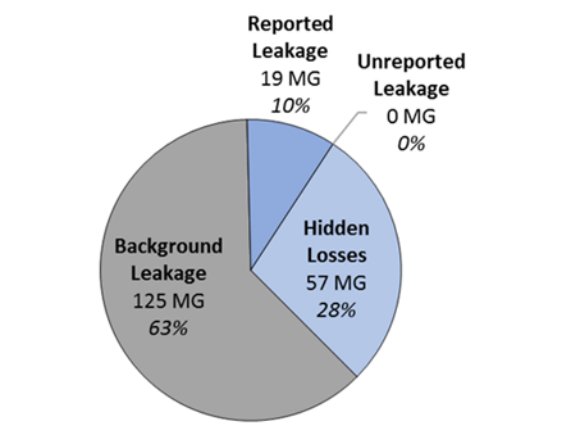
Understanding the Components of Real Losses

Searching for <u>unreported</u> leakage



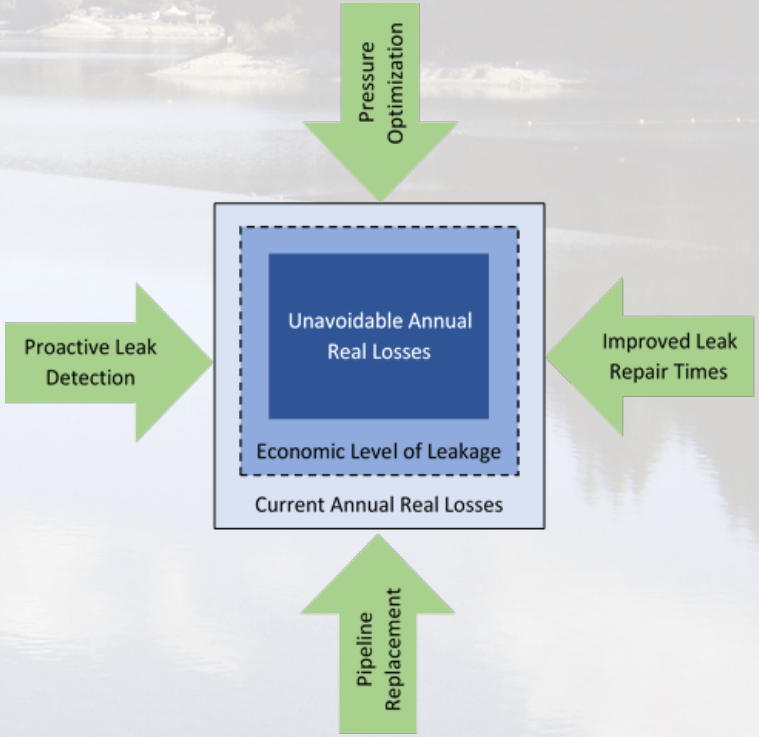
WTDT staff responding to <u>reported</u> leakage

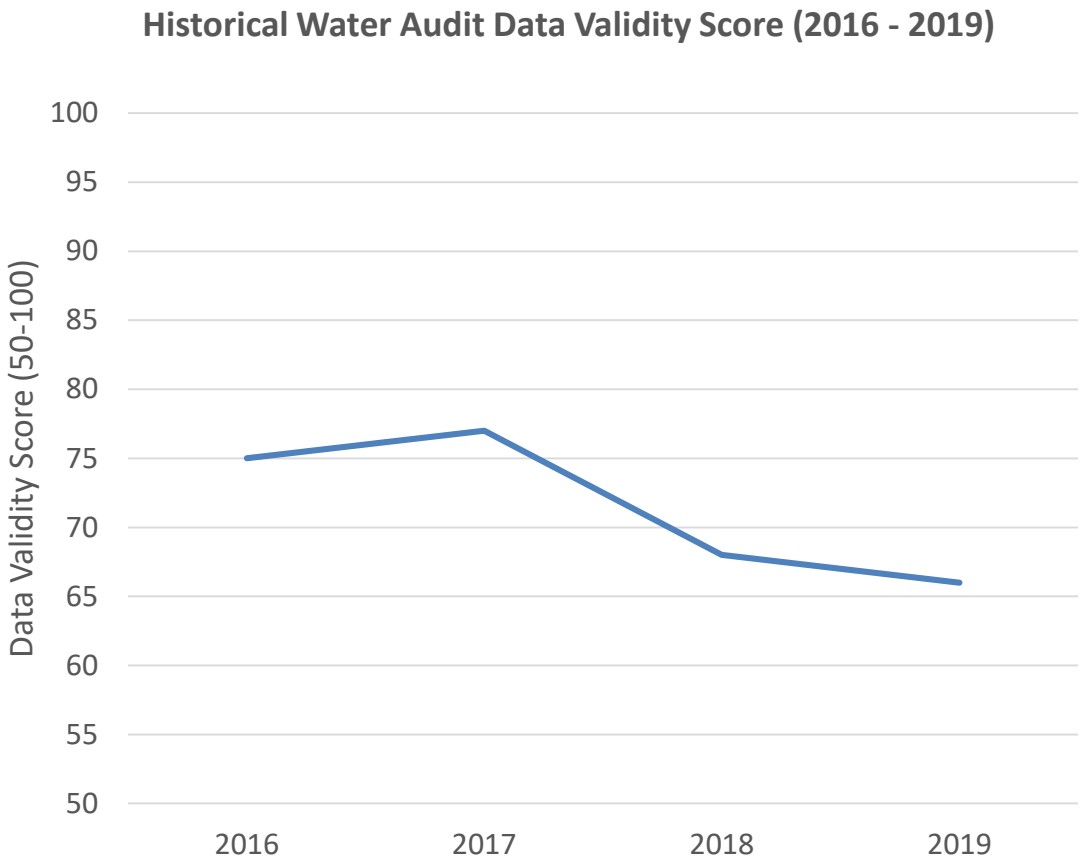
Understanding the Components of Real Losses



2016 Modeled Component Analysis of Real Losses.

Evaluating volumes of real water losses & considerations for implementing real loss reduction measures.





Audit Scoring & Operational Considerations

- **Project Planning & Cost**
- **Operational Availability**
- **Project Prioritization**
- **Sponsorship of Cultural Changes**
- **Developing a Team Approach**
- **Competing Interest**
- **Regulatory Environment**
- **Community Stakeholders**
- **Pandemics**

A Changing Regulatory Environment

2016
- SB 555 - Adoption of the Level 1 Validation Certification for Annual Water Audits

2021
- SB 555 - Adoption of the Water Loss Performance Standard (Gal/Conn/Day)

2022
- Submit to DWR, Metering Practices & Data Handling Supplemental Questionnaire

2024
- Per AB 1668 & SB 606, the Calculated Urban Water Use Objective will include the Water Loss Standard
- Submit to DWR, the Feasibility of Water Loss Control Approached Supplemental Questionnaire

2027
- Submit to DWR, an Updated Feasibility of Water Loss Control Approached Supplemental Questionnaire

2028
- Suppliers Begin Full Compliance with the Volumetric Performance Standard for 2028 on a Three-Year Average Basis

Non-Revenue Water Management Program

Mission: To improve the quality of the data inputs that inform the annual auditing of the distribution system which optimizes the validity of the water loss indicators, providing reliable and actionable data points.

Notable NRW Projects

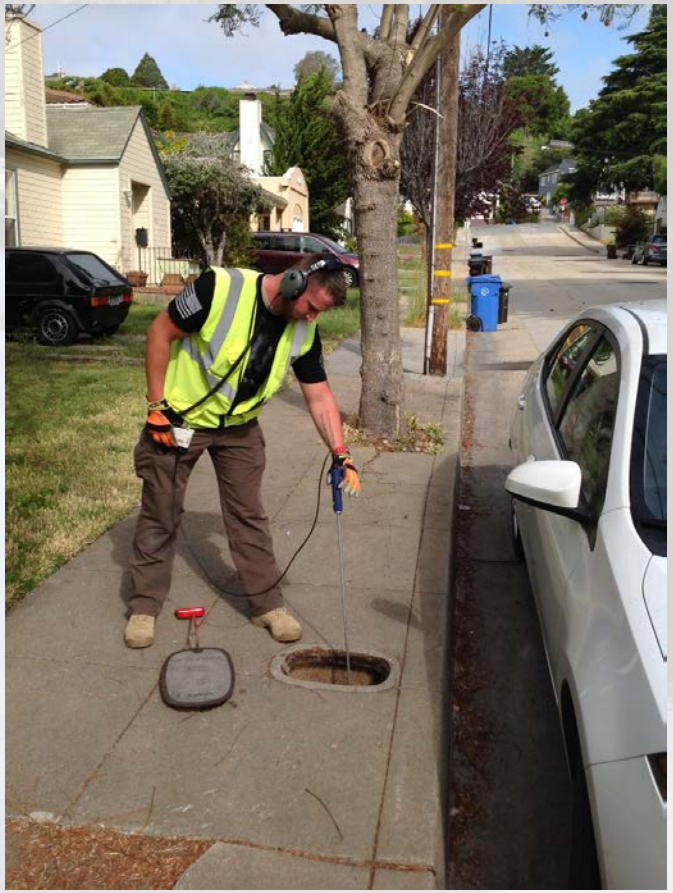
- Volumetric Meter Accuracy Testing of the GHWTP Production Meters
- Annual Production Meter Instrumentation Calibration Program
- Small & Large Meter Accuracy Testing
- Acoustic Leak Detection Surveying of the Distribution System
- Volumetric Accuracy Testing of the Production Meter at Beltz 12
- Implementation of a Geo-data Based Main Failure Tracking Application
- Ongoing Staff Training

Non-Revenue Water Management Program

SCWD small meter bench testing facility

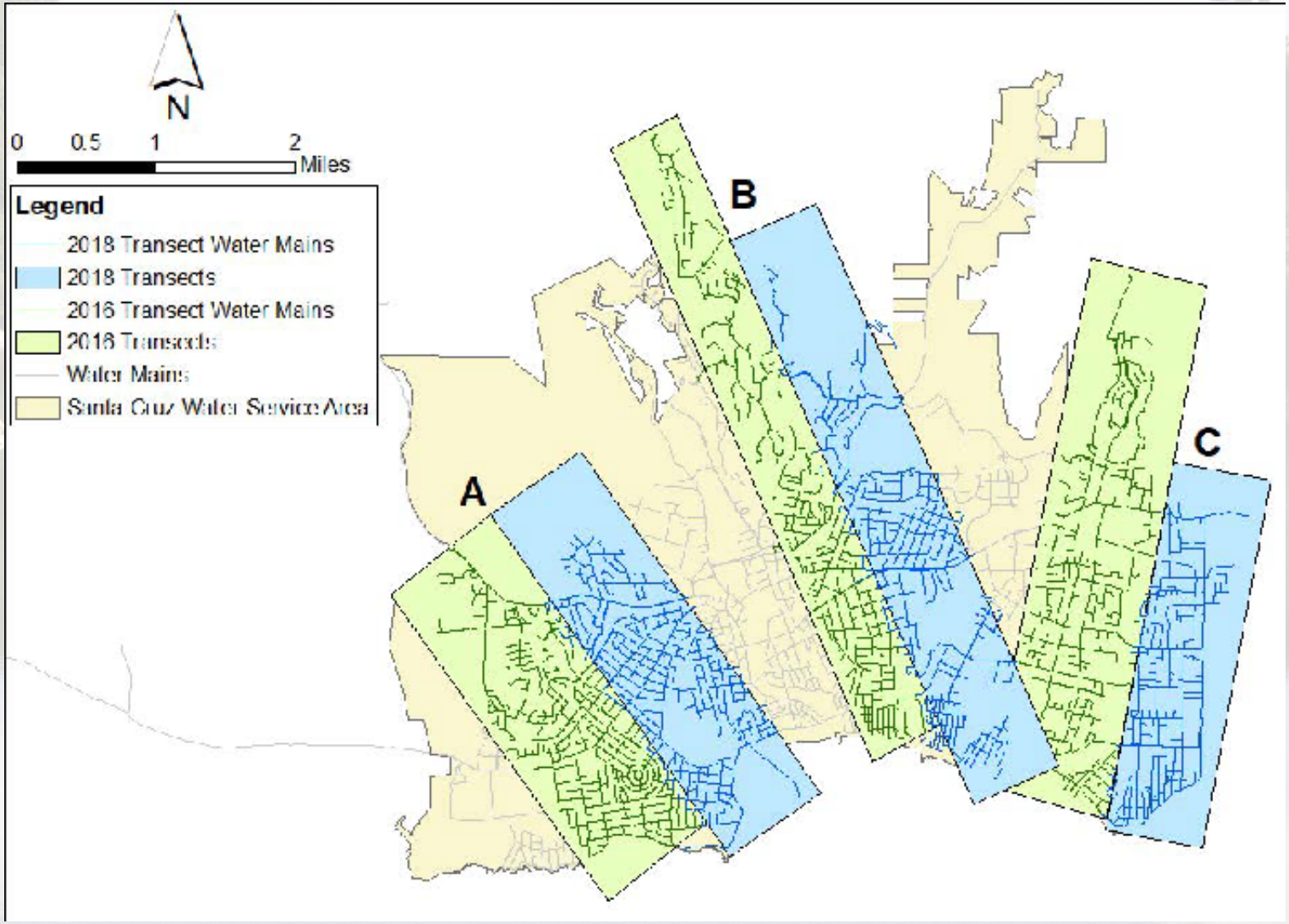
Large meter field testing program

Non-Revenue Water Management Program



Acoustic leak detection surveying of treated water mains & appurtenances

Non-Revenue Water Management Program



Non-Revenue Water Management Program

Beltz 12 Volumetric Meter Accuracy Testing

Non-Revenue Water Management Program

2017 North American Water Loss Conference: ongoing staff education & contributions to professional organizations.

Questions & Comments

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WATER COMMISSION
INFORMATION REPORT

DATE: 12/23/2020

AGENDA OF: January 4, 2021

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: Final Draft, Updated Water Shortage Contingency Plan

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RECOMMENDATION: That the Water Commission approve the final draft of the 2020 Update to the Water Shortage Contingency Plan and recommend its adoption by the Santa Cruz City Council.

BACKGROUND: The Santa Cruz Water Department's current Water Shortage Contingency Plan (WSCP) was approved in 2009 and developed based on customer water use characteristics and demand patterns in 2002 to 2004. The Department recommended the implementation of demand reduction stages in the 2009 WSCP several times during the last decade, including Stage 3 water rationing in 2014 and 2015.

Since the implementation of water rationing, customer water use characteristics and demand patterns have changed substantially, reflecting the community's significant rate of adoption of efficient water use practices and patterns. The degree of these changes made it a priority to update the WSCP to reflect current water use patterns so that curtailment measures, if or when needed, would be adapted to our existing demand characteristics. An additional driver for updating the plan now is that new state regulations developed following the 2013 to 2016 drought, require that our WSCP follow a standardized format that includes five increasing 10% stages and a sixth stage for a shortage of greater than 50%.

DISCUSSION: Through much of calendar year 2020, Water Department staff has been presenting information on changed demand patterns and drafts of an updated plan and the Water Commission has been providing feedback that helped us refine and clarify the plan. Staff's focus since October 2020 has been on creating a final draft of the WSCP for the Water Commission's review, approval and recommendation to the City Council.

Earlier drafts to the WSCP included fairly well developed approaches for the curtailment of residential demand, which makes up the largest percentage of the system's overall demand. The attached draft includes further development and clarification of proposed curtailment strategies

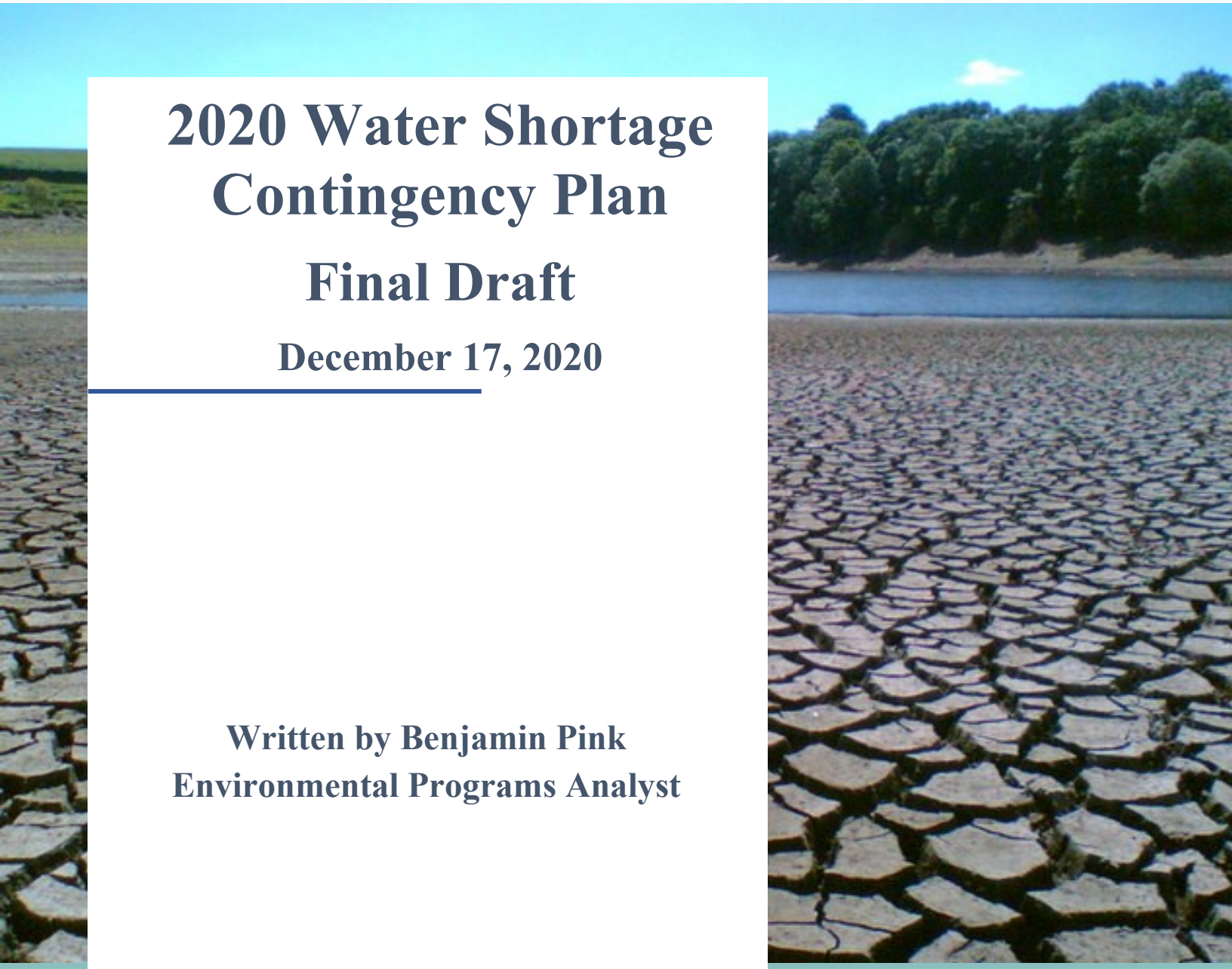
for businesses and other non-residential users, including three types of irrigation, UCSC, and municipal and industrial customers.

Following Water Commission action on the WSCP, City staff will begin working with the City Attorney on revisions to the Santa Cruz Municipal Code section 16.01, which will need to be amended to reflect the changes that have been made to the WSCP.

FISCAL IMPACT: None

PROPOSED MOTION: Motion to approve the final draft of the 2020 update to the Water Shortage Contingency Plan and recommend its adoption by the Santa Cruz City Council.

ATTACHMENTS:
1. Final Draft – City of Santa Cruz 2020 Water Shortage Contingency Plan



2020 Water Shortage Contingency Plan

Final Draft

December 17, 2020

Written by Benjamin Pink
Environmental Programs Analyst

City of Santa Cruz
Water Department

TABLE OF CONTENTS

Executive Summary

Changes in customer water use characteristics and changes in state law have prompted the update of the City of Santa Cruz's 2009 Water Shortage Contingency Plan (WSCP). The new state legislation SB 606 requires every urban water supplier to prepare and adopt a water shortage contingency plan as part of its Urban Water Management Plan (UWMP). The legislation also has new requirements for what must be included in the WSCP, including annual water supply and demand assessment procedures, standard water shortage levels, shortage response actions, and communication protocols and procedures. The bill also requires an urban water supplier to make the WSCP available to its customers and any City or county within which it provides water supplies no later than 30 days after adoption.

This WSCP replaces the plan adopted in 2009, a project that was an outgrowth of the 2005 UWMP. Given that the existing plan is over a decade old, it is clear that many elements of water use in the Santa Cruz service area have since changed. The overall water demand now, compared to when the last plan was written, is the most notable characteristic that has changed over time and is the primary driver for how this plan proposes to reduce demand during a shortage.

The water use base year period for this plan is 2016-2018, in contrast to the last plan that was based on the years 2002-2004. The new base year period was chosen due to it being a recent period in which water use was both stable and there was no shortage emergency. The 2002-2004 period was selected as being representative of typical water consumption patterns in a stable period marked by normal weather and water conditions. At the time, total annual water demand measured about 3.9 billion gallons per year. In this plan, using the 2016-2018 as the base year period, total annual demand now measures about 2.6 billion gallons per year, a decrease of about 33 percent.

The updated demand characteristics have several important ramifications. The primary issue with the current low demand is that there is significantly less discretionary water available to cut now should a shortage occur. For example, whereas in the past when a shortage took place the City could look primarily to outdoor water use restrictions as the main demand reduction tool, today this is no longer the case. With the new demand characteristics, a whole new approach to demand reduction is needed.

The recommended approach throughout this plan is to use customer allocations at all stages of shortage and for all customer groups. An allocation is an amount of water that each customer is allowed to use on a monthly basis once a shortage begins; water used over allocated amount will result in excess use penalty fees being applied to the customer bill. It should be noted that those customers who have already been conserving water will likely find it easier to stay within their allocation. However, customers who have not yet taken steps to become more efficient may have a harder time adjusting to the new system during a shortage.

Each customer class is different and the approach to creating allocations that are reasonable for one group does not necessarily apply to other groups. A primary example of this is the difference between allocations for residential customers and that of business customers. Residential customer allocations are based on the average residential use in the peak season during the base years 2016-2018. The

approach for businesses is different, given their unique usage characteristics, thus the allocation design for them uses an individual account by account reduction approach and not a class-wide average.

Given that this plan relies primarily on customer allocations as the primary demand reduction tool, and given that the new allocations are considerably lower than those contained in the prior plan, significant education and outreach will be essential in order for the successful implementation of during a shortage. Not only will there need to be significant communication to the public in different forms, conveying the main messages of the plan and providing resources to customers, but there will also need to be new tools available for customers to aid them in reducing their water use and staying within allocation. A significant tool for customers will be access to their detailed water use information; the planned meter replacement program that will be initiated in early 2021 will enable customers to access this information. The Department has already implemented a new software platform called WaterSmart Software that can display the usage information from the new meters to customers, and has the ability to notify users when they are nearing specified thresholds such as water rate tiers or allocations. These new tools will be essential in assisting customers with staying within the new allocations.

Although this plan presents a strategy and various actions to take at every shortage stage, the City recognizes two key points about the overall idea of implementing a plan with such deep reduction targets at higher stages:

1) The City's overall water supply augmentation strategy (WSAS) must be pursued and new water supplies developed. Water conservation alone will only aid the City to a certain degree and, given current customer use characteristics cannot be depended upon to routinely address the potential shortages the system may experience, particularly in an extended or severe drought. Developing new water supplies, such as aquifer storage and recovery, water transfers, advanced treated recycled water and others, have the potential to alleviate the supply gap, reduce the frequency and severity of shortage experienced, and limit the need to implement this plan.

2) The new state legislation requires that water suppliers examine six standardized shortage levels ranging from 10% to greater than 50%. Although this plan does examine all the required shortage levels, the City recognizes that the feasibility of actually implementing the necessary allocations and restrictions at higher stages, particularly at 40% (Stage 4) and higher, will present significant challenges and will create economic and physical harm to the community. It is for this reason that the strategy of the City and Water Department will be to avoid needing to implement such drastic measures if at all possible in the first place.

Introduction

The 2020 Water Shortage Contingency Plan (WSCP) is an update of the City of Santa Cruz WSCP that was written in 2009. Although many things have changed since the time when the prior plan was written, as will be discussed in detail below, there are some key characteristics that haven't changed. The fundamental nature of why the City of Santa Cruz is subject to water shortages hasn't changed: water supply storage is constrained to what the Department can store in Loch Lomond Reservoir, which isn't a large enough amount to ensure supply reliability during severe droughts or during a multiple year drought. This situation is made worse by the fact that our water system is entirely dependent on water that falls within our local watersheds and is not connected to imported water sources or to neighboring utilities with robust supplies.

There are several other important local characteristics of Santa Cruz related to water supply that are different now from when the prior WSCP was written. These include: increased commitments to providing water to support protection and recovery of threatened steelhead trout and endangered coho salmon, greater recognition and integration into local water planning of the effects of climate change and the volatile nature of precipitation patterns, new conservation tools, experience in implementing the WSCP, and routine water rate increases to cover rising costs of capital reinvestments in the system. Additionally, and perhaps most importantly, the water demand in the City is significantly lower in recent years compared to the baseline years used for analysis in the prior plan.

In addition to the changes to the water supply augmentation strategy, another significant change that has occurred since the time the prior WSCP was written is the new water conservation legislation at the state level, SB 606 and AB 1668. These new laws strengthen the requirements for WSCPs in Water Code 10632 for all urban water suppliers. Specifically, water suppliers preparing the 2020 updates to their Urban Water Management Plans must include a WSCP that includes the examination of "Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage."

Core Principles

During the development of the 2009 WSCP, the City Water Commission developed a set of principles to guide the planning process. These principles remain mostly the same today (with some minor adjustments) and have been used to guide development of this plan update. The principles are as follows:

- Shared Contribution: All customers will be asked to save their share in order to meet necessary reduction goals during water shortages.

- Reduce non-essential uses first: The plan gives priority to health and safety uses of water and targets non-essential uses for reductions first. However, even some amounts of essential use are reduced under this plan at higher stages due to the overall low levels of demand.

- Preserve jobs and the local economy to the extent possible: Given today's demand characteristics, the business customer class will be subject to the allocation system at each stage of shortage. However, the amount of water the business customer class will need to reduce at each stage is relatively low given that there is a substantial amount of health and safety related use in the overall usage by business customers.

- Existing conservation measures recognized: Customers who have already been conserving will have an easier time maintaining consumption below the allocation levels set out in the plan. This will be especially true in earlier stages of shortage. Customers who haven't conserved as much or at all will find it harder to stay within allocation amounts.

- Communication at every stage: A public information campaign at every level of shortage is essential for customer preparation and will encourage confidence in the City's ability to respond to water shortages.

Relationship to Other Plans

This update to the WSCP is a stand-alone implementation plan for the purposes of managing a water shortage. It also constitutes one of several elements in the City's Urban Water Management Plan (UWMP), as required by State Law.

Although water supply interruptions and shortages may result from a variety of causes, including facility failure, such as a major pipeline break, earthquake, flood, or other natural disaster, this plan is specifically addresses longer-term water shortages that occur as a result of drought conditions that may extend for several months or span several years in duration. For shorter-term emergency incidents or disasters, the Water Department maintains a separate Emergency Response Plan, which is subordinate to and complements the Citywide Emergency Operations Plan, to guide emergency operations response and recovery for shorter-term water supply interruptions and outages.

Updated Water Use Characteristics

As mentioned in the introduction, one of the most significant changes between the 2009 plan and this update is the decline in system-wide water demand that has occurred over the last two decades. The 2009 plan uses customer water use levels and characteristics from 2002-2004 as the basis for normal (unconstrained) water demand.

The 2002-2004 period was selected as being representative of typical water consumption patterns in a stable period marked by normal weather and water conditions. At the time, total annual water demand measured about 3.9 billion gallons per year. **This plan uses 2016-2018 as the base year period**. Total annual demand now measures about 2.6 billion gallons per year, a decrease of about 33 percent. Besides the overall reduction, changes have also occurred in the seasonality or shape of demand as well as the composition of use among and within various customer categories.

In addition to total system production, water demands during the 2016-2018 time period peak season production and peak daily production were significantly different from those in the 2002-2004 base period used in the earlier plan. Specifically, as regards to peak season production, April through October, the average for years of 2002-2004 was 2,641 MG while for the years 2016-2018 it was 1,630 MG. This is a reduction of 38%.

In terms of daily production, for the 2002-2004 period the average peak daily production was 15.3 MGD. For the 2016-2018 period the average peak daily production was 10.1 MGD. This represents a 34% reduction in peak daily production.

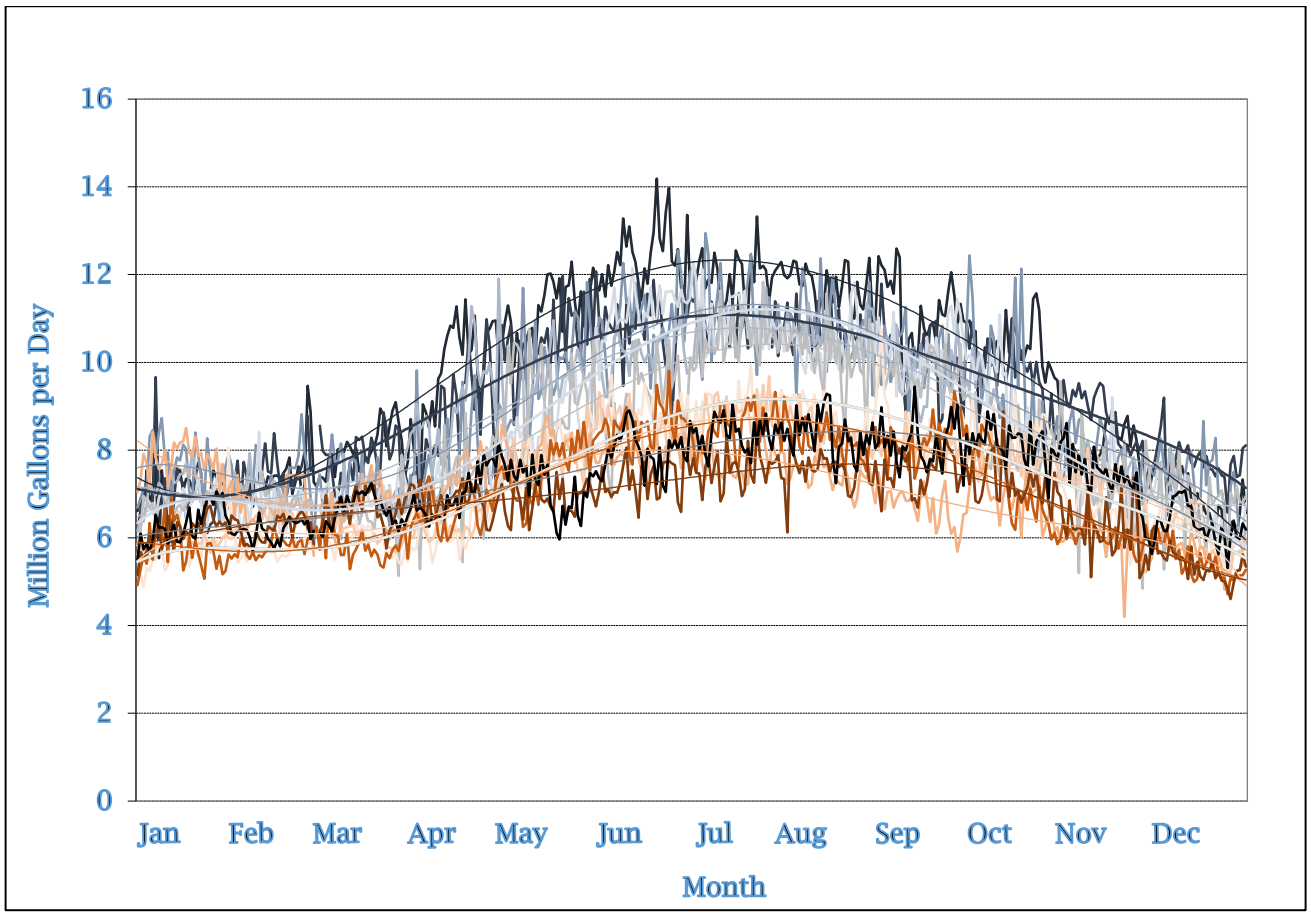
Table 1 summarizes these changes. One of the things that stands out about the new characteristics of water demand then vs. now is that while demand has decreased the population in the service area has increased by roughly 10,000 people.

Table 1 Water Use Comparison Current Base Year Period vs. Old Base Year Period

	2002-2004	2016-2018	Change (Volume)	Percent Change	Direction
Total annual production (billion gallons)	3.9	2.6	-1.3	-33%	↓
Peak season production (billion gallons)	2.3	1.5	-0.8	-35%	↓
Peak month (million gallons)	467	270	-197	-42%	↓
Peak day (million gallons)	15.2	10.4	-4.8	-32%	↓
Average day during peak season (million gallons)	12.7	8.0	-4.7	-37%	↓
Population	87,000	97,000	+10,000	+11%	↑
Visitors (tourism)	?	?	?		↑

Figure 1 shows the daily water production for each year 2008 to 2019 in million gallons per day (MGD). The lower set of curves represent water production in years 2014-2019. The upper set of curves represent water production in years 2008-2013. The substantially lower trend of both overall and peak season water production in recent years is clear from the graph.

Figure 1 Daily Water Production, 2008 – 2019 (MGD)

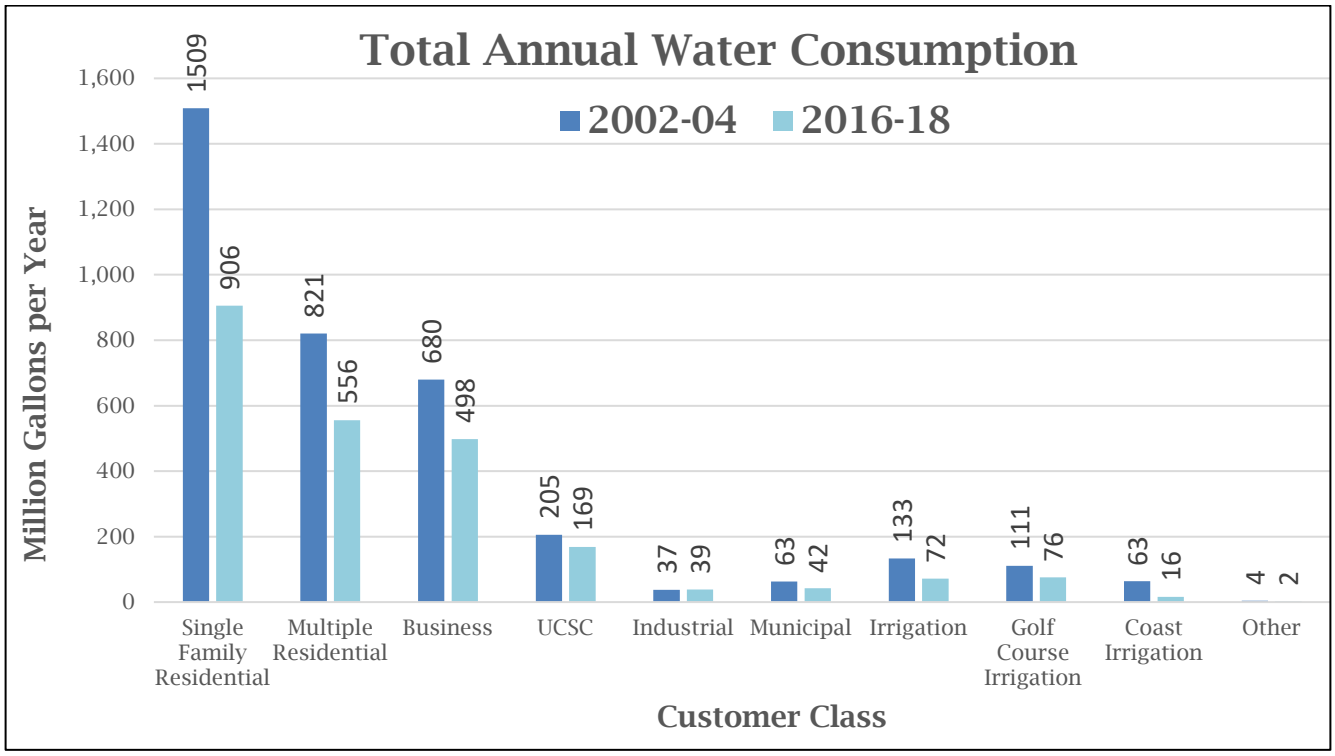


The decline in peak season water use is significant in that it means less water is generally available for cutting back during times of drought. Peak season water usage typically includes various outdoor uses such as irrigation, which is viewed as a more discretionary use than indoor water use. Water providers will often target discretionary uses for greater levels of curtailment than indoor uses. With less discretionary water use in the system, there needs to be a greater focus on curtailing indoor use when shortages occur.

On the other hand, generally speaking, lower system demand mean that total volume of shortages will be lower than would be the case under a higher peak season demand. This is good news, but unfortunately, even with lower system demand, the potential for significant shortages continues to be a real issue.

Figure 2 shows the comparison of annual water use for each customer class between the old base year period for the 2009 WSCP compared to the new base year period for this update. What is clear from the figure is that use in the largest customer classes has significantly declined over this time period.

Figure 2 Water Use by Customer Class, 2002-2004 compared to 2016-2018



Updated Peak Season Composition and Demand Reduction Targets for WSCP Stages

In Santa Cruz, it is typically the peak summer season during which water supplies are more limited because the system's flowing surface water sources, the source of about 45% of total system supply, are less available during the peak season than they are in the wet season, and because stored water is very limited. If winter rains have not replenished Loch Lomond's storage, peak season usage reductions are typically applied in order to ensure that water for essential uses will continue to be available throughout the peak season and into the following water year as well. Demand management through restrictions is the only real tool the Water Department has to manage this risk.

In the existing WSCP, the peak season is defined as the seven-month period April through October and accounted for 1,630 MG of the total annual demand. In this WSCP update, the peak season has been revised to include the six-month period June through November, which reflects water actually consumed from May 1 to October 31st. As a result of both the change in customer demand and the reduction of the peak use period from seven months to six months, the updated peak season usage figure being used in this plan is 1,358 MG.

The change to the definition of the peak season was made because water supplies are historically adequate to meet demand in April. In addition, water shortage regulations usually are not in put into

effect until May 1st or June 1st during a shortage year.

The new water demand characteristics, as well as the state's new standardized WSCP requirements for shortage plans, are the main factors that influence this update of the WSCP. The allocation scheme to be described in this and subsequent sections, which is a major change from the existing WSCP, is driven primarily by the new demand characteristics. In other words, if it were not for the new lower demand in the service area, the demand reduction approaches proposed here would probably be more akin to those in the existing plan including a mix of prescriptive measures and restrictions with allocations only implemented at higher stages. With the new demand however, those approaches are not sufficient or suitable, thus a new demand reduction approach that would ensure that necessary reductions would be achieved even given the low demand characteristics had to be created for this update.

An essential step in updating the WSCP is to determine how much water would need to be cut, overall and from each customer group, at each demand reduction stage. The four steps below were used to generate both the reductions required and the water remaining for use at each WSCP stage:

1. Examine the level and seasonality of water use in each customer category, by breaking down water use in each sector into indoor uses and outdoor/seasonal components;

2. Divide the peak season usage into three usage priorities: 1) health and safety, 2) commerce, and 3) irrigation and other outdoor usage;

3. Determine the level of reductions required at each stage and from each use priority; and

4. Calculate the percentage reductions needed to develop a specific reduction goal for each customer class at each stage of shortfall.

Each of these steps is described in more detail below.

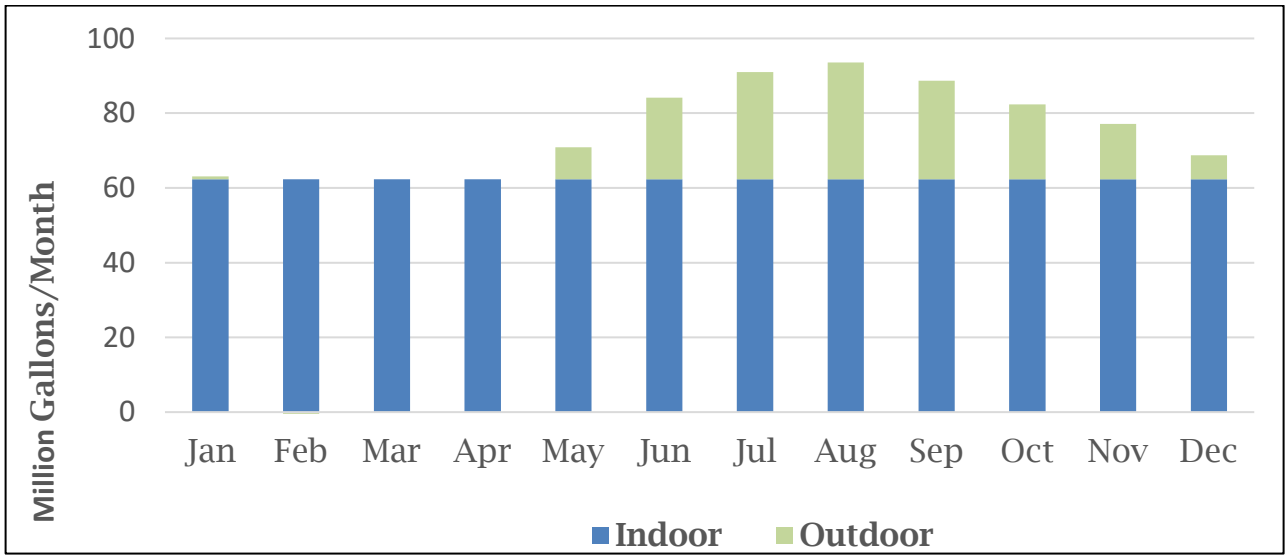
Examine the level and seasonality of water use in each customer category

The process began with examining the seasonality of water use for each customer category. Using the customer sales data for the base year period 2016-2018, each customer group was analyzed for how water was used over the course of each month of the year. For the analysis, the average usage in each month was calculated for the three year base period.

For example, **Figure 3** shows the seasonal consumption composition of the single-family residential sector (SFR). SFR is the largest single customer category with the predominance of the total meters and total consumption. For the analysis, wintertime usage, defined as the average of the usage in the months January through April, is used as a proxy for indoor use. This amount was held constant over the whole year; in Figure 3 you can see this amount plotted in blue for each month. The remainder of the usage in each month is considered to be outdoor usage. In Figure 3 the outdoor usage is plotted in green and does not appear until the peak season begins in the month of May (the May billing period

contains consumption that occurs both in late April and the month of May). What the graph shows is that there is a relatively small component of overall water use in the new base year period that is outdoor use.

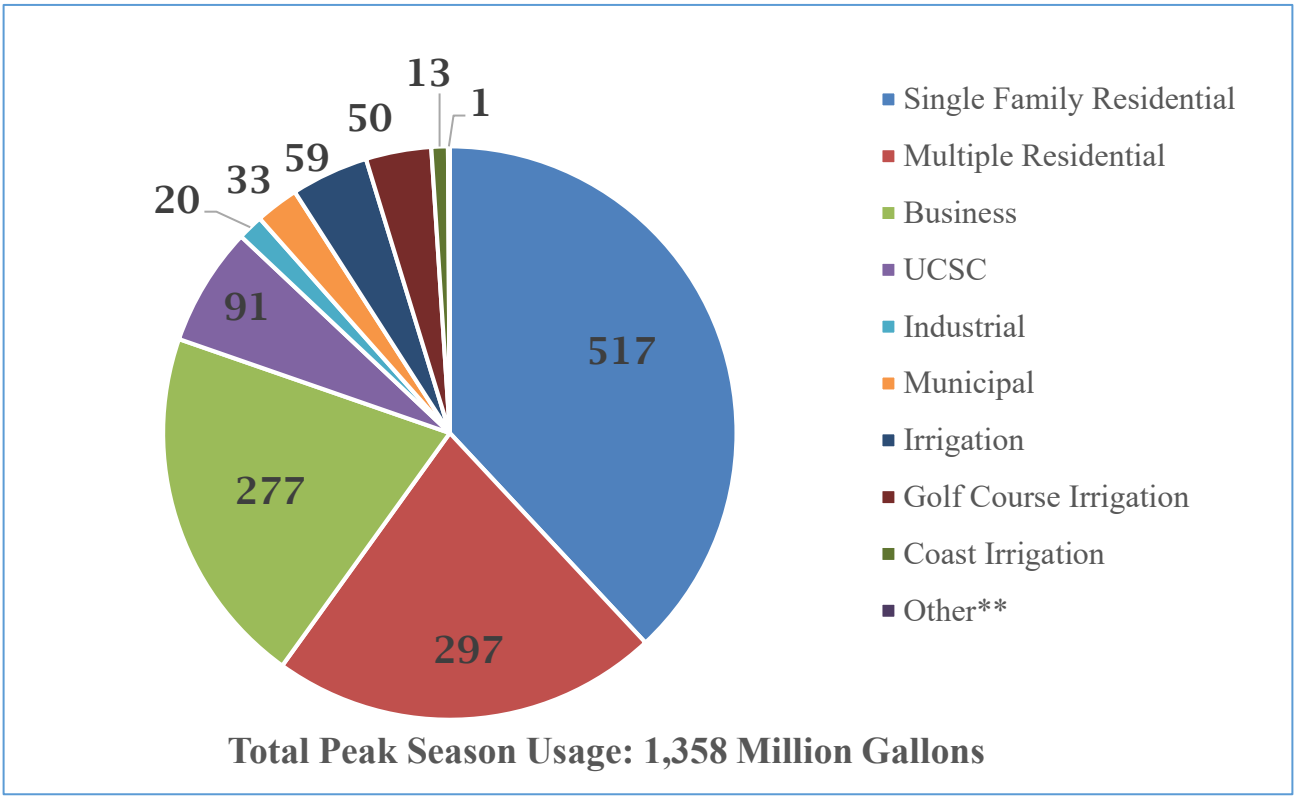
Figure 3 Single-Family Residential Sector Composition 2016-2018 (Million Gallons per Month)



The same analysis of seasonal composition of water use discussed above for SFR customers was repeated for all other customer classes. The purpose of this analysis is to characterize how much water is used during the peak season and how much is outdoor use (discretionary) vs indoor use (more related to health and safety).

Figure 4 shows the usage composition of the peak season in the new base year period by customer class. Single and multi-family residential customer classes are the predominant users of water followed by business use and by usage at UCSC University.

Figure 4 Peak Season Composition by Customer Class (2016-2018) Million Gallons



Divide the peak season usage into the three usage priorities: Health and Safety, Commerce and Irrigation

Once the seasonality and indoor/outdoor composition of the peak season water use has been characterized for each customer class, the next step in the process of allocating water is to divide up water use into three **usage priorities.**

Establishing usage priorities is a way of differentiating the importance of various types of water use. As was the case in the existing WSCP, the three usage priorities that have been identified and are important in allocating water are:

1. **Health and Safety**
2. **Commerce**
3. **Irrigation**

These usage priorities are listed in descending order of importance, with #1 being essential to human health, and #3 being more discretionary in nature. These priorities of water use are the same as in the existing plan.

More specifically, health and safety is defined as water use that is related to essential (indoor) needs

such as drinking, sanitation, washing clothes, cooking, etc. This is the highest priority use of water in the scheme; when there is a shortage, water is retained as long as possible for health and safety uses. .

Commerce is defined as water use that is related to business and commercial activity. This is the second highest priority of water use in the scheme; water for businesses will be retained as long as possible during a shortage, but it will eventually need to be reduced as a shortage intensifies. An example of this type of usage is water used for cooking at a restaurant, or water used for dishwashing or laundry at a hotel.

It should be noted however that there also exists health and safety uses of water at businesses. Health and safety use is, for example, water used for sanitation, health care, drinking and similar purposes. Water use for commerce is different in that the water will be used directly for commercial activity. A good example to illustrate the difference is at restaurant. At a restaurant, a majority of the water used is likely for commerce. That is, the water is used in preparation of food which is then sold to customers. However, a portion of the water used by the restaurant is for sanitation purposes and thus can be thought of as health and safety. Many other business types have a mix of commerce related water use as well as health and safety uses.

Irrigation is defined as water use that is related to outdoor irrigation. This is the lowest priority water use in the scheme; irrigation is considered to be discretionary and thus it is the first use that is cut back and also the first to be completely eliminated when a shortage gets severe enough. Irrigation can be related to any customer class.

The following is an example of how water is divided into usage priorities using the SFR customer class. Figure 4 shows that the total peak season usage of 1,358 MG is primarily the result of use by the SFR customers and, at 517 MG accounts for 38% of the total peak season use.

Table 2 below shows the SFR peak season composition by usage priority. This breakdown of usage is based on the analysis of how much water is used in this sector indoor vs. outdoor. Using the data developed for Figure 4, the amount of peak season water use that is considered as discretionary irrigation water is approximately 28% of the total usage in this customer class, or 143 MG during the peak season. The remaining 374 MG is used for usage priority #1health and safety purposes.

Table 2 Assigning Usage Priority for Single-Family Residential Class (Million Gallons)

Customer Class:	Health/Safety	Commerce	Irrigation	SFR Total for Peak Season	Percent of Total Peak Season Use
Single Family Residential	374	0	143	517	38%

A similar process is followed for each customer class to develop the overall reduction goals for all customer classes. These results are shown in **Table 3**.

Table 3 Overall Composition of Peak Season Usage, by Usage Priority

Jun-Nov, 2016-2018	Usage Priority (million gallons)			
Customer Class:	**1 Health/Safety**	**2 Commerce**	**3 Irrigation**	Total
Single-Family Residential	374		143	517
Multiple Residential	252		45	297
Business	213	64		277
University of California	71		20	91
Other Industrial		20		20
Municipal	7		26	33
Irrigation			59	59
Golf Course Irrigation		17	33	50
Coast Irrigation		13		13
Other		1		1
SUBTOTAL	**917**	**115**	**326**	**1,358**

Table 4 shows how the peak season composition for all customer classes has changed between the old base year period and the new one.

Table 4 Comparing the Peak Season from the base years 2002-2004 to 2016-2018 by usage priority for all customer classes

Usage Priority:	Health/Safety	Commerce	Irrigation	Total
2016-2018 Percent of Total	68%	8%	24%	100%
2002-2004 Percent of Total[1]	53%	16%	31%	100%

To put the figures in Tables 2, 3 and 4 in a more relatable context, over the 180 day peak season, SFR irrigation use in 2002 – 2004 was about 2.1 MGD and in the 2016 – 2018 period that use was about 0.8 MGD. Further, irrigation demand for all customers in 2002 – 2004 was about 4.2 MGD versus 1.8

[1] 2002 – 2004 Data is from Table 3-4 on page 3-10 of the 2009 Water Shortage Contingency Plan

MGD in the 2016 – 2018 period. The SFR irrigation water use for the new base period is just 38% of that used during the 2002 – 2004 base period used in the 2009 WSCP. Overall, use of water for irrigation in the new base period is only 43% of the amount of water used for irrigation in the earlier base period.

What these data shows is that customer demand management efforts, especially with respect to water used for irrigation, have substantially reduced the amount of discretionary water that is typically a major target in any water shortage strategy.

Determine the level of reductions required at each stage and from each use priority

Under the new state requirements for Urban Water Management Plans and WSCPs, there is a specific requirement for standardized shortage levels. From the California Water Code Section 10632, the language is as follows:

> *Section (3) (A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use.*

Based on the new water use characteristics, water use reductions by volume at each stage are shown in **Table 5**.

Table 5 Water Use Reductions Targets by Stage

Peak season total consumption of 1,358 MG				
Stage	Overall System Shortfall:	Cutback (MG)	Consumption (MG)	Cutback (MGD)
1	10%	-136	1,222	-0.7
2	20%	-272	1,086	-1.5
3	30%	-407	951	-2.2
4	40%	-543	815	-3.0
5	50%	-679	679	-3.7
6	>50%		-680 or more	-3.8 or more

The next step in the process is to show how deliveries would be reduced at each stage according to usage priority. Following the Core Principles described earlier, discretionary water use in category 3 is cut by the largest percentage in the earliest stages while cuts in water for commerce and health and safety are subject to smaller, and similarly sized reductions. Once Stage 4 is reached, however, cuts to water for commerce get bigger, in part because there is no longer any irrigation water to cut, and in

part because the water supply situation is dire enough that most of the available water needs to be preserved for health and safety uses.

Table 6 shows the percent of water allocated to each use for each of the required drought response plan stages.

Table 6 Reduction in Water Consumption by Priority

Priority:	**1** **Highest**	**2** **Next highest**	**3** **Lowest**
Stage	Health/Safety (% of normal delivery)	Commerce (% of normal delivery)	Irrigation (% of normal delivery)
1	95%	95%	75%
2	90%	90%	50%
3	85%	85%	25%
4	80%	75%	0
5	70%	30%	0
6	60%	20%	0

Irrigation is reduced by 25% at beginning at Stage 1, and by Stage 4 there is no irrigation water left to curtail. The other characteristic of this schedule is that while business usage is maintained to the degree possible, it, too, is curtailed beginning at Stage 1 and becomes harder to preserve as the shortage intensifies, thus even the water for Commerce priority is impacted significantly at higher stages.

Apply the percentage reductions to develop a specific reduction goal for each customer class

The last step in setting up customer reduction goals for each stage of a shortage is to apply the percentage reductions determined above to each customer class.

The following example for the SFR customer class demonstrates how this process works; the same technique is then applied to all customer classes.

Table 7 illustrates how when starting out with 374 MG for health and safety and 143 MG for irrigation in the peak season, a 95 percent delivery for health and safety equals 355 MG and a 75 percent delivery for irrigation equals 107 MG. The total volume of that combined demand reduction is 54 MG which equals 89% total delivery in this customer class at Stage 1.

Table 7 Example of Applying Percentage Reduction Goals to SFR Customer Class Showing example of Stage 1 reductions

		Usage Priority			
	Single Family Residential	Health /Safety	Commerce	Irrigation	Total
Peak Season Total	Volume (MG)	374	N/A	143	517
Stage 1 Reduction	Percent Delivery	95%	N/A	75%	
	Volume (MG)	355	N/A	107	463

When the full table is assembled for all customer classes for each stage, the result is **Table 8.** The information in Table 8 guides the development of the rest of this shortage plan update in terms of strategy around how to achieve the reduction goals for each stage.

Table 8 Customer Class Reduction Goals

Customer Class	Normal Demand (Million Gallons) Jun-Nov	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
		Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
Single Family Residential	517	89%	79%	68%	58%	51%
		463	408	354	299	262
Multiple Residential	297	92%	84%	76%	68%	59%
		273	249	225	202	176
Business	277	95%	90%	85%	79%	61%
		263	249	235	218	168
UC Santa Cruz	91	91%	81%	72%	62%	55%
		82	74	65	57	50
Other Industrial	20	95%	90%	85%	75%	30%
		19	18	17	15	6
Municipal	33	79%	58%	38%	17%	15%
		26	19	12	6	5
Irrigation	59	75%	50%	25%	0%	0%
		44	30	15	0	0
Golf Course Irrigation	50	82%	64%	45%	26%	10%
		41	32	23	13	5
North Coast Agriculture	13	95%	90%	85%	75%	30%
		12	12	11	10	4
Other	1	95%	90%	100%	100%	100%
		1	1	1	1	1
Total	**1,358**	**1,225**	**1,092**	**959**	**820**	**677**
		Overall reduction in each stage				
		10%	20%	30%	40%	50%

In looking at the results presented in Table 8, two facts stand out: 1) the new demand characteristics mean that reductions at higher stages will be very difficult to achieve and, 2) any strategy for demand reductions will need to be designed with a high likelihood of success. The reason for this requirement is that in a serious shortage, it will be critical to have a system in place that not only is likely to succeed but is also fair to all customer groups and stays true to the core principles set out at the beginning of this plan.

General Approaches to Demand Reduction

A key assumption during a water shortage is that it will take a combination of demand reduction measures, communication actions, and internal utility actions working together to reduce water demand.

To achieve reduction in customer demand, there are generally two main approaches that are used. . The first uses prescriptive measures (rules, requirements, and prohibitions) for customers to follow. Such measures describe the ways customers can use water during a shortage. For example, many shortage plans contain progressively more stringent restrictions on outdoor irrigation such as limits on days per week, minutes per day, or time of day that customers are allowed to water.
The second approach to demand reduction during a shortage is to issue customer allocations. This method assigns each customer a monthly allocation of water and then uses penalties (administrative enforcement methods in the form of excess use penalties) when the customer uses more than their allocation.

These two broad approaches, prescriptive measures and allocations, are not mutually exclusive. The existing (2009) WSCP contains prescriptive measures as well as customer allocations, with allocations coming into play at Stage 3 for residential customers. **However, for this WSCP update, given the new demand characteristics and the need to ensure successful reductions at each stage, an allocation only approach is recommended**. The rationale for why this type of approach is best suited for the current situation in Santa Cruz is explained in the next section.

Recommended demand reduction approach

The recommended approach to demand management in this WSCP update is to provide customer allocations starting at Stage 1 of the plan and reducing these allocations at each successive stage of the plan. This approach gives customers an amount of water to use each month and allows them to use that water as they see fit to meet their needs.

The allocation approach will help to maximize the probability that the demand reductions required at each stage will be achieved. As would be the case regardless of what shortage reduction strategy was pursued, the allocation strategy requires a significant communications and public information, education and outreach campaign to be implemented before and during any use of the Plan.

Water Allocation System for Each Customer Class

The information in Table 8 above shows the peak-season volume for each customer class both for unconstrained demand (no shortage) and for each of the five plus demand reduction stages. This information is the starting point for establishing allocations for each customer within each class.

The methodology will be described in more detail in each customer class sections below. Using the SFR customer class as an example, the following information is used to create an average CCF per year and per month for unconstrained demand:

- Peak season demand for the SFR customer class
- The reduction targets required at each stage of shortage
- The number of customers in the SFR class

Once this data point is available, target allocations can be set for SFR customers for each demand reduction stage. A similar approach is used to translate percentage cuts for other customer classes into monthly allocations.

Single Family Residential

Given the current characteristics of water demand under a new allocation system for single-family residential customers the amount allotted per month would need to be considerably less than in the existing WSCP. Under the existing plan, at Stage 3, single-family residential customers were given an allocation of 10 CCF per month for a family of four persons.

Table 9 shows the reduction amounts that will be required for each stage of shortage, both in terms of overall amount in million gallons but also in terms of the average usage in CCF per month for a single-family account.

Table 9 SFR Reduction Targets in CCF/Year and CCF/Month

PEAK SEASON	CCF	MG	ACCOUNTS	CCF/YR	AVE CCF/MONTH
Unconstrained Demand	691,176	517	19,000	36.4	6.1
Stage 1	618,984	463	19,000	32.6	5.4
Stage 2	545,455	408	19,000	28.7	4.8
Stage 3	473,262	354	19,000	24.9	4.2
Stage 4	399,733	299	19,000	21.0	3.5
Stage 5	350,267	262	19,000	18.4	3.1

Using the average peak season usage per SFR account produces an unconstrained average customer demand of 6.1 CCF per month as the logical basis for establishing a new SFR allocation for the five stages of the WSCP.

Table 10 shows the recommended allotment for each WSCP stage for SFR customers. The allotments are shown in CCF (1 CCF = 1 billing unit = 748 gallons). Given that the billing system can currently only accommodate whole numbers for an allocation, the average CCF per month for unconstrained demand of 6.1 from Table 9 is rounded down to 6.0. Similar rounding is used when calculating allocations as described further below.

This SFR allotment is for a three-person household. The decision to use three persons instead of four comes after reviewing the most recent data available in terms of average occupancy in the service area. The average occupancy is approximately 2.5 persons per household. Clearly there are homes with more occupants and an exception process will be used to adjust allocations for customers with more than three people residing in the residence. The exception process is presented the implementation section of this plan.

Table 10 SFR Customer Allotments (data in CCF)

PEAK SEASON	100%	AVE CCF/MONTH 6.1		
	PERCENT OF NORMAL DELIVERY	RESULTING AVE CCF/MONTH	RECOMMENDED ALLOTMENT (CCF/MONTH)	ENFORCEMENT MECHANISM
Stage 1	89% (11% reduction)	5.4	5	None- Target allotment only
Stage 2	79% (21% reduction)	4.8	5	Excess use penalties begin
Stage 3	68% (32% reduction)	4.2	4	Excess use penalties continue
Stage 4	58% (42% reduction)	3.5	3	Excess use penalties continue
Stage 5	51% (49% reduction)	3.1	3	Excess use penalties continue

Table 10 also refers to administrative enforcement/excess use penalties. These are the monetary penalties that will be applied to customer accounts when usage exceeds the allotment. The schedule of administrative enforcement/excess use penalties is further presented and discussed in the implementation section.

As shown in Table 10, excess use penalties are not applied to use over the customer's allocation in Stage 1. This recommendation is the result of Water Commission input during one of the Commission's multiple reviews and discussions with staff during plan development. The thinking was that for low percentage curtailments, such as required in Stage 1, excess use penalties are neither necessary nor appropriate to ensure compliance with requested cuts.

It is important to be clear that not including excess use penalties in Stage 1 is not a strategy for easing people into curtailments and readying them for the implementation of further restrictions where penalties would be applied. This is not the case because, historically, the City has not implemented WSCP in a stepwise fashion where, for example, Stage 1 reductions are implemented for the early part of the season and then, if water conditions continue to warrant, further reductions are implemented over the last half of the peak use season. Rather, if required, an annual water restriction stage is set in the spring, following completion of the annual water supply and demand assessment. The results of this assessment could be a recommendation to immediately implement any stage of the WSCP for the upcoming summer season, which could result in excess use penalties being in effect without any "warm up" phase.

Multi-Family Family Residential

The allocation system for multi-family residential (MFR) customers will be similar to that of the SFR sector. The same three person per dwelling unit assumption used in SFR is used for MFR customers. This assumption is made knowing that it covers the majority of MFR properties but also with the realization that there are some large MFR properties that have a higher occupancy per dwelling unit.

As would be the case for SFR customers an exception process for properties where there is higher occupancy would be available.

In the prior WSCP, the amount of water allocated for MFR properties was determined by the number of dwelling units at the property; smaller properties with 2-4 units were given a specified allocation, then properties with 5-20 units were given a slightly smaller "per unit" allocation, and lastly properties with over 20 units were given a slightly smaller "per unit" allocation. This system is one of three alternatives that were presented in the prior plan. One of the other two alternatives was a gallons per person per day (GPCD) approach, and the other was a general approach that MFR customers would be treated as the same as SFR in the allocation system.

After evaluating how rationing worked for MFR customers during 2014 and 2015 staff determined to eliminate the three-tiered allocation structure for different MFR property sizes and use the an appropriate base allocation of 5 CCF per unit regardless of property size. The reasons for this distinction are listed below:

1) The usage data for MFR properties support a Stage 1 allocation of 5 CCF across the board. In other words, when examining the usage data for MFR properties, the wintertime usage, used as a proxy for essential indoor use, is in the range of 3-5 CCF across the board, regardless of the number of dwelling units at the property. As a result of this usage profile, it does not make sense to differentiate between MFR properties based on the number of dwelling units when proposing the allocation.

2) The current tiered rate structure for MFR properties already allocates water based on the number of dwelling units per property. Specifically, the amount of water per tier for MFR properties is based on number of dwelling units. For example, the first tier (0-5 CCF) for a 3 unit property would be up (0-15 CCF).

3) The third reason that the MFR allocation scheme should be the same as the SFR allocation is that this approach is easily understood and easy to communicate to customers. The approach is fair, and in outreach and communication of the overall allocation system, this component will not stand out as confusing or perceived to give MFR customers more or less water than SFR customers.

Table 11 shows the MFR allotment schedule. MFR allocations are based on whether or not the property has a dedicated irrigation meter. The presence of a separate meter for irrigation means that outdoor water use for the property is not combined in with the usage on the main meter that measures indoor water use, and thus for allocation purposes, the main meter account can be allocated slightly less water. Irrigation meters all have a water budget associated with them and reductions to those budgets during a shortage will be discussed in a later section of this plan.

Table 11 MFR Customer Allotments

Multiple Family Residential Allotment Schedule		Separate Irrigation Meter Serving Property?	
		Yes	No
	Stage 1	4	5
	Stage 2	4	5
	Stage 3	3	4
	Stage 4	2	3
	Stage 5	2	3

Business

The allocation system for the business customer class differs significantly from the residential customer classes described thus far. Due to the diversity of uses in this class of customers, it is not reasonable to design a one-size-fits-all allocation approach. The types of customers in this class range from small businesses of all kinds with relatively low water use, primarily indoors, to large customers such as the Santa Cruz Boardwalk or large hotels and everything in between. Furthermore, the diversity of the business class is compounded by the fact that a single business account with a single master meter may serve many downstream businesses (e.g. shopping centers, strip malls, and industrial parks). This diversity is reflected in the billing system, with the business class being separated into three sub-categories: Business-general, Business-hotel/motel, and Business-restaurant.

Given the wide variation in water use in the business customer class, using any kind of business customer sub-group average to set allocation doesn't recognize the diversity of water uses even within each sub-group. For example, Santa Cruz's tourist base economy and the often relatively rapid turn-over in restaurant business uses makes it appropriate to create user allocations that are reasonably adapted for each user. This need resulted in a decision to create customer specific allocations for business customers. The detailed reasons behind this decision and how such an approach is planned to be implemented are presented below.

In addition, it is important to reiterate the usage priorities as described in Table 3 as they pertain to the business customer class.

The following **Table 12** is a summary of the usage priorities for business, data pulled from Table 3.

Table 12 Usage priority chart for Business Customer Class

Jun-Nov, 2016-2018	Usage Priority (million gallons)			
Customer Class:	**1 Health/Safety**	**2 Commerce**	**3 Irrigation**	Total
Business	213	64		277

What the breakout in Table 12 reveals is that the business class has a majority of water used for health and safety, and a lesser amount for true commercial activity. For this reason, the reduction targets at each stage of shortage are less severe than for other customer classes. This is a good opportunity to reiterate the basic premise of usage priorities as discussed earlier in the plan. Health and safety is water use for sanitation, health care, drinking and similar purposes. Water use for commerce is different in that the water use will be used directly for commercial activity.

Table 13 is an excerpt from Table 8 that shows the reduction goals just for the business class. The percent reductions for each stage are shown as well as the resulting volume of water. The reduction goals shown here are the result of the makeup of usage priority in the business class. As shown in Table 12, the usage priority spread in this class is primarily in health and safety and some commerce, with no irrigation. Therefore, the reduction goals at each stage are less severe than another class that has a portion of the irrigation priority.

Table 13 Sample Business Allocation Example (data in CCF)

Customer Class	Normal Demand (Million Gallons) Jun-Nov	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
		Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
Business	277	95%	90%	85%	79%	61%
Total Business Use		263	249	235	218	168

The methodology used for developing allocations for business customers

The system will start with the usage profile of each individual customer for each month of the peak season in a selected base year. The selection of a base year is both important and difficult. For the business sector, it is appropriate to select a non-drought year that is as close as possible to plan implementation as possible. The point of that choice is to reflect a time period that has the most recent stable period of usage capturing the latest possible profile of how each business has been operating. For example, it wouldn't make sense to go back five years prior to plan implementation; such a choice would not reflect the current state of what businesses are doing now, and would not reflect recent upgrades or changes to individual business operations. To illustrate the base year choice, if this plan

needs to be implemented in 2021, the base year will be 2019, the most recent year pre-Covid19, in which there was no water shortage.

Going forward, the base year for this customer class will be updated at the time of implementation to reflect the most recent year for which there was no shortage. This approach is an attempt to use the most relevant data available for setting individual business allocations. Although setting allocations for individual businesses may be more complicated than that used for residential allocations, the variability of use within the peak season is a factor that weighs heavily against using an approach involving seasonal averages. An example of this is a hotel with a lot of seasonality. A hotel may have its highest occupancy in the late summer months, with lower occupancy in the first few months of the peaks season. If an average season approach were used, the resulting allocation may be too much in the early months and not enough in the latter months, possibly resulting in operational issues and economic harm.

Table 14 presents an example of how the allocation would work for a sample business. As shown, in the month of May, the 2019 base year usage for this sample business is 70 CCF (1 CCF= 1 billing unit = 748 gallons).

Table 14 Sample Business Allocation Example (data in CCF)

	May	June	July	August	September	October
2019 Base Usage (CCF)	70	102	122	110	93	51
Stage 1 (95% of normal)	67	97	116	105	88	48
Stage 2 (90% of normal)	63	92	110	99	84	46
Stage 3 (85% of normal)	60	87	104	94	79	43
Stage 4 (79% of normal)	55	81	96	87	73	40
Stage 5 (61% of normal)	43	62	74	67	57	31

An important caveat for the business sector is the exemption process and the complete exclusion of some customers from the allocation system. Due to the fact that, as noted above and shown in Table 12, a large component of usage in the business class is for health and safety, there are some important considerations with specific customers when considering how to implement an allocation system. The main issue is that amongst the business customer class there exist many accounts that are specifically related to health care. Examples of said accounts are hospitals, surgery centers, various doctors' offices, maternity centers, nursing homes, etc. All of these "businesses" are classified under the North American Industry Classification System (NAICS) in category 62, the broad sector called "Health Care and Social Assistance". Under this plan, all business accounts that are classified in this sector for health care related businesses will be automatically exempt from the allocation system. The obvious rationale for this is that water used by these businesses is directly related to health and safety and not commerce. Additionally, under the exemption process, which will be described further in the implementation section, other business customers that have a component of health and safety usage will be able to file for an exemption to receive additional water beyond their allocation to account for health and safety requirements.

Other Customer Classes

This section covers the various other main customer classes and how the allocation system will apply to them. The section irrigation below contains information on three sub-classes: landscape irrigation, golf courses and finally north coast agriculture. The other remaining classes that will be discussed are the University of California Santa Cruz (UCSC), municipal, and industrial.

Irrigation

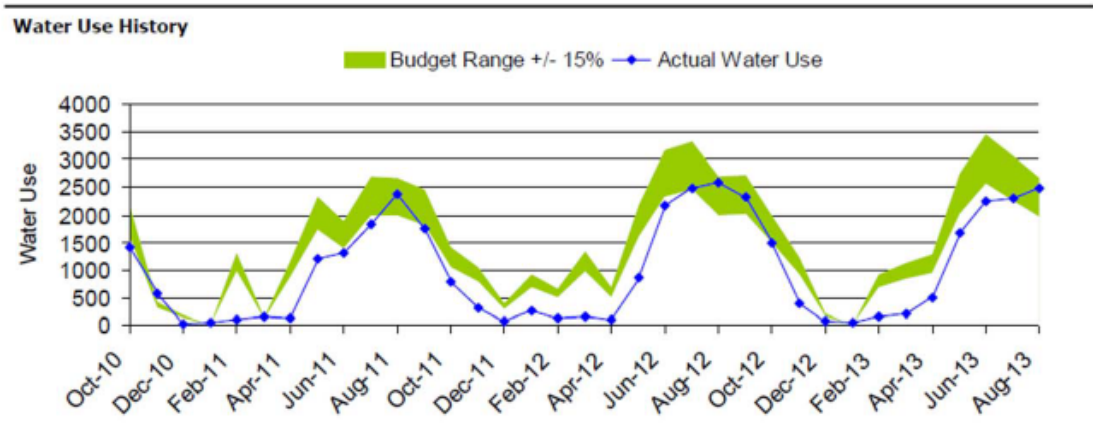
Landscape Irrigation Class

The irrigation class consists of all dedicated irrigation meter accounts in the service area. These accounts serve landscape irrigation that is all in the irrigation usage priority, meaning discretionary in nature. This type of irrigation consists of turf and shrubs at various commercial and residential properties. During a water shortage emergency, this discretionary use of water is reduced more significantly than other uses of water. The result is that in a severe shortage landscapes that are served by these dedicated irrigation accounts will be significantly impacted.

All irrigation meter accounts in the service have been under a water budget system since approximately 2010. This includes all City and county parks, schools, business park irrigation when a dedicated irrigation meter is present and large residential properties that have a dedicated irrigation meter. The early system was an advisory water budget program called WaterFluence. This program was innovative in that it provided a water budget report to customers on a monthly basis. The water budget for each site is calculated using a combination of factors including the site irrigated area in square feet, and actual weather conditions such as evapotranspiration, precipitation and temperature.

The water reports show the site water usage on a graph in comparison to the water budget. An example of the budget graph is shown below in **Figure 5**.

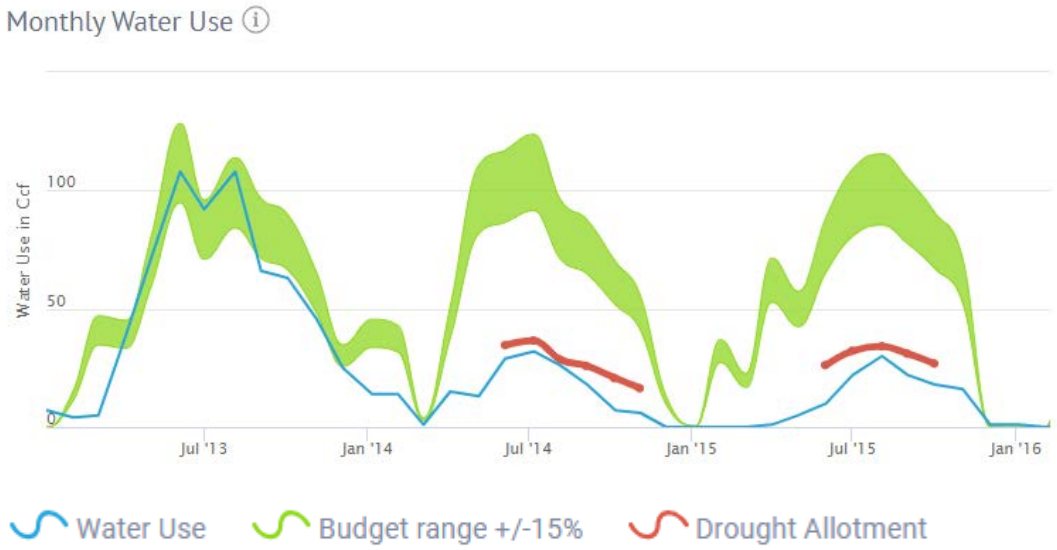
Figure 5 WaterFluence Water Budget Example
(Water Use in CCF)



During the drought of 2014-2015, the irrigation customer class was “rationed” by reducing their water budget using WaterFluence. This was an innovative methodology at the time; it was a new way to easily communicate the shortage level to irrigation customers.

Figure 6 shows an example of a site water budget during the drought; the red line shows the rationed drought allotment. In this example, actual water use is below the allotment, meaning this customer was adhering to the new allotment and lowered actual water use to stay within it.

Figure 6 WaterFluence Drought Allotment Water Budget Example



The WaterFluence program is still being implemented today with some advancements in technology. However, one limitation to the program is that it provides information after the fact. That is, customers get a water report showing the usage for the prior month and how that usage compared to the budget.

In 2016 Santa Cruz Water introduced new water rates as the beginning of a five year rate increase. Included in the new rates was the introduction of water budget based rates for irrigation accounts. In order to implement budget based rates for irrigation customers, a new water budget approach had to be designed that would be forward looking, instead of the WaterFluence that looks at the prior month's consumption. The new water budgets were developed using a formula based on the site irrigated area, a crop coefficient, and average reference evaporation (ETo) from the Santa Cruz Delaveaga CIMIS weather station. This process allows the calculation of water budgets for each account for all 12 months of the year. The compromise of this approach is that the water budget is calculated using average monthly weather (ETo as a proxy) instead of the approach of WaterFluence which takes into account the actual weather and rainfall that occurred during the month that the usage occurs.

With the new methodology, all dedicated irrigation meters, with the exception of City of Santa Cruz accounts (such as City parks, median strips, etc.), are now on water budget based rates. Now that the City has water budget based rates, it is possible to create drought allocations for each account for each stage of a shortage. The allocations will be a percent reduction from the current monthly water budget amount.

Given that City of Santa Cruz accounts are in the municipal class, including City parks which have a considerable amount of irrigation but not budget based rates, these accounts will be handled slightly different, as described in a subsequent section.

Table 17 shows the reduction amounts for each stage for the landscape irrigation class.

Table 17 Percent of normal deliveries during a shortage for Landscape Irrigation

Customer Class	Normal Demand (Million Gallons)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Jun-Nov	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
Landscape Irrigation		Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
		75%	50%	25%	0%	0%
	59	44	30	15	0	0

Table 18 shows an example of an irrigation account and the water budget for the water budget based rates system. The site irrigated area is 8,452 square feet, which results in an annual water budget of 281 CCF. Table 14 shows how this budget amount is divided up over the 12 months of the year. The table also shows the peak season in yellow, with the drought allocation shown at each stage of shortage. By the time Stages 4, 5 & 6 are reached, water available for irrigation has been fully restricted and all landscape irrigation is prohibited.

Table 18 Irrigation Account Water Budget & Drought Allocation

Monthly Distribution					Peak Season							
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Budget CCF	11	14	20	28	33	33	36	33	28	22	14	9
Stage 1					25	25	27	25	21	17		
Stage 2					17	17	18	17	14	11		
Stage 3					8	8	9	8	7	6		
Stage 4					0	0	0	0	0	0		
Stage 5					0	0	0	0	0	0		

Golf Course Irrigation

The golf customer class consists of the two major golf course accounts located in the service area of the Santa Cruz Water Department. These two courses are 1) the public Delaveaga Course and 2) the private Pasatiempo Course. Golf course water use is considered to be a combination of both the commerce and the irrigation usage priority, as shown below in **Table 19**. This determination, which takes into account the nature of the golf course both as business use and discretionary irrigation use, was a result of a compromise during the development of the last WSCP. This plan will continue to use

this determination of usage priority for golf courses.

Table 19 Usage priority chart for Golf Course Irrigation

Jun-Nov, 2016-2018	Usage Priority (million gallons)			
Customer Class:	1	2	3	Total
	Health/Safety	Commerce	Irrigation	
Golf Course Irrigation		17	33	50

Table 20 shows an example showing the golf course irrigation sector. In this example, you can see that in higher stages of shortage golf irrigation is mostly reduced to the point where it is effectively eliminated.

Table 20 Percent of normal deliveries during a shortage for Golf Course Irrigation

Customer Class	Normal Demand (Million Gallons)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Jun-Nov	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
Golf Course Irrigation		Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
		82%	64%	45%	26%	10%
	50	41	32	23	13	5

To provide an allocation for the golf course, the approach will be based on the peak season average for the 2016-2018 base year period, similar to what was used for the residential customer classes.

Table 21 shows the golf course usage for Delaveaga Golf Course and the corresponding allocations for each stage.

Table 21 Example of Allocation for Delaveaga Golf Course

2016-2018 Average Usage During Peak Season (CCF)	7149	
Allocation @ Stage 1 (82% of normal)	5862	
Allocation @ Stage 2 (64% of normal)	4575	
Allocation @ Stage 3 (45% of normal)	3217	
Allocation @ Stage 4 (26% of normal)	1859	
Allocation @ Stage 5 (10% of normal)	715	

North Coast Agriculture

The North Coast Irrigation customer class is different yet again from all the other customer classes. This group of customers consists of approximately 12 separate farms that stretch along the north coast of Santa Cruz from the northern City limits all the way to roughly Liddell Springs. These farms have a mix of water supplies including some limited groundwater, surface water and metered connections to the City of Santa Cruz raw water system. Although there is not a huge variety in the types of crops grown on these farms, the water usage from account to account does vary widely. The variation in water use from account to account is based on a range of factors including the crop type planted in any given season, the availability of water from non-City water sources, leaks on the account's water system and other factors.

Table 22 below is an excerpt from Table 8 that shows the reduction goals just for the North Coast Irrigation class. The percent reductions for each stage are shown as well as the resulting volume of water. The normal demand for this customer class using the 2016-2018

Table 22 Reduction Goals for the North Coast Agriculture Class

Customer Class	Normal Demand (Million Gallons) Jun-Nov	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
Coast Irrigation		Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
	13	95%	90%	85%	75%	30%
		12	12	11	10	4

The intent of designing an allocation system for the Coast Agriculture class is to treat this class similar to the business class. That is, it would be ideal to mimic the business class allocation system by using an individual customer account allocation, reducing at each stage from a base year. This approach makes sense given the unique water use characteristics of the coast irrigation customers. However, what is different between this group and the business class is that with the north coast irrigation customers, it seems impossible to pick a base year that would work for all the accounts. For the business customer class, we are using a base year that is the most recent year without a drought, which

is when usage was considered to be "normal". For north coast irrigation class, given that these customers have other water sources that they would prefer to use during normal years and then only relying on City water heavily during drought years, it does not make sense to select the most recent single year without a drought as base year. If that were done, then the allocation would end up giving this group of customers much less water than they would need to operate if a drought did occur. On the other hand, one of the goals of the allocation system is to ensure that reduction goals are met for each and every customer class, so that overall reduction goals are met at each stage of a shortage. Thus picking a drought year as the base year doesn't work either, as it would provide much more water to these customers (given that they historically use more City water during a drought) than is appropriate for the overall plan. Therefore it is especially difficult to determine what an appropriate base year would be for this customer group.

One solution to the allocation system for this customer class is to use the base year period that used throughout this plan: 2016-2018. This is a period in which overall usage for the service area was relatively stable and not a drought. The approach would be to sum up the usage for the peak season for each month of these three years for each account and then take the average of the three years. The average for each month is then the base from which reductions are made according to Table 22.

The following Table 23 shows and example Coast Agriculture account and the resulting allocations at each shortage stage.

Table 23 Example Reduction by Stage for a Coast Agriculture Account

	3 year average for peak season (CCF)	Percent of 13 MG Peak Season Use	Allocation at Stage 1 (95%) (CCF)	Allocation at Stage 2 (90%) (CCF)	Allocation at Stage 3 (85%) (CCF)	Allocation at Stage 4 (75%) (CCF)	Allocation at Stage 5 (30%) (CCF)
Example Coast Irrigation Account	1,002	0.1	951.9	901.8	851.7	751.5	300.6

UCSC

The University of California Santa Cruz (UCSC) is one of the largest single customers of the City of Santa Cruz Water Department. In 2019, UCSC used 162.7 MG, or nearly 7% of the total consumption for the calendar year. This usage amount is a combination of the main campus (154.3 MG) and the Marine Science Campus (8.34 MG). Of this total, 91 MG is used during the peak season.

Table 24 shows the breakdown of usage by usage priority in the peak season from the 2016-2018 base years. What is apparent from the table is that the majority of usage in the UCSC category is for health

and safety. For this reason, the reduction targets during a shortage are not as dramatically cut as with a category that has more discretionary use.

Table 24 Usage priority chart for UCSC

Jun-Nov, 2016-2018	Usage Priority (million gallons)			
Customer Class:	**1 Health/Safety**	**2 Commerce**	**3 Irrigation**	Total
UCSC	71		20	91

Table 25 shows the reduction targets at each stage for UCSC. Although the cuts at each stage are not as dramatic as with some other customer categories, these reduction targets still represent significant challenges for usage reduction at the campus. This is due to the fact that UCSC has a history of implementation of significant water use efficiency measures over the last decade. While UCSC population has grown over the years, they have implemented extensive conservation measures to keep demand from growing. The usage for the main campus only a decade ago in 2009 was 151 MG and in 2019 it was 154 MG, despite campus enrollment going from about 16,000 to close to 19,000. The efforts by UCSC to keep demand low are laudable but it may pose some challenges in terms of meeting reduction targets during a severe shortage. The allocation scheme for UCSC is similar to the north coast agriculture class; the average usage for each month of the peak season will be calculated from the base year 2016-2018. These monthly averages will be basis for which the reductions will be taken at each shortage stage.

Table 25 Percent of normal deliveries during a shortage for UCSC

Customer Class	Normal Demand (Million Gallons) Jun-Nov	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
UC Santa Cruz	91	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
		91%	81%	72%	62%	55%
		82	74	65	57	50

Municipal

The Municipal category is comprised of City of Santa Cruz accounts. These accounts are primarily for City owned facilities such as offices, civic centers, the City corporation yard, as well as all City irrigation accounts for parks, public facilities and median strips. The municipal category of accounts are called “interdepartmental” within the customer billing system. Interdepartmental accounts are charged at the uniform water rate, similar to the business customer class. The fact that there is a significant portion of irrigation in the municipal class, as illustrated in **Table 26**, means that there needs to be a mechanism by which City irrigation accounts receive an allocation. Unlike regular irrigation accounts, City irrigation accounts do not get charged water budget based rates. There are

several reasons for why this is the case. The primary reason is that most City irrigation accounts are parks. City parks were constructed decades ago and were not designed with dedicated irrigation meters at all sites. The majority of the parks have complicated systems with irrigation and some facility use on the same meter (such as bathrooms and drinking fountains). The process to go through each park now and separate the meters and piping to dedicate a meter to only irrigation would be cost prohibitive.

Therefore, the water budget approach as described in the irrigation section, for demand reductions is not possible for the municipal class. City irrigation accounts do receive an advisory water budget, but for the purposes of this plan another approach is needed. The simplest solution is to create allocations using the 2016-2018 base year similar to what was proposed for UCSC. The month by month average during the peak season from these base years will be the basis from which the reductions will take place. **Table 27** shows the reduction targets for each stage of a shortage for the municipal class.

Table 26 Usage priority chart for the municipal customer class

Jun-Nov, 2016-2018	Usage Priority (million gallons)			
Customer Class:	**1 Health/Safety**	**2 Commerce**	**3 Irrigation**	Total
Municipal	7		26	33

Table 27 Percent of normal deliveries during a shortage for the municipal class

Customer Class	Normal Demand (Million Gallons) Jun-Nov	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
Municipal	33	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
		79%	58%	38%	17%	15%
		26	19	12	6	5

Industrial

The industrial class is another relatively small group of approximately 40 customers. These are accounts that are not businesses, but rather some type of industry that doesn't fall into other customer groups. Industrial customers use water for manufacturing or similar purposes. Examples of these customers are Santa Cruz Biotechnology and Plantronics. Industrial customers will have a similar allocation system as the business customer class. This choice for an allocation system for this class is driven because of two characteristics: Fist, as shown in Table 28, the usage priority makeup for this class all falls into the commerce priority. Second, the unique usage pattern of each of these customers makes the class similar to the other business customers. Like the business customers, it makes sense to take a unique individual customer approach for reductions, using the most recent year without a drought as the base year. In this way, the allocations for the industrial customers will reflect the most recent profile of their water use activities as possible. For example, as with the business customers, if

this plan were to be implemented in 2021, the base year for this group would be 2019, the most recent year that was not a shortage and was not affected by the Covid-19 pandemic. Going forward, if the plan were to be implemented, the base year would be updated.

Table 28 Usage priority chart for the municipal customer class

Jun-Nov, 2016-2018	Usage Priority (million gallons)			
Customer Class:	**1**	**2**	**3**	Total
	Health/Safety	**Commerce**	**Irrigation**	
Industrial		20		20

Table 29 shows the reduction targets for each stage of a shortage for the municipal class**.**

Table 29 Percent of normal deliveries during a shortage for the industrial class

Customer Class	Normal Demand (Million Gallons) Jun-Nov	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)	Delivery (%)
Industrial	20	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)	Volume (MG)
		95%	90%	85%	75%	30%
		19	18	17	15	6

Implementation

Timeline for Declaring Water Shortage

Water Department staff typically begins assessing the potential for a peak season shortage in early winter. If conditions during the winter are unusually dry or are preceded by a dry year, staff's recommendation the City Council to declare a shortage can occur as early as February, but typically staff complete the annual assessment and develop any recommendation for the declaration of a shortage near the end of March when the water supply outlook for the year ahead becomes more certain.

Table 30 shows the timeline for declaration of a water shortage.

Table 30 Timeline for Declaration of a Water Shortage

Target Date	Action
Months of Oct -Dec	Monitor rainfall, reservoir level, and runoff amounts
Late January	Prepare written status report on water supply conditions
Early February	Present initial estimate of water supply availability for year ahead
March	Conduct revised estimate of water supply availability for year ahead and need for shortage declaration
Early April	Present final supply outlook and recommendation to Water Commission; notice of public hearing published if a shortage will be declared
Mid-April	City Council formally declares water supply shortage, adopts emergency ordinance (if needed)
May 1st	Water shortage regulations become effective (if needed)

Shortages are declared for one year at a time. Long-range weather forecasting has not yet advanced to the point where it is possible to know in advance with certainty whether the drought conditions might persist for more than one year. Given the City's vulnerability to droughts that result from having limited seasonal storage, City staff's annual supply analysis will typically emphasize maintaining reasonable levels of carry over storage in Loch Lomond from one year to the next in order to mitigate the potential impacts of a second dry year on available supply.

Process for Declaring Water Shortage

Monthly Water Commission meetings serve as a routine public forum for discussing water conditions and for hearing issues associated with implementation of the water shortage ordinance throughout the entire duration of the water shortage event. In mid-winter staff provides a first look at the water supply situation for the upcoming peak season, with a more definitive forecast and drought declaration recommendation, if any, presented to the Water Commission in March or April.

Following consideration by the Water Commission, formal action declaring a water shortage is taken by City Council. The section of the Santa Cruz Municipal Code that references shortage declaration is as follows:

> **16.01.020 DECLARATION OF WATER SHORTAGE**
> *The provisions of this chapter shall take effect whenever the director, upon engineering analysis of city water supplies, finds and determines that a water shortage exists or is imminent within the city of Santa Cruz water service area and a declaration of a water shortage is made by a resolution of the city council, and they shall remain in effect for the duration of the water shortage set forth in the resolution.*

Effects of Water Shortages on Water Revenues and the Drought Cost Recovery Fee

Since the 2016 water rate increase, implementation of a Drought Cost Recovery Fee specified in the rate resolution and linked to each stage of restrictions is available for automatic implementation once the Council declares a shortage. The Drought Cost Recover Fee is set to recover lost revenue associated with restricting water demand and is collected as a monthly fixed fee based on meter size for a whole fiscal year. The reason for collecting the fee over a full year rather than over just the six peak season months where restrictions are typically in place is to mitigate the financial impact of the fee by spreading it out.

Table 31 provides the Drought Cost Recovery Fee from the 2016 Prop 218 public notice.

Table 31 Drought Cost Recovery Fee Details

Drought Cost Recovery Fee (DCRF)					
	Stage 1 – 5% Shortage	**Stage 2 – 15% Shortage**	**Stage 3 – 25% Shortage**	**Stage 4 – 35% Shortage**	**Stage 5 – 50% Shortage**
Maximum Targeted Cost Recovery	$ 1,000,000	$ 2,500,000	$ 4,000,000	$ 5,500,000	$ 7,500,000
5/8-in	$ 2.45	$ 6.12	$ 9.79	$ 13.46	$ 18.35
3/4-in	$ 2.45	$ 6.12	$ 9.79	$ 13.46	$ 18.35
1-in	$ 6.13	$ 15.30	$ 24.48	$ 33.65	$ 45.88
1 1/2-in	$ 12.25	$ 30.60	$ 48.95	$ 67.30	$ 91.75
2-in	$ 19.60	$ 48.96	$ 78.32	$ 107.68	$ 146.80
3-in	$ 36.75	$ 91.80	$ 146.85	$ 201.90	$ 275.25
4-in	$ 61.25	$ 153.00	$ 244.75	$ 336.50	$ 458.75
6-in	$ 122.50	$ 306.00	$ 489.50	$ 673.00	$ 917.50
8-in	$ 281.75	$ 703.80	$ 1,125.85	$ 1,547.90	$ 2,110.25
10–in	$ 347.90	$ 869.04	$ 1,390.18	$ 1,911.32	$ 2,605.70

Drought restrictions were only declared during the 2018 peak season, which was categorized as a dry year using the Water Departments water year classification scheme. No Drought Cost Recovery Fee was imposed as the drought stage declared was only Stage 1.

The Department will be implementing new rates in 2022. The approach for implementing a drought cost recovery fee will be updated and will continue to be used to mitigate the impact of lower water sales on the Water Department's revenues. As is currently the case any Drought Cost Recovery Fee will only be levied during an officially declared incident of water restrictions. The amount recovered by the fee is indexed to the shortage stage. The fee will be implemented over a whole fiscal year as a fixed charge, by meter size, on the customer's water bill.

Communication Protocols

After decades of frequent water supply shortages, Santa Cruz Water Department customers are predisposed to use water wisely, and are typically responsive to calls for increased conservation. With that said, the community's ongoing commitments to water use efficiency also means that it is more difficult for customers to further cut their already slim household daily water use. Therefore a robust

communications plan utilizing many communications tools and platforms will be necessary to ensure that customers understand the seriousness of additional calls for conservation. In addition, given that this shortage plan, unlike the prior plan, relies on allocations at all stages of shortage, it is crucial that all communications will explain the basic concepts regarding the allocation system and point the customers to various resources that will be available to help them both understand and adapt to the new allocation system.

Drawing from past experiences with supply shortages as well as mandatory water rationing, SCWD will utilize two sets of communication protocols: **general messaging**, focusing on the broad public including residents and visitors; and **specific messaging**, focusing on individual customers. All messaging will be shared in both English and Spanish languages.

The general structure of the communications protocol is as follows:

1) **General Messaging**: This section of communication will be broad in nature and be directed to all customers groups, visitors and water users. General messaging will be akin to an awareness campaign to inform water users about the nature of the water shortage and the implementation of the water shortage plan including the new allocation system. The tools or means of communication for the general messaging will include, but not be limited to: social media channels, email and print newsletters as well as paid & earned media.

2) **Specific/Targeted Messaging**: This section of communication will be a second element in the overall communication strategy. Specific messaging is designed for informing individual customers of their allocation and primarily for those customers who, based on their recent usage history, are expected to exceed their allocation. The specific messaging will come in the form of personalized direct print or email letters. Examples of these specific customer letters are included in Appendix B. There two letters were used in the past and similar letters will be used again under this plan.

   The first letter is an example of an initial notification letter to let customers know, based on their average use in the peak season that their usage is above what the allocation will be for the given stage of shortage. The example of a second letter, the so called “last chance” letter, is to inform customers that the allocation system is about to begin and they may be subject to the excess use penalties if their high usage continues.

   Unlike what occurred in the 2014/2015 drought when these letters were used, under this plan and future implementation, customers will be referred to the Department’s new WaterSmart customer web portal, a resource where customers will be able to view their water use and their allocation and learn how their use compares to what the allocation will be as well as to other similar households.

3) **Customer Resources**: In addition to the two communication strategies described above, a third and important communication element is that of customer resources. These resources, primarily in the form of various customer web pages, forms and online tools, are available in order to provide a wide variety of information to help customers during a shortage. These resources include, among others, information about the allocation exception process. For example, these

web pages provide information about the health & safety exception and the exception process to increase a customer allocation based on additional occupancy. The web pages will also explain the allocation system for business and other customer classes and provide example allocations for informational purposes. In addition to web resources about the allotment system, a complementary set of resources will be available on conservation topics and providing a suite of advice for customers to assist them assessing their water use and identifying strategies to lower their usage to stay within the allocations.

Examples of each of the communication elements are shown below in **Table 32**.

Table 32

Communication Element	Tools/Methodology	Concept
(1) General	Social media, paid and earned media, newsletters, bill inserts	Broad messages regarding nature of water shortage and shortage stage, need for allocations and basic structure of allocation
Example: "The Water Department has evaluated water supply conditions and has determined that a Stage 2 shortage declaration is warranted. Due to the low water demand characteristics in recent years, the Department has developed a shortage response plan that is based on customer allocations at all stages of shortage. Please refer to the customer resource web pages on the Department website for information about the allocation system"		
(2) Specific	Pesonalized customer letter/email communications	Individual personalized letters for customers who the department expects to exceed their allotment, based on historical usage patterns
Example: "Based on your recent usage patterns, it appears that typical usage for your household is 7 CCF. Given that the new customer allocation for single family residential homes is 5 CCF, if your normal usage continues you will be over allocation by 2 CCF. Please refer to the Department's web resources for information on how you can reduce your usage and stay within your allocation."		
(3) Resources	Water Department Web Pages, WaterSmart Software Customer Portal Information	Customer service related web pages that explain allocation system and provides information about the exception process.
Example: "The Water Shortage Contingency Plan has a process for exceptions to the alloation system. Exceptions are made for only two types of reasons: 1) Health & Safety issues and 2) Additional household occupancy. The following sections explain each of these exception categories and provide the corresponding forms to applying for an exception."		

Administrative Enforcement

The Santa Cruz Municipal Code Section 16.01.140 (c), Penalties, includes the following statement that describes the fundamental purpose for and goal of establishing and implementing an administrative enforcement mechanism for the provisions of the Water Shortage Contingency Plan:

> *"The purpose of the administrative penalties assessed pursuant to this section is to assure future chapter compliance by the cited customer through the imposition of increasingly significant penalties so as to create a meaningful disincentive to commit future chapter violations. In acknowledgment of the fact that the City's water is a scarce and irreplaceable commodity and that this chapter is intended to equitably distribute that commodity among Water Department customers and to assure that, to the extent feasible, City water is conserved and used only for purposes deemed necessary for public health and safety, the penalty schedule herein prescribed is not to be construed as creating a "water pricing" structure pursuant to*

which customers may elect to pay for additional water at significantly higher rates. To this end, a customer's repeated violation of this chapter shall result in either the installation of a flow restriction device or disconnection of the customer's property from the City's water service system at the customer's cost."

Excessive Use Penalty

The foundation of the demand reduction measures in this plan is the water allocation system. In order for an allocation system to work, there needs to be a financial incentive for customers to stay within their allocation. The way this typically works is to use Excessive Use Penalty fees for use above customer allocations. These penalties are applied to a customer's water bill when the billing system detects that usage in a month exceeds the customer's allocation.

The schedule for the administrative penalties will be the same as in the prior plan, a two-tiered as shown below in **Table 33**.

Table 33 Administrative Penalties

Excess Use Range	Percent of water used in excess of allotment	Excessive Us Penalty Fee per 100 Cubic Feet for all water used in excess of allotment (in addition to regular water consumption charges)
A	1 CCF over allotment up to 10%	$25
B	Greater than 10% over allotment	$50

The purpose of a two-tier excess use structure is to avoid very large penalties for households that make a good faith effort to stay within their allocation but wind up going over a little. If a customer's water use exceeds one's allocation by a large amount, though, the penalty should be very steep.

Examples of the impacts of applying excess use penalties for single-family residential customers when Stage 2 or above restrictions are in place are shown below in **Table 34**.

Table 34 How Excess Use Penalties Would Apply

	Monthly Allocation (CCF)	Actual Usage (CCF)	Level 1, Excessive Use (1 CCF to 10%), $25/CCF	Level 2, Excessive Use (over 10%), $50/CCF	Total Excessive Use Penalties
Single Family Residential	5	6	1	0	$25
	5	7	1	1	$75
	5	10	1	4	$225

*meter charge, infrastructure reinvestment fee, and other fees not shown

As described later in this section, SFR or MFR customers whose household size is larger than three people will have the opportunity to provide documentation to increase their household allocations. This exception provision is designed to avoid having larger households routinely exceed their allotments and receiving excessive use penalties. However, to maintain equity and ensure that all similarly situated customers are treated fairly, customers who don't qualify for additional allocations and who persistently use more than their allocated amounts are subject to additional measures to bring their consumption in line with requirements. One such measure is the installation of flow restrictors. Another is disconnecting a customer's service. These measures are briefly described below:

Water School: In the drought of 2014 & 2015, Santa Cruz implemented a novel approach for working with customers who had incurred large excess use penalties. A process was set up to allow for a one-time forgiveness of excess use penalties while under water rationing. To be considered for such forgiveness, the customer was required to sign up and complete a short weekend or evening course that became known as "water school". This course covered topics such as basic meter reading, leak detection, and other topics relevant to the water restrictions in place at the time. This approach (like traffic school) would help reduce the number cases heard by the hearing officer, provide financial relief to customers receiving high bills, and most importantly, would give them the opportunity, education, and tools they need to achieve ongoing compliance with water use rules and regulations for the remainder of the shortage. Similarly, if used again under this plan, water school would give customers the tools and education needed to help them stay within the new allocations. The process of providing penalty forgiveness for customers by attending water school will continue under this WSCP update.

Flow restriction: Some customers will continue to exceed their allotment regardless of the amount of their water bill. In such instances, the Water Department is authorized to install a flow restricting device to provide minimal water flow, just enough for health and safety purposes. In these cases the customer is charged a fee to cover the staff time needed to install the flow restrictor and another fee for its removal. The Water Department would not use this method where fire suppression sprinklers are on the same supply line as domestic water.

Disconnection/reconnection fees: Water suppliers have the legal authority to enforce water shortage regulations by terminating service for egregious violations. In such cases, the customer would be charged for both disconnection and reconnection.

Water Waste Prohibition and Enforcement of Water Waste Prohibitions

During a water shortage, in addition to complying with water allocations, customers will also need to comply with existing water waste prohibitions. In cases such as a report of water waste, Water Department staff will take steps to communicate with the customer by telephone, letter, door tag, or by making personal contact in the field to provide information about water waste regulations. Many times this contact is all that is required to get the problem resolved. If not, enforcement progresses to a written notice of violation. Beyond this, there are several methods in the City's existing water conservation and water shortage ordinances that can be used to enforce water waste restrictions and regulations. These methods are described below.

Penalty fees for Water Waste: This method would apply in situations involving violation of water

waste restrictions, if, after multiple warnings had been given, a violation continued to occur at an account. The fee would be added to a customer's utility bill along with a written notice sent to the customer in advance. The penalty fee would increase with subsequent violations as follows:

1st Violation $100
2nd Violation $250
3rd Violation $500
4th Violation $1,000

Exceptions

No water shortage plan can account for all situations. The exception procedure allows the Water Department to provide for special or exceptional circumstances that otherwise would create undue hardship for an individual customer or class of customers.

An exception allows a customer to be relieved of a particular regulation or receive an increased allocation for the duration of the shortage. Therefore, it should be granted only when justified on specific grounds that warrant allocating more water than allocate to other similarly situated customers and when consistent with the intent of the water shortage regulations, while providing equal treatment of all customers.

As stated previously in other sections, the allotments are assuming a household or dwelling unit with 3 person occupancy. A customer may request more water on the basis of having additional occupancy beyond the base 3 persons per household or dwelling unit.

Exceptions for more water will be processed on a case by case basis. Exceptions will be evaluated by the Department and if granted, additional water will be granted at the amount of 1 CCF per person per month.

Additional allotment will only be granted for the reason of additional occupancy beyond three persons per household or for requests specifically related to health and safety purposes. Examples of health and safety related exception could include operating a home day care facility or providing in home medical care for an individual with serious medical issues. Another example would be a business that has a significant portion their water use going to health and safety purposes.

Exceptions will not be granted for items such as vacation rentals, at-home food production such vegetable gardens, or for reasons related to pets or livestock.

The Department's WSRP customer resources will include a web page dedicated to explaining the customer allotments and the exception process. The forms to apply for an exception will be posted there. Customers will need to complete and submit the exception form along with a signed affidavit certifying that they have either an occupancy or health and safety related reason for applying for the exception.

Appeals

The difference between an exception and an appeal is that an appeal gives an individual the opportunity to challenge an official decision about an enforcement action. It is not the primary means

to secure a larger allocation or get an exception to a water use regulation. However, as mentioned above, customers should be able to appeal a denial by the Water Director of such an exception request to the hearing officer.

Section 16.01.130 of the City's Municipal Code (Water Shortage Appeals) allows any water service customer who considers an enforcement action to have been erroneously undertaken to appeal their case before a City appointed administrative hearing officer (this officer will either be City Attorney appointment or be appointed from the Planning Department). The officer would consider the evidence presented by the customer and the Department and decide whether to uphold the enforcement action or to provide relief.

Monitoring and Reporting

There are two general components to monitoring and reporting. One part is the ongoing reporting to the state, which the Department is already doing. This is the ongoing monthly production reporting to the State Water Resources Control Board. Each month the department reports both overall production as well as gallons per capita per day to the board. This reporting will continue throughout any water shortage that may occur. In that sense, the Department is already committed to tracking production and reporting it. The data that the Department reports is publicly available and thus customers can see how water use is tracking over time.

Another phase of monitoring and reporting that could come into play specifically during a shortage is that of month by month presentation of usage data to customers. In other words, during a shortage, a special web page would be created to display usage data and progress on meeting reduction goals.

Water Shortage Recovery and Plan Termination

A water shortage ends when local rainfall, runoff, and reservoir storage levels improve to the point where the water system is once again capable of supporting unrestricted water demand. Any water use rules and regulations in effect at the time are officially rescinded by City Council and public notice is given that the water shortage is over. The Water Director would then oversee any remaining termination and plan review activities. These activities could include:

- Publicize gratitude for the community's cooperation
- Restore water utility operations, organization, and services to pre-event levels
- Document the event and response and compile applicable records for future reference
- Continue to maintain liaison as needed with external agencies
- Collect cost accounting information, assess revenue losses and financial impact, and review deferred projects or programs
- Debrief staff to review effectiveness of actions, to identify the lessons learned, and to enhance response and recovery efforts in the future
- Complete a detailed evaluation of affected facilities and services to prepare an "after action" report
- Update the water shortage contingency plan as needed

Procedure for Making Refinements to the Water Shortage Contingency Plan

Following implementation of this shortage plan there will be an internal Department process that will look at the experience overall and make recommendations for how the process could be improved. The review process will be conducted by a sub-section of Water Department managers who were involved with different aspects of administering the plan. In order to make sure that the implementation of the shortage plan improves over time until the plan is updated again, the review process will occur each time that there is a shortage and the plan is implemented. The results of the review will be documented in a Department memo and a team will be designated to put the recommendations into action for improvement during the next shortage plan implementation.

Appendix A: Implementation Actions by Stage

Stage 1 – Water Shortage Warning

Stage 1 applies to relatively minor water shortage that requires up to a 10% level of demand reduction. In the existing WSCP, this level of shortage was considered to be only requiring voluntary demand reduction measures along with some implementation of water waste enforcement. In this WSCP update the new allocation system applies to all stages. At Stage 1, advisory allocations are provided to customers but excess use penalties are not yet implemented.

An example of a public message that will be used in outreach to customers regarding a Stage 1 Water Shortage Alert will be similar to the following (subject to change):

"Due to abnormally dry conditions this winter, we're asking all customers to voluntarily cut back water use this summer by 10 percent to stretch the available water supply. City water users should stop using water for non-essential purposes and conserve where possible in case the dry period experienced this past winter continues into next year. If everyone cooperates, we may avoid imposing more stringent watering restrictions. As always, wasting water is prohibited by law."

Stage 1 Water Shortage **Warning**

If it is deemed necessary to declare a Stage 1 Water Shortage Warning, based on the water supply outlook made during the spring of each year, the following implementation actions will be taken (not in order of importance or timing):

Demand Reduction Measures:

- Implement and distribute advisory water allocations for all customers at the Stage 1 allocation level
- Step up enforcement of water waste ordinance

• Prohibit non-essential water use:

- Serving drinking water by restaurant or food service establishments except upon request
- Use of potable water for washing driveways, patios, parking lots or other paved surfaces
- Require hotel, motel, and other commercial lodging establishments to offer option of not laundering towels and linen daily
- Require hoses used for any purpose to have shut off nozzles

Publicity/Communications

- Create communication tool to inform customers of ways to reduce water use.
- Distribute and post press release to media, social media channels, City website.
- Create communication pieces including social media posts, direct mail, paid advertising.
- Create dedicated webpage.
- Dedicate monthly SCMU email newsletters to disseminating water shortage information.
- Utilize bi-annual utility newsletter.
- Inform large landscape/property manager/green industry of irrigation restrictions.
- Disseminate information for customers to learn how to read their meters.

Operating Actions

- Coordinate water conservation actions with other City Departments and public agencies
- Adopt water shortage ordinance prohibiting non-essential water use
- Eliminate system water uses deemed non-essential
- Delegate water waste patrol duties to all field personnel
- Undertake contingency planning for continuing/escalating shortage

Stage 2 – Water Shortage Alarm

Stage 2 applies to moderate water shortages with a demand reduction requirement of up to 20%. This condition requires more vigorous public information and outreach. The primary demand reduction measure that will be implemented at this stage and all stages going forward is the use of excess use penalties for water use above customer allocations.

An example of a public message that will be used in outreach to customers regarding a Stage 2 Water Shortage Alarm will be similar to the following (subject to change):

"It is necessary to impose mandatory restrictions on water use to ensure that throughout the duration of this water shortage an adequate supply of water is maintained for public health and safety purposes. Our overall goal is to reduce water use by 20 percent, which can be achieved if everyone adheres to their allocation. Unlike the advisory nature of the allocations at Stage 1, the seriousness of the shortage situation requires that the allocations are now mandatory. Excess use penalties will be applied to customer bills for water usage above allocation."

Stage 2 Water Shortage Alarm

If it is deemed necessary to declare a Stage 2 Water Shortage Alarm, based on the water supply outlook made during the spring of each year, the following implementation actions will be taken (not in order of importance or timing):

Demand Reduction Measures:

- Implement mandatory water allocations for all customers at the Stage 2 allocation level
- Implement excess use penalties for use over allocation
- Step up enforcement of water waste ordinance

<u>Continue to prohibit non-essential water use described in Stage 1</u>

Publicity/Communications

- All actions in Stage 1 Water Shortage Warning in addition to:
- Disseminate PSAs to targeted local radio and television stations.
- Regularly update the public on consumption and supply numbers.
- Include information in City Manager's monthly email newsletter.

- Initiate presentations to local Chambers of Commerce, business associations, board of realtors, etc.
- Inform large landscape/property managers/green industry of water budget reductions.
- Consult with major customers to develop conservation plans.
- Conduct workshops on large landscape requirements for property owners, contractors, and maintenance personnel.

Operating Actions

- Coordinate with all City Departments and public agencies to reduce water use
- Optimize existing sources (increase groundwater production, reduce transmission losses)
- Suspend main flushing except as required for emergency and essential operations
- Intensify distribution system leak detection and repair
- Hire, train, dispatch water waste patrol
- Undertake contingency planning for continuing/escalating shortage
- Develop strategy to mitigate revenue losses

Stage 3 – Water Shortage Emergency

Stage 3 applies to a serious water shortage with a demand reduction requirement of up to 30%. This condition is a serious situation that will require significant reductions by each customer class. Allocations will be reduced to Stage 3 levels (see Table 10 & 11 for SFR and MFR allocations).

An example of a public message that will be used in outreach to customers regarding a Stage 3 Water Shortage Emergency will be similar to the following (subject to change):

"The City faces a serious water shortage emergency due to prolonged drought.
Our overall goal is to reduce water use by 30 percent, which can be achieved if everyone adheres to their allocation. The situation is more serious than it was at stage 2; all customers are urgently asked to make every effort to conserve water and abide by watering restrictions or face further reductions in water allotments."

Stage 3 Water Shortage Emergency

If it is deemed necessary to declare a Stage 3 Water Shortage Emergency, based on the water supply outlook made during the spring of each year, the following implementation actions will be taken (not in order of importance or timing):

Demand Reduction Measures:

- Implement mandatory water allocations for all customers at the Stage 3 allocation level
- Continue to implement excess use penalties for use over allocation
- Further increase of water waste enforcement
- Institute a temporary water service connection ban
- Require all commercial customers to prominently display "save water" signage with specified language at specified location

Continue to prohibit non-essential water use described in Stage 1

Publicity/Communications

- All actions in Stage 2 Water Shortage Alarm in addition to:
- Provide regular, prescriptive media briefings.
- Provide regular and ongoing briefings to Water Commission, City Council, and other key stakeholders.
- Prepare communication pieces for possible future service connection moratorium.

Operating Actions

- Continue all operating actions listed under Stage 2
- Increase customer service training to address high bills and irate customers
- Expand size and coverage of water waste patrol
- Expand, strengthen water conservation education, activities, and program
- Increase frequency of monitoring and reporting of water production and consumption
- Undertake contingency planning for continuing/escalating shortage
- Develop strategy to mitigate revenue losses

Stage 4 – Severe Water Shortage

Stage 4 applies to a serious water shortage with a demand reduction requirement of up to 40%. This condition is a serious situation that will require significant reductions by each customer class. Allocations will be reduced to Stage 4 levels (see Table 10 & 11 for SFR and MFR allocations). The water supply conditions that would trigger Stage 4 parallel the difficult situation the City experienced in the drought of late 1970s. Under this scenario, virtually all available water must be reserved either for health and safety purposes or to sustain local business.

The public message that will be used in outreach to customers regarding a Stage 4 Water Shortage Emergency will be similar to the following (subject to change):

"Due to continuing deterioration in storage and overall scarcity of available supply, all customers, residential and business alike, are now unavoidably subject to water rationing. The current water shortage is among the most severe ever faced in modern times. We must all continue to conserve water to the maximum extent possible and strive to maintain water use within our established rationing allotments as long as the drought endures in order to avert a water crisis."

Severe Water Shortage

If it is deemed necessary to declare a Stage 4 Severe Water Shortage, based on the water supply outlook made during the spring of each year, the following implementation actions will be taken (not in order of importance or timing):

Demand Reduction Measures:

- Reduce water allocations for all customer classes to Stage 4 levels
- Rescind hydrant and bulk water permits, prohibit use except by special permission

Continue to prohibit non-essential water use described in Stage 1

Publicity/Communications
All actions in Stage 3 Water Shortage Emergency in addition to:

- Contract with outside PR agency to manage comprehensive public awareness campaign, including paid ads, earned media, direct mail, etc.
- Promote zeroscape landscaping.
- Partner with other water agencies to promote appropriate grey water use, etc.
- Prepare emergency messaging for possible critical water shortage utilizing Nixel, CodeRed, reverse 911.

Operating Actions

- Scale up administrative appeals staff to support hearing officer(s)
- Expand water waste enforcement to 24/7

Stage 5– Critical Water Shortage

Stage 5 represents an imminent and extraordinary crisis threatening health, safety, and security of the entire community. Under this dire situation, extreme measures are necessary to cut back water use by up to half the normal amount. Not enough water would exist even to meet the community's full health and safety needs, the top priority. **All water should be reserved for human consumption, sanitation, and fire protection purposes and any remaining amount allocated to minimize economic harm.** A shortage of this severity could be expected to generate stress and confusion, much the same as any major emergency and at some point could transform into a full blown natural disaster that can no longer be governed by local ordinance and may need to be manage by the same basic principles and command structure under the state Standardized Emergency Management System that other natural disasters are. The City has experienced water shortages in the past but never one of such large proportion.

The Stage 5 public message is as follows:

"The City of Santa Cruz is confronted with a critical water shortage emergency of unprecedented proportions. At this time, there exists barely enough drinking water for the most essential human health, sanitation, and safety needs. As a result, all outdoor watering is now prohibited. We understand the hardship this extraordinary condition poses to every resident and business in the City and appreciate the sacrifices people are making to ensure that water system does not run dry. Everyone is urgently requested to do whatever necessary to maintain water use within or below their allotted amount."

Critical Water Shortage

If it is deemed necessary to declare a Stage 5 Critical Water Shortage, based on the water supply outlook made during the spring of each year, the following implementation actions will be taken (not in order of importance or timing):

Demand Reduction Measures:

- Further reduce allocations for all customer classes
- Prohibit all outdoor irrigation
- No water for outdoor washing or recreational purposes; close pools, public showers
- Continue all measures initiated in prior stages as appropriate

Continue to prohibit non-essential water use described in Stage 1

Publicity/Communications

- All actions in Stage 4 Severe Water Shortage in addition to:
- Implement crisis/emergency communications including establishment of a Joint Information Center (JIC).
- Deploy prepared emergency messaging on Nixel, CodeRed, reverse 911.

Operating Actions

- Consider shifting to EOC model of command management for overall policy guidance and coordination
- Coordinate with CA Division of Drinking Water, District Engineer and other emergency response agencies regarding water quality, public health issues
- Coordinate with law enforcement agencies to address enforcement challenges
- Continue water waste enforcement 24/7
- Delegate field staff to assist in enforcement (shut offs, flow restrictors)
- Continue all applicable operating actions listed under Stage 4
- Coordinate with local sanitation agencies regarding sewer line maintenance
- Continue close monitoring and reporting of water production and consumption
- Investigate potential for reduced in-stream release
- Procure resources to utilize dead storage, if needed
- Undertake emergency planning for continuing

Stage 6– Catastrophic Water Shortage

The required standardized shortage stages that are specified in CA Water Code Section 10632 do go up to a new required sixth stage which is "greater than 50 percent shortage." Although this stage is required in the plan, the local characteristics of water demand in Santa Cruz that have been described in this document make for a unique and challenging situation when it comes to implementing higher levels of shortage reduction. When it comes to Stage 6, the approach in this plan is that the Santa Cruz Water Department does not plan on ever reaching this stage in a shortage. Even when it comes to Stages 4 and 5, our approach is that the department will do everything in its power in terms of water supply augmentation in order to never reach these higher stages of shortage.

As was stated in the introduction, today's Water Supply Augmentation Strategy contains a number of new elements that were not being considered at the time the excising WSCP was written. The new strategy focuses on in-lieu water exchanges, aquifer storage and recovery (ASR), advanced treated recycled water and/or desalination, as well as ongoing water conservation. It is the Department's

policy that working on and developing these new water supplies will reduce the number of occasions that this WSCP will need to be implemented. Furthermore, even small water supply augmentation efforts such as ASR or transferring water to neighboring water agencies for groundwater banking and eventual use during a shortage, can make incremental additions to water supplies that can decrease chances that a low level shortage will occur.

In terms of a Stage 6 Catastrophic Water Shortage, Santa Cruz takes the position that this level of shortage would most like only occur due to a major disaster that caused significant damage to our water treatment and/or distribution infrastructure. In such a disaster, such as a large earthquake, the Santa Cruz response would not come from this WSCP, but rather from the main Santa Cruz Water Department Emergency Response Plan.

Appendix B: Customer Letters

Initial customer letter

Santa Cruz Municipal Utilities | 212 Locust Street, Suite D | Santa Cruz, CA 95060 | 420-5220

JOHN DOE

100 ANYWHERE ST
SANTA CRUZ CA 95060

INSERT DATE

Account:	001-00001-001
Service Address	100 ANYWHERE ST
Account Type:	Single Family Residential

Dear JOHN DOE:

A drought emergency has been declared for Santa Cruz Municipal Utilities customers. Rationing will begin May 1st for all residential customers. **You are receiving this letter because your average summer consumption is over your allotment, and steep penalties will be applied to any water used in excess of your allotment.***

Your average summer water use is	**7 CCF** per month.
Your allotment is	**5 CCF** per month.

Depending on how much you are over your allotment, you may be required to take significant action to avoid receiving excess use penalties. Remember: allotments are provided to meet basic indoor needs—landscape irrigation may need to be severely curtailed or shutoff to remain within your monthly allotment.

To track your water usage and see how you are doing compared to your allotment, please log into our WaterSmart customer web portal at https://santacruz.watersmart.com/index.php/welcome. On that website you can view your allotment as well as your monthly, daily, and hourly water use. This website also has personalized suggestions for you to save water based on your property information.

If you believe that you are over allotment because more than 3 people live at this address, you may apply for an additional allotment by visiting www.cityofsantacruz.com/drought and filling out an Application for Additional Water Allotment for Large Single Family Households.®

Sincerely,

Santa Cruz Municipal Utilities

*Your allotment may have changed if you have applied and qualified for an additional allotment. Your average summer consumption may have changed if you have made landscape changes in the last few months.

® Application for Additional Water Allotment for Large Single Family Households is not intended for short-term vacation rentals.

Second customer letter "Last chance letter"

Santa Cruz Municipal Utilities | 212 Locust Street, Suite D | Santa Cruz, CA 95060 | 420-5220

JOHN DOE

100 ANYWHERE ST
SANTA CRUZ CA 95060

INSERT DATE

Account:	001-00001-001
Service Address:	100 ANYWHERE ST

Dear JOHN DOE:

We want to alert you that your water consumption during the April – May service period exceeded your allotment:

April – May consumption:	7 CCF per month.
Your allotment:	5 CCF per month.

Fortunately, the April – May service period was not subject to excess use penalties. However, the current service period is, and steep penalties will be applied to any water used over your allotment from now until the water shortage emergency has ended.

To track your water usage and see how you are doing compared to your allotment, please log into our WaterSmart customer web portal at https://santacruz.watersmart.com/index.php/welcome. On that website you can view your allotment as well as your monthly, daily, and hourly water use. This website also has personalized suggestions for you to save water based on your property information.

For more information or questions, please contact conservation@cityofsantacruz.com

Sincerely,

Santa Cruz Municipal Utilities

Appendix C: Californian Water Code Section 10632

State of California WATER CODE Section 10632 10632. (a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements: (1) the analysis of water supply reliability conducted pursuant to Section 10635. (2) The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following: (A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability. (B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following: (i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable. (ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier. (iii) Existing infrastructure capabilities and plausible constraints. (iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment. (v) A description and quantification of each source of water supply. (3) (A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events. (B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage levels.
(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following: (A) Locally appropriate supply augmentation actions.
(B) Locally appropriate demand reduction actions to adequately respond to shortages.
(C) Locally appropriate operational changes. (D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions. (E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action. (5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following: (A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1. (B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1. (C) Any other relevant communications. (6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2. (7) (A) A description of the legal authorities that empower the urban water supplier to implement and

enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions. (B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1. (C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code. (8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following: (A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4). (B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4). (C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1. (9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements. (10) Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed. (b) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code. (c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan. (Repealed and added by Stats. 2018, Ch. 14, and Sec. 32. (SB 606) Effective January 1, 2019.)

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