MEETING OF THE BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS COMMITTEE
18700 Ward Street, Conf. Room 101, Fountain Valley, CA 92708
November 4, 2024, 8:30 a.m.

Teleconference Sites:
25652 Paseo De La Paz, San Juan Capistrano, CA 92675
17420 Walnut Street, Fountain Valley, CA 92708

This meeting will be held in person at 18700 Ward Street, Fountain Valley, California, 92708 (Conference Room 101). As a convenience for the public, the meeting may also be accessed by Zoom Webinar and will be available by either computer or telephone audio as indicated below. Because this is an in-person meeting and the Zoom component is not required, but rather is being offered as a convenience, if there are any technical issues during the meeting, this meeting will continue and will not be suspended.

Computer Audio: You can join the Zoom meeting by clicking on the following link:
https://zoom.us/j/8828665300

Telephone Audio: (669) 900 9128 fees may apply
(877) 853 5247 Toll-free
Webinar ID: 882 866 5300#

P&O Committee:
Director Seckel, Chair
Director Yoo Schneider
Director Dick

Staff: H. De La Torre, C. Harris, H. Chumpitazi, M. Baum-Haley, T. Dubuque, M. Goldsby

Ex Officio Member: President McVicker

MWDOC Committee meetings are noticed and held as joint meetings of the Committee and the entire Board of Directors and all members of the Board of Directors may attend and participate in the discussion. Each Committee has designated Committee members, and other members of the Board are designated alternate committee members. If less than a quorum of the full Board is in attendance, the Board meeting will be adjourned for lack of a quorum and the meeting will proceed as a meeting of the Committee with those Committee members and alternate members in attendance acting as the Committee.

ROLL CALL

PUBLIC COMMENTS - Public comments on agenda items and items under the jurisdiction of the Committee should be made at this time.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED - Determine there is a need to take immediate action on item(s) and that the need for action came to the attention of the District subsequent to the posting of the Agenda. (Requires a unanimous vote of the Committee).

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING -- Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection in the lobby of the District's business office located at 18700 Ward Street, Fountain Valley, California 92708, during regular business hours. When practical, these public records will also be made available on the District's Internet Web site, accessible at http://www.mwdoc.com.

ACTION ITEMS

1. AUTHORIZATION TO VOTE ON BEHALF OF MWDOC ON CALIFORNIA SPECIAL DISTRICTS ASSOCIATION (CSDA) 2024 BYLAWS VOTE

2. AUTHORIZATION TO VOTE ON BEHALF OF MWDOC ON ASSOCIATION OF CALIFORNIA WATER AGENCIES (ACWA) PROPOSED AMENDED AND RESTATED BYLAWS

DISCUSSION ITEMS

3. COMPLETION OF THE LEAD AND COPPER RULE REVISIONS INITIAL SERVICE LINE INVENTORY PROJECT UNDER THE MWDOC SHARED SERVICES PROGRAM

4. WEROC ORANGE COUNTY WATER & WASTEWATER MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

INFORMATION ITEMS (The following items are for informational purposes only – background information is included in the packet. Discussion is not necessary unless requested by a Director.)

5. STATUS OF MWDOC'S WATER QUALITY AND OPERATIONS MANAGEMENT WORKSHOPS AND NEXT STEPS

6. PUBLIC AFFAIRS HIGHLIGHTS

7. DEPARTMENT ACTIVITIES REPORTS
   a. Ongoing MWDOC Reliability and Engineering/Planning Projects
   b. WEROC
   c. Water Use Efficiency Projects
   d. Public and Government Affairs

8. REVIEW OF ISSUES RELATED TO PLANNING OR ENGINEERING PROJECTS, WEROC, WATER USE EFFICIENCY, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, PUBLIC AFFAIRS PROGRAMS AND EVENTS, PUBLIC INFORMATION PROJECTS, PUBLIC INFORMATION CONSULTANTS, DISTRICT FACILITIES, and MEMBER AGENCY RELATIONS

ADJOURNMENT

NOTE: At the discretion of the Committee, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated, and may be subject to action by the Committee. On those items designated for Board action, the Committee reviews the items and makes a recommendation for final action to the full Board of Directors; final action will be taken by the Board of Directors. Agendas for Committee and Board meetings may be obtained from the District Secretary. Members of the public are advised that the Board consideration process includes consideration of each agenda item by one or more Committees indicated on

the Board Action Sheet. Attendance at Committee meetings and the Board meeting considering an item consequently is advised.

Accommodations for the Disabled. Any person may make a request for a disability-related modification or accommodation needed for that person to be able to participate in the public meeting by telephoning Maribeth Goldsby, District Secretary, at (714) 963-3058, or writing to Municipal Water District of Orange County at P.O. Box 20895, Fountain Valley, CA 92728. Requests must specify the nature of the disability and the type of accommodation requested. A telephone number or other contact information should be included so that District staff may discuss appropriate arrangements. Persons requesting a disability-related accommodation should make the request with adequate time before the meeting for the District to provide the requested accommodation.

Item No. 1

ACTION ITEM
November 20, 2024

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Seckel, Yoo Schneider, Dick)

Harvey De La Torre, General Manager

Staff Contact: Heather Baez, Director of Governmental Affairs

SUBJECT: **AUTHORIZATION TO VOTE ON BEHALF OF MWDOC ON CALIFORNIA SPECIAL DISTRICTS ASSOCIATION (CSDA) 2024 BYLAWS VOTE**

STAFF RECOMMENDATION

Staff recommends that the Board of Directors:

- Review the proposed updates to CSDA's Bylaws; and
- Authorize staff to cast the District's ballot in support of the updates; and
- Authorize staff to submit the District's ballot electronically no later than no later than Wednesday, November 20.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

The California Special Districts Association (CSDA) was formed to promote good governance and improved core local services through professional development, advocacy, and other services for independent special districts. MWDOC is a CSDA member and routinely utilizes services such as education and training, legislative advocacy, and information that is crucial to a special district's management and operational effectiveness.

The CSDA Bylaws establish guidelines for chapters to follow when establishing membership requirements and appointing a communications liaison. The last CSDA Bylaws updates were made in 2021 with the primary changes being Rights of Regular Membership,

Budgeted: ☒ Yes ☐ No	Budgeted amount: n/a	Core: ☒	Choice: ☐
Action item amount: n/a	Movement between funds: ☐ Yes ☒ No		

Retiree Membership, use of "member", Procedure for Termination of Membership, Annual Report, and dual directorships with CSDA's Alliance partner - Special District Risk Management Authority (SDRMA).

Proposed Amended and Restated Bylaws

Following receipt of feedback and suggestions over the last few years from members, CSDA has conducted a thorough review of the CSDA Bylaws; making necessary updates as well as additions or improvements where needed. There are numerous verbiage and grammar updates along with significant proposed updates that include:

- Clarification that Retired Members are non-voting members
- Clarification related to termination of membership
- New Section under Article III, Section 2: Early Assumption of Office
- New Section under Article III, Section 2: Change in Regular Voting Member Affiliation
- Update noticing, balloting, and election timeframes to allow additional flexibility in the Board election process
- New Section under Article III, Section 7: A CSDA director shall be disqualified from serving on the CSDA Board if they are no longer a board member or managerial employee of a Regular Member district in the Network they were elected or appointed from
- Committee structure: amend to allow Committee Vice-Chairs, with the exception of the CSDA Finance Corporation Committee, may be individuals from Regular Members' districts in good standing

A full copy of the CSDA Bylaws, including the tracked changes are **linked here** and attached.

Voting Process

As a voting member of CSDA, MWDOC has been asked to review the proposed updates to CSDA's Bylaws and cast the District's ballot electronically.

The notice to vote, background information, draft Bylaws, and ballot were sent via email to Heather Baez and Cathy Harris, who are the District's designated staff at CSDA.

The deadline for submitting MWDOC's vote is **Wednesday, November 20, 2024**.

ALIGNMENT WITH BOARD STRATEGIC PRIORITIES

- ☒ *Clarifying MWDOC's mission and role; defining functions and actions.*
- ☐ *Balance support for Metropolitan's regional mission and Orange County values and interests.*
- ☐ *Strengthen communications and coordination of messaging.*
- ☐ *Work with member agencies to develop water supply and demand objectives.*
- ☐ *Solicit input and feedback from member agencies.*
- ☐ *Invest in workforce development and succession planning.*

BOARD OPTIONS

Option #1: Authorize staff to cast the District's ballot electronically with a "Yes" vote for CSDA's Bylaw Update for 2024.

Fiscal Impact: None

Option #2: Authorize staff to cast the District's ballot electronically with a "No" vote for CSDA's Bylaw Update for 2024.

Fiscal Impact: None

List of Attachments/Links:

Attachment 1: Draft CSDA Bylaws Updates 2024

Link 1: https://static.simplyvoting.com/uploads/csda/election-242898/6a2-csda-bylaws-2024-updates-v4-final-draft-tracked-changes-eac7.pdf



BYLAWS
California Special Districts Association

Approved Bylaw Revision Dates:

Revised 1996
Revised 1999
Revised 2004
Revised October 1, 2009
Revised August 2, 2010
Revised August 1, 2011
Revised July 1, 2014
Revised July 1, 2016
Revised November 15, 2021
Revised XXXXX XX, 2024

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ARTICLE I – GENERAL

Section 1. Purpose:

In addition to the general and specific purposes set forth in the Articles of Incorporation of the California Special Districts Association (hereinafter referred to as "CSDA"), CSDA will provide outreach, advocacy, professional development, information, and other various services to member districts. CSDA will interact and collaborate, where appropriate, with the associations and groups that support or oppose its membership's interests. The control and governance of CSDA shall be the responsibility of CSDA's Board of Directors (the "Board of Directors").

Section 2. CSDA Networks:

The state of California shall be divided ~~along county boundaries~~ into six voting networks, using county boundaries to shape the respective networks. The areas of the networks are determined by the Board of Directors of CSDA. A map of the six (6) networks of CSDA is attached as Exhibit A.

Section 3. Principal Office:

The principal business office of CSDA is located at 1112 I Street, Suite 200, Sacramento, California 95814. The Board of Directors shall have authority to change the principal office from one location to another.

ARTICLE II – MEMBERSHIP

Section 1. Qualification of Membership:

There may be several classes of membership in CSDA, as determined by the Board of Directors. The following classes have been adopted:

A. Regular Voting Members:

Regular voting members shall be any public agency formed pursuant to either general law or special act for the local performance of governmental or proprietary functions within limited boundaries, and which meets any one of the following criteria:

1. Meets the definition of "independent special district" set forth in Government Code Section 56044 by having a legislative body comprised entirely of elected members, or which members are appointed to fixed terms; or

2. The following public agencies: (a) air quality management districts; (b) air pollution control districts; (c) county water agencies or authorities; (d) transit or rapid transit districts, or transportation authorities; (e) metropolitan water districts; (f) flood control or water conservation districts; (g) sanitation agencies.

Regular voting members shall not include any state, cities, counties, school districts, community college districts, local agency formation commissions (LAFCOs), dependent districts, or joint powers authorities (JPAs) except as may be specifically referenced above.

Rights of Regular Membership: Regular voting members have voting privileges and may have a member of the Board of Directors or a managerial employee hold a seat~~s~~ on the Board of Directors. All Regular Members shall have the right to vote, as set forth in these bylaws, on the election of directors, on the disposition of all or substantially all of the corporation's assets, on any merger and its principal terms and any amendment of those terms, and on any election to dissolve the corporation. In addition, Regular Members shall have all rights afforded members under the California Nonprofit Public Benefit Corporation Law.

B. Associate Non-Voting Members:

Associate members shall be public agencies such as dependent districts composed of appointees from a single public agency, cities, counties, joint powers authorities, and other public agencies that do not satisfy the criteria for regular voting membership specified in Section A above.

Associate members have no voting privileges, except as approved members on a CSDA committee, and may not hold a seat on the Board of Directors.

C. Business Affiliate Non-Voting Members:

Business Affiliate members shall be those businesses or organizations that provide products or services to special districts and have evidenced interest in the purposes and goals of CSDA. Business Affiliates have no voting privileges, except as approved members on a CSDA committee, and may not hold a seat on the Board of Directors.

D. Retired Non-Voting Member (Individual Membership):

Retired Individual members shall be those persons that are retired from service as a staff or board member at a special district and have at least 1 year of previous service.

Retired members shall not be affiliated with or serve as a consultant to any agency eligible for regular, associate, or business affiliate membership in CSDA. Retired members cannot be employed by a company that provides services or products to special districts.

Retired members have no voting privileges and may not hold a seat on the CSDA Board of Directors or any CSDA committees.

CSDA benefits available to retired members shall be determined by the CSDA Board of Directors.

Section 2. Membership Application:

Application for membership to CSDA will be directed to staff, who will determine if the applicant's interest and purpose is in common with CSDA. If the applicant meets the requirements of membership, the Board of Directors shall approve the new member by a majority vote of the Board at the next regularly scheduled Board meeting. Acceptance to membership shall authorize participation in CSDA activities as specified in these Bylaws. The Board shall retain the authority to deny membership in CSDA at its discretion.

Section 3. Membership Dues:

The membership dues of CSDA shall be established annually by a majority vote of the Board of Directors at a scheduled Board meeting. Authority to adjust the dues shall remain with the Board of Directors.

Section 4. Membership Voting:

Matters to be voted upon by the authorized voting membership shall be determined by the Board of Directors in accordance with these Bylaws. Only those matters of which notice has been given to voting members by CSDA may be voted upon.

A. Voting Designee:

In accordance with these Bylaws, regular voting members in good standing shall have voting privileges. The governing body of each regular voting member shall designate one representative from their respective district who shall have the authority to exercise the right of the regular voting member to vote. Such voting designee shall be a Board ~~member~~ Member or managerial employee of the regular voting member.

B. Voting Authorization:

Regular voting members who have paid the required dues as set by the Board of Directors are members in good standing. Each regular voting member in good standing shall be entitled to one vote on all matters brought before the membership for vote at any meeting or by ballot.

C. Non-Voting Members:

CSDA may refer to Associate Members, Retired Members and Business Affiliate Members or other persons or entities associated with it, as "members", even though those persons or entities are not voting Regular Members as set forth in Article II Section I A ~~hereof~~. No such reference as "members" shall constitute anyone as a voting member of this corporation unless that person or entity has qualified for voting Regular Membership pursuant to Article II Section I A of these Bylaws. The Board of Directors may adopt policies which grant some or all of the rights of a Regular Member, other than voting rights, to an Associate Member, Retired Member or Business Affiliate Member, but no such person or entity shall be a Regular Member by virtue of such grant of rights.

Section 5. Membership Quorum:

A. Meeting Quorum:

Twenty-five voting designees, as defined in Article II, Section 4, present at any annual or special meeting of the CSDA shall constitute a quorum. No regular voting member shall have the right to vote by means of an absentee or proxy ballot.

B. Mailed or Electronic Ballot Quorum:

Mail ballots or electronic ballots received from 25 voting designees officially designated by each regular voting member shall constitute a quorum. Each regular voting member shall be entitled to one vote. No regular voting member shall have the right to vote by means of a proxy.

Section 6. Membership Meetings:

A. Annual Business Meeting:

The annual business meeting of the members shall be held at the CSDA Annual ~~CSDA~~ Conference at such time and place as determined by the Board of Directors or Staff. Written notice of the annual business meeting distributed by mail or electronically shall include all matters that the Board intends to present for action and vote by the members if such a vote is required.

B. Special Meetings:

Special meetings of the members may be called at any time by the President, by a majority of the Board of Directors, or at least a quorum of the members (25 members). Such a special meeting may be called by written request, specifying the general nature of the business proposed to be transacted and addressed to the attention of and submitted to the President of the Board. The President shall direct the Chief Executive

Officer to cause notice to be given promptly to the members stating that a special meeting will be held at a specific time and date fixed by the Board. No business other than the business that was set forth in the notice of the special meeting may be transacted at a special meeting.

C. Notice of Meetings:

~~Whenever members are permitted~~In any case that members are requested to take any action at any annual or special meeting, written notice of the meeting distributed by mail or electronically shall be ~~given~~ sent to each member entitled to vote at that meeting. The notice shall specify the place, date and hour of the meeting, and the means of communication to be utilized by and between CSDA and its members, if any, through which members may participate in the meeting. For the Annual Membership Meeting, the notice shall state the matters that the Board intends to present for action by the members. For a special meeting the notice shall state the general nature of the business to be transacted and shall state that no other business may be transacted. The notice of any meeting at which directors are to be elected shall include the names of all persons who are nominees when notice is given.

1. Notice Requirements. Written notice of any annual membership meeting shall be given at least 45 days before the meeting date either personally, by first class registered or certified mail, or by electronic transmission.

2. Electronic Notice. Notice given by electronic transmission by CSDA shall be valid if delivered by either (a) facsimile telecommunication or electronic mail when directed to the facsimile number or electronic mail address for that main contact member on record with CSDA; (b) posting on an electronic message board or ~~network~~ website community that CSDA has designated for such communications, together with a separate electronic notice to each member of the posting; or (c) any other means of electronic communication. Such electronic transmission must be directed to each~~a~~ member which has ~~provided to CSDA an unrevoked~~not revoked consent to the use of electronic transmission for such communications. The method of electronic communication utilized must create a record that is capable of retention, retrieval and review by CSDA.

All such electronic transmissions shall include a written statement that each member receiving such communication has the right to have the notice provided in non-electronic form. Any member may withdraw its consent to receive electronic transmissions in the place of written communications by providing written notice to CSDA of such withdrawal of consent.

Notice shall not be given by electronic transmission by CSDA if CSDA is unable to deliver two (2) consecutive notices to a member by that means, or otherwise becomes aware of the fact that the member cannot receive electronic communications.

D. Electronic Meetings:

Members not physically present in person at either an annual or special meeting of members may participate in such a meeting by electronic transmission or by ~~electronic video screen communication~~use of web-based video communication software by and between such members and CSDA. Any eligible member participating in a meeting

electronically shall be deemed present in person and eligible to vote at such a meeting, whether that meeting is to be held at a designated place, conducted entirely by means of electronic transmission, or conducted in part by electronic communication between CSDA and those members who are not capable of being physically present at such designated meeting place.

Annual and special meetings of the members may be conducted in whole or in part by electronic transmission or by use of web-based video communication software ~~electronic video screen communication~~ by and between CSDA and its members if all of the following criteria are satisfied: (1) CSDA implements reasonable procedures to provide members participating by means of electronic communication a reasonable opportunity to participate in the meeting and to vote on matters submitted to the members, including an opportunity to hear the proceedings of the meeting including comments of members participating in person substantially concurrent with such proceedings; and (2) any votes cast by a member by means of electronic communication by and between CSDA and a member must be recorded and maintained in the minutes by CSDA.

E. Majority Vote:

Any matter submitted to the membership for action or approval shall constitute the action or approval of the members only when: (1) the number of votes cast by regular voting members present at the meeting equals or exceeds the quorum requirement of 25 ~~registered voters~~regular voting members; and (2) the number of votes approving the action or proposal equals or exceeds a majority (i.e., 50% plus one) of the regular voting members present and casting votes on the issue.

F. Solicitation of Written Ballots from Members:

All solicitations of votes by written ballot, whether by means of electronic communication or first class mail, shall: (1) state the number of returned ballots needed to meet the quorum requirement ; (2) state, with respect to returned ballots other than for election of directors, that the majority of returned ballots must indicate approval of each measure in order to adopt such measure; and (3) specify the time by which the written ballot must be received by CSDA in order to be counted. Each written ballot so distributed shall: (1) set forth the proposed action; (2) give members an opportunity to specify approval or disapproval of each proposal; and (3) provide a reasonable time in which to return the ballots to CSDA either electronically or by first class mail.

Each written ballot distributed by first class mail shall be mailed to each regular voting member at least 45 days in advance of the date designated for return of the ballot by each such member to CSDA. Written ballots transmitted electronically to members shall be electronically communicated at least 45 days in advance of the date designated for return of the ballot by each member to CSDA.

G. Return of Ballots:

Written ballots shall be returned either by first class mail or by electronic communication to either the principal business address of CSDA or CSDA's designated electronic format specified on the ballot prior to the close of business (5:00 pm) on the designated election date. Written ballots received either by first class mail or electronic

communication from regular voting members after the specified date shall be invalid and shall not be counted.

H. Number of Votes Required for Approval of Action on Written Ballot:

Approval by written ballot shall be valid only when (1) the number of votes cast by written ballot either by means of electronic communication or first class mail within the specified time equals or exceeds the quorum required to be present at a meeting authorizing the action (25 votes); and (2) the number of ~~approvals~~ votes in favor of the action equals or exceeds the number of votes that would be required for approval at a meeting of members~~,~~ (i.e. 50% plus one) of those participating members casting written ballots either electronically or by first class mail.

Section 7. Termination of Membership:

~~A member shall not be in good standing, and membership may be terminated, O~~on occurrence of any of the following events, a member shall no longer be in good standing, and membership may be terminated:

A. Any member delinquent in the payment of dues for a period of three months after said dues are due and payable, shall be notified in writing of such arrearage, and shall be given written notice of possible termination. If such delinquent dues remain unpaid for 45 days after notice, the delinquent member shall automatically cease to be a member of CSDA. CSDA's Chief Executive Officer may approve special payment arrangements if deemed necessary including with those districts that may be members of the Special District Risk Management Authority (SDRMA).

B. Determination by the Board of Directors that a member has failed in a material and serious degree to observe the rules of conduct or operational policies of CSDA, including but not limited to the Corporation's Anti-Trust Policies, or has engaged in conduct materially and seriously prejudicial to ~~this~~ CSDA~~'s~~ purposes and interests.

Section 8. Procedure for Termination of Membership:

If grounds exist for terminating the membership of a member under Section 7 ~~hereof~~of these bylaws, the following procedures shall be followed:

A. The Board of Directors shall give the member at least 15 days prior written notice of the proposed termination and the reasons for the proposed termination of membership. Notice ~~shall~~ may be given by any method reasonably calculated to provide actual notice. Notice given by mail shall be sent by first-class mail to the member's last address as shown on CSDA records.

B. The member shall be ~~given an opportunity to be heard~~provided an opportunity to contest the termination, either orally or in writing, at least 5 days before the effective date of the proposed termination of ~~_____~~membership. ~~The~~ A ~~hearing~~ meeting shall be held in a time and manner determined by the Chief Executive Officer, or the written statement considered, by the Board of Directors which is responsible for determining in its sole discretion whether the termination of membership should occur.

C. The Board of Directors shall determine whether the membership shall be terminated. The decision of the Board of Directors shall be final.

ARTICLE III – DIRECTORS

Section 1. Number of Directors:

The authorized number of elected directors to serve on the Board of Directors shall be 18. Each regular voting member shall be limited to one seat on the Board.

There shall be three directors elected from three different regular voting members in each of the six CSDA networks. Directors elected from each of the six networks shall hold staggered three-year terms.

Section 2 Term of Office:

Directors elected from each of the six networks shall hold staggered three-year terms. After the annual election of directors, a meeting of the Board shall be held to ratify the election results. The term of office of the newly elected persons shall commence on the following January 1 and shall automatically terminate three years thereafter unless a newly elected or appointed Director is completing the remaining balance of an incomplete term due to a vacancy in a respective Director seat.

Early Assumption of Office.: In such cases, if there is a candidate-elect who has won the election and is willing to assume office early to fill a vacant seat, the Board of Directors may allow the candidate-elect to assume office prior to the regular January 1 start date.

Conditions: The candidate-elect assuming office early shall meet all eligibility requirements for Board membership.

Ratification: The early assumption of office by the candidate-elect shall be subject to ratification by the Board of Directors at its next regularly scheduled meeting following the completion of the election.

Change in Regular Voting Member Affiliation.: Any Director that is a board member or managerial employee of a member district and subsequently transitions to a board member or managerial employee position at another regular voting member district in the same Network, shall retain their seat and term.

Conditions: In order to retain voting rights on the CSDA Board of Directors, the Director shall provide a resolution or minute action from their new district within two months of the change affirming the individual Directors continued service on the CSDA Board of Directors.

Section 3. Nomination of Directors:

Nomination of Directors seeking to serve on the Board shall be by network. Any regular voting member in good standing is eligible to nominate one person from their district to run for director of CSDA. The CSDA director nominee shall be a member of the board of directors of the district or a managerial employee as defined by that district's board of directors. Nomination of the director designee shall be made by a resolution or minute action of the regular voting member's

Board of Directors. Only one individual from each regular voting member district may be nominated to run at each election.

CSDA staff will review all nominations received and accept all that meet the qualifications set by these Bylaws. A slate of each network's qualified nominees will be transmitted by mail or electronic ballot to that network's regular voting membership for election pursuant to Article III, Section 4

Section 4. Election of Directors:

The Election and Bylaws Committee shall have primary responsibility for establishing and conducting elections for the Board of Directors. The Committee may enforce any regulation to facilitate the conduct of said elections. Directors shall be voted upon and elected by the regular voting members from the network from which they are nominated.

The Election and Bylaws Committee shall meet each year to review, with CSDA staff, the networks where election of directors will be necessary. The Committee will coordinate~~,~~ with staff~~,~~ the dates nomination requests shall be mailed to the regular voting members, the official date for the nomination requests to be received at the CSDA office, and set the date of the election.

A. Written Notice:

Written notice requesting nominations of candidates for election to the Board of Directors shall be sent by first class mail or electronically to each regular voting member in good standing on the date specified by the Election and Bylaws Committee, which shall be at least ~~120~~ 100 days prior to the election. The nominations must be received either by mail or electronically by CSDA before the established deadline which shall be no later than 60 days prior to the election. Nominations received after the deadline date shall be deemed invalid. In the event an incumbent does not re-run for their seat, the nomination period for that network shall be extended by ten days.

B. Balloting and Election:

Voting for directors shall be by written ballot distributed by mail or by electronic transmission by CSDA directly or via authorized third-party to members eligible to vote in each network.

After the nomination period for directors is closed, a written ballot specifying the certified nominees in each network shall be distributed by first class mail or electronically to each regular voting member in that network. Each such regular member in good standing in each network shall be entitled to cast one vote for each of that network's open seats on the Board. In the event there is more than one seat available for election, regular members shall be entitled to a number of votes equal to the seats available for election in their network.

The ballot for each network shall contain all nominations accepted and approved by CSDA staff. In the event there is only one nomination in a network, the nominee shall automatically assume the Seat up for election and a ballot shall not be mailed or electronically transmitted. Staff will execute a Proof of Service certifying the date upon which all regular voting members of each network were sent a ballot, either by first class

mail or by electronic transmission. The form of written ballot and any related materials sent by electronic transmission by CSDA and completed ballots returned to CSDA by electronic transmission by participating members must comply with all of the requirements of Article II, Section 6(F-H) of these Bylaws. If a member does not consent to electronic communication for balloting purposes, a form of written ballot will be mailed to such participating member no later than 45 days prior to the date scheduled for such election. All written ballots shall indicate that each participating member may return the ballot by electronic communication or ~~first class~~first-class mail.

All solicitations of votes by written ballot shall: (1) state the number of returned ballots needed to meet the quorum requirement ; (2) state, with respect to ballots for election of directors, that those nominees receiving the highest number of votes for each Board position subject to election will be certified as elected to that Board position.

Election of a nominee to a Board position shall be valid only when: (1) the number of votes cast by written ballot, transmitted either electronically or by first class mail, within the time specified, equals or exceeds the quorum required to be present at a meeting of members authorized in such action ; and (2) the number of written ballots approving the election of a nominee must be the highest number of votes cast for each respective Board position subject to election~~ as would be required for an election of a nominee at a meeting of the members~~.

Written ballots shall be returned either by first class mail or by electronic mail communication to either the principal business address of CSDA or CSDA's designated electronic format specified on the ballot prior to the close of business (5:00 pm) on the designated election date, which shall be at least ~~45~~ 30 days prior to the Annual Conference. Written ballots received either by first class mail or electronic communication after the specified date shall be invalid and shall not be counted.

All written ballots received by mail shall remain sealed until opened in the presence of the Election and Bylaws Committee chairperson or their designee. All electronic ballots will be prepared, distributed, authenticated, received, tabulated, and kept secure and confidential. Election documents will be retained as outlined in CSDA's Board approved records retention policy.

Section 5. Event of Tie:

In the event of a tie vote, a supplemental written ballot containing only the names of those candidates receiving the same number of votes shall be distributed either by first class mail or electronically to each regular voting member in the network where the tie vote occurred.

Those written ballots received by mail or electronically prior to the close of business (5:00 pm) on the date designated by the Election and Bylaws Committee shall be considered valid and counted. All supplemental written ballots received after the designated date whether by first class mail or electronically shall be deemed invalid. All written ballots received either by mail or electronically shall remain sealed as provided in Article III, Section 4.B of these Bylaws.

In the event the supplemental written ballot also results in a tie vote, the successful candidate will be chosen by a drawing by lot.

Section 6. Director Vacancy:

In the event of a director vacating their seat on the Board of Directors, an individual who meets the qualifications as specified in ~~these~~ Article III Section 3 of these ~~B~~bylaws may be appointed or elected to complete the director's unexpired term.

A. Two or Three Vacant Seats in the Same Network:

In the event more than one seat on the CSDA Board of Directors in any one network is vacant at the same time, such vacancies shall be filled by election. A written ballot shall be prepared; listing all nominees for that network accepted and approved by CSDA and distributed o each regular voting member in each such network either by first class mail or by electronic communication pursuant to the provisions of Article III, Section 4.A and B of these Bylaws

Regular members of each network shall be entitled to cast one vote for each open seat in that network by returning a completed written ballot to CSDA either by first class mail or by electronic communication. The candidate receiving the most votes will be elected to the vacant seat with the longest remaining term. The candidate receiving the second highest number of votes will be elected to fill the vacant seat with the second longest remaining term. The candidate receiving the third highest number of votes will be elected to fill the vacant position with the third longest remaining term.

B. Vacancy Outside of Nomination Period

In the event of a vacancy occurring outside of the nomination period timeframe, at the discretion of the CSDA Board, the vacancy may be filled by appointment or special election. The CSDA Board at its discretion may leave a vacancy that occurs outside of the nomination period unfilled until the next regularly scheduled election.

Should the CSDA Board choose to fill the vacancy by appointment, notification of the vacancy and request for nominations shall be sent by regular mail or electronic communication to all regular members in good standing in the network in which the vacancy occurred. The network's existing directors sitting on the CSDA Board shall interview all interested candidates of that network and bring a recommendation to the CSDA Board of Directors for consideration. The Board shall make the appointment to fill the unexpired term of the vacated Board position.

Should the CSDA Board choose to fill the vacancy by special election, written notification of the vacancy and request for nominations shall be sent either by first class mail or electronically to each regular member in good standing in the network in which the vacancy occurred. Nominations will be accepted for the vacant seat by first class mail or by electronic communication and shall be placed on the written ballot for election in that network. Such election shall be conducted pursuant to the provisions of Article III, Section 4.A and B hereof.

C. Vacancy During Nomination Period:

In the event of a vacancy occurring during the nomination period, the vacancy shall be filled by election. Written notification of the vacancy and request for nominations shall be sent either by first class mail or electronically to each regular member in the network

in which the vacancy occurred. Nominations will be accepted for the vacant seat by first class mail or by electronic communication and shall be placed on the written ballot for election in that network. Such election shall be conducted pursuant to the provisions of Article III, Section 4.A and B ~~hereof~~of these bylaws.

Section 7. Director Disqualification:

A. A director shall be~~come~~ disqualified from further service on the Board of Directors or any committee upon the occurrence of any of the following:

1. A director's district is no longer a member of CSDA;
2. A director is no longer a board member or an employee of a member district;
~~2.~~3. A director is no longer a board member or an managerial employee of a regular member district in the Network they were elected or appointed from;
~~3.~~4. A director is elected or appointed to the Board of Directors of the Special District Risk Management Authority (SDRMA) or
~~4.~~5. A director's resignation from CSDA.

Any officer or director may resign at any time by giving written notice to the President or CEO. Any such resignation shall take effect at the date of the receipt of such notice or at any time specified therein.

B. The position of a director may be declared vacant by a majority vote of the CSDA Board of Directors when a director is unexcused and fails to attend three consecutive meetings of the Board or has not completed the Board Member requirements and expectations as outlined in policy.

Section 8. Powers of Directors:

Subject to the limitations of these Bylaws, the Articles of Incorporation, and the California General Nonprofit Corporation Law, all corporate powers of the CSDA shall be exercised by or under the authority of the Board of Directors.

Directors shall serve without compensation. However, they shall be allowed reasonable reimbursement for pre-approved expenses incurred in the performance of their duties as Directors.

Annual Report: The Board of Directors shall cause an annual report to be sent to the members within 120 days after the end CSDA's fiscal year. That report shall contain the following information, in appropriate detail:

- The assets and liabilities of CSDA as of the end of the fiscal year;
- The principal changes in assets and liabilities;
- CSDA's revenue or receipts, both unrestricted and restricted to particular purposes;
- CSDA's expenses or disbursements for both general and restricted purposes.

The CSDA Annual Financial Audit shall serve as the Annual Report of CSDA.

Section 9. No Dual Directorships:

During any period that CSDA is a participant in the Alliance Executive Council Memorandum of Understanding (MOU), the Board of Directors of CSDA shall appoint three (3) members of its board to serve as members of the Alliance Executive Council. No member of the Board of Directors of CSDA shall serve as a director on the board of SDRMA during the term of the MOU. In the event a director is elected to SDRMA, that director shall immediately be disqualified from further service on the Board of Directors of CSDA.

ARTICLE IV – DIRECTOR MEETINGS

Section 1. Place of Meetings:

Meetings of the Board of Directors shall be held in the state of California, at such places as the Board may determine. Directors may participate and have voting privileges remotely from other states and countries.

Section 2. Ratification Meeting:

Following the election of Directors, the Board shall hold a meeting at such time and place as determined by the Board for the purpose of ratifying the newly elected directors and to transact other business of CSDA.

Section 3. Organization Meeting:

After the ratification meeting, an organizational meeting of the Board shall be held at such time and place as determined by the Board for the purpose of electing the officers of the Board of Directors and the transaction of other business of CSDA.

Section 4. Planning Session:

As directed by the Board of Directors, a special Strategic Planning Meeting shall be held to review, evaluate, and update the plans, policies and activities related to the business interests of CSDA. Timing and intervals of the Strategic Planning Meeting shall be determined by the Board of Directors.

Section 5. Regular Meetings:

The dates of the regular meetings of the Board of Directors on an annual basis shall be ratified at the last Board meeting of the previous year. The meetings shall be held at such time and place as the Board may determine. The dates and places of the Board meetings shall be published in the CSDA's publications for the benefit of the members.

Section 6. Special Meetings:

A special meeting of the Board of Directors may be called for any purpose at any time by the President or by any group of 10 directors or as described in Article II, Section 6.B.

Such meetings may be held at any place designated by the Board of Directors. In the event directors are unable to personally attend the special meeting, teleconferencing means will be made available.

Notice of the time and place of special meetings shall be given personally to the ~~directors, or~~directors or sent by written or electronic communication. All written notices shall be sent at least ten days prior to the special meeting and electronic notices at least five days prior.

Section 7. Board of Directors Meeting Quorum:

A quorum of the Board of Directors for the purpose of transacting business of the CSDA shall consist of ten directors. A majority vote among at least ten directors present at a duly noticed meeting shall constitute action of the Board of Directors.

Section 8. Board Meetings by Telephone and Electronic Communications:

Any Board meeting may be held by conference telephone, use of web-based video communication software ~~video screen communication~~ or other electronic communications equipment. Participation in such a meeting under this Section shall constitute presence in person at the meeting if both of the following apply: (a) each Board member participating in the meeting can communicate concurrently with all other Board members; and (b) each member of the Board is provided a means of participating in all matters before the Board, including the capacity to propose or interpose an objection to a specific action to be taken by CSDA, and the capacity to vote on any proposal requiring action of the Board.

Section 9. Official Records:

All official records of the meetings of the CSDA shall be maintained at the principal business office of the CSDA or on official CSDA electronic file server(s).

ARTICLE V – OFFICERS

Section 1. Number and Selection:

The officers of CSDA shall be the President, Vice President, Secretary, Treasurer and the Immediate Past President. The officers shall be elected annually from the members of the Board of Directors without reference to networks. All officers shall be subordinate and responsible to the CSDA Board of Directors and shall serve without compensation.

Each officer shall hold office for the term of one year, or until resignation or disqualification.

The Board of Directors may appoint such other officers as the business of CSDA may require. Each of the appointed officers shall hold office for such period, have such authority, and perform such duties as are provided in these Bylaws or as the Board of Directors may determine.

Section 2. Duties of the President:

The President shall be the chief officer of the CSDA and shall, subject to the approval of the Board of Directors, give supervision and direction to the business and affairs of CSDA.

The President shall preside at all Board of Director and membership meetings. The President shall be an ex-officio member of all Standing Committees. The President shall appoint committee chairs and vice-chairs and members of the Standing Committees, subject to confirmation by the Board of Directors.

The President shall have the general powers, duties and management usually vested in the office of the president of a corporation. The President shall have such other powers and duties as may be prescribed by these Bylaws or by the vote of the Board of Directors.

Section 3. Duties of the Vice President:

In the absence of, or disability of the President, the Vice President shall perform all of the duties of the President. When so acting, the Vice President shall have all the powers of the President, and be subject to all the restrictions upon the President.

The Vice President shall be an ex-officio member of all of the Standing Committees.

Section 4. Duties of the Secretary:

The Secretary or a designee appointed by the Board of Directors shall give notice of meetings to the Board of Directors, and notices of meetings to the members as provided by these Bylaws.

The Secretary or designee shall record and keep all motions and resolutions of the Board. A record of all meetings of the Board and of the members shall be maintained. All written records of the Secretary shall be kept at the business office of CSDA.

A list of the membership of CSDA shall be maintained by the Secretary or such designee. Such record shall contain the name, address and type of membership, of each member. The date of membership shall be recorded, and in the event the membership ceases, the date of termination.

The Secretary or designee shall perform such other duties as may be required by law, by these Bylaws, or by the Board of Directors.

Section 5. Duties of the Treasurer:

The Treasurer or a designee appointed by the Board of Directors shall keep and maintain adequate and correct accounts of the properties and the business transactions of CSDA, including accounts of its assets, liabilities, receipts, disbursements, gains and losses. The books of account shall at all times be open to inspection by any director or member of the CSDA.

The Treasurer or designee shall be responsible to cause the deposit of all moneys of the CSDA, and other valuables in the name and to the credit of CSDA, with such depositories as may be designated by the Board of Directors.

The Treasurer or designee, shall disburse, or cause to be disbursed by persons as authorized by resolution of the Board of Directors, the funds of CSDA, as ordered by the Board of Directors.

The Treasurer or designee shall serve as chair of the CSDA Fiscal Committee. The Treasurer shall render to the President and the Board of Directors an account of all financial transactions and the financial condition of CSDA at each Board meeting and on an annual basis, or upon request of the Board.

The Treasurer or designee shall, after the close of the fiscal year of CSDA, cause an annual audit of the financial condition of CSDA to be done.

The Treasurer or such designee shall perform such other duties as may be required by law, by these Bylaws, or by the Board of Directors.

Section 6. Disbursement of Funds:

No funds shall be disbursed by CSDA unless a check, draft or other evidence of such disbursement has been executed on behalf of CSDA by persons authorized by resolution of the Board of Directors.

Section 7. Removal of Officers:

Officers of the Board may be removed with or without cause at any meeting of the Board of Directors by the affirmative vote of a majority of the Board of Directors present at such meeting.

ARTICLE VI – COMMITTEES

Section 1. Committee Structure:

Each committee shall have a chair and a vice-chair. Committee chairs shall be a member of the Board of Directors, except for the CSDA Finance Corporation Committee. Committee Vice-Chairs may be individuals from Regular Member districts in good standing upon appointment by the CSDA Board President and ratification by the CSDA Board of Directors. Each committee shall have at least two Board members and no more than nine Board members. Directors may be appointed as alternate members of a committee, in the event of an absent committee member.

Other members of any committee may include designees of regular, associate or Business Affiliate members.

Section 2. Committee Actions:

All actions of any committee of the CSDA shall be governed by and taken in accordance with the provisions of these Bylaws. All committees shall serve at the pleasure of the Board and have such authority as provided by the Board of Directors. Minutes of each committee meeting shall be ~~kept~~ maintained and each committee shall present a report to the Board of Directors at each regularly scheduled Board meeting.

No committee may take any final action on any matter that, under these Bylaws, or under the California Nonprofit Public Benefit Corporation Law, also requires approval of the members of the CSDA.

All committees, regardless of Board resolution, are restricted from any of the following actions as imposed by the California Nonprofit Public Benefit Corporation Law:

- No committee may fill vacancies on the Board of Directors or on any committee that has authority of the Board, establish any other committees of the Board, or appoint the members of the committees of the Board.

- No committee may fix compensation of the directors for serving on the Board or on any committee, expend corporate funds to support a nominee for director, or approve any contract or transaction to which CSDA is a party and in which one or more of its directors has a material financial interest.

- No committee may amend or repeal Bylaws or adopt new Bylaws or amend or repeal any resolution of the Board that by its express terms is not subject to amendment or repeal.

Section 3. Committee Meetings:

Meetings of the committees of CSDA shall be held in accordance with the provisions of these Bylaws. The time and place for regular meetings of such committees may be determined by the Board or by such committees. Special meetings of the committees may be called by the chair of such committee, or by the Board of Directors.

Written notice of any regular or special committee meeting may be given either personally, by first class mail, or by electronic transmission as specified in Article II, Section 6.C.2 of these Bylaws. Any committee meeting may also be held by conference telephone, use of web-based video communication software~~web conference~~ or other electronic communication equipment. Participation in such a meeting under this Section shall constitute presence in person at the committee meeting if both of the following apply: (a) each committee member participating in the meeting can communicate concurrently with all other committee members; and (b) each member of the committee is provided a means of participating in all matters before the committee, including the capacity to propose or interpose an objection to a specific action to be taken by that committee, and the capacity to vote on any proposal requiring action or recommendation by the committee.

Section 4. Standing Committees:

Standing Committees of CSDA shall be advisory in nature except for the Finance Corporation (see Section 4D). The Standing Committees are: Executive, Professional Development, Elections and Bylaw, Finance Corporation, Fiscal, Legislative, Member Services and Audit.

The President shall recommend the appointment of committee officers and members of each Standing Committee except the Executive Committee. All committee members are subject to ratification by the Board of Directors.

A. Executive Committee:

The Executive Committee shall consist of all officers of CSDA: the President, Vice President, Secretary, Treasurer and the Immediate Past President of CSDA. If the Immediate Past President is no longer a member of the Board of Directors, a previous past president may be appointed. If there are no directors who have served previously as President, the President shall appoint a current director to serve as a member of the Executive Committee.

Subject to these Bylaws and approval of the Board of Directors, the Executive Committee shall have full power, authority and responsibility for the operation and function of the CSDA.

B. Professional Development Committee:

The Professional Development Committee shall provide advice, feedback and general guidance for CSDA professional development programs and events.

C. Election and Bylaws Committee:

The Election and Bylaws Committee shall be responsible for conducting all elections for the CSDA Board of Directors as provided in these Bylaws. The Committee shall annually review the Bylaws and shall be responsible for membership vote on any bylaw changes and approval of election materials.

D. Finance Corporation Committee:

The Finance Corporation Committee shall serve as ex officio members of the Board of Directors of the CSDA Finance Corporation, a California non-profit public benefit corporation organized to provide financial assistance to CSDA members in acquiring, constructing and financing various public facilities and equipment for the use and benefit of the public. The Finance Corporation Committee is not an advisory committee, but rather has all of the powers described in the CSDA Finance Corporation Bylaws, which are incorporated herein by this reference. Such powers include the powers to manage and control the business affairs of the corporation, to approve policies for the corporation's operations, and to enter into all contracts necessary to provide financial assistance to CSDA members.

E. Fiscal Committee:

The Treasurer shall serve as the chair of the Fiscal Committee and shall, with the Committee, be responsible for oversight of all the financial transactions of the CSDA. An annual budget shall be reviewed by the committee and ratified by the Board of Directors.

F. Legislative Committee:

The Legislative Committee shall be responsible for the development of CSDA's legislative agenda and advocacy priorities. The Legislative Committee shall review, direct and assist the CSDA Advocacy and Public Affairs Department with legislative and public policy issues.

G. Member Services Committee:

The Member Services Committee shall be responsible for recruitment and retention activities as well as recommendation of new members and benefits to the CSDA Board of Directors. All new members shall be ratified by the Board of Directors.

H. Audit Committee:

The Audit Committee is responsible for maintaining and updating internal controls. The Committee selects the Auditor for Board of Directors approval and provides guidance to the auditors on possible audit and fraud risks. The Committee reviews the audit and management letter and makes recommendation to the Board of Directors for action.

Section 5. Ad Hoc Committees:

The President may appoint other Ad Hoc Committees and their officers as may be determined necessary for the proper operation of the CSDA. The Standing Committees and the Ad Hoc Committees shall plan and authorize such programs as may be directed by the Board of Directors.

The Ad Hoc Committees shall be advisory in nature and shall be composed of at least two members of the Board of Directors. Other members of such committees may include designees of regular, associate or professional members, or members of the public, as approved by the Board of Directors.

Section 6. Special Committee of the Board:

A Special Committee may be granted authority of the Board as a Committee of the Board, as required by the California Nonprofit Public Benefit Corporation Law, provided by a specific resolution adopted by a majority of the Board of Directors then in office. In such case, the Special Committee shall be composed exclusively of two or more directors, but less than a quorum of the Board of Directors.

ARTICLE VII – INDEMNIFICATION

Section 1. Right of Indemnity:

To the fullest extent permitted by law, the CSDA shall defend, indemnify and hold harmless both its past and present directors, officers, employees and other persons described in Section 5238(a) of the California Corporations Code, against any and all actions, expenses, fines, judgments, claims, liabilities, settlements and other amounts reasonably incurred by them in connection with any "proceeding", as that term is used in the Section 5238(a) of the California Corporations Code.

"Expenses", as used in these Bylaws, shall have the same meaning as in Section 5238(a) of the California Corporations Code.

Section 2. Approval of Indemnity:

On written request to the Board by any person seeking indemnification under Section 5238(b) or Section 5238(c) of the California Corporations Code, the Board shall promptly determine under Section 5238(e) of the California Corporations code whether the applicable standard of conduct set forth in Section 5238(b) or Section 5238(c) has been met, and if so, the Board shall authorize indemnification.

If the Board cannot authorize indemnification because the number of directors who are parties to the proceeding with respect to which indemnification is sought prevents the formation of a quorum of directors who are not parties to that proceeding, the Board shall promptly call a meeting of the members.

At the request for indemnification meeting, the members shall determine under Section 5238(e) of the California Corporations Code whether the applicable standard or conduct set forth in Section 5238(b) or Section 5238(c) has been met, and, if so, the members present at the meeting in person or by proxy shall authorize indemnification.

Section 3. Insurance:

CSDA shall have the right to purchase and maintain insurance to the full extent permitted by law, on behalf of its officers, directors, employees, and agents, against any liability asserted against or incurred by any officer, director, employee or agent in such capacity, or arising out of the officer's, director's, employee's, or agent's status as such.

Section 4. Liability:

No member, individual, director, or staff member of the CSDA shall be personally liable to the CSDA's creditors, or for any indebtedness or liability. Any and all creditors shall look only to the CSDA's assets for payment.

ARTICLE VIII – AFFILIATED CHAPTERS

Section 1. Purpose:

The purpose of affiliated chapters is to provide local forums of members for the discussion, consideration and interchange of ideas concerning matters relating to the purposes and powers of special districts and the CSDA.

The affiliated chapters may meet to discuss issues bearing upon special districts and the CSDA. The chapters may make recommendations to the CSDA's Board of Directors.

Section 2. Organization:

The regular voting members of CSDA are encouraged to create and establish affiliated chapters. In order to be recognized as a CSDA Chapter, each Chapter must approve and execute a Chapter Affiliation Agreement in order to obtain the right to use the CSDA name, logo, membership mailing list, intellectual property, endorsements, and CSDA staff support and technical assistance in conducting Chapter activities. The terms and conditions of the Chapter Affiliation Agreement are incorporated herein by this reference.

Each chapter formed prior to August 1, 2011 must have at least one CSDA member in their membership at all times, including but not limited to the following chapters: Alameda, Butte, Contra Costa, Kern, Marin, Monterey, Orange (ISDOC), Placer, Sacramento, San Bernardino, San Diego, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara and Ventura. Such existing chapters may include as members: local organizations and businesses, districts and professionals who are not members of CSDA.

New chapters formed after August 1, 2011, are required to have 100 percent of their special district members as current members of CSDA in order to be a chapter affiliate of CSDA. Such chapters may include as members: local organizations/businesses and professionals who are not members of CSDA.

Affiliated chapters shall be determined upon approval and execution of the Chapter Affiliation Agreement by the chapter and approval and ratification of the Chapter Affiliation Agreement by the CSDA Board of Directors. The chapters shall be required to provide updated membership lists to the CSDA at least annually or upon request by the President or CEO.

No partnership or joint venture shall be established between CSDA and its affiliated chapters by reason of the provisions of these Bylaws or the Chapter Affiliation Agreement.

Section 3. Rules, Regulations and Meetings:

Each affiliated chapter shall adopt such rules and regulations, meeting place and times as the membership of such affiliated chapter may decide by majority vote. Rules and regulations of the affiliated chapter shall not be inconsistent with the Articles of Incorporation or Bylaws of CSDA.

Section 4. Financing of Affiliated Chapters:

No part of CSDA's funds shall be used for the operation of the affiliate chapters. CSDA is not responsible for the debts, obligations, acts or omissions of the affiliate chapters.

Section 5. Legislative Program Participation:

Affiliate chapters may function as a forum regarding federal, state and local legislative issues. The chapters may assist CSDA in the distribution of information to their members.

ARTICLE IX – AMENDMENTS TO THE BYLAWS

Section 1. Amendment Proposals:

Any regular voting member in good standing may propose changes to these Bylaws. The proposed amendments shall be reviewed by the Board of Directors and submitted to the Election and Bylaws Committee for their study.

After examination by the Election and Bylaws Committee and upon approval by the Board of Directors the amendment proposals may be submitted for vote at the Annual Business meeting of the members held by CSDA, at a specially called meeting, or by mail or electronic ballot.

Section 2. Amendment Membership Meeting:

Prior notice in writing of the proposed amendments to these Bylaws shall be given either by first class mail or by electronic transmission by the Board of Directors to the regular voting members in good standing, not later than 45 days in advance of the amendment meeting pursuant to the provisions of Article II, Section 6.C of these Bylaws. The electronic notice shall include copies of the proposed amendments.

Electronic copies of the proposed amendments shall also be available on the CSDA website for review by the regular voting members prior to the meeting. Copies of the proposed amendments shall also be available for the regular voting members at the amendment membership meeting.

The amendment membership meeting may be conducted as an electronic meeting pursuant to the provisions of Article II, Section 6.D of these Bylaws.

Section 3. Written Bylaw Amendment Ballot:

The Board of Directors of CSDA may submit Bylaw amendments for approval of regular voting members by mail or electronic ballot rather than by means of an amendment membership meeting.

When a written ballot is used to amend these Bylaws, the ballot shall include the text of all proposed Bylaw amendments the Board of Directors intends to present for vote by the members. Such written ballot shall contain the information specified in Article II, Section 6.F of these Bylaws and shall be distributed to regular voting members either by first class mail or by electronic transmission at least 45 days in advance of the date designated for return of the ballot.

Written ballots shall be returned either by first class mail or by electronic communication to either the principal business address of CSDA or CSDA's designated electronic format specified on the ballot prior to the close of business (5:00 pm) on the designated election date. Written ballots received either by first class mail or electronic communication after the specified date shall not be counted and will be deemed invalid.

Section 4. Bylaw Amendment Ratification:

A. Membership Meeting:

The proposed Bylaw amendments shall be deemed adopted by the members when the number of votes cast by regular voting members present at such membership meeting meets or exceeds the required quorum of 25 regular voting members, and the number of votes cast approving the Bylaw amendments constitutes a majority of votes cast, i.e., 50% plus one of regular voting members casting ballots at such meeting.

B. Mail or Electronic Ballot:

The proposed Bylaw amendment/s shall be deemed adopted by a majority of the regular voting members by mail or electronic ballot when the provisions of Article II, Section 6.H of these Bylaws have been satisfied.


California Special Districts Association
DISTRICT NETWORKS
CSDA
Northern Network
Sierra Network
Bay Area Network
Central Network
Coastal Network
Southern Network
Del Norte
Siskiyou
Modoc
Humboldt
Trinity
Shasta
Lassen
Tehama
Plumas
Mendocino
Glenn
Butte
Sierra
Colusa
Nevada
Yuba
Placer
Lake
Sutter
Yolo
El Dorado
Alpine
Sonoma
Napa
Sac.
Amador
Solano
Calaveras
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
Alameda
Stanislaus
Mariposa
Santa Clara
Merced
Madera
Santa Cruz
San Benito
Fresno
Inyo
Monterey
Kings
Tulare
San Luis Obispo
Kern
San Bernardino
Santa Barbara
Ventura
Los Angeles
Orange
Riverside
San Diego
Imperial

Item No. 2

ACTION ITEM
November 20, 2024

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Seckel, Yoo Schneider, Dick)

Harvey De La Torre, General Manager

Staff Contact: Heather Baez, Director of Governmental Affairs

SUBJECT: **AUTHORIZATION TO VOTE ON BEHALF OF MWDOC ON THE ASSOCIATION OF CALIFORNIA WATER AGENCIES (ACWA) PROPOSED AMENDED AND RESTATED BYLAWS**

STAFF RECOMMENDATION

Staff recommends that the Board of Directors:

- Review the ACWA's proposed bylaw amendments; and
- Authorize staff to submit a Voter Designation and Information Form to ACWA as required no later than Monday, November 25; and
- Authorize MWDOC's Board President Bob McVicker (or his designee), and an alternate, to cast the District's ballot at ACWA's Fall Conference on December 4, 2024.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

At the Association of California Water Agencies (ACWA) 2024 Fall Conference & Expo a membership meeting will be held to conduct a vote by the membership on proposed amended and restated Bylaws of ACWA. The in-person meeting will be held on **Wednesday, December 4 at 1:30 p.m.** at the Main Stage in the Springs Ballroom F & G at the JW Marriott Desert Springs Resort & Spa, Palm Desert.

Budgeted: ☒ Yes ☐ No	Budgeted amount: n/a	Core: ☒	Choice: ☐
Action item amount: n/a	Movement between funds: ☐ Yes ☒ No		

Each member agency is entitled to one vote that will be cast by its authorized voting representative. Member agencies must designate their voting representative and alternate by submitting the attached Voting Representative Form by **Monday, November 25.**

Proposed Amended and Restated Bylaws

As part of ongoing efforts to ensure ACWA's Bylaws are current, ACWA staff are proposing several amendments to the Bylaws for consideration by the membership, as recommended by the ACWA Board of Directors at its meeting on September 20, 2024.

ACWA staff worked with its general counsel, Joshua Nelson, to prepare the proposed amendments, which include the following changes:

- Amendments to clarify language and to reflect consistency with other governance documents, daily operations, and practices.
- Amendments to clarify the role of the Council of Past Presidents as it relates to participation in Board and Executive Committee meetings as non-voting representatives.
- Amendments to clarify the Past Presidents' eligibility to serve on ACWA's Election Committee.
- Amendments to clarify language pertaining to ACWA's voting and written ballots processes.

Refer to the linked table describing each proposed bylaw amendment along with the rationale for change. Redline (linked) and clean (linked) versions of the proposed Amended and Restated Bylaws are also available.

Redline and clean versions of these amendments are attached.

Voting Process

Consistent with ACWA's Bylaws, Article 9, Section 5:

- Each member of the Association shall be entitled to one vote that shall be cast by its authorized representative.
- Voters must be present at the membership meeting to vote.

ACWA will be using a voting system called Live-Tally, which will allow voters to vote using a handheld keypad.

- Member agencies must indicate their voting representative and alternate on the attached Voter Designation & Information Form as well as provide all the information identified on the form for ACWA to facilitate all aspects of the membership meeting and voting processes.

ALIGNMENT WITH BOARD STRATEGIC PRIORITIES

- ☒ *Clarifying MWDOC's mission and role; defining functions and actions.*
- ☐ *Balance support for Metropolitan's regional mission and Orange County values and interests.*
- ☐ *Strengthen communications and coordination of messaging.*
- ☐ *Work with member agencies to develop water supply and demand objectives.*
- ☐ *Solicit input and feedback from member agencies.*
- ☐ *Invest in workforce development and succession planning.*

BOARD OPTIONS

Option #1: Staff recommends that the Board of Directors:

- Review the ACWA's proposed bylaw amendments; and
- Authorize staff to submit a Voter Designation and Information Form to ACWA as required no later than Monday, November 25; and
- Authorize MWDOC's Board President Bob McVicker (or his designee), and an alternate, to cast the District's ballot at ACWA's Fall Conference on December 4, 2024.

Fiscal Impact: None

Option #2: Take no action

Fiscal Impact: None

List of Attachments/Links:

Attachment 1: Authorized Voting Representative Form

Attachment 2: Proposed Amendments to ACWA's Bylaws Table

Attachment 3: Proposed Amended and Restated Bylaws (redline version)

Attachment 4: Proposed Amended and Restated Bylaws (clean version)

Link 1: www.acwa.com/wp-content/uploads/2024/10/Proposed-Amendments-to-Bylaws-Table_GSMM_2024-09-20.pdf

Link 2: www.acwa.com/wp-content/uploads/2024/10/2022-11-30_ACWA-Bylaws_GSMM_2024-09-20_redline.pdf

Link 3: www.acwa.com/wp-content/uploads/2024/10/2022-11-30_ACWA-Bylaws_GSMM_2024-09-20_clean.pdf

ACWA
Association of California Water Agencies

2024 ACWA MEMBERSHIP MEETING

AUTHORIZED VOTING REPRESENTATIVE FORM

There will be a Membership Meeting at ACWA's 2024 Fall Conference & Expo.

Date & Time: December 4, 2024, 1:30 p.m.
Location: JW Marriott Desert Springs Resort & Spa, Palm Desert
Main Stage in the Springs Ballroom F & G

The purpose of the meeting is to conduct a vote by the membership on proposed Amended and Restated Bylaws of the Association of California Water Agencies as recommended by the Board of Directors at it meeting on September 20, 2024.

As set forth in Board Policy 2.8.1.5, each authorized voting representative has the responsibility to do the following in order to vote:

- Pick up handheld keypad or other designated voting mechanism prior to the start time of the membership meeting as specified in the meeting notice.
- Be physically present and inside the meeting room at the start of the membership meeting as specified on the meeting agenda.

Pick up Voting Keypad and Ask Questions

ACWA staff will be at the **Membership Meeting Check-In Desk** on **Wednesday, December 4, from 9:00 a.m. to noon.** to answer questions about the membership meeting and voting process. Voters must sign in during this time to pick up their voting keypads. *Note: If you do not have your keypad by noon., you will not be able to vote, consistent with established Board Policy 2.8.1.5.*

The person designated below will attend the Membership Meeting on December 4 as our voting representative. An alternate has also been identified as a backup voter in the event one is needed.

Member Agency's Name		Agency's Phone No.
Authorized Voting Representative's **Name**	Authorized Voting Representative's **Email**	Authorized Voting Representative's **Phone No.**
Alternate Authorized Voting Representative's **Name**	Alternate Authorized Voting Representative's **Email**	Alternate Authorized Voting Representative's **Phone No.**

☐ Member acknowledges that this information has been communicated to their authorized voting representative.

Print Name of Member Agency's Authorized Signatory

Date

X

Authorized Signatory Signature

SUBMIT YOUR FORM

To: Donna Pangborn, Senior Clerk of the Board
Email: donnap@acwa.com
Fax: 916-669-2425

SUBMISSION DEADLINE
NOVEMBER 25, 2024

Amendment 1: ARTICLE 3, Officers

Current Bylaw	Proposed Bylaw	Rationale
Section 3.01. (c) Vice President. The vice president shall, in the absence of the president, assume all of the duties of that office and, if a vacancy occurs, succeed thereto for the unexpired term. The vice president shall sit as a member of the Executive Committee of the ACWA Joint Powers Insurance Authority and shall perform such other duties as assigned by the president.	Section 3.01. (c) Vice President. The vice president shall, in the absence of the president, assume all of the duties of that office and, if a vacancy occurs, succeed thereto for the unexpired term. The vice president shall sit as a member of the Executive Committee of the ACWA Joint Powers Insurance Authority and shall perform such other duties as assigned by the president. The vice president shall be a non-voting, *ex officio* member of each committee, but shall not be an *ex officio* member of the Election Committee or the region boards. The vice president may be expelled from office with or without cause, upon the satisfaction of the following two events: (1) a two-thirds vote of the Board of Directors; and (2) a subsequent simple majority vote of the members of the Association during a meeting of the membership.	Amendment to add these provisions to the Vice President position, similar to Section 3.01(b) to provide procedural consistency to the two Board Officer positions.

Note: Green text throughout this document reflects edits recommended by the Legal Affairs Committee (LAC) Workgroup in response to its review and analysis of the proposed amendments to the Bylaws, consistent with Section 9.09 of ACWA's Bylaws. The ACWA Board included the LAC Workgroup's recommended edits as part of its recommendation to the members.

Amendment 2: ARTICLE 4, Board of Directors

Current Bylaw	Proposed Bylaw	Rationale
Section 4.07. Quorum. At any meeting of the Board of Directors, the attendance of 50 percent of the voting members of the Board of Directors, or their permitted alternates as specified in these bylaws, shall constitute a quorum for the transaction of any business. The Board may hold a closed session for discussion of personnel matters or enforcement of violations of the code of conduct.	**Section 4.07. Quorum.** At any meeting of the Board of Directors, the attendance of 50 percent of the voting members of the Board of Directors, or their permitted alternates as specified in these bylaws, shall constitute a quorum for the transaction of any business. The Board may hold a closed session for discussion of personnel matters~~,~~; ~~or~~ enforcement of violations of the code of conduct~~,~~; pending or anticipated litigation or other legal matters, including, but not limited to, considering whether to file or join in an amicus brief; real property negotiations and discussions~~,~~; and other confidential matters as determined by the Board to the extent permitted by applicable law. (See Board Policy 2.1.8.3.)	Amendment to clarify the scope of issues that can be addressed by the Board in closed session.

Amendment 3, ARTICLE 3, Board of Directors

Current Bylaw	Proposed Bylaw	Rationale
Section 4.12. Code of Conduct of Board Members. (a) **Code of Conduct Purpose and Adoption.** The Board of Directors shall establish, and update as appropriate, a code of conduct for its Directors that recognizes the Association's commitment of integrity, respect, and fair representation to its members and the public they serve and establishes minimum ethical standards for the performance of the duties of office. The code shall be consistent with the procedural processes contained in this section. The code shall be distributed to all new Directors and shall be distributed annually to all members of the Association.	**Section 4.12. Code of Conduct of Board Members.** (a) **Code of Conduct Purpose and Adoption.** The Board of Directors shall establish, and update as appropriate, a code of conduct for its Directors that recognizes the Association's commitment of integrity, respect, and fair representation to its members and the public they serve and establishes minimum ethical standards for the performance of the duties of office. ~~The code shall be consistent with the procedural processes contained in this section.~~ (See Code of Conduct Policy, Board Policy Manual, Policy No. GO-2.1A). The code shall be consistent with the procedural processes contained in the Code of Conduct Policy (See sections 2.1.3A and 2.1.4A of Policy No. GO-2.1A of the Board Policy Manual.) The code shall be distributed to all new Directors and shall be distributed annually to all members of the Association.	Amendment to reflect consistency with recently adopted Board Policy GO-2.1A Code of Code and to delete reference to the Legal Affairs Committee Chair in Section 4.12(b). Amendment reflects deletion to this text to be less prescriptive due to the details in Board Policy GO-2.1A.

Amendment 3 (cont'd), ARTICLE 3, Board of Directors

Current Bylaw	Proposed Bylaw	Rationale
Section 4.12. Code of Conduct of Board Members. (b) **Violations and Enforcement Process.** A violation of the code of conduct may result in removal, public censure, or private reprimand of a Director, or such other action as contained in the code of conduct. However, removal and public censure shall be reserved only for serious violations. A Director may not be removed or publicly censured absent an affirmative vote of two-thirds of the voting members of the Board of Directors. A Director may be privately reprimanded for a violation of the code of conduct upon the majority vote of the quorum. Complaints of violation of the code of conduct may be filed with the president, or the vice-president if the allegations are made against the president. The president may refer a complaint of violation to the executive director/secretary for investigation. The executive director/secretary may retain a special investigator or special counsel to conduct or assist the investigation. A Director accused of a violation shall be provided a	**Section 4.12. Code of Conduct of Board Members.** ~~(b) **Violation and Enforcement Process.** A violation of the code of conduct may result in removal, public censure, or private reprimand of a Director, or such other action as contained in the code of conduct. However, removal and public censure shall be reserved only for serious violations. A Director may not be removed or publicly censured absent an affirmative vote of two-thirds of the voting members of the Board of Directors. A Director may be privately reprimanded for a violation of the code of conduct upon the majority vote of the quorum. Complaints of violation of the code of conduct may be filed with the president, or the vice-president if the allegations are made against the president. The president may refer a complaint of violation to the executive director/secretary for investigation. The executive director/secretary may retain a special investigator or special counsel to conduct or assist the investigation. A Director accused of a violation shall be provided a~~	Amendment to reflect consistency with recently adopted Board Policy GO-2.1A Code of Code and to delete reference to the Legal Affairs Committee Chair in Section 4.12(b). Amendment reflects deletion to this text to be less prescriptive due to the details in Board Policy GO-2.1A.

Amendment 4, Article 6, Executive Committee

Current Bylaw	Proposed Bylaw	Rationale
Section 6.02 Powers. **Personnel.** (a) Subject to the budget adopted by the Board of Directors, the Executive Committee shall perform the following personnel actions: (1) recommend compensation for the executive director/secretary to the Board of Directors for approval; (2) perform annual reviews of the executive director/secretary and submit that review to the Board of Directors; (3) review and approve the classification and compensation plan and publicly posted salary schedule for Association employees submitted by the executive director/secretary, which shall be reviewable by the Board of Directors, in closed session, upon request of the Board of Directors; . . .	**Section 6.02 Powers.** **Personnel.** (a) Subject to the budget adopted by the Board of Directors, the Executive Committee shall perform the following personnel actions: (1) recommend compensation for the executive director/secretary to the Board of Directors for approval; (2) perform annual reviews of the executive director/secretary and submit that review to the Board of Directors; (3) review ~~and approve~~ the classification and compensation plan and publicly posted salary schedule for Association employees submitted by the executive director/secretary, which shall be ~~reviewable~~ approved by the Board of Directors~~, in closed session, upon request of the Board of Directors~~; . . .	Amendment to clarify that the ACWA Board is the approving authority for the public salary schedule, as required by CalPERS. The Executive Committee will review and make a recommendation to the Board.

Amendment 5, ARTICLE 8, Special Council, Committees, and Task Forces

Current Bylaw	Proposed Bylaw	Rationale
Section 8.01 Council of Past Presidents. There shall be a Council of Past Presidents composed of all past presidents of the Association who serve on the council until each is no longer able to or wishes to serve. The council shall provide a mechanism for past presidents to continue to make valuable contributions to the Association. With approval of the Board of Directors, the president and/or executive director/secretary may assign specific responsibilities to the council from time to time. Members of the Council of Past Presidents are invited to attend and participate in the Association's Board meetings.	**Section 8.01 Council of Past Presidents.** There shall be a Council of Past Presidents composed of all past presidents of the Association who serve on the council until each is no longer able to or wishes to serve. The council shall provide a mechanism for past presidents to continue to make valuable contributions to the Association. With approval of the Board of Directors, the president and/or executive director/secretary may assign specific responsibilities to the council from time to time. Members of the Council of Past Presidents are invited to attend and participate in the Association's Board and Executive Committee meetings, including attending closed sessions. With the exception of the immediate past president, members of the Council of Past Presidents are non-voting.	Amendment to clarify that Past Presidents are non-voting representatives on ACWA's Board and Executive Committee with the ability to participate in the full range of activities, including closed session.

Amendment 6, ARTICLE 8, Special Council, Committees, and Task Forces

Current Bylaw	Proposed Bylaw	Rationale
Section 8.02 Election Committee. **(b) Qualification.** In order to serve on the Election Committee, an individual must be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Where an individual ceases to meet these criteria during the election cycle, the individual may not continue to serve. When the disqualified member represented a Region Board, the affected Region Board shall select a replacement representative. When the disqualified member represented the President, the President shall select an alternate representative.	**Section 8.02 Election Committee.** **Qualification.** In order to serve on the Election Committee, an individual must be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Past presidents, who are Honorary Life Members of the Association, may also serve on the Election Committee without meeting stated qualifications unless otherwise disqualified. Where an individual ceases to meet these criteria during the election cycle, the individual may not continue to serve. When the disqualified member represented a Region Board, the affected Region Board shall select a replacement representative. When the disqualified member represented the President, the President shall select an alternate representative.	Amendment to allow unaffiliated Past Presidents to serve on the Election Committee without meeting the stated criteria since they are Honorary Life Members of the Association.

Amendment 7, ARTICLE 9, Meetings of Members

Current Bylaw	Proposed Bylaw	Rationale
Section 9.06 Voting. Each member of the Association in good standing at the time of the annual or special meeting shall be entitled to one vote that shall be cast by its authorized representative. Each member must designate its authorized representative prior to the annual or special meeting. It is the member's responsibility to designate or update its authorized representative as needed. The Association may confirm with any member the identify of that member's authorized representative for the purpose of casting ballots in any election of president and vice president. All questions, except amendments or revisions of these bylaws, shall be determined by a majority of the members present and voting. A roll call may be requested by any authorized representative.	**Section 9.06 Voting.** Each member of the Association in good standing at the time of the annual or special meeting shall be entitled to one vote that shall be cast by its authorized representative. Each member must designate its authorized representative prior to the annual or special meeting. It is the member's responsibility to designate or update its authorized representative as needed. The Association may confirm with any member the identity of that member's authorized representative for the purpose of casting ballots in any election of president and vice president, amendments to these Bylaws, or other Association business that requires a vote. All questions, except amendments or revisions of these bylaws, shall be determined by a majority of the members present and voting. A roll call may be requested by any authorized representative.	Amendment to expand this language to cover additional actions where an authorized representative will need to be confirmed for the purposes of casting a ballot (see newly added Section 9.15).

Amendment 8, ARTICLE 9, Meetings of Members

Current Bylaw	Proposed Bylaw	Rationale
Section 9.08 Quorums. The presence of the authorized representative of 50 members of the Association at any meeting of the members shall constitute a quorum for transacting business. Written ballots timely received from the authorized representative of 50 members shall constitute a quorum for elections of president and vice president.	**Section 9.08 Quorum~~s~~.** The presence of the authorized representatives of at least 50 members of the Association at any meeting of the members shall constitute a quorum for transacting business. ~~Written ballots timely received from the authorized representative of 50 members shall constitute a quorum for elections of president and vice president.~~ Actions taken by written ballot shall require the timely receipt of the written ballot from the authorized representatives of at least 50 members to constitute a quorum.	Amendment to clarify the written ballot quorum language to cover other actions besides the elections of president and vice president (see newly added Section 9.15)

Amendment 9, ARTICLE 9, Meetings of Members

Current Bylaw	Proposed Bylaw	Rationale
Section 9.11. Election of President and Vice President. Each member of the Association in good standing at the time a vote is cast is entitled to one vote for election of the president and vice president that shall be cast by its authorized representative by written ballot. The ballot and any related material may be sent by first class, registered, or certified mail or electronic transmission by the Corporation that meets the requirements of Corporations Code section 20, and responses may be returned to the Corporation by mail or electronic transmission. On any written ballot for the election of president or vice president, an authorized representative acting on behalf of the member may write in a qualified candidate for election.	**Section 9.11. Election of President and Vice President.** Each member of the Association in good standing at the time a vote is cast is entitled to one vote for election of the president and vice president that shall be cast by its authorized representative by written ballot. The ballot and any related material may be sent by first class, registered, or certified mail or electronic transmission by the Corporation that meets the requirements of Corporations Code section 20, and responses may be returned to the Corporation by mail or electronic transmission. On any written ballot for the election of president or vice president, an authorized representative acting on behalf of the member may write in a qualified candidate for election. Nominating resolutions for write-in candidates must be received by the deadline for the return of ballots.	Amendment to clarify that write-in candidates for president or vice presidents must submit a nominating resolution by the election deadline since they did not go through the Election Committee review process.

Amendment 10, ARTICLE 9, Meeting of Members

Current Bylaw	Proposed Bylaw	Rationale
	Newly Added Section. **Section 9.15. Action by Written Ballot.** To the extent permitted by applicable law and subject to all applicable requirements, any action that may be taken at a regular or special member meeting of the members may be approved by written ballot if a ballot is sent to each member entitled to vote on the matter. Ballots may be sent and returned by electronic transmission as permitted in the Corporations Code. Ballot format, solicitation and voting thresholds shall meet the requirements of the Corporations Code and be consistent with applicable provisions of these Bylaws.	Amendment to allow the flexibility to take action by written ballot beyond the currently approved process of electing the president and vice president by written ballot.

Amendment 11, Article 11, Definitions

Current Bylaw	Proposed Bylaw	Rationale
Section 11.04. Definitions. As used in these bylaws, the term "notice provided by electronic means" shall refer to notice given by fax or e-mail.	**Section 11.04. Definitions**. As used in the ~~b~~Bylaws, the terms "electronic transmission" and "notice provided by electronic means" shall refer to notice and other communications given by fax or email.	Amendment to add "electronic transmission," to clarify the meaning of this term in Section 9.15 and to harmonize this term with currently accepted means of providing notice.
	Newly Added Section. **Section 11.05. Conflicts Between Bylaws and Other Association Policies.** To the extent permitted by applicable law, these Bylaws shall govern in the event there is a conflict between these Bylaws and another Association policy, rule, or procedure.	Amendment to clarify that ACWA's Bylaws govern in the event there is a conflict with another Association policy, rule, or procedure.

Amendment 12, VARIOUS, References to ACWA

Current Bylaw	Proposed Bylaw	Rationale
Cleanup amendments:	Change the reference to ACWA to Association in the following Bylaws: Section 5.02 Officers (a) Section 7.01 Qualification. Section 7.05 Agriculture Committee Section 5.02 Officers (a): Delete reference to ACWA before Board of Directors.	Amendment to change references to ACWA to Association to provide consistency throughout the document.



PROPOSED AMENDED AND RESTATED BYLAWS of the Association of California Water Agencies

Amended and restated by the ACWA Members: November 30, 2022

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(As amended and restated by the Members on November 30, 2022)

ARTICLE 1 - General

Section 1.01. Name. The name of this California nonprofit corporation shall be the Association of California Water Agencies (hereinafter referred to as the Association).

Section 1.02. Principal Office. The principal office for the transaction of business of the Association shall be located in Sacramento, California.

Section 1.03. Purposes. The purposes of the Association shall be to work together with its members and others for the best interests of California and its citizens and landowners who use, need and depend upon water; to encourage the orderly development of the waters of the state; to seek means of obtaining and making available to all of California a dependable water supply of the best possible quality at the lowest possible cost, giving due consideration to environmental factors involved therein; to provide inspiration and leadership in meeting and solving the water supply problems of this state; to propose and advocate such policies and measures—local, state and federal—that serve the best interests of the Association, opposing those of contrary nature; to assist in promoting the health, safety and welfare of the employees of its members; and to do all other things that are in the best interests of its members.

ARTICLE 2 – Membership and Dues

Section 2.01. Membership.

(a) Members. Only a public district, public agency, or public organization created and operated for the purpose of controlling, treating, developing, acquiring, using or supplying water for any purpose for inhabitants or lands within the state of California, or for the protection, drainage or reclamation of lands within the state of California, may become a member of the Association. Such an entity will become a member upon written application, approval by the Board of Directors, and the payment of the required dues. Acceptance to membership shall authorize full participation in Association activities. Except as otherwise provided in Section 2.01(b) below, in no case may an organization other than a state, a political subdivision (as defined in § 1.103-1(b) of the Income Tax Regulations) of a state or an entity the income of which is excluded from gross income under § 115 of the Internal Revenue Code be a member of the Association. A member of the Association shall be in good standing if in compliance with all bylaws and requirements of membership, including timely payment of annual dues and emergency assessments.

(b) Honorary Life Members. Any person who has rendered conspicuous service in furthering the purposes of the Association may, by vote of the Board of Directors, be granted an honorary life membership in the Association without payment of dues or assessments. All past presidents of the Association shall automatically be honorary life members without vote of the Board of Directors. Honorary life members shall not be entitled to a vote or to hold office automatically because of their status as honorary life members.

(c) Termination of Members. Membership shall cease upon the failure of any member to pay the dues provided for in Section 2.02 of this Article. The membership of any member may be terminated at any time by such member sending written notification of its intention to withdraw to the Association's principal office. The Board of Directors may terminate the membership of any member upon 30 days' written notice by first-class mail when it is determined at any regular Board meeting or at any special Board meeting called for that purpose that continuance of such membership would not be in the best interests of the Association. Withdrawal or termination of membership ends any participation in Association activities and shall terminate a member's interest in the Association's assets.

Section 2.02. Dues. The annual dues of each member of the Association shall be established by the Board of Directors; provided, however, that any member may apply for a change in its dues because of conditions that differentiate such applicant from other members.

Section 2.03. Liability of Members. No member shall be liable for any obligation incurred by the Association with the following exception: (1) the payment of the annual dues while it remains a member;

and (2) the payment of emergency assessments, which shall not exceed 10 percent of current annual dues for each member in any calendar year while it remains a member. No emergency assessment may be levied against any member during its first two years of membership in the Association.

ARTICLE 3 - Officers

Section 3.01. President and Vice President.

(a) **General.** The president and vice president of the Association shall be the elected officers of the Association. At the time of their election the president and vice president shall each be an elected or appointed member of the governing body or commission (as appropriate) of a member agency of the Association. The president and vice president shall be elected by the members of the Association by written ballot in each odd-numbered year before the Association's annual meeting, shall be announced at the Association's annual meeting, shall take office on January 1 of the calendar year following election, and shall hold office until such time as their successors take office or are appointed. An elected president shall not be permitted to succeed himself/herself to that office. Except as provided in this Article, should vacancies occur in either office of the president or vice president, the Board of Directors shall appoint persons to fill such offices for the unexpired terms thereof.

(b) **President.** The president shall preside at all meetings of the Board of Directors, the Executive Committee, and the general membership; shall appoint members of all committees, including the chair and vice chair of each, upon recommendation from members and regions (as communicated by the region chairs), with each such committee chair and vice chair ratified by the Board of Directors; and shall perform all other duties necessary to carry out the functions of the office. The president shall be a non-voting, *ex officio* member of each committee, but shall not be an *ex officio* member of the Election Committee or the region boards.

The president may be expelled from office with or without cause, upon the satisfaction of the following two events: (1) a two-thirds vote of the Board of Directors; and (2) a subsequent simple majority vote of the members of the Association during a meeting of the membership.

~~(c)~~ **Vice President.** The vice president shall, in the absence of the president, assume all of the duties of that office and, if a vacancy occurs, succeed thereto for the unexpired term. The vice president shall sit as a member of the Executive Committee of the ACWA Joint Powers Insurance Authority and shall perform such other duties as assigned by the president. The vice president shall be a non-voting, *ex officio* member of each committee, but shall not be an *ex officio* member of the Election Committee or the region boards.

The vice president may be expelled from office with or without cause, upon the satisfaction of the following two events: (1) a two-thirds vote of the Board of Directors; and (2) a subsequent simple majority vote of the members of the Association during a meeting of the membership.

Section 3.02. Executive Director/Secretary and Controller/Treasurer.

(a) **General.** The executive director/secretary and controller/treasurer of the Association shall also be officers of the Association. The executive director/secretary shall be appointed by and hold office at the pleasure of the Board of Directors of the Association.

(b) **Executive Director/Secretary.** The executive director/secretary shall: (1) advise and assist the Board of Directors, all committees, the boards of each region, and the workgroups of each region; (2) be responsible for administering the total operations of the Association; (3) employ, direct, and release all employed staff in accordance with the policies adopted by the Board of Directors and consistent with the budget adopted by the Board of Directors; (4) provide relevant information to the Board of Directors needed by the Board to take actions; (5) give members notice and record minutes of all meetings of the membership, Board of Directors, and Executive Committee; and (6) have such other powers and perform such other duties as may be provided and assigned by the Board of Directors directly or through the president of the Board or the Executive Committee. The executive director/secretary, with the assistance of the controller/treasurer, shall render a report to the Board of Directors at the first meeting following the close of each calendar year showing the membership of the Association, the receipts and expenditures during the year, and the work accomplished during the previous year.

(c) **Controller/Treasurer.** The controller/treasurer shall report to and act under the direction of the executive director/secretary. The controller/treasurer shall be a signatory on all accounts held by the Association and shall act as a fiduciary for all assets of the Association.

ARTICLE 4 – Board of Directors

Section 4.01. **Membership.** The Board of Directors shall consist of:

(a) The Association president and vice president.

(b) The chair and vice chair of each region.

(c) The chair of each standing committee.

(d) The most immediate active past president.

(e) The vice president of the ACWA/Joint Powers Insurance Authority.

Section 4.02. Term of Office. The term of office of all members of the Board of Directors shall commence on January 1 of the calendar year following election of the president and vice president, except for those persons who serve on the Board of Directors by nature of their position as chairs of standing committees, whose terms shall instead commence upon their ratification by the Board of Directors. Except as provided in Article 4, Section 4.11, the term of office for all members of the Board of Directors shall terminate on December 31 of the following odd-numbered year two years later, or until their successors take office.

Section 4.03. Attendance Requirement. Any member of the Board of Directors who misses two consecutive regular Board meetings without being excused by the Board will no longer be a member of the Board of Directors.

Section 4.04. Regular Meetings. Regular meetings of the Board of Directors shall be held bimonthly at such times and places as the Board may determine.

Section 4.05. Special Meetings. Special meetings may be called by the president upon the president's own volition or shall be called by the president when requested in writing by five directors. Prior to conducting such a special meeting, the president shall consult with the Executive Committee to ensure that adequate information is available to the Board of Directors for any necessary decisions; and where such meeting is called upon the president's own volition, the president shall also consult with the Executive Committee as to the necessity of the special meeting. Notice for special meetings shall be provided in the following manner: (1) upon 10 days' written notice sent by mail to each director and addressed to each at the address as shown upon the records of the Association; or (2) upon 48 hours' notice with notice provided by electronic means. When the meeting is called upon the president's own volition, the president shall choose the form of notice; when the meeting is called by a request of five directors, the five directors shall choose the form of notice and the president shall promptly call the meeting. No business except those items described in the notice shall be transacted at any special meeting, except by consent of three-fourths of the members of the Board of Directors present.

Section 4.06. Meetings by Electronic Communication. Any meeting of the Board of Directors, region boards, or any committee may be conducted, in whole or in part, by telephone, electronic transmission, or by electronic video screen communication. A member of the Board of Directors, a region board, or any committee shall be deemed present in person at the meeting if the following apply:

(a) Each director, region board, or committee member participating in the meeting can communicate concurrently with all other directors, region board, or committee members.

(b) Each director, region board or, committee member is provided the means of participating in all matters before the board, region board, or committee, including the capacity to propose, or to interpose an objection to, a specific action to be taken by the Association.

Section 4.07. Quorum. At any meeting of the Board of Directors, the attendance of 50 percent of the voting members of the Board of Directors, or their permitted alternates as specified in these bylaws, shall

constitute a quorum for the transaction of any business. The Board may hold a closed session for discussion of personnel matters~~,~~; ~~or~~ enforcement of violations of the code of conduct~~,~~; pending or anticipated litigation or other legal matters, including, but not limited to, considering whether to file or join in an amicus brief; real property negotiations and discussions~~,~~; and other confidential matters as determined by the Board to the extent permitted by applicable law. (See Board Policy 2.1.8.3.)

Section 4.08. Alternates. Each region shall designate an alternate for each chair and vice chair, who shall meet the qualification requirements for chair and vice chair, to act at meetings of the Board of Directors when the chair or vice chair is unable to attend. The vice chair of each standing committee will be the alternate to act at meetings of the Board of Directors when the standing committee chair is unable to attend. An alternate may not act or vote on behalf of more than one member of the Board of Directors. A member of the Board of Directors may not act as an alternate for any other member.

Section 4.09. Vacancies for Standing Committee Chairs and Vice Chairs. Should a vacancy occur in the office of any standing committee chair or vice chair before the end of the term, the president shall appoint a new committee chair or vice chair to fulfill the unexpired term of such committee chair or vice chair subject to ratification by the Board of Directors. A vacancy in the office of any such standing committee chair or vice chair as described in the previous sentence shall be deemed to exist when the chair or vice chair: (1) resigns the office; (2) no longer is an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member; or (3) is otherwise removed by a member agency of the Association.

Section 4.10. Duties, Authorities, and Delegation. Subject to the provisions and limitations of California Nonprofit Corporation Law, other applicable laws, and the provisions of these bylaws, the Association's activities and affairs are to be exercised by or under the direction of the Association's Board of Directors. The Board of Directors is responsible for the overall supervision, control, and direction of the Association. The Board of Directors shall: (1) employ and release the executive director/secretary; (2) set performance expectations for the executive director/secretary; (3) receive, review, and consider approval of executive director/secretary recommended compensation, other terms and conditions of employment, and annual evaluations as prepared by the Executive Committee; (4) annually adopt a budget; and (5) set the level of dues for the Association. Except as to the duties listed in the previous sentence, and subject to Article 3, Section 2, the Board of Directors may delegate the supervision, control, and direction of the Association's affairs to any person or group, including a committee, provided the Association Board retains ultimate responsibility for the actions of such person or group. Where such powers are delegated, the delegation shall be documented in writing.

Section 4.11. Immediate Past President. The immediate past president automatically assumes this position after serving as the Association's elected president and is a voting member of the Board of Directors and Executive Committee. The term of office for the immediate past president shall commence on January 1 of the calendar year following election of the president and vice president and shall terminate on December 31 of the following odd-numbered year two years later. In the event the most

immediate active past president is unavailable to serve, the most recent and available active past president in succession shall serve in this capacity.

Section 4.12. Code of Conduct of Board Members.

~~(a)~~ ~~**Code of Conduct: Purpose and Adoption.**~~ The Board of Directors shall establish, and update as appropriate, a code of conduct for its Directors that recognizes the Association's commitment of integrity, respect, and fair representation to its members and the public they serve and establishes minimum ethical standards for the performance of the duties of office. ~~The code shall be consistent with the procedural processes contained in this section.~~ (See Code of Conduct Policy, Board Policy Manual, Policy No. GO-2.1A.) The code shall be consistent with the procedural processes contained in the Code of Conduct Policy. (See sections 2.1.3A and 2.1.4A of Policy GO-2.1A of the Board Policy Manual.) The code shall be distributed to all new Directors and shall be distributed annually to all members of the Association.

~~(b) **Violations and Enforcement Process.** A violation of the code of conduct may result in removal, public censure, or private reprimand of a Director, or such other action as contained in the code of conduct. However, removal and public censure shall be reserved only for serious violations. A Director may not be removed or publically censured absent an affirmative vote of two-thirds of the voting members of the Board of Directors. A Director may be privately reprimanded for a violation of the code of conduct upon the majority vote of the quorum. Complaints of violation of the code of conduct may be filed with the president, or the vice-president if the allegations are made against the president. The president may refer a complaint of violation to the executive director/secretary for investigation. The executive director/secretary may retain a special investigator or special counsel to conduct or assist the investigation. A Director accused of a violation shall be provided a copy of the complaint. A Director that takes any hostile or retaliatory action, directly or indirectly, against a complainant is subject to removal from the Board in conformance with the process identified above. Prior to scheduling a Board action on a complaint, the president shall consult with the Executive Committee and the chair of the Legal Affairs Committee. A Director accused of a violation of the code of conduct shall be provided at least 15 days' written notice of any meeting of the Board at which a determination of enforcement will be considered. A determination of enforcement may be made only at a regular meeting of the Board and shall be made in closed session. The determinations of the Board under this section shall not be admissible in any criminal or civil proceeding brought against the Director for conduct that violates any other law.~~

ARTICLE 5 – Regions

Section 5.01. Boundaries of Each Region.

(a) There shall be a maximum of 10 regions within the state. The Board of Directors shall determine the regional boundaries. Insofar as is practicable, the regions shall have a numerical balance in members of the Association; make geographic sense; and promote regional problem solving.

(b) A member of the Association may file a written petition to the Board of Directors requesting a change in regions. Such petition shall set forth the reasons for such requested change. The Board shall, within a reasonable time, act upon such petition and set forth the reasons for its action. Such action by the Board shall be based on factors in Section 5.01(a) above, as well as others deemed by the Board of Directors to be relevant to the decision.

Section 5.02. Officers.

(a) The officers of each region shall be a chair and vice chair and three to five region board members who shall be elected by the region in each odd-numbered year. A region may maintain a board of fewer than five but not less than three members as provided in the region's rules and regulations. The officers of the region board shall take office on January 1 of the calendar year following election and shall hold office for two years, or until their successors take office. Regions shall hold elections by electronic ballot. ~~ACWA~~ Association staff shall verify the legitimacy of the ballots.

(b) The officers of each region shall: (1) exercise the powers and perform duties of the region during the interim between region meetings; and (2) make recommendations to the president regarding appointments to committees. The chair and vice chair shall be the region's representatives to the ~~ACWA~~ Board of Directors.

(c) Each officer of a region shall be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Where an individual ceases to meet these criteria during the term of the office, the individual may not serve during the remaining term of that office unless that individual can again meet the criteria for the office and is appointed to complete the term. The region board may adopt more stringent criteria for board member qualifications as part of the region's rules and regulations.

(d) Should a vacancy occur in any of the region board positions before the end of the term, the remaining members of the region board shall appoint a new member. A vacancy in the office of any region board position shall be deemed to exist when a region board

member: (1) resigns the office; (2) no longer is an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member of the Association to represent that member; or (3) is otherwise removed by a member agency of the Association.

Section 5.03. Nominating Committees. There shall be a nominating committee for each region consisting of three or more designees, each representing a member of the Association located within the region, appointed by the chair of the region and approved by the region board. Nominating committees shall be formed by February 28 of each odd-numbered year.

Section 5.04. Meetings. The meetings of each region shall be held at both the spring and fall conferences and at such other times and places as may be determined by the region chair. Representatives of five or more members of the Association from the region present at any region meeting shall constitute a quorum for purposes of conducting the business of the region. Any meeting, regular or special, may be held in person or by telephone conference, web video conference, or other electronic video screen communication or electronic transmission, as set forth in Section 4.06.

Section 5.05. Workgroups. Workgroups may be appointed by the region chair as needed.

Section 5.06. Rules. Each region shall organize and adopt rules and regulations for the conduct of its meetings and affairs not inconsistent with the Articles of Incorporation or bylaws of the Association. Each region shall abide by the code of conduct adopted by the Board of Directors of the Association.

ARTICLE 6 – Executive Committee

Section 6.01. Membership. There shall be an Executive Committee consisting of the following: the president of the Association, who shall be the chair thereof; the vice president; the most immediate active past president; the chair of the Finance Committee; and three at-large representatives selected from and by the members of the Board of Directors. The election of the three at-large representatives to the Executive Committee shall occur at the first Board of Directors meeting held in each even-numbered year and the elected representatives shall serve immediately following their election and until such time as their successors take office. To the extent practical, the Executive Committee should be constituted so as to reflect the geographic extent of the Association and the functions of the members of the Association.

Section 6.02. Powers. The Executive Committee shall have the following authority:

(a) Personnel. Subject to the budget adopted by the Board of Directors, the Executive Committee shall perform the following personnel actions: (1) recommend compensation for the executive director/secretary to the Board of Directors for approval; (2) perform annual reviews of the executive director/secretary and submit that review to the Board of Directors; (3) review ~~and approve~~ the classification and compensation plan and publicly posted salary schedule for Association employees submitted by the executive director/secretary, which shall be ~~reviewable~~ approved by the Board of Directors~~, in~~

~~closed session, upon request of the Board of Directors~~; (4) establish personnel policies for the conduct and behavior of employees, which shall be reviewable by the Board of Directors; and (5) undertake such other personnel actions as may be requested by the executive director/secretary in support of his or her oversight of all other personnel matters, which shall be reviewable by the Board of Directors, in closed session, upon request of the Board of Directors.

(b) **Delegation.** The Executive Committee may act pursuant to any authority specifically delegated to it by the Board of Directors. The delegation shall indicate whether the authority is still subject to the ultimate authority of the Board.

(c) **Authority to Act Between Meetings.** The Executive Committee may act for the Board of Directors between Board meetings when calling a special meeting of the Board of Directors is impracticable, provided that no such action of the Executive Committee shall be binding on the Board of Directors until authorized or approved by the Board. The Executive Committee has the authority to authorize actions recommended by the Legal Affairs Committee (such as the filing of letter briefs and amicus curiae briefs) by electronic means without the need for an in-person or telephonic meeting, but such actions shall be ratified by the Board of Directors at its next meeting.

Section 6.03. **Reporting.** The president, or any person designated by the president, shall report to the Board of Directors, at each regular Board meeting, any action taken by the Executive Committee since the last preceding regular Board meeting. The minutes of Executive Committee meetings, which at that time may still be in draft form, shall be mailed (using the U.S. Postal Service, express delivery, electronic means, or otherwise) to each member of the Board of Directors at least five days prior to Board meetings, except in cases in which the Executive Committee meets during or immediately prior to a conference of the Association or immediately prior to a Board meeting, in which case the minutes, which may still be in draft form, shall be mailed to each director promptly thereafter.

Section 6.04. **Meetings.** The Executive Committee shall hold regularly scheduled meetings as set by the president. Special meetings of the Executive Committee may be called by the president upon notice to the members of that committee or upon written request of three Executive Committee members. Notice for special Executive Committee meetings shall be provided to the entire Board: (1) upon five days' written notice sent by mail, or (2) upon 24 hours' notice with notice provided by electronic means; and all such meetings shall be open to the Board of Directors. Any meeting, regular or special, may be held in person or by telephone conference, web video conference, or other electronic video screen communication or electronic transmission, as set forth in Section 4.06. All members of the Board of Directors may attend any meeting of the Executive Committee. Meetings of the Executive Committee may be closed to others at the discretion of the president or committee. Only members of the Executive Committee are allowed to vote on matters at a meeting of the committee.

Section 6.05. **Minutes.** The minutes of the Executive Committee meetings shall be kept by the executive director/secretary at the Association's principal office. Actions of the Executive Committee shall

be reported to the Board of Directors as provided in Section 3 of this Article and shall be available to any member of the Board of Directors upon request to the executive director/secretary.

ARTICLE 7 – Standing Committees

Section 7.01. Qualification. In order to serve on any ~~ACWA~~ Association standing committee, an individual must be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Where an individual ceases to meet these criteria during the term of the appointment, the individual may not serve during the remaining term of that appointment unless that individual can again meet the criteria for appointment and is appointed to complete the term.

Section 7.02. Term of Office. The term of office of standing committee members shall be two years commencing on January 1 of each even-numbered year. The term of office of standing committee chairs and vice chairs shall be approximately two years and shall commence as soon after January 1 of the even-numbered year as they may be appointed by the president and ratified by the then-seated Board of Directors, and shall terminate on December 31 of the odd-numbered year approximately two years later or until their successors are appointed and ratified.

Section 7.03. Meetings. Meetings of standing committees may be called at such times and places designated by the respective chair thereof except where provided otherwise by these bylaws. Any meetings of standing committees may be conducted, in whole or in part, by electronic transmission or by electronic video screen communication, as set forth in Section 4.06. Subject to the provisions of these bylaws and any actions that may be taken by the Board of Directors, the chairs of each standing committee may establish their own rules for the efficient operation of the committee they each chair. The chairs of each standing committee are authorized to create subcommittees and workgroups in order to complete the work of the committee.

Section 7.04. Committee Composition. Each limited standing committee shall have a membership composition that is comprised of members in the quantity and with qualifications as defined by the provisions of these bylaws. The committee chair position shall not be included in the maximum count for determining the committee composition total of any given limited committee. The committee chair shall, however, be a voting member of their respective committees subject to the rules and procedures of each committee. If the chair is absent, the vice chair shall fill the role of the chair during such absence.

Section 7.05. Agriculture Committee. There shall be an Agriculture Committee whose duty it shall be to recommend Association policy, positions and programs to the Board of Directors, State Legislative Committee, Federal Affairs Committee or other committees, as appropriate, regarding agricultural issues affecting the interests of ~~ACWA~~ the Association and its members. The committee shall consist of at least one member from each region.

Section 7.06. Business Development Committee. There shall be a Business Development Committee whose duty it is to develop and recommend to the Board of Directors programs and activities to be

provided or administered by the Association that generate non-dues revenue and provide a service or benefit to member agencies. The committee shall consist of at least one member from each region and may include members from any of the other standing committees.

Section 7.07. Communications Committee. There shall be a Communications Committee whose duty it shall be to develop and make recommendations to the Board of Directors regarding a comprehensive internal and external communications program for the Association and to promote development of sound public information and education programs and practices among member agencies. The committee shall consist of no more than 40 members. The committee shall consist of at least one member from each region.

Section 7.08. Energy Committee. There shall be an Energy Committee whose duty it shall be to recommend policies and programs to the Board of Directors and to the State Legislative Committee and/or Federal Affairs Committee as appropriate. The committee shall consist of at least one member from each region.

Section 7.09. Federal Affairs Committee. There shall be a Federal Affairs Committee whose duty it shall be to review all federal legislative proposals and regulatory proposals affecting member agencies, after consulting with other appropriate committees, and to develop Association positions consistent with existing policy, where it has been established; recommend sponsorship of bills that will resolve problems or improve conditions for member agencies; and assist in the establishment of the Association's federal legislative program. The committee shall consist of at least one, but no more than five members from each region.

Section 7.10. Finance Committee. There shall be a Finance Committee whose duty it shall be to make recommendations to the Board of Directors regarding annual budgets, dues formula and schedules and other revenue-producing income, annual audit and selection of an auditor, and investment strategies. The committee shall consist of the president and vice president of the Association as *ex officio* members, either the chair or vice chair from each of the Association's 10 region boards, and one additional member from each region with experience in financial matters.

Section 7.11. Groundwater Committee. There shall be a Groundwater Committee whose duty it shall be to recommend policies and programs to the Board of Directors and to the State Legislative Committee and/or Federal Affairs Committee as appropriate. The committee shall consist of at least one member from each region.

Section 7.12. Legal Affairs Committee. There shall be a Legal Affairs Committee whose duty it shall be to support the mission of the Association, and more particularly to deal with requests for assistance involving legal matters of significance to member agencies, including but not limited to state and federal court litigation, water rights matters, selected regulatory and resources agency matters, proposed bylaw revisions, review of legislation as requested by the State Legislative Committee, etc. The committee shall consider matters and issues submitted to it in order to determine which ones are of major significance to the member agencies and, assuming a finding of major significance, recommend to the Board of Directors

the position(s) which the committee believes the Association should take with respect thereto. The committee shall be composed of between 34 and 44 attorneys, each of whom shall be a member of the California Bar and shall be, or act as, counsel for a member agency, representing diverse interests within the Association, including but not limited to, different geographical areas throughout the state, large and small agencies, agricultural and urban agencies, agencies created under the various enabling statutes, etc. The committee shall consist of at least one member from each region.

Section 7.13. Local Government Committee. There shall be a Local Government Committee whose duty it shall be to recommend policies to the State Legislative Committee, as appropriate, and Board of Directors on matters affecting water agencies as a segment of local government in California. The committee shall consist of at least one, but no more than three members from each region.

Section 7.14. Membership Committee. There shall be a Membership Committee whose duty it shall be to assist staff in developing membership recruitment and retention programs, make recommendations to the Board of Directors regarding membership policies, eligibility, and applications for membership and review and make recommendations to the Finance Committee regarding an equitable dues structure. The committee shall consist of at least one member from each region.

Section 7.15. State Legislative Committee. There shall be a State Legislative Committee whose duty it shall be to review all state legislative proposals affecting member agencies and to establish Association positions, consistent with existing policy, where it has been established; sponsor bills that will resolve problems or improve conditions for member agencies; and assist in the establishment of the Association's legislative program. The committee shall consist of members representing a variety of types of member agencies and at least one, but no more than four members from each region.

Section 7.16. Water Management Committee. There shall be a Water Management Committee whose duty it shall be to recommend policy and programs to the Board of Directors on any area of concern in water management. The committee shall consist of at least one, but no more than four members from each region.

Section 7.17. Water Quality Committee. There shall be a Water Quality Committee whose duty it shall be to develop and recommend Association policy, positions, and programs to the Board of Directors, to promote cost-effective state and federal water quality regulations that protect the public health, to enable interested member agencies to join together to develop and coordinate with other organizations, and to present unified comments regarding agricultural and domestic water quality regulations. The committee shall consist of at least one member from each region.

ARTICLE 8 – Special Councils, Committees, and Task Forces

Section 8.01. Council of Past Presidents. There shall be a Council of Past Presidents composed of all past presidents of the Association who serve on the council until each is no longer able to or wishes to serve. The council shall provide a mechanism for past presidents to continue to make valuable

contributions to the Association. With approval of the Board of Directors, the president and/or executive director/secretary may assign specific responsibilities to the council from time to time. Members of the Council of Past Presidents are invited to attend and participate in the Association's Board and Executive Committee meetings, including attending closed sessions. With the exception of the immediate past president, members of the Council of Past Presidents are non-voting.

Section 8.02. Election Committee. There shall be an Election Committee consisting of eleven representatives established by February 28 of each odd-numbered year, whose purpose shall be to present qualified individuals for the offices of president and vice president of the Association. The Election Committee shall vet all candidates to determine if the eligibility criteria have been met. The Election Committee will endorse a preferred candidate for president and vice president before presenting an open ballot with all qualifying candidates to the members for a vote in the manner set forth in Section 9.10 and Section 9.11.

(a) Selection. The Election Committee shall be selected in the following manner:

(1) Each of the 10 currently seated Region Boards in the odd-numbered year shall appoint a representative from their respective regions to serve on the Election Committee.

(2) One representative appointed by the president in the odd-numbered year shall also serve on the Election Committee. Neither the president nor the vice president qualifies to be appointed to this position.

(b) Qualification. In order to serve on the Election Committee, an individual must be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Past presidents, who are Honorary Life Members of the Association, may also serve on the Election Committee without meeting stated qualifications unless otherwise disqualified. Where an individual ceases to meet these criteria during the election cycle, the individual may not continue to serve. When the disqualified member represented a Region Board, the affected Region Board shall select a replacement representative. When the disqualified member represented the President, the President shall select an alternate representative.

Section 8.03. Other Committees and Task Forces. Other committees and task forces may be appointed by the president from time to time as needed, consistent with and supportive of the mission of the Association.

ARTICLE 9 – Meetings of Members

Section 9.01. Meetings. Meetings of the members of the Association shall be held at the Association's conferences to provide a report to the members on the Association's activities during the past year, provide an overview of the Association's finances, announce the newly elected president and vice president of the Association in each odd-numbered year, and to transact such other proper business as may come before the meeting.

Section 9.02. Special Meetings. Special meetings of the members of the Association may be called by the Board of Directors, the president of the Board of Directors, or by 5 percent or more of the members of the Association. Except when called by the Board, a request for a special meeting must be in writing and must be delivered in person or mailed by first-class mail addressed to the president of the Board at the principal office of the Association, with a copy to the executive director/secretary. The request must state the general nature of the business proposed to be transacted at the meeting.

A special meeting that has been called by written request of 5 percent of the member agencies of the Association to the Board of Directors shall be set by the Board of Directors on a date that is not less than 35 or more than 90 days after receipt of the request.

Section 9.03. Meetings by Remote Communication. Any meeting of the members may be conducted, in whole or in part, by electronic transmission by and to the Association or by electronic video screen communication. The member shall be deemed present in person at the meeting if the following apply:

(a) The Association implements reasonable measures to provide the member a reasonable opportunity to participate in the meeting and to vote on matters submitted to the members, including an opportunity to read or hear the proceedings of the meeting substantially concurrently with those proceedings.

(b) If any member votes or takes other action at the meeting by means of electronic transmission to the Association or electronic video screen communication, a record of that vote or action is maintained by the Association.

(c) The Association verifies that each person participating remotely is an authorized representative of a voting member.

Section 9.04. Notice Requirements for Membership Meetings. Written notice of any membership meeting shall be given to each voting member of the Association. The notice shall state the date, time, and place of the meeting; the means by which members may participate; and the general nature of the business to be transacted. The member notification information shall also be posted on the Association's website.

Except as otherwise provided in these bylaws or California law, a written notice of regular membership meetings shall be given not less than 10 or more than 90 days before the date of the meeting to each

member who, on the record date for notice of the meeting, is entitled to vote; provided, however, that if notice is given by mail, and the notice is not mailed by first-class, registered, or certified mail, that notice shall be given not less than 20 days before the meeting.

Section 9.05. Notice Requirements for Special Meetings. The executive director/secretary shall cause notice to be given to all members of the Association of the date, time, and place of the meeting and the general nature of the business to be transacted at the meeting. No business except that specified in the request and notice may be transacted at said special meeting. If notice of the requested special meeting is not given within 20 days after receipt of the request, the person or persons requesting the meeting may give the notice.

Section 9.06. Voting. Each member of the Association in good standing at the time of the annual or special meeting shall be entitled to one vote that shall be cast by its authorized representative. Each member must designate its authorized representative prior to the annual or special meeting. It is the member's responsibility to designate or update its authorized representative as needed. The Association may confirm with any member the identity of that member's authorized representative for the purpose of casting ballots in any election of president and vice president, amendments to these Bylaws, or other Association business that requires a vote. All questions, except amendments or revisions of these bylaws, shall be determined by a majority of the members present and voting. A roll call may be requested by any authorized representative.

Section 9.07. Amendment of Bylaws. These bylaws may be amended or revised by two-thirds of the member agencies of the Association present and voting at any meeting.

Section 9.08. Quorum~~s~~. The presence of the authorized representatives of at least 50 members of the Association at any meeting of the members shall constitute a quorum for transacting business. ~~Written ballots timely received from the authorized representative of 50 members shall constitute a quorum for elections of president and vice president.~~ Actions taken by written ballot shall require the timely receipt of the written ballot from the authorized representatives of at least 50 members to constitute a quorum.

Section 9.09. Amendments, Revisions, and Resolutions. Before any amendments or revisions to the bylaws, or resolutions, may be considered at any meeting of the Association, any such amendment, revision, or resolution shall be submitted to the executive director/secretary at least 90 days prior to the first day of such meeting. The executive director/secretary shall promptly distribute any proposed amendments or revisions to the Legal Affairs Committee for the Legal Affairs Committee to develop an unbiased analysis of the amendments or revisions. Following development of an analysis for the proposed amendments or revisions, the executive director/secretary shall distribute copies of any resolutions, amendments or revisions, including any applicable analyses, to all members of the Association not less than 10 days or more than 90 days prior to presentation at such meeting. The written notice of the membership meeting shall be given to each voting member of the Association consistent with the provisions defined in Section 9.04. The 90-day rule may be suspended at any meeting of the Association

by consent of three-fourths of the members present. Voting on resolutions, amendments, or revisions shall proceed as provided by Sections 9.06 and 9.07.

Section 9.10. Nomination of President and Vice President.

(a) Qualification. At the time of their election, the president and vice president of the Association shall each be an elected or appointed member of the governing body or commission (as appropriate) of a member agency of the Association.

(b) Nominating Resolutions. All nominations for the positions of president and vice president shall be accompanied by an official resolution from the Association member agency on whose board the nominee serves. Said resolution shall be signed by an authorized signatory of the member agency's Board of Directors.

Section 9.11. Election of President and Vice President. Each member of the Association in good standing at the time a vote is cast is entitled to one vote for election of the president and vice president that shall be cast by its authorized representative by written ballot. The ballot and any related material may be sent by first class, registered, or certified mail or electronic transmission by the Corporation that meets the requirements of Corporations Code section 20, and responses may be returned to the Corporation by mail or electronic transmission. On any written ballot for the election of president or vice president, an authorized representative acting on behalf of the member may write in a qualified candidate for election. Nominating resolutions for write-in candidates must be received by the deadline for the return of ballots.

Section 9.12. Write-In Candidates. If a write-in candidate prevails in any election for president or vice president, such individual shall not be officially elected into such position until the Election Committee confirms that the individual meets the eligibility criteria and qualifications requirements.

Section 9.13. Run-off Election for President and Vice President. In the event a nominee does not receive a majority of the votes for president or vice president, a run-off election shall be held for the office or offices for which a majority of the votes have not been received. The run-off election shall only involve the nominees who received the two highest amounts of votes. The run-off election shall be conducted in the same manner as the initial election.

Section 9.14. Additional Procedures for Election of President and Vice President. The Board shall have the authority to adopt policies for elections ("Election Policy") of president and vice president setting forth the details for the election of such positions when not otherwise contrary to or covered by these bylaws.

~~Section 9.14.~~Section 9.15. **Action by Written Ballot.** To the extent permitted by applicable law and subject to all applicable requirements, any action that may be taken at a regular or special member meeting of the members may be approved by written ballot if a ballot is sent to each member entitled to vote on the matter. If approved by the Board, ballots may be sent and returned by electronic transmission

as permitted in the Corporations Code. Ballot format, solicitation and voting thresholds shall meet the requirements of the Corporations Code and be consistent with applicable provisions of these Bylaws.

ARTICLE 10 –Indemnification of Directors, Officers, and Other Agents

Section 10.01. Right of Indemnity. To the fullest extent permitted by law, this Corporation shall indemnify its Directors, Officers, employees, and other persons described in Section 7237(a) of the California Corporations Code, including persons formerly occupying any such position, against all expenses, judgments, fines, settlements and other amounts actually and reasonably incurred by them in connection with any "proceeding," as that term is used in that Section, and including an action by or in the right of the Corporation, by reason of the fact that the person is or was a person described in that section. "Expenses," as used in this bylaw, shall have the same meaning as in Section 7237(a) of the California Corporations Code.

Section 10.02. Approval of Indemnity. On written request to the Board by any person seeking indemnification under Section 7237(b) or Section 7237(c) of the California Corporations Code, the Board shall promptly determine under Section 7237(e) of the California Corporations Code whether the applicable standard of conduct set forth in Section 7237(b) or Section 7237(c) has been met and, if so, the Board shall authorize indemnification.

Section 10.03. Advancement of Expenses. To the fullest extent permitted by law and except as otherwise determined by the Board in a specific instance, expenses incurred by a person seeking indemnification under these bylaws in defending any proceeding covered by those Sections shall be advanced by the Corporation before final disposition of the proceeding, on receipt by the Corporation of an undertaking by or on behalf of that person that the advance will be repaid unless it is ultimately determined that the person is entitled to be indemnified by the Corporation for those expenses.

Section 10.04. Insurance. The Corporation shall have the right to purchase and maintain insurance to the full extent permitted by law on behalf of its Officers, Directors, employees, and other agents, against any liability asserted against or incurred by any officer, director, employee, or agent in such capacity or arising out of the officer's, director's, employee's or agent's status as such.

ARTICLE 11 - Miscellaneous

Section 11.01. Conduct of Meetings. All meetings of the Association shall be conducted in accord with the code of conduct and in substantial accordance with the latest edition of Robert's Rules of Order Newly Revised unless the Board adopts alternate rules of conduct for itself and/or its committees, region boards, and region workgroups.

Section 11.02. Funds. The funds of the Association shall be used to further the aims and purposes of this Association. They shall be kept by the controller/treasurer and paid out by checks or other electronic means, which shall only be valid with two authorized signatures. The Board of Directors shall designate

by resolution which persons, other than the controller/treasurer, may sign for expenditures. The Finance Committee shall implement procedures to ensure necessary internal controls over the receipt and expenditures of Association funds and arrange for an external audit. Audit reports shall be presented to the Board of Directors.

Section 11.03. Disposition of Assets upon Dissolution. The Association's properties and assets are irrevocably dedicated to the fulfillment of the Association's purposes as described in Article 2 of the Articles of Incorporation. No part of the Association's net earnings, properties and assets, on dissolution or otherwise, may inure to the benefit of any private person. Upon the dissolution of the Association, all debts thereof shall be paid and its affairs settled, and all remaining assets shall be distributed to the Association's member political subdivisions for a public purpose, consistent with the provisions of the California Nonprofit Corporation Law relating to mutual benefit corporations then in effect and with the Articles of Incorporation.

Section 11.04. Definitions. As used in these ~~b~~Bylaws, the terms "electronic transmission" and "notice provided by electronic means" shall refer to notice and other communications given by fax or e-mail.

~~Section 11.04.~~Section 11.05. **Conflicts Between Bylaws and Other Association Policies.** To the extent permitted by applicable law, these Bylaws shall govern in the event there is a conflict between these Bylaws and another Association policy, rule, or procedure.

Amended comprehensively December 1, 2010
Amended May 9, 2012
Amended May 7, 2014
Amended December 2, 2015
Amended November 29, 2017
Amended & Restated November 30, 2022



AMENDED AND RESTATED BYLAWS of the Association of California Water Agencies

Amended and restated by the ACWA Members: November 30, 2022

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(As amended and restated by the Members on November 30, 2022)

ARTICLE 1 - General

Section 1.01. Name. The name of this California nonprofit corporation shall be the Association of California Water Agencies (hereinafter referred to as the Association).

Section 1.02. Principal Office. The principal office for the transaction of business of the Association shall be located in Sacramento, California.

Section 1.03. Purposes. The purposes of the Association shall be to work together with its members and others for the best interests of California and its citizens and landowners who use, need and depend upon water; to encourage the orderly development of the waters of the state; to seek means of obtaining and making available to all of California a dependable water supply of the best possible quality at the lowest possible cost, giving due consideration to environmental factors involved therein; to provide inspiration and leadership in meeting and solving the water supply problems of this state; to propose and advocate such policies and measures—local, state and federal—that serve the best interests of the Association, opposing those of contrary nature; to assist in promoting the health, safety and welfare of the employees of its members; and to do all other things that are in the best interests of its members.

ARTICLE 2 – Membership and Dues

Section 2.01. Membership.

(a) Members. Only a public district, public agency, or public organization created and operated for the purpose of controlling, treating, developing, acquiring, using or supplying water for any purpose for inhabitants or lands within the state of California, or for the protection, drainage or reclamation of lands within the state of California, may become a member of the Association. Such an entity will become a member upon written application, approval by the Board of Directors, and the payment of the required dues. Acceptance to membership shall authorize full participation in Association activities. Except as otherwise provided in Section 2.01(b) below, in no case may an organization other than a state, a political subdivision (as defined in § 1.103-1(b) of the Income Tax Regulations) of a state or an entity the income of which is excluded from gross income under § 115 of the Internal Revenue Code be a member of the Association. A member of the Association shall be in good standing if in compliance with all bylaws and requirements of membership, including timely payment of annual dues and emergency assessments.

(b) Honorary Life Members. Any person who has rendered conspicuous service in furthering the purposes of the Association may, by vote of the Board of Directors, be granted an honorary life membership in the Association without payment of dues or assessments. All past presidents of the Association shall automatically be honorary life members without vote of the Board of Directors. Honorary life members shall not be entitled to a vote or to hold office automatically because of their status as honorary life members.

(c) Termination of Members. Membership shall cease upon the failure of any member to pay the dues provided for in Section 2.02 of this Article. The membership of any member may be terminated at any time by such member sending written notification of its intention to withdraw to the Association's principal office. The Board of Directors may terminate the membership of any member upon 30 days' written notice by first-class mail when it is determined at any regular Board meeting or at any special Board meeting called for that purpose that continuance of such membership would not be in the best interests of the Association. Withdrawal or termination of membership ends any participation in Association activities and shall terminate a member's interest in the Association's assets.

Section 2.02. Dues. The annual dues of each member of the Association shall be established by the Board of Directors; provided, however, that any member may apply for a change in its dues because of conditions that differentiate such applicant from other members.

Section 2.03. Liability of Members. No member shall be liable for any obligation incurred by the Association with the following exception: (1) the payment of the annual dues while it remains a member;

and (2) the payment of emergency assessments, which shall not exceed 10 percent of current annual dues for each member in any calendar year while it remains a member. No emergency assessment may be levied against any member during its first two years of membership in the Association.

ARTICLE 3 - Officers

Section 3.01. President and Vice President.

(a) **General.** The president and vice president of the Association shall be the elected officers of the Association. At the time of their election the president and vice president shall each be an elected or appointed member of the governing body or commission (as appropriate) of a member agency of the Association. The president and vice president shall be elected by the members of the Association by written ballot in each odd-numbered year before the Association's annual meeting, shall be announced at the Association's annual meeting, shall take office on January 1 of the calendar year following election, and shall hold office until such time as their successors take office or are appointed. An elected president shall not be permitted to succeed himself/herself to that office. Except as provided in this Article, should vacancies occur in either office of the president or vice president, the Board of Directors shall appoint persons to fill such offices for the unexpired terms thereof.

(b) **President.** The president shall preside at all meetings of the Board of Directors, the Executive Committee, and the general membership; shall appoint members of all committees, including the chair and vice chair of each, upon recommendation from members and regions (as communicated by the region chairs), with each such committee chair and vice chair ratified by the Board of Directors; and shall perform all other duties necessary to carry out the functions of the office. The president shall be a non-voting, *ex officio* member of each committee, but shall not be an *ex officio* member of the Election Committee or the region boards.

The president may be expelled from office with or without cause, upon the satisfaction of the following two events: (1) a two-thirds vote of the Board of Directors; and (2) a subsequent simple majority vote of the members of the Association during a meeting of the membership.

(c) **Vice President.** The vice president shall, in the absence of the president, assume all of the duties of that office and, if a vacancy occurs, succeed thereto for the unexpired term. The vice president shall sit as a member of the Executive Committee of the ACWA Joint Powers Insurance Authority and shall perform such other duties as assigned by the president. The vice president shall be a non-voting, *ex officio* member of each committee, but shall not be an *ex officio* member of the Election Committee or the region boards.

The vice president may be expelled from office with or without cause, upon the satisfaction of the following two events: (1) a two-thirds vote of the Board of Directors; and (2) a subsequent simple majority vote of the members of the Association during a meeting of the membership.

Section 3.02. Executive Director/Secretary and Controller/Treasurer.

(a) **General.** The executive director/secretary and controller/treasurer of the Association shall also be officers of the Association. The executive director/secretary shall be appointed by and hold office at the pleasure of the Board of Directors of the Association.

(b) **Executive Director/Secretary.** The executive director/secretary shall: (1) advise and assist the Board of Directors, all committees, the boards of each region, and the workgroups of each region; (2) be responsible for administering the total operations of the Association; (3) employ, direct, and release all employed staff in accordance with the policies adopted by the Board of Directors and consistent with the budget adopted by the Board of Directors; (4) provide relevant information to the Board of Directors needed by the Board to take actions; (5) give members notice and record minutes of all meetings of the membership, Board of Directors, and Executive Committee; and (6) have such other powers and perform such other duties as may be provided and assigned by the Board of Directors directly or through the president of the Board or the Executive Committee. The executive director/secretary, with the assistance of the controller/treasurer, shall render a report to the Board of Directors at the first meeting following the close of each calendar year showing the membership of the Association, the receipts and expenditures during the year, and the work accomplished during the previous year.

(c) **Controller/Treasurer.** The controller/treasurer shall report to and act under the direction of the executive director/secretary. The controller/treasurer shall be a signatory on all accounts held by the Association and shall act as a fiduciary for all assets of the Association.

ARTICLE 4 – Board of Directors

Section 4.01. **Membership.** The Board of Directors shall consist of:

(a) The Association president and vice president.

(b) The chair and vice chair of each region.

(c) The chair of each standing committee.

(d) The most immediate active past president.

(e) The vice president of the ACWA/Joint Powers Insurance Authority.

Section 4.02. Term of Office. The term of office of all members of the Board of Directors shall commence on January 1 of the calendar year following election of the president and vice president, except for those persons who serve on the Board of Directors by nature of their position as chairs of standing committees, whose terms shall instead commence upon their ratification by the Board of Directors. Except as provided in Article 4, Section 4.11, the term of office for all members of the Board of Directors shall terminate on December 31 of the following odd-numbered year two years later, or until their successors take office.

Section 4.03. Attendance Requirement. Any member of the Board of Directors who misses two consecutive regular Board meetings without being excused by the Board will no longer be a member of the Board of Directors.

Section 4.04. Regular Meetings. Regular meetings of the Board of Directors shall be held bimonthly at such times and places as the Board may determine.

Section 4.05. Special Meetings. Special meetings may be called by the president upon the president's own volition or shall be called by the president when requested in writing by five directors. Prior to conducting such a special meeting, the president shall consult with the Executive Committee to ensure that adequate information is available to the Board of Directors for any necessary decisions; and where such meeting is called upon the president's own volition, the president shall also consult with the Executive Committee as to the necessity of the special meeting. Notice for special meetings shall be provided in the following manner: (1) upon 10 days' written notice sent by mail to each director and addressed to each at the address as shown upon the records of the Association; or (2) upon 48 hours' notice with notice provided by electronic means. When the meeting is called upon the president's own volition, the president shall choose the form of notice; when the meeting is called by a request of five directors, the five directors shall choose the form of notice and the president shall promptly call the meeting. No business except those items described in the notice shall be transacted at any special meeting, except by consent of three-fourths of the members of the Board of Directors present.

Section 4.06. Meetings by Electronic Communication. Any meeting of the Board of Directors, region boards, or any committee may be conducted, in whole or in part, by telephone, electronic transmission, or by electronic video screen communication. A member of the Board of Directors, a region board, or any committee shall be deemed present in person at the meeting if the following apply:

(a) Each director, region board, or committee member participating in the meeting can communicate concurrently with all other directors, region board, or committee members.

(b) Each director, region board or, committee member is provided the means of participating in all matters before the board, region board, or committee, including the capacity to propose, or to interpose an objection to, a specific action to be taken by the Association.

Section 4.07. Quorum. At any meeting of the Board of Directors, the attendance of 50 percent of the voting members of the Board of Directors, or their permitted alternates as specified in these bylaws, shall

constitute a quorum for the transaction of any business. The Board may hold a closed session for discussion of personnel matters; enforcement of violations of the code of conduct; pending or anticipated litigation or other legal matters, including, but not limited to, considering whether to file or join in an amicus brief; real property negotiations and discussions; and other confidential matters as determined by the Board to the extent permitted by applicable law. (See Board Policy 2.1.8.3.)

Section 4.08. Alternates. Each region shall designate an alternate for each chair and vice chair, who shall meet the qualification requirements for chair and vice chair, to act at meetings of the Board of Directors when the chair or vice chair is unable to attend. The vice chair of each standing committee will be the alternate to act at meetings of the Board of Directors when the standing committee chair is unable to attend. An alternate may not act or vote on behalf of more than one member of the Board of Directors. A member of the Board of Directors may not act as an alternate for any other member.

Section 4.09. Vacancies for Standing Committee Chairs and Vice Chairs. Should a vacancy occur in the office of any standing committee chair or vice chair before the end of the term, the president shall appoint a new committee chair or vice chair to fulfill the unexpired term of such committee chair or vice chair subject to ratification by the Board of Directors. A vacancy in the office of any such standing committee chair or vice chair as described in the previous sentence shall be deemed to exist when the chair or vice chair: (1) resigns the office; (2) no longer is an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member; or (3) is otherwise removed by a member agency of the Association.

Section 4.10. Duties, Authorities, and Delegation. Subject to the provisions and limitations of California Nonprofit Corporation Law, other applicable laws, and the provisions of these bylaws, the Association's activities and affairs are to be exercised by or under the direction of the Association's Board of Directors. The Board of Directors is responsible for the overall supervision, control, and direction of the Association. The Board of Directors shall: (1) employ and release the executive director/secretary; (2) set performance expectations for the executive director/secretary; (3) receive, review, and consider approval of executive director/secretary recommended compensation, other terms and conditions of employment, and annual evaluations as prepared by the Executive Committee; (4) annually adopt a budget; and (5) set the level of dues for the Association. Except as to the duties listed in the previous sentence, and subject to Article 3, Section 2, the Board of Directors may delegate the supervision, control, and direction of the Association's affairs to any person or group, including a committee, provided the Association Board retains ultimate responsibility for the actions of such person or group. Where such powers are delegated, the delegation shall be documented in writing.

Section 4.11. Immediate Past President. The immediate past president automatically assumes this position after serving as the Association's elected president and is a voting member of the Board of Directors and Executive Committee. The term of office for the immediate past president shall commence on January 1 of the calendar year following election of the president and vice president and shall terminate on December 31 of the following odd-numbered year two years later. In the event the most

immediate active past president is unavailable to serve, the most recent and available active past president in succession shall serve in this capacity.

Section 4.12. Code of Conduct of Board Members.

(a) The Board of Directors shall establish, and update as appropriate, a code of conduct for its Directors that recognizes the Association's commitment of integrity, respect, and fair representation to its members and the public they serve and establishes minimum ethical standards for the performance of the duties of office. (See Code of Conduct Policy, Board Policy Manual, Policy No. GO-2.1A.) The code shall be consistent with the procedural processes contained in the Code of Conduct Policy. (See sections 2.1.3A and 2.1.4A of Policy GO-2.1A of the Board Policy Manual.) The code shall be distributed to all new Directors and shall be distributed annually to all members of the Association.

ARTICLE 5– Regions

Section 5.01. Boundaries of Each Region.

(a) There shall be a maximum of 10 regions within the state. The Board of Directors shall determine the regional boundaries. Insofar as is practicable, the regions shall have a numerical balance in members of the Association; make geographic sense; and promote regional problem solving.

(b) A member of the Association may file a written petition to the Board of Directors requesting a change in regions. Such petition shall set forth the reasons for such requested change. The Board shall, within a reasonable time, act upon such petition and set forth the reasons for its action. Such action by the Board shall be based on factors in Section 5.01(a) above, as well as others deemed by the Board of Directors to be relevant to the decision.

Section 5.02. Officers.

(a) The officers of each region shall be a chair and vice chair and three to five region board members who shall be elected by the region in each odd-numbered year. A region may maintain a board of fewer than five but not less than three members as provided in the region's rules and regulations. The officers of the region board shall take office on January 1 of the calendar year following election and shall hold office for two years, or until their successors take office. Regions shall hold elections by electronic ballot. Association staff shall verify the legitimacy of the ballots.

(b) The officers of each region shall: (1) exercise the powers and perform duties of the region during the interim between region meetings; and (2) make recommendations to the

president regarding appointments to committees. The chair and vice chair shall be the region's representatives to the Board of Directors.

(c) Each officer of a region shall be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Where an individual ceases to meet these criteria during the term of the office, the individual may not serve during the remaining term of that office unless that individual can again meet the criteria for the office and is appointed to complete the term. The region board may adopt more stringent criteria for board member qualifications as part of the region's rules and regulations.

(d) Should a vacancy occur in any of the region board positions before the end of the term, the remaining members of the region board shall appoint a new member. A vacancy in the office of any region board position shall be deemed to exist when a region board member: (1) resigns the office; (2) no longer is an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member of the Association to represent that member; or (3) is otherwise removed by a member agency of the Association.

Section 5.03. Nominating Committees. There shall be a nominating committee for each region consisting of three or more designees, each representing a member of the Association located within the region, appointed by the chair of the region and approved by the region board. Nominating committees shall be formed by February 28 of each odd-numbered year.

Section 5.04. Meetings. The meetings of each region shall be held at both the spring and fall conferences and at such other times and places as may be determined by the region chair. Representatives of five or more members of the Association from the region present at any region meeting shall constitute a quorum for purposes of conducting the business of the region. Any meeting, regular or special, may be held in person or by telephone conference, web video conference, or other electronic video screen communication or electronic transmission, as set forth in Section 4.06.

Section 5.05. Workgroups. Workgroups may be appointed by the region chair as needed.

Section 5.06. Rules. Each region shall organize and adopt rules and regulations for the conduct of its meetings and affairs not inconsistent with the Articles of Incorporation or bylaws of the Association. Each region shall abide by the code of conduct adopted by the Board of Directors of the Association.

ARTICLE 6 – Executive Committee

Section 6.01. Membership. There shall be an Executive Committee consisting of the following: the president of the Association, who shall be the chair thereof; the vice president; the most immediate active past president; the chair of the Finance Committee; and three at-large representatives selected from and

by the members of the Board of Directors. The election of the three at-large representatives to the Executive Committee shall occur at the first Board of Directors meeting held in each even-numbered year and the elected representatives shall serve immediately following their election and until such time as their successors take office. To the extent practical, the Executive Committee should be constituted so as to reflect the geographic extent of the Association and the functions of the members of the Association.

Section 6.02. Powers. The Executive Committee shall have the following authority:

(a) Personnel. Subject to the budget adopted by the Board of Directors, the Executive Committee shall perform the following personnel actions: (1) recommend compensation for the executive director/secretary to the Board of Directors for approval; (2) perform annual reviews of the executive director/secretary and submit that review to the Board of Directors; (3) review the classification and compensation plan and publicly posted salary schedule for Association employees submitted by the executive director/secretary, which shall be approved by the Board of Directors; (4) establish personnel policies for the conduct and behavior of employees, which shall be reviewable by the Board of Directors; and (5) undertake such other personnel actions as may be requested by the executive director/secretary in support of his or her oversight of all other personnel matters, which shall be reviewable by the Board of Directors, in closed session, upon request of the Board of Directors.

(b) Delegation. The Executive Committee may act pursuant to any authority specifically delegated to it by the Board of Directors. The delegation shall indicate whether the authority is still subject to the ultimate authority of the Board.

(c) Authority to Act Between Meetings. The Executive Committee may act for the Board of Directors between Board meetings when calling a special meeting of the Board of Directors is impracticable, provided that no such action of the Executive Committee shall be binding on the Board of Directors until authorized or approved by the Board. The Executive Committee has the authority to authorize actions recommended by the Legal Affairs Committee (such as the filing of letter briefs and amicus curiae briefs) by electronic means without the need for an in-person or telephonic meeting, but such actions shall be ratified by the Board of Directors at its next meeting.

Section 6.03. Reporting. The president, or any person designated by the president, shall report to the Board of Directors, at each regular Board meeting, any action taken by the Executive Committee since the last preceding regular Board meeting. The minutes of Executive Committee meetings, which at that time may still be in draft form, shall be mailed (using the U.S. Postal Service, express delivery, electronic means, or otherwise) to each member of the Board of Directors at least five days prior to Board meetings, except in cases in which the Executive Committee meets during or immediately prior to a conference of the Association or immediately prior to a Board meeting, in which case the minutes, which may still be in draft form, shall be mailed to each director promptly thereafter.

Section 6.04. Meetings. The Executive Committee shall hold regularly scheduled meetings as set by the president. Special meetings of the Executive Committee may be called by the president upon notice to the members of that committee or upon written request of three Executive Committee members. Notice for special Executive Committee meetings shall be provided to the entire Board: (1) upon five days' written notice sent by mail, or (2) upon 24 hours' notice with notice provided by electronic means; and all such meetings shall be open to the Board of Directors. Any meeting, regular or special, may be held in person or by telephone conference, web video conference, or other electronic video screen communication or electronic transmission, as set forth in Section 4.06. All members of the Board of Directors may attend any meeting of the Executive Committee. Meetings of the Executive Committee may be closed to others at the discretion of the president or committee. Only members of the Executive Committee are allowed to vote on matters at a meeting of the committee.

Section 6.05. Minutes. The minutes of the Executive Committee meetings shall be kept by the executive director/secretary at the Association's principal office. Actions of the Executive Committee shall be reported to the Board of Directors as provided in Section 3 of this Article and shall be available to any member of the Board of Directors upon request to the executive director/secretary.

ARTICLE 7 – Standing Committees

Section 7.01. Qualification. In order to serve on any Association standing committee, an individual must be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Where an individual ceases to meet these criteria during the term of the appointment, the individual may not serve during the remaining term of that appointment unless that individual can again meet the criteria for appointment and is appointed to complete the term.

Section 7.02. Term of Office. The term of office of standing committee members shall be two years commencing on January 1 of each even-numbered year. The term of office of standing committee chairs and vice chairs shall be approximately two years and shall commence as soon after January 1 of the even-numbered year as they may be appointed by the president and ratified by the then-seated Board of Directors, and shall terminate on December 31 of the odd-numbered year approximately two years later or until their successors are appointed and ratified.

Section 7.03. Meetings. Meetings of standing committees may be called at such times and places designated by the respective chair thereof except where provided otherwise by these bylaws. Any meetings of standing committees may be conducted, in whole or in part, by electronic transmission or by electronic video screen communication, as set forth in Section 4.06. Subject to the provisions of these bylaws and any actions that may be taken by the Board of Directors, the chairs of each standing committee may establish their own rules for the efficient operation of the committee they each chair. The chairs of each standing committee are authorized to create subcommittees and workgroups in order to complete the work of the committee.

Section 7.04. Committee Composition. Each limited standing committee shall have a membership composition that is comprised of members in the quantity and with qualifications as defined by the provisions of these bylaws. The committee chair position shall not be included in the maximum count for determining the committee composition total of any given limited committee. The committee chair shall, however, be a voting member of their respective committees subject to the rules and procedures of each committee. If the chair is absent, the vice chair shall fill the role of the chair during such absence.

Section 7.05. Agriculture Committee. There shall be an Agriculture Committee whose duty it shall be to recommend Association policy, positions and programs to the Board of Directors, State Legislative Committee, Federal Affairs Committee or other committees, as appropriate, regarding agricultural issues affecting the interests of the Association and its members. The committee shall consist of at least one member from each region.

Section 7.06. Business Development Committee. There shall be a Business Development Committee whose duty it is to develop and recommend to the Board of Directors programs and activities to be provided or administered by the Association that generate non-dues revenue and provide a service or benefit to member agencies. The committee shall consist of at least one member from each region and may include members from any of the other standing committees.

Section 7.07. Communications Committee. There shall be a Communications Committee whose duty it shall be to develop and make recommendations to the Board of Directors regarding a comprehensive internal and external communications program for the Association and to promote development of sound public information and education programs and practices among member agencies. The committee shall consist of no more than 40 members. The committee shall consist of at least one member from each region.

Section 7.08. Energy Committee. There shall be an Energy Committee whose duty it shall be to recommend policies and programs to the Board of Directors and to the State Legislative Committee and/or Federal Affairs Committee as appropriate. The committee shall consist of at least one member from each region.

Section 7.09. Federal Affairs Committee. There shall be a Federal Affairs Committee whose duty it shall be to review all federal legislative proposals and regulatory proposals affecting member agencies, after consulting with other appropriate committees, and to develop Association positions consistent with existing policy, where it has been established; recommend sponsorship of bills that will resolve problems or improve conditions for member agencies; and assist in the establishment of the Association's federal legislative program. The committee shall consist of at least one, but no more than five members from each region.

Section 7.10. Finance Committee. There shall be a Finance Committee whose duty it shall be to make recommendations to the Board of Directors regarding annual budgets, dues formula and schedules and other revenue-producing income, annual audit and selection of an auditor, and investment strategies. The committee shall consist of the president and vice president of the Association as *ex officio* members,

either the chair or vice chair from each of the Association's 10 region boards, and one additional member from each region with experience in financial matters.

Section 7.11. Groundwater Committee. There shall be a Groundwater Committee whose duty it shall be to recommend policies and programs to the Board of Directors and to the State Legislative Committee and/or Federal Affairs Committee as appropriate. The committee shall consist of at least one member from each region.

Section 7.12. Legal Affairs Committee. There shall be a Legal Affairs Committee whose duty it shall be to support the mission of the Association, and more particularly to deal with requests for assistance involving legal matters of significance to member agencies, including but not limited to state and federal court litigation, water rights matters, selected regulatory and resources agency matters, proposed bylaw revisions, review of legislation as requested by the State Legislative Committee, etc. The committee shall consider matters and issues submitted to it in order to determine which ones are of major significance to the member agencies and, assuming a finding of major significance, recommend to the Board of Directors the position(s) which the committee believes the Association should take with respect thereto. The committee shall be composed of between 34 and 44 attorneys, each of whom shall be a member of the California Bar and shall be, or act as, counsel for a member agency, representing diverse interests within the Association, including but not limited to, different geographical areas throughout the state, large and small agencies, agricultural and urban agencies, agencies created under the various enabling statutes, etc. The committee shall consist of at least one member from each region.

Section 7.13. Local Government Committee. There shall be a Local Government Committee whose duty it shall be to recommend policies to the State Legislative Committee, as appropriate, and Board of Directors on matters affecting water agencies as a segment of local government in California. The committee shall consist of at least one, but no more than three members from each region.

Section 7.14. Membership Committee. There shall be a Membership Committee whose duty it shall be to assist staff in developing membership recruitment and retention programs, make recommendations to the Board of Directors regarding membership policies, eligibility, and applications for membership and review and make recommendations to the Finance Committee regarding an equitable dues structure. The committee shall consist of at least one member from each region.

Section 7.15. State Legislative Committee. There shall be a State Legislative Committee whose duty it shall be to review all state legislative proposals affecting member agencies and to establish Association positions, consistent with existing policy, where it has been established; sponsor bills that will resolve problems or improve conditions for member agencies; and assist in the establishment of the Association's legislative program. The committee shall consist of members representing a variety of types of member agencies and at least one, but no more than four members from each region.

Section 7.16. Water Management Committee. There shall be a Water Management Committee whose duty it shall be to recommend policy and programs to the Board of Directors on any area of concern in

water management. The committee shall consist of at least one, but no more than four members from each region.

Section 7.17. Water Quality Committee. There shall be a Water Quality Committee whose duty it shall be to develop and recommend Association policy, positions, and programs to the Board of Directors, to promote cost-effective state and federal water quality regulations that protect the public health, to enable interested member agencies to join together to develop and coordinate with other organizations, and to present unified comments regarding agricultural and domestic water quality regulations. The committee shall consist of at least one member from each region.

ARTICLE 8 – Special Councils, Committees, and Task Forces

Section 8.01. Council of Past Presidents. There shall be a Council of Past Presidents composed of all past presidents of the Association who serve on the council until each is no longer able to or wishes to serve. The council shall provide a mechanism for past presidents to continue to make valuable contributions to the Association. With approval of the Board of Directors, the president and/or executive director/secretary may assign specific responsibilities to the council from time to time. Members of the Council of Past Presidents are invited to attend and participate in the Association's Board and Executive Committee meetings, including attending closed sessions. With the exception of the immediate past president, members of the Council of Past Presidents are non-voting.

Section 8.02. Election Committee. There shall be an Election Committee consisting of eleven representatives established by February 28 of each odd-numbered year, whose purpose shall be to present qualified individuals for the offices of president and vice president of the Association. The Election Committee shall vet all candidates to determine if the eligibility criteria have been met. The Election Committee will endorse a preferred candidate for president and vice president before presenting an open ballot with all qualifying candidates to the members for a vote in the manner set forth in Section 9.10 and Section 9.11.

(a) Selection. The Election Committee shall be selected in the following manner:

(1) Each of the 10 currently seated Region Boards in the odd-numbered year shall appoint a representative from their respective regions to serve on the Election Committee.

(2) One representative appointed by the president in the odd-numbered year shall also serve on the Election Committee. Neither the president nor the vice president qualifies to be appointed to this position.

(b) Qualification. In order to serve on the Election Committee, an individual must be an officer, employee, or member of the governing body of a member agency of the Association, or other representative duly designated by a member agency of the Association to represent that member at the time of the appointment. Past presidents,

who are Honorary Life Members of the Association, may also serve on the Election Committee without meeting stated qualifications unless otherwise disqualified. Where an individual ceases to meet these criteria during the election cycle, the individual may not continue to serve. When the disqualified member represented a Region Board, the affected Region Board shall select a replacement representative. When the disqualified member represented the President, the President shall select an alternate representative.

Section 8.03. Other Committees and Task Forces. Other committees and task forces may be appointed by the president from time to time as needed, consistent with and supportive of the mission of the Association.

ARTICLE 9 – Meetings of Members

Section 9.01. Meetings. Meetings of the members of the Association shall be held at the Association's conferences to provide a report to the members on the Association's activities during the past year, provide an overview of the Association's finances, announce the newly elected president and vice president of the Association in each odd-numbered year, and to transact such other proper business as may come before the meeting.

Section 9.02. Special Meetings. Special meetings of the members of the Association may be called by the Board of Directors, the president of the Board of Directors, or by 5 percent or more of the members of the Association. Except when called by the Board, a request for a special meeting must be in writing and must be delivered in person or mailed by first-class mail addressed to the president of the Board at the principal office of the Association, with a copy to the executive director/secretary. The request must state the general nature of the business proposed to be transacted at the meeting.

A special meeting that has been called by written request of 5 percent of the member agencies of the Association to the Board of Directors shall be set by the Board of Directors on a date that is not less than 35 or more than 90 days after receipt of the request.

Section 9.03. Meetings by Remote Communication. Any meeting of the members may be conducted, in whole or in part, by electronic transmission by and to the Association or by electronic video screen communication. The member shall be deemed present in person at the meeting if the following apply:

(a) The Association implements reasonable measures to provide the member a reasonable opportunity to participate in the meeting and to vote on matters submitted to the members, including an opportunity to read or hear the proceedings of the meeting substantially concurrently with those proceedings.

(b) If any member votes or takes other action at the meeting by means of electronic transmission to the Association or electronic video screen communication, a record of that vote or action is maintained by the Association.

(c) The Association verifies that each person participating remotely is an authorized representative of a voting member.

Section 9.04. Notice Requirements for Membership Meetings. Written notice of any membership meeting shall be given to each voting member of the Association. The notice shall state the date, time, and place of the meeting; the means by which members may participate; and the general nature of the business to be transacted. The member notification information shall also be posted on the Association's website.

Except as otherwise provided in these bylaws or California law, a written notice of regular membership meetings shall be given not less than 10 or more than 90 days before the date of the meeting to each member who, on the record date for notice of the meeting, is entitled to vote; provided, however, that if notice is given by mail, and the notice is not mailed by first-class, registered, or certified mail, that notice shall be given not less than 20 days before the meeting.

Section 9.05. Notice Requirements for Special Meetings. The executive director/secretary shall cause notice to be given to all members of the Association of the date, time, and place of the meeting and the general nature of the business to be transacted at the meeting. No business except that specified in the request and notice may be transacted at said special meeting. If notice of the requested special meeting is not given within 20 days after receipt of the request, the person or persons requesting the meeting may give the notice.

Section 9.06. Voting. Each member of the Association in good standing at the time of the annual or special meeting shall be entitled to one vote that shall be cast by its authorized representative. Each member must designate its authorized representative prior to the annual or special meeting. It is the member's responsibility to designate or update its authorized representative as needed. The Association may confirm with any member the identity of that member's authorized representative for the purpose of casting ballots in any election of president and vice president, amendments to these Bylaws, or other Association business that requires a vote. All questions, except amendments or revisions of these bylaws, shall be determined by a majority of the members present and voting. A roll call may be requested by any authorized representative.

Section 9.07. Amendment of Bylaws. These bylaws may be amended or revised by two-thirds of the member agencies of the Association present and voting at any meeting.

Section 9.08. Quorum. The presence of the authorized representatives of at least 50 members of the Association at any meeting of the members shall constitute a quorum for transacting business. Actions taken by written ballot shall require the timely receipt of the written ballot from the authorized representatives of at least 50 members to constitute a quorum.

Section 9.09. Amendments, Revisions, and Resolutions. Before any amendments or revisions to the bylaws, or resolutions, may be considered at any meeting of the Association, any such amendment,

revision, or resolution shall be submitted to the executive director/secretary at least 90 days prior to the first day of such meeting. The executive director/secretary shall promptly distribute any proposed amendments or revisions to the Legal Affairs Committee for the Legal Affairs Committee to develop an unbiased analysis of the amendments or revisions. Following development of an analysis for the proposed amendments or revisions, the executive director/secretary shall distribute copies of any resolutions, amendments or revisions, including any applicable analyses, to all members of the Association not less than 10 days or more than 90 days prior to presentation at such meeting. The written notice of the membership meeting shall be given to each voting member of the Association consistent with the provisions defined in Section 9.04. The 90-day rule may be suspended at any meeting of the Association by consent of three-fourths of the members present. Voting on resolutions, amendments, or revisions shall proceed as provided by Sections 9.06 and 9.07.

Section 9.10. Nomination of President and Vice President.

(a) Qualification. At the time of their election, the president and vice president of the Association shall each be an elected or appointed member of the governing body or commission (as appropriate) of a member agency of the Association.

(b) Nominating Resolutions. All nominations for the positions of president and vice president shall be accompanied by an official resolution from the Association member agency on whose board the nominee serves. Said resolution shall be signed by an authorized signatory of the member agency's Board of Directors.

Section 9.11. Election of President and Vice President. Each member of the Association in good standing at the time a vote is cast is entitled to one vote for election of the president and vice president that shall be cast by its authorized representative by written ballot. The ballot and any related material may be sent by first class, registered, or certified mail or electronic transmission by the Corporation that meets the requirements of Corporations Code section 20, and responses may be returned to the Corporation by mail or electronic transmission. On any written ballot for the election of president or vice president, an authorized representative acting on behalf of the member may write in a qualified candidate for election. Nominating resolutions for write-in candidates must be received by the deadline for the return of ballots.

Section 9.12. Write-In Candidates. If a write-in candidate prevails in any election for president or vice president, such individual shall not be officially elected into such position until the Election Committee confirms that the individual meets the eligibility criteria and qualifications requirements.

Section 9.13. Run-off Election for President and Vice President. In the event a nominee does not receive a majority of the votes for president or vice president, a run-off election shall be held for the office or offices for which a majority of the votes have not been received. The run-off election shall only involve the nominees who received the two highest amounts of votes. The run-off election shall be conducted in the same manner as the initial election.

Section 9.14. Additional Procedures for Election of President and Vice President. The Board shall have the authority to adopt policies for elections ("Election Policy") of president and vice president setting forth the details for the election of such positions when not otherwise contrary to or covered by these bylaws.

Section 9.15. Action by Written Ballot. To the extent permitted by applicable law and subject to all applicable requirements, any action that may be taken at a regular or special member meeting of the members may be approved by written ballot if a ballot is sent to each member entitled to vote on the matter. If approved by the Board, ballots may be sent and returned by electronic transmission as permitted in the Corporations Code. Ballot format, solicitation and voting thresholds shall meet the requirements of the Corporations Code and be consistent with applicable provisions of these Bylaws.

ARTICLE 10 –Indemnification of Directors, Officers, and Other Agents

Section 10.01. Right of Indemnity. To the fullest extent permitted by law, this Corporation shall indemnify its Directors, Officers, employees, and other persons described in Section 7237(a) of the California Corporations Code, including persons formerly occupying any such position, against all expenses, judgments, fines, settlements and other amounts actually and reasonably incurred by them in connection with any "proceeding," as that term is used in that Section, and including an action by or in the right of the Corporation, by reason of the fact that the person is or was a person described in that section. "Expenses," as used in this bylaw, shall have the same meaning as in Section 7237(a) of the California Corporations Code.

Section 10.02. Approval of Indemnity. On written request to the Board by any person seeking indemnification under Section 7237(b) or Section 7237(c) of the California Corporations Code, the Board shall promptly determine under Section 7237(e) of the California Corporations Code whether the applicable standard of conduct set forth in Section 7237(b) or Section 7237(c) has been met and, if so, the Board shall authorize indemnification.

Section 10.03. Advancement of Expenses. To the fullest extent permitted by law and except as otherwise determined by the Board in a specific instance, expenses incurred by a person seeking indemnification under these bylaws in defending any proceeding covered by those Sections shall be advanced by the Corporation before final disposition of the proceeding, on receipt by the Corporation of an undertaking by or on behalf of that person that the advance will be repaid unless it is ultimately determined that the person is entitled to be indemnified by the Corporation for those expenses.

Section 10.04. Insurance. The Corporation shall have the right to purchase and maintain insurance to the full extent permitted by law on behalf of its Officers, Directors, employees, and other agents, against any liability asserted against or incurred by any officer, director, employee, or agent in such capacity or arising out of the officer's, director's, employee's or agent's status as such.

ARTICLE 11 - Miscellaneous

Section 11.01. Conduct of Meetings. All meetings of the Association shall be conducted in accord with the code of conduct and in substantial accordance with the latest edition of Robert's Rules of Order Newly Revised unless the Board adopts alternate rules of conduct for itself and/or its committees, region boards, and region workgroups.

Section 11.02. Funds. The funds of the Association shall be used to further the aims and purposes of this Association. They shall be kept by the controller/treasurer and paid out by checks or other electronic means, which shall only be valid with two authorized signatures. The Board of Directors shall designate by resolution which persons, other than the controller/treasurer, may sign for expenditures. The Finance Committee shall implement procedures to ensure necessary internal controls over the receipt and expenditures of Association funds and arrange for an external audit. Audit reports shall be presented to the Board of Directors.

Section 11.03. Disposition of Assets upon Dissolution. The Association's properties and assets are irrevocably dedicated to the fulfillment of the Association's purposes as described in Article 2 of the Articles of Incorporation. No part of the Association's net earnings, properties and assets, on dissolution or otherwise, may inure to the benefit of any private person. Upon the dissolution of the Association, all debts thereof shall be paid and its affairs settled, and all remaining assets shall be distributed to the Association's member political subdivisions for a public purpose, consistent with the provisions of the California Nonprofit Corporation Law relating to mutual benefit corporations then in effect and with the Articles of Incorporation.

Section 11.04. Definitions. As used in these Bylaws, the terms "electronic transmission" and "notice provided by electronic means" shall refer to notice and other communications given by fax or e-mail.

Section 11.05. Conflicts Between Bylaws and Other Association Policies. To the extent permitted by applicable law, these Bylaws shall govern in the event there is a conflict between these Bylaws and another Association policy, rule, or procedure.

Amended comprehensively December 1, 2010
Amended May 9, 2012
Amended May 7, 2014
Amended December 2, 2015
Amended November 29, 2017
Amended & Restated November 30, 2022

Item No. 3

DISCUSSION ITEM
November 4, 2024

TO: **Planning & Operations Committee**
(Directors Seckel, Yoo Schneider, Dick)

FROM: **Harvey De La Torre, General Manager**

Staff Contact: Charles Busslinger and Sarina Sriboonlue

SUBJECT: **COMPLETION OF THE LEAD AND COPPER RULE REVISIONS INITIAL SERVICE LINE INVENTORY PROJECT UNDER THE MWDOC SHARED SERVICES PROGRAM**

STAFF RECOMMENDATION

It is recommended that the Board of Directors review and discuss the information presented.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

Background

On September 20, 2023, the MWDOC Board authorized the Interim General Manager to enter into a professional services agreement with Hazen and Sawyer (Hazen) as part of a MWDOC Shared Services Program (Program) to assist participating agencies in the development of initial service line inventories (SLI) and other deliverables required by the United States Environmental Protection Agency (USEPA) Lead and Copper Rule Revisions (LCRR). The LCRR comprises a series of requirements for public water systems nationwide to complete an initial SLI, verify service line materials using visual inspection (direct method) and/or using alternative (indirect) methods approved by the primacy agency to identify service line materials, and provide public education and outreach communications by the October 16, 2024 compliance date. Beyond October 16, 2024, water systems are required to conduct tap monitoring at school and childcare facilities, and if service lines are found to contain or possibly contain lead, to also develop Lead Service Line (LSL)

Budgeted: ☐ Yes ☐ No ☒ N/A	Budgeted amount:	Core: ☐	Choice: ☒
Action item amount: N/A	Movement between funds: ☐ Yes ☐ No		

Replacement Plan and conduct LSL replacement. Adding to the complexity of undertaking LCRR compliance was the anticipated release of the Lead and Copper Rule Improvements (LCRI) in the fall of 2024 which would present another evolution of rules and requirements pertaining to LSL that water systems must navigate.

Collaboration Through MWDOC Shared Services Program

In early 2023, multiple agencies requested MWDOC's assistance in complying with the LCRR. At the May 1, 2023, P&O Committee meeting, MWDOC staff presented background information on a potential Shared Services Program and received input from the Board to continue development of the Program. MWDOC in collaboration with interested agencies developed a Request for Proposal to solicit proposals from qualified consultants. Proposals received were reviewed and evaluated by a selection committee comprised of MWDOC and volunteers from interested agencies. Collaboration continued beyond consultant solicitation into the project phases. It was key to the project's success. The Shared Services Program framework provided economies of scales that saved time and resources for all parties involved. MWDOC staff provided project management, contract administration, and coordination that streamlined the administrative process. This allowed participating agencies staff to focus their efforts on collecting agency-specific data and providing system-specific insights. Participating agencies also benefited from the sharing of knowledge and leveraging of expertise among peer agencies.

Program Outcomes, Completion, and Next Steps

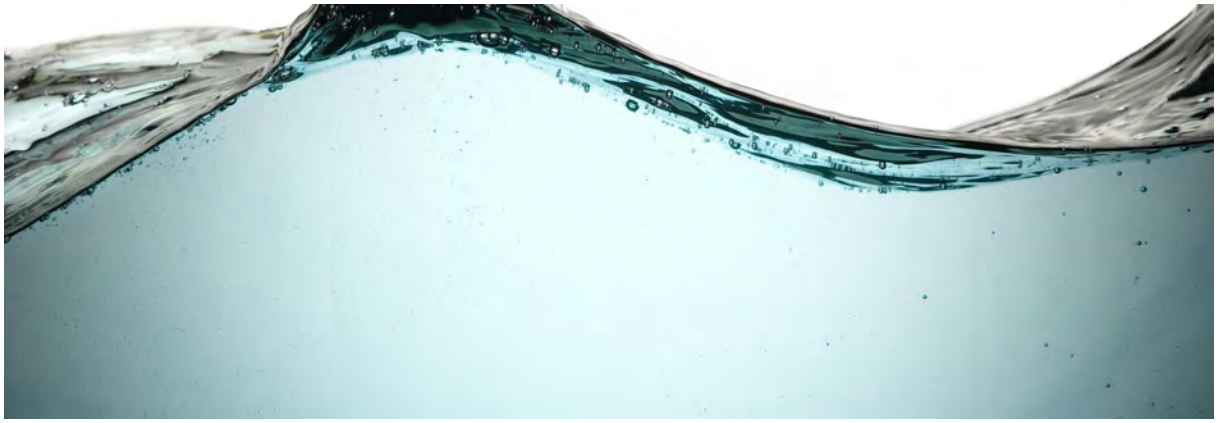
No lead service lines were identified following an extensive verification process. All 13 participating agencies achieved non-lead designation and have submitted a non-lead designation statement with their initial service line inventory to the State Water Resources Control Board Division of Drinking Water by the October 16, 2024 compliance date. Hazen completed their scope of work on time and within budget. In this final phase, Hazen will transition the non-proprietary GIS database and supplemental information to each participating agency for future in-house maintenance and updates of their initial inventory. This hand-off will prepare participating agencies for success in the LCRI compliance independent of outside services.

ALIGNMENT WITH BOARD STRATEGIC PRIORITIES

- ☒ *Clarifying MWDOC's mission and role; defining functions and actions.*
- ☐ *Balance support for Metropolitan's regional mission and Orange County values and interests.*
- ☐ *Strengthen communications and coordination of messaging.*
- ☐ *Work with member agencies to develop water supply and demand objectives.*
- ☐ *Solicit input and feedback from member agencies.*
- ☐ *Invest in workforce development and succession planning.*

List of Attachments/Links:

Attachment 1: *Presentation*



MWDOC Shared Services Program

Completion of the Lead & Copper Rule Revisions Service Line Inventory
MWDOC Planning & Operations Committee Meeting

November 4, 2024

1

Congratulations to Participating Agencies!

Congratulations to all 13 participating agencies for meeting all LCRR requirements by the October 16, 2024, compliance date!

Thank you for your commitment & collaboration!

2

2

Collaboration = Key to Success

Consultant Team
- Technical expertise
- GIS capability
- Regulatory insights
- Field crew
- Quality control
- DDW relationship

Participating Agencies
- Data & information
- System-specific insights
- Field crew
- Review & oversight

MWDOC
- Project management
- Contract administration
- Coordination
- Quality review

LCRR Service Line Inventory & Deliverables

3

3

Consultant's Expertise & Capabilities


GIS & Database Capabilities


Technical Expertise


Efficient Field Services (Blaine Tech)


Well-rounded Resources


Agility & Flexibility


Relationship with DDW

Thank you to Hazen and Blaine Tech for your expertise & service!

4

4

Words of Appreciation

"The Hazen/Blaine Tech team deserves significant credit for the success of their role in this LCRR project."

"Thanks to their expert management, what could have been a challenging project proceeded smoothly."

- SCWD

"I want to acknowledge the incredible teamwork and dedication of Hazen team in getting our agency to the finish line. Thank you, all for helping Orange achieve the non-lead designation!"

"I also want to thank Sarina and Charles for doing the heavy lifting in bringing Hazen team on board. It would have cost a lot more to get the Service Line Inventory complete if it wasn't for MWDOC."

- Sonny Tran, City of Orange

"Many thanks to your diligent efforts in assisting all participating agencies to successfully comply with 2024 LCRR."

"I am really grateful to [MWDOC] for stepping in on numerous occasions throughout the process and offering to be a part of the individual meetings with Hazen, looking out for our best interests."

"It was truly a monumental effort that everyone involved championed."

- Yvette Hana, YLWD

5

5

Project Outcomes & Next Steps

Huge THANK YOU to participating agencies staff!

- All 13 participating agencies achieved non-lead designation
- Completed on time & within budget:
  - Board approved NTE $2.9M
  - Final cost $2.3M
- Hand-off in preparation for Lead & Copper Rule Improvements (LCRI)
- Debrief with agencies on upcoming monitoring requirements for LCRI

6

6

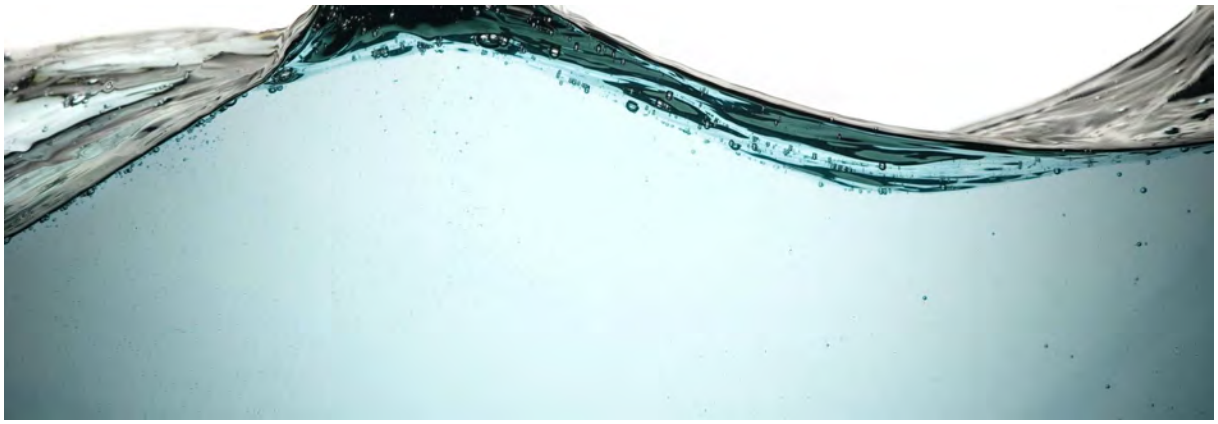
LCRR Shared Services Program Recap

- Saves time & resources through economies of scale
- Leverages expertise among agencies
- Lays groundwork for future compliance
- Sets agencies up for future success



7

7



Thank you for your attention.
Please **let us know** if you have questions.

8

Item No. 4

DISCUSSION ITEM
November 4, 2024

TO: **Planning & Operations Committee**
(Directors Seckel, Yoo Schneider, Dick)

FROM: **Harvey De La Torre, General Manager**

Staff Contact: Vicki Osborn

SUBJECT: **WEROC ORANGE COUNTY WATER & WASTEWATER MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE**

STAFF RECOMMENDATION

It is recommended that the Board of Directors review and discuss the information presented.

COMMITTEE RECOMMENDATION

The committee recommends (To be determined at Committee Meeting)

SUMMARY

Since the last update in August, WEROC has been working with participating agencies to complete all the data sets required to update to their Multi-Jurisdictional Hazard Mitigation Plan (MJHMP); a five-year strategic plan to improve local resilience to hazard events.

The base plan has been delivered to WEROC and is currently under review with a due date of November 1st. The participating agencies are reviewing their annexes to the base plan, which is specific to each participating agency. All plans were developed with information provided by agency staff, with support from key stakeholders and technical consultants .

Budgeted: ☐ Yes ☒ No	Budgeted amount	Core: ☐	Choice: ☒
Action item amount:	Movement between funds: ☐ Yes ☐ No		

DETAILED REPORT

In January 2024, WEROC developed a “Request for Proposal” for updating the Orange County Water and Wastewater Multi-Jurisdiction Local Hazard Mitigation Plan (MJHMP) and meeting the AWIA requirements of conducting a Risk and Resilience Assessment (RRA) and Emergency Response Plans (ERP).

In addition to protecting MWDOC and participating agencies from current and future hazards, having an MJHMP will allow them to be eligible for grants from FEMA for additional hazard mitigation efforts under the provisions of the federal Robert T. Stafford Act and the Disaster Mitigation Act of 2000.

To be eligible for Federal Emergency Management Agency (FEMA) hazard mitigation funding, water and wastewater agencies are required to maintain a current and approved Hazard Mitigation Plan (Plan). The Plan is required to be updated every five years to maintain grant eligibility. The current Orange County Regional Water and Wastewater LHMP is approved through March 9, 2025.

The Orange County Multi-Jurisdictional Water and Wastewater Hazard Mitigation Plan (MJHMP) needs to be submitted to California Office of Emergency Services (CalOES) by Dec 1, 2024, to meet deadlines. The timing of the LHMP also aligns with the recommended start date for initiating the RRA process for water utilities serving a population greater than 100,000 residents. FEMA’s LHMP requirements were updated in 2023 and must be incorporated into the 2024 LHMP update. WEROC has an opportunity to ensure the 2024 LHMP meets the new FEMA requirements. Public outreach and public participation are one of the highlighted requirement changes for the MJHMP to be successful.

Here is the list of agencies that indicated they want to be part of the 2025 MJHMP:

1. Costa Mesa Sanitary District
2. El Toro Water District
3. Irvine Ranch Water District
4. Laguna Beach County Water District
5. Mesa Water
6. Moulton Niguel Water District
7. Municipal Water District of Orange County
8. Orange County Sanitation District
9. Orange County Water District
10. Santa Margarita Water District
11. Serrano Water District
12. South Coast Water District
13. South Orange County Wastewater Authority
14. Trabuco Canyon Water District
15. Yorba Linda Water District

It will also incorporate regular feedback from key MWDOC/WEROC community members such as but not limited to feedback received from the Costa Mesa Sanitary District's Citizens Advisory Committee, Orange County Emergency Management Organization, the Orange County Operational Area Executive Board. MWDOC and participating agencies plan on releasing a public review draft in Fall 2024, with final adoption planned for spring 2025 following approval from CalOES and FEMA.

WEROC Project Coordination since the last presentation to Date:

WEROC has taken the following steps since the last report:

- WEROC staff has presented an overview detailing the project and changes from the last plan at 10 meetings.
- All agencies successfully submitted the data needed to update the plans.
- WEROC has been coordinating with our participating agencies to begin the process of seeking their level of service and financial commitment.
- A public engagement toolkit has been used by all agencies, and at a minimum have the project information on their websites in accordance with federal guidelines.
- Draft plan and annexes are currently being reviewed by all agencies.
- WEROC staff has another 3 presentations for community outreach already booked for the month of November.
- There is still one HMP contract that has not been returned. Staff is working on getting the remaining contract signed. All other Choice contracts for this project have been returned, and invoicing for this program began in October.

ALIGNMENT WITH BOARD STRATEGIC PRIORITIES

☐ *Clarifying MWDOC's mission and role; defining functions and actions.*	☐ *Work with member agencies to develop water supply and demand objectives.*
☐ *Balance support for Metropolitan's regional mission and Orange County values and interests.*	☒ *Solicit input and feedback from member agencies.*
☒ *Strengthen communications and coordination of messaging.*	☐ *Invest in workforce development and succession planning.*

List of Attachments/Links:

Attachment 1: *MJHMP Base Administrative Plan DRAFT 10_2024*

2024





Orange County Water and Wastewater
Multi-Jurisdictional Hazard Mitigation Plan

Municipal Water District of Orange County
18700 Ward St, Fountain Valley, CA 92708
Director of Emergency Management Vicki Osborn
Email: weroc@mwdoc.com
Tel: 714.593.5010

WEROC

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Annexes

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Annex B: Orange County Water District Jurisdictional Profile

Annex C: Orange County Sanitation District Jurisdictional Profile

Annex D: South Orange County Water Authority Jurisdictional Profile

Annex E: Costa Mesa Sanitary District Jurisdictional Profile

Annex F: El Toro Water District Jurisdictional Profile

Annex G: Laguna Beach County Water District Jurisdictional Profile

Annex H: Moulton Niguel Water District Jurisdictional Profile

Annex I: Mesa Water District Jurisdictional Profile

Annex J: Santa Margarita Water District Jurisdictional Profile

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SECTION 1: INTRODUCTION

Across the United States, natural and human-caused disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The impact to water and wastewater utilities and the individuals they serve can be immense and damages to their infrastructure can result in regional economic and public health consequences. The water and wastewater utilities are vulnerable to a variety of hazards that can result in damaged equipment, loss of power, disruption to services, contaminated water supply, and revenue losses. By planning for natural and human-caused hazards and implementing projects that mitigate risk, utilities can reduce costly damage and improve the reliability of service following a disaster.

As a best practice Orange County water and wastewater agencies have worked together for decades to improve regional and local reliability and resiliency through joint or collaborative capital improvement projects, planning processes, and emergency management practices. Throughout the county's history the need for, and development of, water and wastewater services has been driven by the principles of economies of scale, and limitations of risk by working together among the wholesale and retail water and wastewater agencies. Below is a brief history of this collaborative process that developed the framework for this multi-agency plan today.

- In 1921 the Orange County Joint Outfall Sewer (JOS) is formed. Santa Ana and Anaheim agree to construct an outfall extending into the Pacific Ocean.
- In 1928 the cities of Anaheim, Fullerton, and Santa Ana realized that groundwater supplies were insufficient to meet the demands of their growing communities, prompting them to join the Metropolitan Water District of Southern California (Metropolitan) in order to get access to water imported from the Colorado River.
- In 1931 local agencies again recognized the importance of economies in scale by forming the Orange County Water District (OCWD). One of the goals of OCWD is to protect Orange County's Santa Ana River water rights from upstream interest.
- Growth in Orange County continued into the 1940s and 1950s when it was realized that the next increment of supplies was needed. That is when portions of what is now Orange County (outside of those original three cities) joined Metropolitan. The Metropolitan was formed for much the same reason, in that it was more economical and less risky to pursue importation of water from the Colorado River and later Northern California as part of a large co-op rather than having each local entity rely on their own planning and development of water supplies.
- The supplemental water supplies of Metropolitan encouraged other Orange County water providers to collaborate, creating the Coastal Municipal Water District (Coastal) in 1941, and Orange County Municipal Water District (OCMWD) in 1951. OCMWD would go on to change its name to Municipal Water District of Orange County (MWDOC).
- Following a 1946 Board of Supervisor's Orange County Sewerage Survey Report, seven individual districts combine into the JOS. While individual cities continue to maintain sewage collection systems, county-wide collections and treatment became a regional operation. And after several reiterations, it became the Orange County Sanitation District (OC San).
- Later, as Orange County continued to develop and expand, these new developments were located further and further from the Metropolitan pipelines bringing water into Orange County. Economically it was again much more efficient, and less risky, for local members to band

together to participate in regional pipelines and jointly use the same water facilities to convey the Metropolitan water from where it was available to where it was needed. Even today, water reliability planning is conducted based on the needs of these original areas, each with its own supply reliability risk profile. The three areas are:

1. The Brea/La Habra service area receives approximately 80% of their supplies from Cal Domestic Water Company groundwater sources in San Gabriel Valley.
2. The OCWD service area receives approximately 75% of their supplies from groundwater sources.
3. The South Orange County service area has few local resources, thereby requiring the import of approximately 95% of their potable water demands.

- In 1983 the Volunteer Emergency Preparedness Organization (VEPO) was formed, creating a mutual aid agreement and communications system for Orange County's 33 water utilities to work together.
- Following the 1994 Northridge Earthquake and subsequent Standardized Emergency Management System in 1996, Orange County water agencies recognized the need to staff the VEPO program as a shared service to support its member agency's disaster readiness.
- VEPO was renamed to the Water Emergency Response Organization of Orange County (WEROC) in 1999 to better reflect its goal and purpose.
- The agency known today as the South Orange County Wastewater Authority (SOCWA) was formed in 2001 when the South East Regional Reclamation Authority (SERRA), Aliso Water Management Agency (AWMA), and South Orange County Reclamation Authority consolidated to meet the wastewater needs of more than 500,000 homes and businesses across South Orange County.
- In 2006, WEROC staff realized the importance of including wastewater agencies in its program, as many of its water utilities also provided wastewater services and because the sectors had similar resources that could support each other. With this change, the program welcomed in wastewater agencies and grew to support 37 agencies in total.
- In 2008, the internationally awarded Ground Water Replenishment System (GWR) was completed. This was a joint project of the OCWD and the OC San enhancing reliability for all of the county.
- In 2019, WEROC supported American Water Infrastructure Act (AWIA) compliance for nearly all agencies within the planning area to ensure timely and accurate completion of Risk Resilience Assessments (RRAs) and Emergency Response Plans (ERPs) in accordance with Environmental Protection Agency (EPA) requirements.
- In 2021, Orange County Local Agency Formation Commission (LAFCO) unanimously approved the annexation of the City of San Juan Capistrano water and wastewater facilities into the Santa Margarita Water District (SMWD), allowing SMWD to manage and operate water and wastewater services to customers within the City of San Juan Capistrano.

As has been demonstrated throughout the history of Orange County, the principles of banding together with neighboring interests to create joint regional infrastructure, connected systems, and

economies of scale has been applied time and time again. Working together to develop a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) focused on the agencies (cities and special districts) that provide drinking water and wastewater services came from an already standing practice of regional planning and coordination to improve resiliency and response. Additionally, it gave the participating agencies the opportunity to focus on risk as it applies specifically to these joint considerations as well as their jurisdiction's individual services.

In 2005, WEROC started to work with its member agencies (MAs), the California Governor's Office of Emergency Services (Cal OES), and the Federal Emergency Management Agency (FEMA) to fund the first MJHMP through a Hazard Mitigation Planning Grant. In 2007, with the assistance of the Mitigation Grant, MWDOC along with 20 MAs prepared an MJHMP that identified critical water and wastewater facilities in the county and mitigation actions in the form of projects and programs to reduce the impact of natural and human-caused hazards on these facilities. The vision of this original MJHMP took into consideration regional and local infrastructure, how it worked together, and how it could be strengthened, while supporting other planning efforts such as the South Orange County Reliability Study and later the Orange County Reliability Study.

This plan builds on the original 2007 MJHMP and previous updates in 2012 and 2019. MWDOC was joined in this current update by 14 participating water and wastewater utilities (see **Section 1.2.2**), the current MAs, that serve communities in Orange County, California. The plan was prepared with input from county residents, Orange County emergency managers, and with the support of the Cal OES and FEMA. The process to develop the MJHMP update included two planning team meetings and coordination with representatives from MWDOC and each participating MA.

This MJHMP is a guide for MWDOC and the MAs over the next five years toward greater disaster resistance in harmony with the character and needs of the local community and the MAs. The plan focuses on participating water and wastewater facilities in the county and identifies mitigation actions to reduce the impact of natural and human-caused hazards on critical facilities. In addition, each agency will use current, approved planning documents that identify implementation strategies for capital improvement, risk reduction, system upgrades, and operations. These documents complement the MJHMP and include but are not limited to: Urban Water Management Plans, AWIA RRAs, All Hazards Standardized Emergency Management System (SEMS)/ National Incident Management System (NIMS) ERPs, Capital Improvement Plans (CIPs), and Asset Management Plans.

The MJHMP is a working document that will grow and change as our communities and MAs do. This means at times participating agencies may identify a higher priority than noted in this plan, or a redirection of goals based on current information or updated decisions. In consideration of this concept, there may be projects or policies that need to be considered that were not included in this document. These changes will be documented during the MJHMP implementation, and formal updates to the plan will be made every five years as required to maintain a valid plan and FEMA grant eligibility.

1.1 Purpose of the Plan and Authority

Federal legislation has historically provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process (Public Law 106-390). This legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, DMA 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-

disaster Hazard Mitigation Grant Program (HMGP). The Pre-Disaster Mitigation Act of 2010 was signed into law in January of 2011 but does not impact the planning process. The 2010 Act reauthorizes the pre-disaster mitigation program.

Section 322 of DMA 2000 specifically addresses mitigation planning at the State and local levels. It identifies the requirements that allow HMGP funds to be used for planning activities and increases the amount of HMGP funds available to States that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving pre- or post-disaster funds. Local mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

DMA 2000 is intended to facilitate cooperation between State and local authorities, prompting them to work together. It encourages and rewards local and State pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network is intended to enable local and State governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

FEMA prepared the Final Rule, published in the Federal Register on September 16, 2009 (Code of Federal Regulations [CFR] at Title 44, Chapter 1, Part 201 [44 CFR Part 201 and 206]), which establishes planning and funding criteria for states and local communities.

According to the updated FEMA Local Hazard Mitigation Policy Guide (FEMA 2022) and 44 CFR § 201.6(a)(4), local governments may work together to create a multi-jurisdictional plan. For multi-jurisdictional plans, one community should be designated as the lead jurisdiction. For this update MWDOC is acting as the lead jurisdiction and is responsible for ensuring each participating jurisdiction meets the requirements laid out in the guidance. MWDOC is also taking on the role of coordinating the plan submission and adoption by all participating jurisdictions (the 15 current MAs).

For Federal approval, the following criteria must be met during the planning process:

- Complete documentation of the planning process.
- Detailed risk assessment of hazard exposures in the community and water and wastewater infrastructure.
- Comprehensive mitigation strategy, describing goals and objectives, proposed strategies, programs, and actions to avoid long-term vulnerabilities.
- A planned maintenance process will describe the method and schedule for monitoring, evaluating, and updating the MJHMP , and the integration of the plan into other planning mechanisms.
- The formal adoption of the governing bodies of each participating jurisdiction.
- Plan review by both Cal OES and FEMA.

As the cost of recovering from natural disasters continues to increase, the MAs realize the importance of identifying effective ways to reduce vulnerability to disasters. HMPs assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while guiding and coordinating mitigation activities.

The Orange County Water and Wastewater MJHMP provides a framework for participating water and wastewater utilities to plan for natural and human-caused hazards in Orange County. The resources and information within the plan will allow participating jurisdictions to identify and prioritize future mitigation projects, meet the requirements of Federal assistance programs and grant applications, and encourage coordination and collaboration in meeting mitigation goals.

This MJHMP is intended to serve many purposes, including:

- **Enhance Public Awareness and Understanding.** To help county residents better understand the natural and human-caused hazards that threaten public health, safety, and welfare; economic vitality; and the operational capability of important facilities.
- **Create a Decision Tool for Management.** To provide information so that water and wastewater managers and leaders of local government may act to address vulnerabilities.
- **Enhance Local Policies for Hazard Mitigation Capability.** To provide the policy basis for mitigation actions that will create a more disaster-resistant future.
- **Integrate the HMP into Other Plans and Programs.** To provide an opportunity for MWDOC and the MAs to assess their current planning efforts associated with water supply management, infrastructure enhancement, and facilities master planning and to promote the integration of hazard mitigation into these activities.
- **Provide Inter-Jurisdictional Coordination of Mitigation-Related Programming.** To ensure that proposals for mitigation initiatives are reviewed and coordinated among MWDOC and MAs.
- **Promote Compliance with State and Federal Program Requirements**. To ensure that MWDOC and the MAs can take full advantage of State and Federal grant programs, policies, and regulations.

To qualify for certain forms of Federal aid for pre- and post-disaster funding, local jurisdictions must comply with the Federal DMA 2000 and its implementing regulations. The MJHMP has been prepared to meet FEMA and Cal OES requirements, thus making MWDOC and the participating MAs eligible for funding and technical assistance for State and Federal hazard mitigation grant programs.

DMA 2000 requires local HMPs, including this plan, to be updated every five years. This means that this MJHMP is designed to carry the MAs through the next five years, after which its assumptions, goals, and objectives will be revisited, updated, and resubmitted for approval.

1.2 Multi-Jurisdictional Participation

1.2.1 Overview of Water and Wastewater Systems in Orange County

Water distribution and wastewater collection and treatment in Orange County involves dozens of agencies and utilities working together, and relies on integrated, regional systems and facilities. There are several retail water and wastewater utilities in Orange County, each with its own distinct service area and sources of potable water. The retail water agencies include water districts and city water departments (not participating in this update).

The Municipal Water District of Orange County (MWDOC) is a wholesale water supplier and resource planning agency that serves all of Orange County (except Anaheim, Fullerton, and Santa Ana) through 28 retail water agencies. MWDOC purchases imported water from the Metropolitan

for distribution to its MAs, which provide retail water services to the public. Local supplies meet more than half of Orange County's total water demand. To meet the remaining demand, MWDOC purchases imported water from northern California (through the State Water Project) and the Colorado River. This water is provided by Metropolitan, which in addition to Orange County, also serves Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties (MWDOC 2015).

Local water supplies in Orange County vary regionally and include groundwater, recycled wastewater, and surface water. Water supply resources in MWDOC's service area include groundwater basins, which provide a reliable local source and are also used as reservoirs to store water during wet years and draw from storage during dry years. Recycled water and surface water provide an additional local source to some MWDOC retail agencies, with surface water captured mostly from Santiago Creek into Santiago Reservoir (MWDOC 2015).

The OCWD manages and replenishes the Orange County Groundwater Basin, ensures water reliability and quality, prevents seawater intrusion, and protects Orange County's rights to Santa Ana River water. The Orange County Groundwater Basin contains approximately 500,000 acre-feet (AF) of usable storage water and covers 270 square miles. The basin is a reliable source of water and provides approximately 75% of north and central Orange County's water supply, as South Orange County is virtually 100% dependent on imported water.

MWDOC and OCWD work cooperatively and continue to evaluate new and innovative programs, including seawater desalination, wetlands expansion, recharge facility construction, surface storage, new water use efficiency programs, and system interconnections for enhanced reliability.

Wastewater collection and treatment in Orange County is managed by two regional agencies: OC San and the SOCWA, which cover north and central Orange County and South Orange County, respectively. These districts are responsible for the trunk line collection, treatment, biosolids management, and ocean outfalls for treated wastewater disposal. OC San has two primary treatment facilities, and SOCWA has three primary treatment facilities. Their facilities treat wastewater from residential, commercial, and industrial sources. Costa Mesa Sanitary District (CMSD) is a smaller wastewater provider that primarily supports the City of Costa Mesa. With more than 200 miles of sewer mains, CMSD provides service to more than 47,000 connections within their service area.

1.2.1.1 Potable Water Supplies – Current and Future

Potable water demand for Orange County was about 427,700 acre-feet per year (AF/yr) in 2020. In 2020 MWDOC provided service to approximately 2.34 million residents of the Orange County population, and that number is projected to rise to approximately 2.41 million people by 2025 (3% increase). While potable water demand in 2025 is projected to increase to 486,747 (AF/yr). This constitutes an increase of approximately 145 over 2020 demand. However some of this increase may be attributed to removal of some of the water restrictions put in place due to the drought conditions experienced in Orange County.

With planned local water supply projects plus the continued availability of Metropolitan water to replenish the Orange County Groundwater Basin, demand projections show a 12% decrease in demand for imported, full-service Metropolitan water by 2025. If the local projects do not get built, produce less than planned, or are merely delayed, then additional Metropolitan water will be needed.

1.2.2 Participating Jurisdictions

Following is a list of the jurisdictions participating in the MJHMP update; refer to **Exhibit 1-1:**

- Municipal Water District of Orange County (MWDOC)
- Costa Mesa Sanitary District (CMSD)
- El Toro Water District (ETWD)
- Irvine Ranch Water District (IRWD)
- Laguna Beach County Water District (LBCWD)
- Mesa Water District
- Moulton Niguel Water District (MNWD)
- Orange County Sanitation District (OC San)
- Orange County Water District (OCWD)
- Santa Margarita Water District (SMWD)
- Serrano Water District
- South Coast Water District (SCWD)
- South Orange County Wastewater Authority (SOCWA)
- Trabuco Canyon Water District (TCWD)
- Yorba Linda Water District (YLWD)

It should also be noted that the cities participating in the previous version of the MJHMP (Buena Park, Garden Grove, La Habra, Newport Beach, Orange, and Westminster) are not participating in the latest update to the plan. However, both IRWD and CMSD are participating as MAs for the 2024 MJHMP update. The inclusion of IRWD involves the integration of their recently completed Local Hazard Mitigation Plan (LHMP) from 2021 into this document as an annex. In the case of CMSD, their annex is the first HMP that they have completed in conformance with DMA 2000.

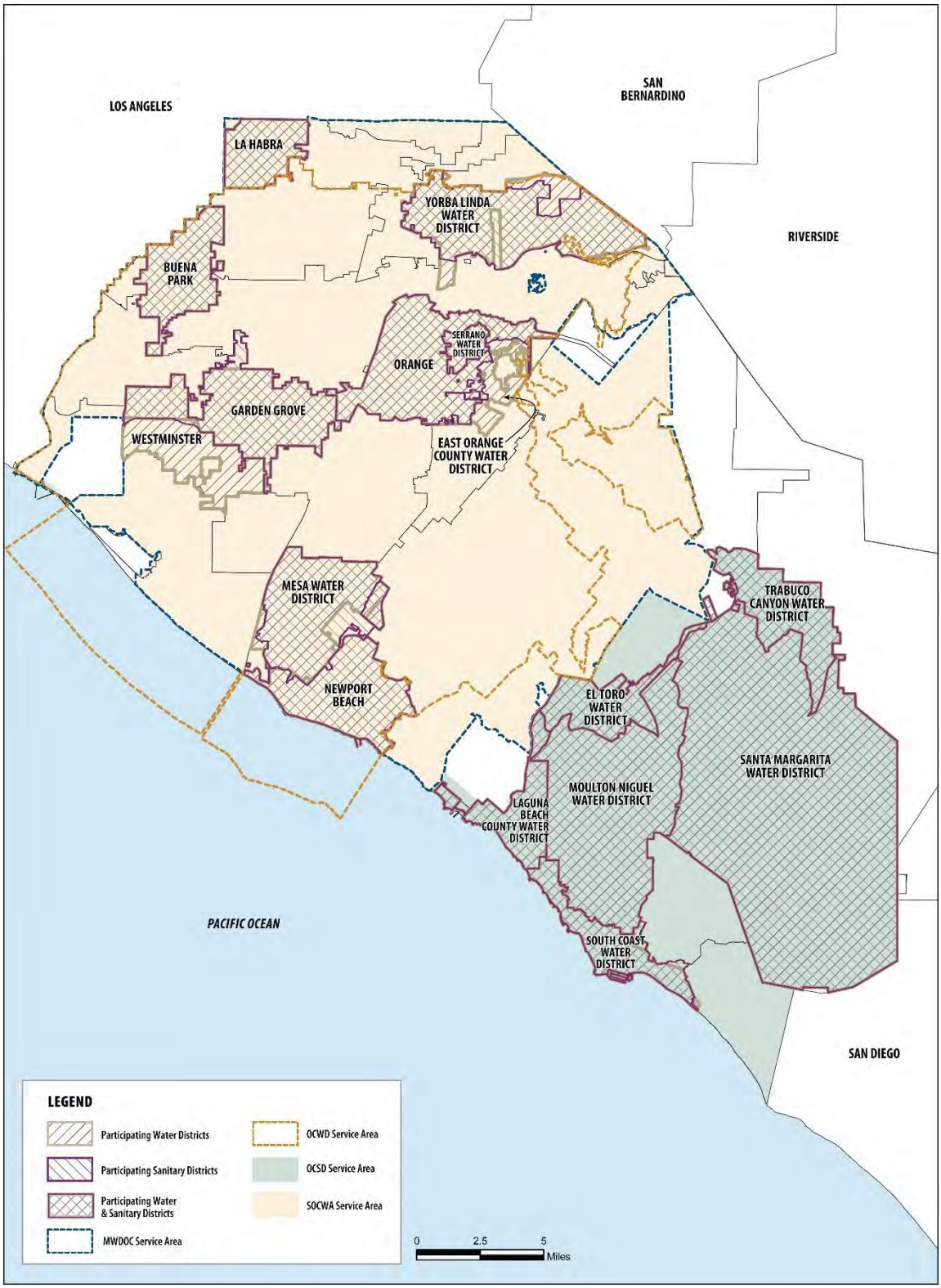
Retailers can be grouped into the following regions based on the availability of local groundwater resources:

- The Orange County Groundwater Basin provides approximately 75% of Orange County's north and central water supply. The rest of their supply is primarily imported water provided by Metropolitan; although Serrano Water District is partly served by local runoff captured in Irvine Lake. Participating MAs within the Orange County Groundwater Basin include the Mesa, Serrano, Yorba Linda, and Irvine Ranch water districts.
- South Orange County is almost 100% dependent on Metropolitan for its potable water supply. Parts of this area are within the San Juan Capistrano Groundwater Basin, which is managed by the San Juan Basin Authority. Local groundwater in the area is high in salts and accounts for less of the water supply than utilities in the Orange County Groundwater Basin. MAs include El Toro, Laguna Beach County, Moulton Niguel, Santa Margarita, South Coast, and Trabuco Canyon water districts.

Although located within Orange County, the participating MAs do not comprise or serve the entire county. In addition, the service areas for each of the MAs participating in the MJHMP do not necessarily align with incorporated or unincorporated boundaries or city boundaries. In many cases an MA may serve multiple cities and/or portions of cities/unincorporated areas. Profiles for each of the participating water and wastewater utilities are provided in the Jurisdictional Annexes. The MJHMP must be formally adopted by each jurisdiction's governing body, which may be the Board of Directors for each agency and district.

The resources and background information in the MJHMP are applicable county-wide, providing the groundwork for goals and recommendations for other local mitigation plans and partnerships. In the identification of shared action items, the plan fosters the development of partnerships and implementation of preventative activities. A unified MJHMP will ensure that any proposals for mitigation initiatives are reviewed and coordinated among the participating agencies and utilities.

Exhibit 1-1. Member Agency Plan Participants – New Map to Be Inserted



1.3 What Is New/What Has Changed from the 2019 MJHMP

Several sections of the 2024 MJHMP have been modified from the previous plan. Changes made to specific sections of the plan are summarized below:

- **Section One:** This section text has been modified to clarify the multi-jurisdictional involvement and changes to MAs, update outdated or irrelevant information, and to streamline the section.
- **Section Two:** This section includes an updated description of the planning process conducted for this plan update. This section has been completely revised and updated to discuss the process for the MJHMP update, including the Hazard Mitigation Planning Team (Planning Team), meetings, public outreach, and overall process for this update.
- **Section Three:** This section comprises the risk assessment. The hazards have been confirmed with minor updates to better reflect hazards that affect the planning area, as determined by the Planning Team. This includes the addition of extreme heat, and cyber threats, as well as a reorganization of hazards under primary headings for easier reading. In addition, climate change was incorporated into all-hazard profiles instead of a stand-alone profile to better connect how climate change may exacerbate future hazards. Each of the hazard profiles were updated to reflect hazard occurrences (if any) since the 2019 MJHMP was prepared. During this MJHMP update, additional infrastructure analysis was completed for MAs that had built new assets or added assets from other agencies (annexation of one district into another) These new facilities were overlaid on top of the hazard layers to verify potential vulnerability.
- **Section Four.** This section documents the mitigation strategy, which includes overarching hazard mitigation goals for the planning area. It was determined through the Planning Team meetings that the existing mitigation goals are still relevant for all participating MAs, and therefore this set of goals was maintained with minor edits. Some participating MAs identified additional goals specific to their agencies, which have been included in the respective annex. Updated mitigation actions and capabilities assessments specific to each MA are included in their respective annexes. An overview of hazard mitigation is provided, including the methodology for identifying and prioritizing mitigation actions.
- **Section Five.** This section documents the MJHMP maintenance process and includes a reference to a Monitoring and Implementation Workbook developed as part of the update.
- **Section Six:** This section documents the MJHMP references and has been updated to reflect new references used in this 2024 MJHMP.
- **Jurisdictional Annexes:** The annexes have been updated to include new information, updated asset inventories and risk assessment, and updated mitigation strategies.
- **Appendices:** The appendices have been completely updated to include 2024 MJHMP update materials.

1.4 Plan Organization

The Orange County Regional Water and Wastewater MJHMP is organized into the following sections:

- **Section One: Introduction.** Provides an overview of the plan, a discussion of the plan's purpose and authority, a description of the multi-jurisdictional participation, a summary of how this update differs from previous versions of the plan and describes the plan's organization.
- **Section Two: Planning Process Documentation.** Describes the MJHMP planning process, as well as the meetings and outreach activities undertaken to engage the MAs and the public.
- **Section Three: Risk Assessment.** Identifies and profiles the hazards that threaten the area served by the MAs and identifies the vulnerability and risk to critical water and wastewater infrastructure associated with each hazard. Due to the vast planning area associated with the MAs participating in the plan, this section addresses the entire geographic area served by the MAs. The Jurisdictional Annexes detail the hazards, risk assessments, and mitigation strategies specific to each MA.
- **Section Four: Mitigation Strategy.** Includes multi-jurisdictional goals for the 2024 update and summarizes the mitigation action plan process. Mitigation actions and capabilities specific to each MA are detailed in the Jurisdictional Annexes.
- **Section Five: Plan Maintenance.** Discusses how the 2024 MJHMP will be monitored, evaluated, and updated over the next five years.
- **Section Six: References.** Identifies the resources used in preparation of the 2024 update.
- **Appendices.** Provides the 2024 update materials.
- **Jurisdiction Annexes.** Provides a profile of the jurisdiction, describe the hazards of concern, assesses the vulnerabilities to the MA, describes the existing capabilities and proposed mitigation strategies specific to each MA.

Sections one through six plus the appendices comprise the primary MJHMP. It describes the MJHMP planning process and hazard mitigation planning requirements for each MA. The information in this primary MJHMP are applicable to all the MAs. The Jurisdictional Annexes provide hazard mitigation planning information specific to each MA and supplements the information contained in the primary document.

SECTION 2: PLANNING PROCESS DOCUMENTATION

This section describes each stage of the planning process used to update this 2024 MJHMP. The planning process provides a framework to document the plan's update and follows the FEMA-recommended steps. This update follows a prescribed series of planning steps, which includes organizing resources, assessing risk, updating the mitigation actions, updating the plan, reviewing and revising the plan, and adopting and submitting the plan for approval. Each step is described in this section.

Hazard mitigation planning in the United States is guided by the statutory regulations described in the DMA 2000 and implemented through 44 CFR Parts 201 and 206. FEMA's hazard mitigation plan guidelines outline a four-step planning process for the development and approval of HMPs. **Exhibit 2-1, DMA 2000 CFR Crosswalk**, lists the specific CFR excerpts that identify the requirements for approval.

Exhibit 2-1. DMA 2000 CFR Crosswalk

DMA 2000 (44 CFR 201.6)	2024 MJHMP Update Section
(1) Organize Resources	Section 2 (this section)
201.6(c)(1)	Organize to prepare the plan
201.6(b)(1)	Involve the public
201.6(b)(2) and (3)	Coordinate with other agencies
(2) Assess Risks	Section 3
201.6(c)(2)(i)	Assess the hazard
201.6(c)(2)(ii) and (iii)	Assess the problem
(3) Develop the Mitigation Plan	Section 4
201.6(c)(3)(i)	Set goals
201.6(c)(3)(ii)	Review possible activities (actions)
201.6(c)(3)(iii)	Draft an action plan
(4) Plan Maintenance	Section 5
201.6(c)(5)	Adopt the plan
201.6(c)(4)	Implement, evaluate, and revise

As documented in the corresponding sections, the planning process for the 2024 MJHMP was consistent with the requirements for hazard mitigation planning with customizations, as appropriate. All basic Federal guidance documents and regulations were met through the customized process.

2.1 Organizing Resources

One of the first steps in the planning process involved organization of resources, including identifying the Project Management Team, convening the Planning Team, and performing document review.

2.1.1 Project Management Team

The Project Management Team was responsible for the day-to-day coordination of the update work program, including forming and assembling the Planning Team; scheduling Planning Team meetings; preparing, reviewing, and disseminating Planning Team meeting materials; coordinating, scheduling, and participating in community engagement activities and meetings; and coordinating document review. The Project Management Team was led by an emergency coordinator from the Water Emergency Response Organization of Orange County (WEROC), administered by the

MWDOC, who served as project manager and participated on the Planning Team. The project manager monitored planning progress and met with participating jurisdictions as needed to assist with obtaining and updating information for the plan.

The Project Management Team worked directly with the Consultant Project Management Team throughout development of the plan update. The Consultant Team, consisting of a variety of hazard mitigation/planning professionals, provided guidance and support to MWDOC and the Planning Team through facilitation of the planning process, data collection, community engagement, and meeting material and document development.

2.1.2 Planning Team

The planning process for the MJHMP involved 12 water districts, two regional wastewater agencies, and one sanitary district; a total of 15 special districts participated in the planning process. Representatives from participating MAs provided input into the MJHMP update process. Each MA provided at least one representative to participate on the Planning Team and attend meetings. Each MA local team, made up of staff/officials, met separately and provided additional local-level input to the Consultant Team for inclusion into the MJHMP. The MA participated in the planning process by exchanging information, providing feedback on prior plan progress, discussing planning strategies, sharing goals, resolving issues, and monitoring progress. The MA benefited from working closely together because many of the hazards identified are shared by neighboring jurisdictions and participants were involved in the discussion of potential mitigation actions. Jurisdictional representatives included but were not limited to utility engineers, planners, public information officers (PIOs), and emergency management staff.

The Planning Team worked together to ensure the success of the planning process and is responsible for its implementation and future maintenance. The Planning Team's key responsibilities included:

- Participation in Planning Team meetings.
- Coordination of jurisdiction-specific meetings to relay information and obtain input.
- Collection of valuable local information and other requested data.
- Decision on plan process and content.
- Development and prioritization of mitigation actions for the plan.
- Review and comment on plan drafts.
- Coordination and involvement in the public engagement process.

Exhibit 2-2, **Members of the Planning Team,** identifies the Planning Team members.

Exhibit 2-2. Members of the Planning Team

Name	Title/Position	Organization
Vicki Osborn	Director of Emergency Management	WEROC/MWDOC
Gabby Landeros	WEROC Programs Manager	WEROC/MWDOC
Janine Schunk	WEROC Coordinator	WEROC/MWDOC
Noelani Middenway	PIO	CMSD
Gina Terraneo	Senior Management Analyst	CMSD
Scott Carroll	General Manager	CMSD
Mark Esquer	District Engineer	CMSD
Sherri Seitz	Public Relations/ Emergency Preparedness Administrator	El Toro Water District
Hannah Ford	Hannah Ford	El Toro Water District

Name	Title/Position	Organization
Dennis Cafferty	General Manager/ District Engineer	El Toro Water District
Eric AKiyoshi	Engineering Manager	IRWD
Steve Choi	Director of Safety & Security	IRWD
Robert Meripol	Safety Specialist	IRWD
Leo Lopez	Safety Officer	LBCWD
Christopher Regan	Assistant General Manager	LBCWD
Kaying Lee	Water Quality and Compliance Supervisor	Mesa Water District
Andrew Wiesner	District Engineer	Mesa Water District
Bob Mitchell	Water Operations Supervisor	Mesa Water District
Carrie Fesili	Water Operations Coordinator	Mesa Water District
Karyn Igar	Senior Civil Engineer	Mesa Water District
Tyler Jernigan	Water Operations Manager	Mesa Water District
Adrian Tasso	Assistant Director of Operations	MNWD
Cristina Garcia	Administrative Analyst	MNWD
Dan Horn	Water Distribution Supervisor	MNWD
David Larsen	Assistant Director of Engineering	MNWD
Genevieve Ramirez	Communications Manager	MNWD
Len Barton	Safety and Emergency Manager	MNWD
Matthew Brown	Information Systems Officer	MNWD
Matthew Collings	Assistant General Manager	MNWD
Ronin Goodall	Assistant Director of Operations	MNWD
Rodney Woods	Director of Engineering	MNWD
Todd Dmytryshyn	Assistant Director of Engineering	MNWD
William Kidd	Information Systems Administrator	MNWD
Dan West	Superintendent of Operations	MNWD
John Frattali	Safety and Health Supervisor	OC San
Krystal Aleman	Security/ Emergency Planning Specialist	OC San
Paula Bouyounes	Risk and Safety Manager	OCWD
Chris Lopez	Safety Officer	SMWD
Daniel Peterson	Regulatory and Logistics Manager	SMWD
Eric Smith	Utilities Manager	SMWD
Jerry Vilander	General Manager	Serrano Water District
Blaise Bautsch	Safety and Health Program Manager	SCWD
Chris Newton	Operations Superintendent	SCWD
Kyle Gough	Transmission Main Manager	SCWD
Steve Dishon	Water Resources Manager	SCWD
Sunny Lee	Compliance and Risk Program Manager	SCWD
Sean Peacher	Environmental Compliance Safety Risk Manager	SOCWA
Ernie Leal	Plant Operator	SOCWA
Jim Burror	Director of Operations	SOCWA
Amber Baylor	Human Resources Administrator	SOCWA
Michael Perea	Assistant General Manager	TCWD
Lorrie Lausten	District Engineer	TCWD
David Rodriguez	??	TCWD
Alex Ramirez	Safety Officer	YLWD

Exhibit 2-3, Planning Team Roles, identifies each member's roles in the plan update.

Exhibit 2-3. Planning Team Roles

Member	Planning Team Role
Vicki Osborn, WEROC/MWDOC	Project Manager/Planning Team Representative – Organization of Planning Team and meetings, development of and participation in community outreach, hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan coordination, and review.
Gabby Landeros, WEROC/MWDOC	Project Management Team – Historical knowledge and insight into 2012 plan, overall guidance on 2018 plan, hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
All Planning Team Members	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.

It should be noted that through the Orange County Emergency Management Organization (OCEMO), the County of Orange, and all cities within the county were provided the opportunity to participate in the MJHMP development process, including dissemination of the draft plan to OCEMO's distribution list for review and comment. This included all Orange County's cities, colleges, school districts, special districts, water districts, State and county agencies, the hospital association, affiliates, and other approved agencies. Refer to **Appendix A** for outreach content and information.

MWDOC also provided an opportunity for State and county agencies and emergency services providers to be part of the Planning Team. Email invitations were extended to the following:

- State Water Resources Control Board
- Orange County Health Care Agency
- Orange County Fire Agency
- Orange County Sheriff's Department

Note to staff: were these entities invited to the process?

Businesses, academia, and other private and non-profit interests were provided notification of the Draft MJHMP's availability via the MA email distribution, notification lists, and social media. Distribution documentation is provided in **Appendix A**.

The Planning Team held three meetings. The meetings were designed to aid the MA in completing a thorough review of the hazards within their jurisdictions, identifying capabilities, understanding and assessing vulnerabilities, and identifying mitigation strategies. **Exhibit 2-4, Planning Team Meeting Summary,** provides a summary of the meetings. Meeting agendas and pertinent materials are provided in **Appendix A.**

Exhibit 2-4. Planning Team Meeting Summary

Date	Meeting	Discussion
June 17, 2024	Planning Team Meeting #1	Introductions Project goals and objectives Roles and responsibilities Data/information needs Plan update and requirements Preliminary discussion of community engagement strategy Hazard identification and prioritization Meeting schedule

Date	Meeting	Discussion
July 16, 2024, through July 30, 2024	Planning Team Meetings #2	Review of Compiled Data Tool that discusses hazards of concern, hazard priorities, additional critical facilities, capabilities assessment updates, and mitigation actions status.
October 16, 2024, through November 8, 2024	Planning Team Meetings #3	Review of the Administrative Draft HMP documents (the base plan and annexes) with MAs requesting assistance.
Date TBD	Planning Team Meetings #4	Meeting with specific MA to address comments from FEMA, as necessary.

In addition to the regularly scheduled meetings, Planning Team members coordinated individually with the plan update project manager, as necessary, to resolve any questions or discuss information requested at the Planning Team meetings. This was typically accomplished via telephone or email. Any MA that missed a scheduled planning meeting coordinated with the project manager separately to review what was discussed in the meeting and to obtain jurisdiction-specific information.

2.1.3 Public Outreach

A public outreach and engagement strategy was developed to inform the public and maximize public involvement in the plan-update process. The public outreach strategy included posting information on the MA websites, email and social media distribution, a community survey, and presentations at individual Board meetings and OCEMO meetings, as described below. Refer to **Appendix A.**

Member Agency Websites

Information regarding the MJHMP update was made available on each MA website. The webpages provided information on the plan, the plan update process, and how the public can be involved in the planning process, including a link to the community survey (discussed below). A link to the Draft MJHMP was also made available for review and comment.

Social Media

Social media notifications regarding the MJHMP's update, including a link to the community survey were sent to MA social media accounts.

Community Survey

A community survey was developed to obtain input from the community about various hazard mitigation topics. The survey was designed to help the MA gauge the level of knowledge the community has about natural disaster issues and to obtain input about areas of Orange County that may be vulnerable to various types of natural disasters. The information provided was used to identify and coordinate projects focused on reducing the risk of injury or damage to property from future hazard events. A link to the survey was provided on each of the MAs' websites, as well as information shared via social media and through newsletters and other communications.

Based on the distribution across all 15 MAs' social media platforms over XXX,XXX impressions were obtained via social media outreach and 51 surveys were completed. Results from survey participants are provided in **Appendix A.**

Stakeholder Outreach

Water Board Meeting Presentations – Various Dates

Between July X, 2024, and October X, 2024, the MWDOC Project Management Team attended Board of Directors meetings to discuss the MJHMP update and provide additional information to decision makers regarding the update process and what to expect when the plan is ready for final approval. The following are a list of in-person meetings attended where this information was shared:

Insert List – Vicki to Provide List

A copy of the presentation provided at these meetings is included in **Appendix A.**

Orange County Emergency Management Organization – Insert Date

The plan update project manager presented to the OCEMO during their monthly meeting. OCEMO is a subcommittee comprised of the County of Orange and all subdivisions that ensure the cooperative maintenance of the Operational Area Emergency Operations Plan, policies and procedures, training, and exercises. The presentation included information about hazard mitigation, the planning process, hazards affecting Orange County water and wastewater infrastructure, and the importance of OCEMO's involvement in the development process. As noted previously, the Draft MJHMP was disseminated to OCEMO's distribution list for review and comment. Refer to **Appendix A** for outreach materials and information shared during the planning process**.**

Public Review Draft Hazard Mitigation Plan

The public review Draft MJHMP was made available for review and comment for a 15-day period beginning November X, 2024, and concluding on November X, 2024. The draft plan was made available on the MAs' webpages and at the MAs' offices and/or front counters. An online form was created allowing reviewers to easily submit comments and feedback to the Project Management Team.

2.1.4 Review and Incorporate Existing Information

The Planning Team and each MA local team reviewed and assessed existing plans and studies available from Federal, State, and local sources during the planning process. The types of documents reviewed and incorporated as part of the MJHMP update are listed in **Exhibit 2-5, Existing Plans and Studies.** Due to the number of MAs involved in the plan update, similar plans and studies specific to each district were reviewed and incorporated in the 2024 MJHMP. A complete list of references is included in **Section 6, References.**

Exhibit 2-5. Existing Plans and Studies

Existing Plans and Studies	Relevant Topic
Orange County Water & Wastewater Multi-Jurisdictional HMP	Hazard Profiles; Capabilities Assessment; Mitigation Strategy
State of California Multi-Jurisdictional HMP (2023)	Hazard Profiles
Agency Urban Water Management Plans	Hazard Profiles; Capabilities Assessment
FEMA Hazard Mitigation How-to Guides	Plan Development; Plan Components

Existing Plans and Studies	Relevant Topic
FEMA Local Mitigation Planning Handbook (May 2023)	Plan Development; Local Plan Integration Methods
FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (September 2021)	Mitigation Strategy Development
Orange County Water and Wastewater GIS Layers with Critical Infrastructure Facilities	Hazard Profiles; Risk/Vulnerability Assessments; Mitigation Strategy
Seismic Hazard Assessment, Orange County Seismic Vulnerability, Mitigation and Recovery Planning Study (August 28, 2015)	Hazard Profiles; Risk/Vulnerability Assessments; Mitigation Strategy
Agency-Specific Reliability Studies	Hazard Profiles; Risk/Vulnerability Assessments; Mitigation Strategy
Agency-Specific Risk and Resilience Assessments	Hazard Profiles, Risk/Vulnerability Assessments, Mitigation Strategy

2.2 Assess Risks

In accordance with FEMA requirements, the Planning Team identified and prioritized the hazards affecting Orange County and assessed the associated vulnerability from those hazards. Results from this phase of the planning process aided subsequent identification of appropriate mitigation actions to reduce risk from these hazards (refer to **Section 3**).

2.2.1 Identify/Profile Hazards

The Planning Team reviewed the hazards profiled in the 2019 MJHMP as well as a list of FEMA-identified hazards to determine which hazards had the potential to impact Orange County and thus should be profiled as part of the plan update. This 2024 MJHMP continues to include natural and human-caused hazards that may threaten all or a portion of the county and individual MAs. It was noted that some location-specific hazards would not be applicable to every MA, but still warranted identification. Through discussions of the hazards, including the probability, location, maximum probable extent, and potential secondary impacts, a list of hazards was developed and prioritized. Content for each hazard profile is provided in **Section 3.** A key update to these hazard profiles is the integration of climate change into each hazard discussion. This approach was agreed upon by the Planning Team to ensure climate change was adequately addressed in relation to the hazards profiled.

2.2.2 Assess Vulnerabilities

Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining which areas within Orange County are vulnerable to specific hazard events. The vulnerability assessment included input from the Planning Team and a refinement of the GIS overlaying method previously used for hazard risk assessments in the 2019 MJHMP. Using these methodologies, water and wastewater infrastructure impacted by the profiled hazards was identified and potential loss estimates were updated. Detailed information on the vulnerability assessments for each hazard is provided in **Section 3.**

2.3 Develop Mitigation Plans

The 2024 MJHMP was prepared in accordance with DMA 2000 and FEMA's latest HMP guidance documents. This plan provides an explicit strategy and blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources,

and the MAs ability to expand on and improve existing tools. Developing the mitigation plan involved identifying goals, assessing existing capabilities, and identifying mitigation actions. This step of the planning process is detailed in **Section 4** and summarized below.

2.3.1 Identify Goals

The Planning Team reviewed the goals identified in the 2019 MJHMP and determined that the existing goals in the plan were still relevant and meaningful to MWDOC and its MAs. Only minor modifications were included in the 2024 MJHMP goals, which focused on refinement of language. The Mitigation Goals are presented in **Section 4.2**. For some MAs, it was determined that additional goals specific to their agency were still warranted and are included in the Jurisdiction Annexes, where applicable.

2.3.2 Develop Capabilities Assessment

A capabilities assessment is a comprehensive review of all the various mitigation capabilities and tools currently available to the MA to implement the mitigation actions that are prescribed in the MJHMP. The Planning Team reviewed planning, regulatory, administrative, technical, financial, educational, and outreach capabilities to implement mitigation actions. Each MA reviewed capabilities information from the 2019 MJHMP and worked with their local teams to identify and updated the capabilities assessment specific to their agency. This review also identified potential improvements to better support future mitigation. The capabilities assessments for each MA are included in the Jurisdiction Annexes.

2.3.3 Identify Mitigation Actions

As part of the planning process, the Planning Team worked to identify and develop mitigation actions to address the profiled hazards. The mitigation actions in the 2019 MJHMP were reviewed to determine whether they had been achieved, were still relevant, or were no longer relevant due to changing circumstances. Each MA considered the hazards applicable to their agency and identified and prioritized mitigation actions. The mitigation actions for each MA are included in the Jurisdiction Annexes.

2.3.4 Plan Review and Revisions

Once the Draft MJHMP was completed, a public review period was provided from November XX, 2024, through November XX, 2024, to allow public review and comments. Comments received on the draft plan were reviewed and the plan was revised, as appropriate.

2.3.5 Plan Adoption and Submittal

Upon completion of the public review period this 2024 MJHMP was submitted to Cal OES on (insert date upon completion). On (insert date), Cal OES approved the plan for transmittal to FEMA for review. FEMA completed their review and provided MWDOC and MAs with an Approvable Pending Adoption letter on (insert date). Final Board adoption by MWDOC and MAs occurred on or after (insert date). **Appendix B** includes copies of the resolutions of adoption from all participating MAs.

2.3.6 Plan Maintenance

Plan maintenance procedures, found in **Section 5**, include the measures each MA will take to ensure the 2024 MJHMP's continuous long-term implementation. The procedures also include the manner in which the plan will be regularly monitored, reported upon, evaluated, and updated to

remain a current and meaningful planning document. **Appendix C** includes a "Progress Report Worksheet" intended to support future plan maintenance and implementation by MWDOC and MAs.

SECTION 3: RISK ASSESSMENT

Risk assessment requires the collection and analysis of hazard-related data to enable local jurisdictions to identify and prioritize appropriate mitigation actions and strategies that will reduce losses from potential hazards. FEMA's LHMP How-to Guide recommends four steps for conducting a risk assessment:

1. Describe hazards that pose a threat to the planning area;
2. Identify community assets (for the purposes of this MJHMP this includes water and wastewater infrastructure) in the planning area;
3. Analyze risks associated with the hazards, including describing the potential impacts and estimating losses for each hazard; and
4. Summarize vulnerability to understand the most significant risks and vulnerabilities associated with the identified hazards.

The risk assessment must result in an evaluation of potential impacts and overall vulnerability for each participating jurisdiction to develop specific mitigation actions. The following identifies the hazards for the entire planning area and notes if the hazard is applicable to all jurisdictions or is unique to specific jurisdictions. Hazards applicable to all jurisdictions are described in this section and are not described separately in the Jurisdictional Annexes. Hazards unique to a jurisdiction are further discussed in the Jurisdictional Annexes.

3.1 Hazard Identification and Prioritization

3.1.1 Hazard Identification

Hazard identification is the process of identifying hazards that threaten an area including both natural and human-caused events. A natural event causes a hazard when it harms people or property. Such events would include floods, earthquakes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. Human-caused hazard events are caused by human activity and include technological hazards and malevolent acts such as terrorism. Technological hazards are generally accidental and/or have unintended consequences (for example, an accidental hazardous materials release). Terrorism is defined by the CFR as "…unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." Natural hazards that have harmed Orange County in the past are likely to happen in the future; consequently, the process of identifying hazards includes determining if the hazard has occurred previously.

The Planning Team reviewed the list of FEMA-identified hazards, the 2019 MJHMP, and other relevant information to determine the extent of hazards with the potential to affect the planning area; refer to **Exhibit 2-5, Existing Plans and Studies**. A discussion of potential hazards during the first Planning Team meeting resulted in the identification of the natural and human-cause hazards that pose a potential risk to all or a portion of the planning area and MAs. **Exhibit 3-1, Hazard Identification,** summarizes the Planning Team's discussion and identification of the hazards included in this 2024 MJHMP.

Exhibit 3-1. Hazard Identification

Hazards	Included in 2019 MJHMP?	Included in 2024 MJHMP?	Discussion Summary
Avalanche	No	No	Not applicable. Snowfall is not a typical occurrence in Orange County and there is no historical record of this hazard in the region.
Climate Change	Yes	Yes	Climate change is a phenomenon that could exacerbate hazards. Climate change and how it can potentially affect the severity, intensity, and frequency of a hazard is discussed in each individual hazard profile.
Coastal Erosion	Yes	Yes	Coastal erosion and storms occur within the coastal communities, which include development along the coast. These hazards are combined in **Section 3.2.1, Coastal Hazards** (Coastal Erosion, Coastal Storm, Sea Level Rise, and Tsunami).
Coastal Storm	Yes	Yes	Coastal erosion and storms occur within the coastal communities within the planning area. These hazards are combined in **Section 3.2.1, Coastal Hazards**.
Contamination/ Saltwater Intrusion	Yes	Yes	Water supplies are susceptible to contamination from human activities. In addition, saltwater intrusion is a concern within the planning area as it has occurred previously due to groundwater extraction. This hazard has been combined in **Section 3.2.5, Human-Caused Hazards**.
Cyber Threats (Terrorism)	No	Yes	The growing threat of cyber security and data breaches has increasingly become a potential hazard concern for jurisdictions throughout the planning area. Due to the potential effect on key infrastructure functions this hazard has been included in the plan update.
Dam/Reservoir Failure	Yes	Yes	Several dams and reservoirs are located throughout Orange County or in areas that could impact the county in the event of a failure. Infrastructure located within inundation areas could be impacted. This hazard includes dams and reservoirs.
Disease/Pest Management	No	No	Not applicable. Disease/pest management is not a hazard that impacts water/wastewater facilities and infrastructure.
Drought	Yes	Yes	Water supplies are dependent on groundwater and imported surface water, both of which are susceptible to drought. The county has experienced historical droughts, including the most recent State-declared drought emergency (2014-2017). See **Section 3.2.7, Severe Weather.**
Earthquake Fault Rupture	Yes	Yes	Alquist-Priolo fault zones occur within Orange County. The county has a long history of earthquakes, some resulting in considerable damage. This topic has been in **Section 3.2.6, Seismic Hazards,** which address Fault Rupture, Seismic Shaking, and Liquefaction.
Expansive Soils	Yes	Yes	Expansive soil conditions occur within portions of Orange County and can be exacerbated by periods of rain and drought. This topic is combined in **Section 3.2.4,**

Hazards	Included in 2019 MJHMP?	Included in 2024 MJHMP?	Discussion Summary
			Geological Hazards, which includes Expansive Soils, Land Subsidence, Landslides, and Mudflow.
Extreme Heat	No	Yes	Extreme heat is a hazard that typically affects all of Southern California. Recently portions of Orange County have experienced extreme heat events causing concern. In addition, climate change is anticipated to increase temperatures throughout the planning area. This hazard has been included in this MJHMP and is discussed in **Section 3.2.7, Severe Weather Hazards**, which includes Drought, Extreme Heat, and Windstorms.
Flood	Yes	Yes	Portions of Orange County are located within floodplains and have experienced historic flooding. More localized flooding also occurs during rainstorms.
Geological Hazards	Yes	Yes	Orange County is located in an area of geological hazards, including seismic activity. This topic has been combined to include Expansive Soils, Land Subsidence, Landslides, and Mudflow.
Hailstorm	No	No	Not applicable. Hailstorms rarely occur within Orange County and there is no historical record of this hazard causing significant damage to the planning area.
Hazardous Materials	Yes	Yes	Water supplies could be compromised by accidental or intentional release of hazardous materials. This hazard is addressed in **Section 3.2.5, Human-Caused Hazards**.
Human-Caused Hazards	Yes	Yes	Human-caused hazards are a concern throughout the planning area and Southern California. This category has been expanded to include Contamination/Saltwater Intrusion, Hazardous Materials, Power Outage, Terrorism (Cyber Threat), and Terrorism (Mass Casualty Incident).
Hurricane	No	No	Not applicable.
Land Subsidence	Yes	Yes	Land subsidence conditions occur within Orange County. This topic is addressed in **Section 3.2.4, Geological Hazards.**
Landslide and Mudflow	Yes	Yes	Areas of the county are susceptible to landslides and mudflow, which can be exacerbated by other hazards including seismic ground shaking, drought conditions, and wildfires. See **Section 3.2.4, Geological Hazards.**
Lightning	No	No	Not applicable. Although lightning sometimes occurs during storm events, it is limited within the region and there is no historical record of this hazard significantly impacting the planning area.
Liquefaction	Yes	Yes	Liquefaction zones occur within Orange County. This topic has been combined in **Section 3.2.6, Seismic Hazards,** which includes Fault Rupture, Seismic Shaking, and Liquefaction.
Mass Casualty Incident (Terrorism)	Yes	Yes	Mass casualty incidents and terrorism have been identified as potential hazards of concern for the planning area. This hazard is addressed in **Section 3.2.5, Human-Caused Hazards.**

Hazards	Included in 2019 MJHMP?	Included in 2024 MJHMP?	Discussion Summary
Power Outage	Yes	Yes	Although typically associated with other hazards, power outages can directly impact water and wastewater systems and have been added to **Section 3.2.5, Human-Caused Hazards.**
Sea Level Rise	Yes	Yes	Sea level rise has been identified as a hazard affecting some of the coastal communities. This hazard has been included in the Coastal Hazards profile within this 2024 Multi-Jurisdictional HMP. **See Section 3.2.1, Coastal Hazards.**
Seismic Shaking	Yes	Yes	Orange County has a long history of earthquakes, some resulting in considerable damage. This topic is included the seismic hazards discussion, which includes Fault Rupture, Seismic Shaking, and Liquefaction. **See Section 3.2.6, Seismic Hazards.**
Severe Winter Storm	No	No	Not applicable. Severe winter storms are not common in Orange County, and there are no historical records of this hazard in the region.
Tornado	Yes	No	Tornadoes are not a typical occurrence in Orange County. This topic has been removed from this 2024 MJHMP.
Tsunami	Yes	Yes	Portions of the Orange County coastline are located within tsunami inundation areas. This topic is discussed in **Section 3.2.1, Coastal Hazards.**
Urban Fire	No	Yes	The potential for damage to key facilities and infrastructure has been identified as a potential threat within the planning area. It has been included in **Section 3.2.8, Wildland/Urban Fire.**
Volcano	No	No	Not applicable. There are no active volcanoes in Orange County or the surrounding area.
Wildfire	Yes	Yes	Portions of Orange County are located within fire hazard zones, which are adjacent to existing urban development. Due to the proximity of both development and critical infrastructure to fire hazard zones, this hazard has been profiled in this plan. **See Section 3.2.8, Wildland/Urban Fire.**
Wind	No	No	Regular wind is not a typical occurrence and does not cause severe damage within the area. High winds/Santa Ana winds are common throughout Orange County and are addressed in **Section 3.2.7, Severe Weather.**
Windstorm	Yes	Yes	High Winds/Santa Ana winds are a common occurrence in the planning area and can impact critical infrastructure and services that support water/wastewater operations, see **Section 3.2.7, Severe Weather.**

3.1.2 Hazard Prioritization

The Planning Team used a Microsoft Excel-based tool to prioritize the identified hazards by assigning each hazard a ranking based on probability of occurrence and the potential impact.

These rankings were assigned based on a group discussion, knowledge of past occurrences, and familiarity with each MA's vulnerabilities. Four criteria were used to establish priority:

- Probability (likelihood of occurrence)
- Location (size of potentially affected area)
- Maximum Probable Extent (intensity of damage)
- Secondary Impacts (severity of impacts to community)

A value from 1 to 4 was assigned for each criterion. The four criteria were then weighted based on the Planning Team's opinion of each criterion's importance. **Exhibit 3-2, Hazard Rankings,** presents the results of the hazard rankings for the planning area.

Exhibit 3-2. Hazard Rankings

Hazard Type	Probability	Impact			Total Score	Hazard Planning Consideration
		Affected Area	Primary Impact	Secondary Impact		
Human-Caused Hazards: Power Outage	4	3	4	4	57.6	High
Wildfire	4	3	3	4	52.0	High
Human-Caused Hazards: Terrorism (Cyber Threat)	4	3	3	2	44.0	High
Seismic Hazards: Seismic Shaking	3	3	4	4	43.2	High
Seismic Hazards: Liquefaction	3	3	4	4	43.2	High
Severe Weather: Windstorm	4	4	2	1	40.8	Medium
Severe Weather: Extreme Heat	3	3	3	3	36	Medium
Severe Weather: Drought	4	4	1	1	35.2	Medium
Dam/Reservoir Failure	2	3	4	4	28.8	Medium
Flood	3	3	2	1	25.8	Medium
Coastal Hazards: Coastal Storm	3	2	2	2	24.0	Medium
Coastal Hazards: Coastal Erosion	3	1	2	2	19.2	Medium
Seismic Hazards: Earthquake Fault Rupture	2	1	4	2	18.4	Medium
Geological Hazards: Landslide and Mudflow	2	2	2	3	18	Medium
Coastal Hazards: Sea Level Rise	3	1	2	1	16.2	Medium
Human-Caused Hazards: Contamination/Saltwater Intrusion	1	2	3	4	11.4	Low

Hazard Type	Probability	Impact			Total Score	Hazard Planning Consideration
		Affected Area	Primary Impact	Secondary Impact		
Human-Caused Hazards: Terrorism (MCI)	1	1	3	3	8.8	Low
Human-Caused Hazards: Hazardous Materials	1	1	2	3	7.4	Low
Urban Fire	1	1	2	1	5.4	Low
Geological Hazards: Land Subsidence	1	1	1	2	5	Low
Geological Hazards: Expansive Soils	1	1	1	2	5	Low
Coastal Hazards: Tsunami	1	1	1	1	4	Low

*Scores are based on a scale from 1 to 4, where 4 is the highest score and 1 is the lowest. The total score is based on an equation that weights categories by importance. Refer to **Exhibit 3-3** for additional information.*

Exhibit 3-3, Hazard Ranking Methodology, provides additional detail regarding how the probability, affected area, and impact categories are weighted and how the total score is calculated for the hazard rankings.

Exhibit 3-3. Hazard Ranking Methodology

Probability: Importance 2.0	
Based on estimated likelihood of occurrence from historical data.	
Probability	***Score***
Unlikely (less than 1% probability in next 100 years or has a recurrence interval of greater than every 100 years)	1
Somewhat Likely (between 1% and 10% probability in next year or has a recurrence interval of 11 to 100 years)	2
Likely (between 10% and 100% probability in next year or has a recurrence interval of 10 years or less)	3
Highly Likely (near 100% probability in next year or happens every year)	4

Affected Area: Importance 0.8	
Based on size of geographical area of community affected by hazard.	
Affected Area	***Score***
Isolated	1
Small	2
Medium	3
Large	4

Secondary Impacts: Importance 0.5	
Based on estimated secondary impacts to community at large.	
Impact	***Score***
Negligible – no loss of function, downtime, and/or evacuations	1
Limited – minimal loss of function, downtime, and/or evacuations	2
Moderate – some loss of function, downtime, and/or evacuations	3
High – major loss of function, downtime, and/or evacuations	4

Total Score = Probability x Impact, where:
Probability = (Probability Score x Importance)
Impact = (Affected Area + Primary Impact + Secondary Impacts), where:
Affected Area = Affected Area Score x Importance
Primary Impact = Primary Impact Score x Importance
Secondary Impacts = Secondary Impacts Score x Importance

Primary Impact: Importance 0.8	
Based on percentage of damage to typical facility in community.	
Impact	***Score***
Negligible – less than 10% damage	1
Limited – between 10% and 25% damage	2
Critical – between 25% and 50% damage	3
Catastrophic – more than 50% damage	4

Hazard Planning Consideration			
Total Score	***Range***	***Distribution***	***Hazard Level***
0.0	20.0	7	Low
20.1	42.0	10	Medium
42.1	64.0	5	High

The probability of each hazard is determined by assigning a level, from unlikely to highly likely, based on the likelihood of occurrence from historical data. The total impact value includes the affected area, primary impact, and secondary impact levels of each hazard. Each level's score is reflected in the matrix. The total score for each hazard is the probability score multiplied by its importance factor times the sum of the impact level scores multiplied by their importance factors. Based on this total score, the hazards are separated into three categories based on the hazard level they pose to the communities: High, Medium, and Low.

It should be noted that climate change was not prioritized for the planning area. Instead a discussion regarding climate change considerations has been added to each hazard profile. Regardless of the prioritization (low, medium, or high), it was determined by the Planning Team that all the hazards identified in **Exhibit 3-2** would be profiled. Due to the vast geography and hazards that impact the various MAs, it was recognized by the Planning Team that some hazards that ranked low overall, may be a high priority depending upon the MA.

3.2 Hazard Profiles

This section contains profiles for the hazards identified in **Exhibit 3-2**. Due to the nature of the hazards, some hazards were combined for purposes of the profiles as noted in **Exhibit 3-2**. Information was obtained from various Federal, State, and local sources, as well as the Planning Team. A detailed list of references is provided in **Section 6.**

The service areas for each of the MAs participating in the MJHMP update do not always align with incorporated city or unincorporated county boundaries. In many cases, an MA may serve multiple cities and/or portions of cities/unincorporated areas. For the purposes of this MJHMP , the planning area refers to Orange County, since the MAs provide services and infrastructure throughout most of the county. Because much of the available hazard data is provided by jurisdictional boundary (county or city), it is not always possible to obtain or delineate data specific to the MA jurisdictional (service) boundary. The Jurisdictional Annexes detail the hazards, risk assessments, and mitigation strategies specific to each jurisdiction.

Each hazard profile addresses the following:

- **Description (Nature) of the Hazard:** Describes the hazard and its characteristics.
- **History/Past Occurrences:** Provides a history of the hazard and identifies previous occurrences. Where an occurrence is specific to an MA, this information is provided.
- **Location/Geographic Extent:** Describes the location (geographic) area affected by the hazard. If the hazard affects the entire planning area, it is noted. For geographically specific hazards, the specific MAs affected by the hazard are identified and discussed further in the Jurisdictional Annexes.

- **Magnitude/Severity:** Describes the extent (magnitude or severity) of each hazard. If a hazard has a uniform extent for all the MAs, it is noted. For geographically specific hazards, mapping is provided that illustrates the extent of the hazard for the entire planning area. Mapping for applicable hazards specific to an MA are provided in the Jurisdictional Annexes.
- **Probability of Future Occurrences:** Provides a discussion of the probability of future occurrences of the hazard based on the history of past occurrence, location, and severity. If the likelihood of occurrence is the same for all jurisdictions or varies amongst the jurisdictions, it is noted.
- **Climate Change Considerations:** Provides a discussion regarding the potential effects climate change may have on a specific hazard. In some instances there may be no obvious and direct effect, while in other instances, significant information is available regarding the connections between climate change and the hazard of concern.

3.2.1 Coastal Hazards (Coastal Erosion, Coastal Storms, Sea Level Rise, Tsunamis)

The Coastal Hazards profile includes discussions regarding coastal erosion, coastal storms, sea level rise, and tsunamis.

3.2.1.1 Nature of Hazard

Coastal Erosion/Storms

Erosion is a naturally occurring phenomenon all along California's coastline. Erosion can be severe during winter storms, which are often accompanied by high surf, particularly during El Niño events. Rising sea levels caused by climate change will increase coastal erosion by exacerbating the impact of high tides and waves. Climate change is also expected to increase the frequency and severity of storms. As a result, even areas that have not experienced significant erosion in the past may be at risk in the future.

Erosion can also be affected by engineered structures that impede the deposit of new sediment at beaches; these include inland dams, channelized rivers, harbors, jetties, and seawalls/revetments (MWDOC 2019). This has been the case in Orange County, where the channelization of the Santa Ana River has reduced the amount of sediment reaching the coast, while the construction of jetties at Anaheim Bay and breakwaters at Long Beach have changed deposit patterns (MWDOC 2019). This led to the formation of several chronic erosion hotspots along the county's coastline. In some cases, long-term beach replenishment efforts and management plans have been able to counteract or reverse some of these trends.

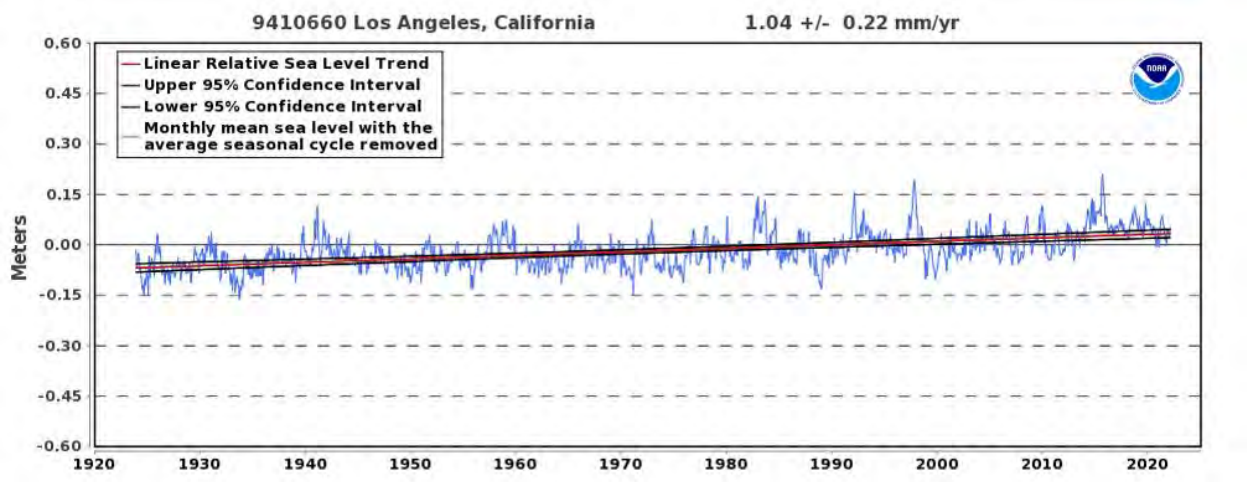
In addition to the gradual narrowing of sandy beaches, storms and erosion can damage steep coastal bluffs and cliffs. Landforms that appear to have been stable for years may retreat several feet in just a few hours. In either case, erosion can cause considerable damage to coastal infrastructure and property. As Orange County's beaches are centers for recreation and tourism, loss of land has economic consequences, as well.

Sea Level Rise

Sea level rise is the increase in the average height of the ocean's surface. It occurs when global temperatures rise and melt land ice, such as glaciers and the polar ice caps that have formed over land masses. The meltwater runs into the world's oceans, causing a global increase in ocean levels. Additionally, because most materials expand in size when they become warmer, increased

temperatures cause ocean water to expand, further raising the height of the ocean's surface. **Exhibit 3-4** shows the sea level trend over the past 100 years.

Exhibit 3-4. Sea Level Trend (1920-2020)



Source: NOAA, 2024b

While sea level rise can happen naturally, such as at the end of an ice age, the driver of sea level rise at present is global climate change. Unlike many other hazards, sea level rise is very gradual and occurs over the course of decades. Sea level rise itself poses both indirect and direct threats. Indirectly, a higher average sea level means that there is less of a buffer between the ocean and coastal structures or facilities. This can make it easier for coastal flooding, which can occur during storms, high surf, or particularly strong tides, to affect coastal properties since the distance between the ocean and these properties is smaller. Similarly, sea level rise can exacerbate coastal erosion, as discussed above. If sea level rise becomes severe enough, low-lying coastal areas can be semi-permanently or permanently underwater, rendering these areas uninhabitable.

Tsunamis

The phenomenon we call "tsunami" is a series of traveling ocean waves of extremely long length generated primarily by earthquakes occurring below or near the ocean floor. In the deep ocean, the tsunami waves move across the deep ocean with a speed exceeding 500 miles per hour, and a wave height of only a few inches. Tsunami waves are distinguished from ordinary ocean waves by their great length between wave crests, often exceeding 60 miles or more in the deep ocean, and by the time between these crests, ranging from 10 minutes to an hour.

As they reach the shallow waters of the coast, the waves slow down, and the water can pile up into a wall of destruction up to 30 feet or more in height. The effect can be amplified where a bay, underwater features, or harbor or lagoon funnels the wave as it moves inland. Large tsunamis have been known to rise over 100 feet. Even tsunamis 1 to 3 feet high can be very destructive and cause many deaths and injuries.

There are many causes of tsunamis, but the most prevalent is earthquakes. In addition, landslides, volcanic eruptions, explosions, and even the impact of meteorites can generate tsunamis. Not all earthquakes generate tsunamis. To generate a tsunami, the fault where the earthquake occurs must be underneath or near the ocean and cause vertical movement of the sea floor over a large area, hundreds or thousands of square miles. By far the most destructive tsunamis are generated

from large, shallow earthquakes with an epicenter or fault line near or on the ocean floor. The amount of vertical and horizontal motion of the sea floor, the area over which it occurs, the simultaneous occurrence of slumping of underwater sediments due to the shaking, and the efficiency with which energy is transferred from the earth's crust to the ocean water are all part of the tsunami generation mechanism. The sudden vertical displacements over such large areas disturb the ocean's surface, displace water, and generate destructive tsunami waves. Although all oceanic regions of the world can experience tsunamis, the most destructive and repeated occurrences of tsunamis are in the Pacific Rim region.

Tsunami waves can travel at the speed of a commercial jet plane, over 500 miles per hour, moving from one side of the Pacific Ocean to the other in less than a day. This great speed makes it important to be aware of the tsunami as soon as it is generated. Scientists can predict when a tsunami will arrive at various locations by knowing the source characteristics of the earthquake that generated the tsunami and the characteristics of the sea floor along the path to the shore from the point of origin.

Offshore and coastal features can determine the size and impact of tsunami waves. Reefs, bays, entrances to rivers, undersea features and the slope of the beach all modify the tsunami as it converges on the coastline. People living near areas where large earthquakes occur may find that the tsunami waves can reach their shores within minutes of the earthquake. For these reasons, the tsunami threat to many areas such as Alaska, the Philippines, Japan, and the U.S. West Coast can be immediate (as tsunamis from nearby earthquakes take only a few minutes to reach coastal areas) or less urgent (as tsunamis from distant earthquakes take from 3 to 22 hours to reach coastal areas). When a tsunami reaches the coastline and moves inland, the water level can rise several feet, flooding homes, businesses, and infrastructure from several thousand feet to miles inland, depending on the topography.

Scientists cannot accurately predict when earthquakes will occur, and as a result they cannot determine exactly when a tsunami will be generated or how destructive it will be. However, past tsunami height measurements are useful in predicting future tsunami impact and flooding limits at specific coastal locations and communities.

3.2.1.2 History/Past Occurrences

Coastal Erosion/Storms

Problems with chronic erosion in Orange County have been recognized since at least 1945, when beach nourishment operations were undertaken to shore up the eroding Surfside-Sunset shoreline (MWDOC 2019). A 2006 U.S. Geological Survey (USGS) assessment of the entire California coast found that, between Los Angeles Harbor and Dana Point, the shoreline had receded since the early 1970s for 35% of the 29-miles coastline. Beach nourishment projects prevented further observable erosion during this period.

California typically experiences the most erosion during significant El Niño events. The three strongest El Niño events on record were during the winters of 1982-1983, 1997-1998, and 2015-2016. Historic erosion was reported all along the West Coast in 2015-2016, according to the USGS (USGS 2017b). While the winter storms brought extreme wave action to California's shores, they featured surprisingly little rainfall. With California in the midst of a major drought, less sediment was washed to the ocean to replenish beaches. Portions of beaches in San Clemente and Laguna Beach were temporarily closed to the public due to hazardous conditions (Connelly 2016).

Sea Level Rise

NASA reports that the global average sea level has risen almost 7 inches in the last 100 years. Rising sea levels have been observed in Orange County, as well. Measurements taken at Newport Beach since 1955 show that the sea level there has risen an average of 2.22 millimeters, or 0.09 inches, per year (MWDOC 2019). This is also expected to accelerate as more polar ice melts due to rising global temperatures.

King tides have flooded Orange County coastal communities, including Seal Beach, Huntington Beach, Balboa Peninsula and Balboa Island in Newport Beach, and Sunset Beach in the past (OCR 2017). In the last 10 years, the National Centers for Environmental Information (NCEI) Storm Events Database reports four coastal flooding incidents that affected Orange County: in October and November of 2015 and in May and October of 2017. It is difficult to say how higher sea levels may have affected the severity of these events. The independent organization Climate Central estimates that La Jolla, California, located south of Orange County, experienced 60 days of coastal flooding between 2005 and 2014, based on observed impacts such as flooded roads. Of those events, only four would have occurred without climate-linked sea level rise (Climate Central n.d.).

Tsunamis

Tsunamis can be categorized as Pacific-wide or "local." Typically, a Pacific-wide tsunami is generated by a major vertical shift in the ocean floor creating a wave that includes the entire column of water that has the potential to travel long distances. A "local" tsunami can be a component of a Pacific-wide tsunami in the immediate area of the earthquake or a wave that is confined to the area of generation, such as a landslide within a bay or harbor. Worldwide, tsunamis have resulted in the loss of thousands of lives, billions of dollars in damages, and the closure of many local economies.

All of the coastal areas in Orange County are susceptible to tsunamis, although most tsunamis have occurred in Northern California. The Channel Islands were impacted by a tsunami in the early 1800s. In the 1930s, four tsunamis struck the Los Angeles, Orange County, and San Diego coastal areas. In Orange County the tsunami wave reached heights of approximately 20 feet above sea level. In 1964, following the Alaska 8.2 earthquake, tidal surges of approximately 4 feet to 5 feet battered Huntington Harbor causing moderate damage.

According to the OC San Emergency Management Division, the following events generated response by their office (Ethan Miller Brown, OC San Emergency Management Division, pers. comm. Email correspondence. September 5, 2017):

- **April 1, 2014**. An 8.2 earthquake off the coast of Chile had the potential to generate a tsunami that could impact the Orange County coastline. The event was monitored, but no watch, advisory, or warning was issued for the county.
- **September 16, 2015.** An 8.3 earthquake off the coast of Chile triggered a Tsunami Advisory for the Orange County coastline. The Orange County Emergency Operations Center (EOC) was activated, and beaches were closed as a precaution; no evacuation orders were issued, and no damages occurred.
- **January 15, 2022.** A volcanic eruption near the Tonga Islands of the South Pacific generated a tsunami triggering a Tsunami Advisory for Orange County beaches, harbors, and piers. (NGDC 2024)

The National Oceanic and Atmospheric Administration (NOAA) reports one tsunami event in Orange County (MWDOC 2019):

- **September 16-17, 2015.** As described above, an 8.3 magnitude earthquake off the coast of Chile led the National Tsunami Warning Center to issue a tsunami advisory for a portion of California, including Orange County. All beaches, harbors, piers, and marinas in the cities of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, Dana Point, and San Clemente, including county and State beaches were closed. Tsunami wave heights were observed to be just under 1 foot along the Orange County coast. The Orange County EOC reported no significant coastal flooding, but to be aware of the high likelihood of strong currents and waves dangerous to persons in or near the water.

3.2.1.3 Location/Geographic Extent

Coastal Erosion/Storms

Orange County's coastline includes sand and cobble beaches, rocky cliffs and coastal bluffs, and intertidal areas. In general, beach erosion is more of an issue along Orange County's northern coast, while bluff retreat is a greater concern along the southern portion.

Beginning in 1964, the Orange County Erosion Control Project targeted Surfside-Sunset and West Newport Beach as locations in need of restoration. The U.S. Army Corps of Engineers spearheaded efforts to import sand and install retention devices in these areas.

A 2006 USGS study found that West Newport Beach had the largest measurable erosion rate in Orange County between the early 1970s and 1998.

As part of the Coastal Storm Modeling System (CoSMoS), data available from the USGS shows the projected location of the California shoreline under various scenarios of sea level rise. The Coastal Storm Modeling System (CoSMoS-COAST) shows that with a 3.3-foot rise in sea levels, Huntington State Beach will see the greatest erosion, followed by parts of Huntington City Beach, West Newport Beach, Surfside, and Bolsa Chica State Beach.

Sea Level Rise

Sea level rise presents a risk for all coastal communities with low-lying areas. In Orange County, Huntington Beach is particularly vulnerable. A 2017 report by the Union of Concerned Scientists, "When Rising Seas Hit Home," includes a mapping tool that shows what coastal areas will experience flooding at least 26 times a year under various sea level rise scenarios. Under a moderate scenario of a 4-foot rise, the area of north Orange County roughly bounded by the Santa Ana River and State Route 22 will see 14% of its land chronically inundated by 2100, even with existing levees. With a rise of 6 feet, 24% of the land will be chronically inundated. Affected areas include neighborhoods in Seal Beach, Huntington Beach, and Newport Beach.

NOAA offers another mapping tool to visualize areas vulnerable to flooding due to climate change. Its Sea Level Rise Viewer projects that, with a 1-foot rise in sea levels, there will be flooding through many parts of southeastern Huntington Beach, including neighborhoods between the Talbert Chanel and Huntington Beach Channel. A 2-foot rise will also start to affect parts of Sunset Beach and Balboa Island in Newport Beach, as well as less developed areas of Upper Newport Bay and Bolsa Chica Ecological Reserve.

Tsunamis

Exhibit 3-5 illustrates the portions of the planning area within a tsunami hazard zone. Tsunami inundation maps are provided by the California Geological Survey and represent a combination of the maximum considered tsunamis for each area.

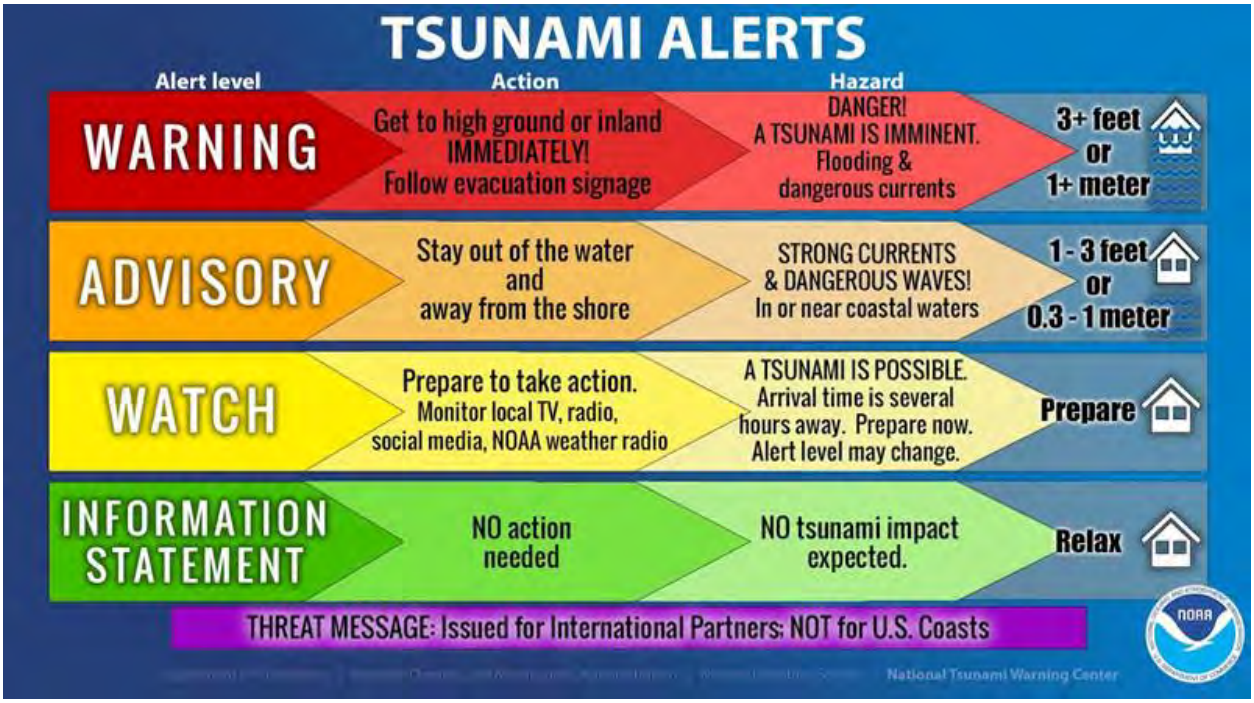
As illustrated on **Exhibit 3-5**, tsunami inundation areas are contained to the coastal areas of the planning area, extending into the areas of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, Dana Point, and San Clemente.

To better understand the severity of a tsunami event, NOAA provides an alert scale (**Exhibit 3-6**) that provides four alert levels each with an information statement, watch, advisory, and warning. These levels are based on the hazard level and actions necessary in response to the type of alert provided.

Exhibit 3-5. Tsunami Hazard Zones



Exhibit 3-6. Tsunami Alerts Scale



3.2.1.4 Magnitude/Severity

Coastal Erosion/Storms

Erosion is usually described in terms of how much the beach width deceases per year. The 2006 USGS study, for example, found that erosion at West Newport Beach was at a rate of -2.2 meters per year. Overall, the shoreline of Los Angeles Harbor and Dana Point grew by an average of 0.5 meters per year, the highest rate in all of California, due largely to beach nourishment projects. Among those sections that did experience erosion, it happened at an average rate of -0.5 meters per year.

The volume of sand used to fight erosion can also indicate the magnitude of the problem. For example, from 1945 to 2009, more than 20 million cubic yards of sediment has been added to Surfside-Sunset Beach (Everest 2013).

In November 2023, the U.S. Army Corps of Engineers announced a new beach nourishment project that will dredge roughly 1.2 million cubic yards of sand off the coast of Surfside and Sunset beaches. These dredged materials will be deposited south of the Naval Weapons Station Seal Beach, allowing for sediment to be transported naturally to the Huntington, Bolsa Chica, and Newport Beaches.

Sea Level Rise

Sea level is measured by local tide gauges and satellite. Sea level rise describes projected changes in those measurements based on different climate models. NOAA's Sea Level Rise Viewer projects that the sea level at Newport Bay will rise by at least 0.75 feet and as much as 2.72 feet by 2050, based on different global scenarios. By 2100, the level may rise by as much as 10.14 feet under the most extreme scenario.

Tsunamis

The magnitude/severity of a tsunami would be dependent on the severity and location of the event causing the tsunami. The California Geological Survey tsunami inundation maps (refer to **Exhibit 3-5**) identify the maximum extent of the tsunami inundation area within Orange County, which is primarily contained to the coastline. However, the inundation areas extend into several coastal communities with the largest potential inundation areas occurring within the cities of Seal Beach, Huntington Beach, Newport Beach, and Dana Point.

3.2.1.5 Probability of Future Occurrences

Coastal Erosion/Storm

Climate change all but ensures that the entire Orange County coast will experience some degree of erosion through the end of the century. The amount will depend on how much sea levels rise, which is contingent on global efforts to curb greenhouse gas emissions. An online mapping tool produced by Our Coast Our Future, a collaborative effort of 15 organizations including the USGS and California Coastal Commission, used CoSMoS data to predict that very few sections of the county's shoreline will maintain their current position assuming a 3.3-foot rise in sea level, even with the continuation of current beach nourishment efforts.

A new study released in 2017 using CoSMoS data found that, without human intervention, 31% to 67% of Southern California beaches may be completely eroded by 2100 if sea levels rise by 1 to 2 meters (USGS 2017a).

Sea Level Rise

According to the 4th Climate Change Assessment, thermal expansion was the largest contributor to sea level rise followed by melting ice from glaciers, ice caps, and loss of ice sheets covering Greenland and Antarctica. While the rate of sea level rise has been slow along the Orange County coast in the past, it is expected to accelerate in the future. According to the 4th Climate Change Assessment, by 2050 sea levels could be approximately 1 foot higher than they are now, and by 2100 sea levels could 5.5 feet higher or more (Hall et al. 2018).

Independent of all other factors, sea level rise is expected to cause temporary inundation of large sections of the planning area's beaches, particularly near the piers, during high wave events. However, no substantial permanent inundation is expected at this time. However, the effect of sea level rise is much greater in combination with various flood events, including coastal flooding and extreme high tides.

Climate Central's Surging Sea Risk Finder attempts to estimate the probability that coastal floods will reach elevations above the local high tide line. The tool does not have estimates for every tide gauge, and estimates for Orange County are based on data from the gauge at Los Angeles' Outer Harbor. It shows that, while there is currently less than a 1% chance of coastal flooding reaching areas 3 feet above the tide line in any given year, those chances increase to 6% annually by 2040 under a medium sea level rise scenario. By 2070, these areas will be flooding every year. Under an extreme scenario, annual flooding will happen as soon as 2040.

Tsunamis

The historic record indicates that there is a low probability of occurrence of a major tsunami in Orange County. However, there is the potential for future tsunami events to impact water and

wastewater infrastructure located within a tsunami inundation area. This probability is similar for each of the jurisdictions located within these areas.

3.2.1.6 Climate Change Considerations

Coastal Erosion/Storms

Coastal erosion is caused primarily by tides and wave action from storms. While tides are not affected by climate change, some studies suggest that climate change is expected to cause a 10% to 20% increase in the intensity of the severe storms that affect Southern California, as discussed in greater detail in **Section 3.2.3, Flood** (Oskin 2014). This means that the significant wave events that already cause substantial erosion along low-lying coastal areas may become more intense, causing greater loss of beaches and coastal bluffs during these events. Sea level rise, which is caused by climate change, may exacerbate the issue. As the surface of the ocean becomes higher, wave and tidal action will be able to reach farther onto land. As a result, wave and tide events that currently do not reach far enough to cause any erosion may be able to do so in the future, and wave and tide events that already cause erosion will be able to affect areas farther from the water line.

Sea Level Rise

Sea level rise is a direct consequence of climate change and would likely not exist to any substantial degree if climate change was not occurring. Climate change does not create any particular considerations for sea level rise, as the hazard itself is a result of climate change.

Tsunamis

The displacement events that cause tsunamis are geologic in nature and unaffected by climate change to any known degree. However, as sea level rise increases the average height of the ocean, this will allow tsunami waves to reach farther inland. Even though climate change is not expected to affect the severity of tsunamis, sea level rise is likely to create the potential for tsunamis to cause greater damage.

3.2.2 Dam/Reservoir Failure

3.2.2.1 Description (Nature) of the Hazard

Dam failures can result from several natural or human-caused threats such as earthquakes, erosion of the face or foundation, improper silting, rapidly rising flood waters, malicious events, and structural/design flaws. Seismic activity can also compromise dam regulating structures, resulting in catastrophic flooding. A dam failure can cause loss of life, damage to property, the displacement of persons, and other ensuing hazards along the inundation path. Damage to electricity-generating facilities and transmission lines could also impact life support systems in communities outside of the immediate hazard areas.

In the event of a major dam failure, mutual aid from all levels of government would be required for an extended period. Recovery efforts would include the removal of debris, clearing roadways, demolishing unsafe structures, assistance in reestablishing public services, and providing continued care and welfare for the affected population.

There are 33 dams in Orange County with ownership ranging from the Federal Government to homeowners' associations. These dams hold billions of gallons of water in reservoirs. The major

reservoirs are designed to protect Southern California from flood waters and to store domestic and recycled water.

In addition to reservoirs with dams in Orange County, there are many water storage tanks that are potentially susceptible to failure or damage by natural or human-caused events. These water tanks contain millions of gallons of water each and provide an important source of water storage. Their capacity is large enough to cause substantial damage down slope from a tank should one fail. Correspondingly, the history of failure of water storage tanks is considered.

Because dam failure can have severe consequences, FEMA and Cal OES require all dam owners to develop Emergency Action Plans (EAP) for warning, evacuation, and post-flood actions. Although there has been extensive coordination with Orange County officials in the development of an Orange County Response Plan, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the dam owner.

3.2.2.2 History/Past Occurrences

Orange County has never experienced a major dam failure, but there have been two deadly incidents involving dams built to supply water for the City of Los Angeles. In addition, the failure of a water tank caused considerable damage within the City of Westminster in 1998. These three disasters are detailed below.

St. Francis Dam, Disaster of 1928

In Los Angeles, the failure of the St. Francis Dam, and the resulting loss of over 500 lives was a scandal that resulted in the almost complete destruction of the reputation of its builder, William Mulholland. It was he who proposed, designed, and supervised the construction of the Los Angeles Aqueduct, which brought water from the Owens Valley to the city. The St. Francis Dam, built in 1926, was 180 feet high and 600 feet long. It was located near the City of Saugus in San Francisquito Canyon.

The dam failed on March 12, 1928 three minutes before midnight. Its waters swept through the Santa Clara Valley toward the Pacific Ocean about 54 miles away. The valley was devastated before the water finally made its way into the ocean between Oxnard and Ventura. At its peak the wall of water was said to be 78 feet high. At the time the water flowed through Santa Paula, 42 miles south of the dam, the water was estimated to be 25 feet deep. Almost everything in its path was destroyed: livestock, structures, railways, bridges, and orchards. In the end Ventura County lay below 70 feet of mud and damage estimates topped $20 million.

Baldwin Hills Dam, Disaster of 1963

The Baldwin Hills Dam collapse sent a 50-foot wall of water down Los Angeles' Cloverdale Avenue on December 14, 1963. Five people were killed. Sixty-five hillside houses were ripped apart, and 210 homes and apartments were damaged. The flood swept northward in a V-shaped path roughly bounded by La Brea Avenue, Jefferson Boulevard, and La Cienega Boulevard.

The earthen dam that created a 19-acre reservoir to supply drinking water to West Los Angeles residents ruptured at 3:38 p.m. A pencil thin crack widened to a 75-foot gash allowing 292 million gallons to surge out in 77 minutes. The cascade caused an unexpected ripple effect that is still being felt in Los Angeles and beyond. It prompted the end of urban-area earthen dams as a major element of water storage systems, and a tightening of the Division of Safety of Dams control over reservoirs throughout the State.

Westminster Water Tank Failure, Disaster of 1998

In September of 1998, a 5-million-gallon municipal water storage tank in the City of Westminster ruptured because of corrosion and construction defects. There was no loss of life, but damage was extensive. The flow of water from the 32-year-old tank destroyed most of the storage facility as well as several private residences. Additionally, there were approximately 30 more homes inundated with water and silt. Through the Public Works Mutual Aid Agreement, the Orange County Public Works Department assisted the City of Westminster in the cleanup and temporary repair of the streets.

City employees, the Orange County Fire Authority, neighboring fire services, and the Red Cross were onsite for days assessing the damage and assisting residents. Water storage for the city was non-existent following this event while the other 5-million-gallon tank of similar age and construction was removed from service as a precautionary measure.

A new reservoir facility began providing services in March 2003, consisting of two 8-million-gallon water storage tanks, a 17-million-gallon-per-day booster station, and a new groundwater well with a capacity of 3,000 gallons per minute. All new construction has passed rigorous inspections and has obtained the required permits from the California Department of Public Health.

3.2.2.3 Location/Geographic Extent

Exhibit 3-7 lists the larger reservoirs and dams in Orange County and their owners/operators.

Exhibit 3-7. Orange County Large Reservoirs and Dams

Name of Facility	Owner/Operator
Santiago Creek Dam/Reservoir (Irvine Lake)	IRWD
Villa Park Dam	County of Orange
Sulphur Creek Dam	County of Orange
Peters Canyon Dam	County of Orange
Walnut Canyon Dam/Reservoir	City of Anaheim
San Joaquin Dam/Reservoir	IRWD
Sand Canyon Dam/Reservoir	IRWD
Rattlesnake Canyon Dam/Reservoir	IRWD
Big Canyon Dam/Reservoir	City of Newport Beach
Lake Mission Viejo	Lake Mission Viejo Association
El Toro R-6 Dam/Reservoir	ETWD
El Toro Reservoir/Rossmoor #1 Dam	ETWD
Diemer Filtration Plant	Metropolitan Water District of Southern California
Palisades Bradt Dam/Reservoir	SCWD
Portola Dam/Reservoir	SMWD
Syphon Canyon Dam/Reservoir	The Irvine Company
Trabuco Dam/Reservoir	TCWD
Dove Canyon Dam	Dove Canyon Master Association/TCWD
Upper Oso Dam/Reservoir	SMWD
Upper Chiquita Dam/Reservoir	SMWD
Brea Dam	U. S. Army Corps of Engineers
Fullerton Dam	U. S. Army Corps of Engineers
Carbon Canyon Dam	U. S. Army Corps of Engineers
Prado Dam	U.S. Army Corps of Engineers

As mentioned above, the responsibility for developing maps showing areas that would be inundated in the event of a failure is the responsibility of the dam's owner. Not all of the dams and reservoirs in **Exhibit 3-7** would impact the planning area. Those that could impact the planning area, should they fail, are described below.

Big Canyon Reservoir is a 600-AF potable water storage facility constructed in 1959 and owned by the City of Newport Beach. It is in the San Joaquin Hills overlooking Newport Bay. Big Canyon Reservoir is retained on three sides by a homogenous earth-filled embankment dam, while the east side was formed by a slope cut. At its maximum section the dam embankment is 65 feet high. The spillway is an ungated concrete lined overflow structure located on the west side of the reservoir. The bottom of the reservoir and the cut slopes are lined with minimum 5-foot-thick clay blanket, and the entire inside surface, including the embankments and cut slopes, is overlain with a 3-inch-thick porous asphalt pavement. The reservoir is covered with a reinforced polypropylene weight-tensioned floating cover that was installed in 2004.

Dove Canyon Dam is an earth-filled dam completed in 1990. The dam is in the Dove Canyon residential community within the City of Rancho Santa Margarita, Orange County. The dam is owned by the Dove Canyon Master Association (DCMA). DCMA owns and operates recreational facilities situated immediately downstream of the dam crest on compacted backfill. The recreational facilities were included in the construction documents for the dam and approved by the State Division of Safety of Dams. The impounded reservoir is located on land owned by the TCWD and is used to store up to about 415 AF of runoff. TCWD and DCMA have an agreement to operate and maintain the dam and reservoir. TCWD utilizes storage in the reservoir to supplement its recycled water demands for landscape irrigation. The impounded water can be stored to an elevation of 1,090 feet, approximately 11 feet below the top of the dam crest's elevation of 1,101 feet above mean sea level (MSL).

El Toro Reservoir is an embankment-type dam owned and operated by ETWD. The reservoir is located in the City of Mission Viejo. The impounded reservoir has a storage capacity of 275 million gallons (850 AF) with a surface area of approximately 20.6 acres. The bottom and internal slopes of the reservoir are lined, and the reservoir surface has a floating cover. There is no surface water influent to the reservoir. The reservoir includes an emergency spillway and drainage facilities. Storage capacity in the El Toro Reservoir is owned through a regional partnership between ETWD, SMWD, and MNWD.

Rossmoor #1 Dam is an embankment type dam, with a height of 36 feet and a length of approximately 305 feet. The dam is located in the City of Laguna Woods. The impounded Holding Pond is used to provide emergency storage of secondary effluent from the ETWD Water Recycling Plant and has a storage capacity of 14 million gallons (43 AF). The reservoir includes an emergency spillway and drainage facilities.

Palisades Bradt Reservoir provides up to 48 million gallons of potable water storage with a 146-foot-high, zoned, earthen embankment dam constructed in 1963. The bottom and internal slopes of the reservoir are lined, and the reservoir surface has a floating cover. The dam has a low-level outlet, an emergency outlet, and an emergency spillway. The upstream watershed that contributes inflow to the reservoir has an area of 19 acres.

Peters Canyon Dam is an earth-filled structure owned by Orange County that has a capacity of 626 AF at the spillway pipe elevation of 537 feet above MSL. Water storage varies from 200 AF to 600 AF depending on seasonal rain amounts. Alerting would come primarily from the Park Ranger

at Peters Canyon Regional Park who would notify the Sheriff's Department, Control One of dam failure or possible dam failure.

Prado Dam is owned and operated by the Army Corps of Engineers and provides flood control and water conservation storage for Orange, Riverside, and San Bernardino counties. Prado Dam is a major component of the Santa Ana Mainstem Project, which extends from the upper canyon in the San Bernardino Mountains downstream to the Pacific Ocean at Newport Beach, some 75 miles along the Santa Ana River. The entire system is designed to provide various levels of flood protection ranging from 100 to 190 years for areas most susceptible to damage from flooding. The dam collects upstream water releases from storage facilities and runoff from uncontrolled drainage areas. It primarily benefits Orange County by reducing the potential for flood-induced damage and by providing water conservation storage. The Prado Dam has been undergoing major improvements including raising the embankment and spillway, increasing the maximum discharge capacity, constructing new levees and dikes, relocating and protecting utility lines, increasing reservoir area, and increasing impoundment.

Portola Dam is located near the northern end of Canada Gobernadora in southern Orange County, within the Coto de Caza gated community. Canada Gobernadora flows north to south and confluences with San Juan Creek approximately 7.5 miles upstream of the Pacific Ocean. Portola Dam is an earth-filled structure situated about 8 miles north of San Juan Creek with a maximum recycled water (or domestic water blend) storage capacity of 586 AF and a high-water elevation of 936 feet.

The Canada Gobernadora valley channel area between the dam and San Juan Creek has been developed with a golf course and lined on each side by thousands of homes positioned just at or above the 100-year flood plain. If a Portola Dam break occurred, the flow would likely destroy streets crossing the flood plain; damage the water, sewer, and recycled water pipeline infrastructure in them; and affect some or many home locations near the stream channel. Streets in Coto de Caza certain to be affected are: Trigo Trail, Via Pajaro, Via Conejo, Vista Del Verde, San Miguel, Cantamar, and South Bend. Along with the golf course and the equestrian center, additional SMWD facilities that are anticipated to be damaged or destroyed by a dam break in Coto de Caza and farther downstream are:

- Coto Lift Station and force main
- South Ranch Lift Station and force main
- South county pipeline
- Ortega Lift Station (Talega) force mains
- Talega recycled water transmission main
- Chiquita Land Outfall pipeline

Per the compliance report, after entering San Juan Creek, the dam break inundation flood area would be about the same as the 100-year flood plain all the way down to the Pacific Ocean.

Santiago Creek Dam is an earth-fill dam with a 25,000 AF capacity reservoir (Irvine Lake). The dam is owned by IRWD. **Villa Park Dam** is a flood control dam located downstream from Santiago Dam. It is an earth-fill structure with a capacity of 15,600 AF and is owned by the Orange County Flood Control District. Initial alerting is expected from dam keepers who are on duty at both Santiago Creek Dam and Villa Park Dam.

Trabuco Dam is an earth-filled dam completed in 1984. The dam is located adjacent to the Robinson Ranch residential community within the City of Rancho Santa Margarita, Orange County. The dam and impounded reservoir is owned and operated by the TCWD. TCWD utilizes the reservoir to store up to approximately 135 AF of reclaimed water produced from the Robinson Ranch Wastewater Treatment Plant located adjacent to the reservoir. The reclaimed water can be stored to an elevation of 1,274 feet, approximately 6 feet below the top of the dam crest's elevation of 1,280 feet above MSL.

Upper Oso Reservoir (UOR) and Dam are located within the Cities of Mission Viejo and Rancho Santa Margarita near the northern end of the Oso Creek Watershed in southern Orange County. Upper Oso Dam is an earth-filled structure situated between El Toro Road and Los Alisos Boulevard nearly 10 miles north of the Trabuco Creek confluence point. UOR has a high-water elevation of 953 feet and stores up to 4,000 AF of recycled water for landscape irrigation that is mainly used within SMWD and MNWD.

Immediately downstream of the Upper Oso Dam, a long bridge for State Route 241 crosses the flood channel and may not experience problems during a major flood event. Just upstream of Los Alisos Boulevard, some commercial property lies adjacent to the Oso Creek channel and may be affected. About 3 miles downstream on Oso Creek and upstream of Olympiad Road, a large basin area was created (now a sports park) to capture and attenuate major discharges from UOR before they enter **Lake Mission Viejo (LMV).**

LMV is created by a dam lying under Alicia Parkway. An Upper Oso Dam breach may also overflow LMV and damage the dam to point where it could release stored water and create a catastrophic flood hazard all the way to the Pacific Ocean.

Downstream of LMV, two golf courses have been developed within the Oso Creek channel area and numerous commercial properties are on adjacent sides. Housing tracts have been built above the 100-year flood plain, but, if a dam break occurred, the flow from UOR and LMV would likely destroy streets crossing the flood plain and damage the water, sewer, and recycled water pipeline infrastructure in them. In addition to the many pipelines crossing the flood plain, SMWD facilities that are anticipated to be damaged or destroyed by an Upper Oso Dam break are:

- Eastbrook Recycle Water Pump Station
- Lakeside Pump Station
- South County Pipeline
- Oso Creek Water Reclamation Plant
- Oso Creek Trunk Sewer
- Oso Barrier RW Pump Station and Pipelines

Due to proximity and elevation, a considerable number of the residential and commercial properties in many areas close to the banks of Oso Creek and farther downstream would likely be flooded for a short period of time and damaged. Streets in Mission Viejo and farther south likely to be affected by a dam failure are Los Alisos Boulevard, Santa Margarita Parkway, Olympiad Road, Alicia Parkway, Jeronimo Road, Marguerite Parkway, Casta del Sol, La Paz Road, Oso Parkway, Interstate 5, Camino Capistrano, Del Obispo Street, Stonehill Drive, and Pacific Coast Highway.

Upper Chiquita Reservoir (UCR) was constructed by SMWD to provide the South Orange County region with substantial new water reserves to meet customer demand during disruptions of water deliveries. These interruptions can be unanticipated, like the break of the Allen McColloch Pipeline

in 1999, or planned, like the shutdowns of the Diemer Filtration Plant in Yorba Linda to complete improvements or maintenance and repairs.

The UCR consists of an earth-fill dam structure and a covered, domestic water reservoir with a storage volume of 750 AF. The reservoir footprint is approximately 19.7 acres with a surface area of approximately 15.4 acres and has a High-Water Level (HWL) of 860 feet.

In addition to the dam and reservoir, the site contains the following facilities:

- Floating cover
- Access roads
- Spillway and drainage facilities
- Inlet/outlet facilities and pipelines
- Pump station
- Disinfection equipment
- Pipeline connection to the South Orange County Pipeline

The UCR site is located on the western side of Chiquita Canyon north of Oso Parkway and west of the current terminus of State Route 241 (SR-241) within the City of Rancho Santa Margarita, east of the community of Las Flores in southern Orange County.

A portion of the site is encumbered within the Transportation Corridor Agency's Chiquita Canyon Perimeter Conservation Easement. The closest developed areas are the Tesoro High School campus (located across Oso Parkway and south of the reservoir site) and the residential community of Las Flores (approximately 0.8-mile west of the site). Additional land uses in the proximity to the reservoir site include a neighborhood park, Crestview Park, located just over 300 feet west of the site, and the SMWD Las Flores Reservoir, located approximately 250 feet west of the site.

Under an extreme catastrophic dam failure scenario, the flood zone would exceed the FEMA 100-year floodplain in the Canada Chiquita Channel. Under this extreme scenario, land use categories that would be affected include the Oso Parkway, SR-241, and the Tesoro High School. Once the flood waters reach the San Juan Creek the flood flows would be less than the FEMA 100-year flood.

The UCR is located on the western slope of Chiquita Canyon, just north of Oso Parkway in the City of Rancho Santa Margarita. Completed in October 2011, the 244 million-gallon UCR is the largest domestic water reservoir built in South Orange County in nearly 45 years. The UCR has:

- A storage capacity of approximately 244 million gallons of domestic water (750 AF) contained in a lined and covered reservoir.
- A surface area of approximately 17.8 acres.
- A regional partnership between SMWD (lead agency) and MNWD, City of San Juan Capistrano, City of San Clemente, and SCWD (storage owners).
- A service base of approximately 168,000 families receiving approximately 200 gallons of fresh water a day for one week.
- A reservoir design that conforms to the rigorous standards set forth by the State of California.
- Safety features, including piezometers (moisture sensors), to continually monitor water levels and test for irregularities.

- An earthen embankment that significantly reduces any visual impacts while traveling west along Oso Parkway near Highway 241.
- A location that is not visible from homes in local neighborhoods, including Las Flores and Wagon Wheel.

The UCR was included in the South Orange County Natural Community Conservation Plan, which designates habitat conservation and species protection measures to ensure an environmentally sensitive design.

3.2.2.4 Magnitude/Severity

Orange County's reservoirs range in capacity from 18 to 196,235 AF of water storage. Inundation maps and studies, when available, indicate the area that would be flooded and can be used to gauge the severity of a dam failure.

A compliance analysis and inundation study report was prepared for Upper Oso Dam in 1979 to allow for construction permitting by the State of California. This study indicated that if the dam was breached, a potential maximum flow rate exceeding 250,000 cubic feet per second may be expected when the water surface elevation drops to about 935 feet. Should such an event occur, the UOR could potentially empty in about a half hour.

A similar report for Portola Dam was done in 1980. This study indicated that if the dam was breached, a potential maximum flow rate of 22,645 cubic feet per second may be expected after about 3 hours once the water surface elevation is at elevation 920 feet. Should such an event occur, Portola Dam would potentially empty in just over 6 hours.

Failure of a reservoir or a dam could extend throughout most of the planning area, depending upon the size of the facility and associated failure.

3.2.2.5 Probability of Future Occurrences

There has been just one incident involving a water storage structure in the 110 years since construction of the first contemporary dam in Orange County. It is expected that future events will remain highly unlikely, with a less than 1% chance of happening in any given year. However, such occurrences have the potential to be highly destructive.

In the more than 50 years since the collapse of the Baldwin Hills Dam, there have been very few incidents in California due to stringent standards, regulations, and regular inspections. The near-catastrophic failure of the main spillway of the Oroville Dam in Northern California in 2017 is a reminder of the ongoing risk presented by dams.

3.2.2.6 Climate Change Considerations

While climate change is not expected to directly affect the risk of dam failure, the risk could increase due to an expected rise in the number of intense storms as a result of climate change, as discussed in **Section 3.2.3, Flood.** For example, an increase in the number of intense storms in the Santa Ana River Basin could place stress on the effectiveness of Prado Dam. More storms could lead to increased usage of the dams by necessity, and potentially require infrastructure to hold back larger amounts of water. As intense storms caused a near-failure of Prado Dam in 2005, it is possible that increases in the number of intense storms may increase the risk of similar events in the future. This scenario can be applied to many of the dams and reservoirs located within the

planning area. An increase in both the frequency and intensity of storms could potentially cause failure of the current infrastructure in place.

3.2.3 Flood

3.2.3.1 Description (Nature) of the Hazard

Flooding may result from heavy rains raising water levels in rivers and streams; storms, tides, and weather patterns pushing ocean water into coastal areas; and when debris blocks normal storm water drainage systems. Other causes are discussed in more detail elsewhere in this plan, including sea level rise in **Section 3.2.1** and dam/reservoir failure in **Section 3.2.2**. Flooding can happen fast and with little warning, or water levels may rise slowly over the course of several days.

Orange County's terrain makes it naturally susceptible to flooding. Many of the rivers, creeks, and streams flow through natural floodplains on their way to the ocean. The county's rapid growth and transformation from an agricultural community to an urban community has changed flood control practices in the region. Drainage is managed through reservoirs, dams, diversion structures, and developed plains. In addition, seven pump stations (Huntington Beach, Cypress, Seal Beach, Los Alamitos, Rossmoor, Harbor-Edinger, and South Park) regulate storm water discharge to flood control channels. Although there is a county-wide system of flood control facilities, many of these are not designed for or capable of conveying runoff from major storms.

Orange County also has a warning system in place to detect potential flooding. The county began installing its ALERT (Automated Local Evaluation in Real Time) system in 1983. Operated by the county's Environmental Resources Section of the Resource Development and Management Department (RDMD) in cooperation with the National Weather Service, ALERT uses remote sensors located in rivers, channels, and creeks to transmit environmental data to a central computer in real time. Sensors are installed along the Santa Ana River, San Juan Creek, Arroyo Trabuco Creek, Oso Creek, Aliso Creek, as well as flood control channels and basins. The field sensors transmit hydrologic and other data (e.g., precipitation data, water levels, temperature, wind speed) to base station computers for display and analysis.

3.2.3.2 History/Past Occurrences

Residents reported damaging floods caused by the Santa Ana River as early as 1770 (as recorded by explorer and missionary Father Juan Crespi). Major floods in Orange County along the Santa Ana River occurred in 1810, 1815, 1825, 1862, 1884, 1891, 1916, 1927, 1938, 1969, 1983, 1993, 1995, 1998, 2005, 2010, and 2017. Often these events involved additional hazards, such as landslides, mud flows, and high winds. **Exhibit 3-8, Presidential Disaster Declarations for Flooding in Orange County Since 1969,** lists Presidential Disaster Declarations since 1969 that involved flooding and affected Orange County.

Exhibit 3-8. Presidential Disaster Declarations for Flooding in Orange County Since 1969

Disaster Number	Incident Type	Title	Incident Begin Date	Incident End Date
3592	Flood	Severe winter storms, flooding, landslides, and mudslides.	3/9/2023	7/10/2023
3591	Flood	Severe winter storms, flooding, and mudslides.	1/8/2023	1/31/2023
4305	Flood	Severe winter storms, flooding, and mudslides.	1/18/2017	1/23/2017

Disaster Number	Incident Type	Title	Incident Begin Date	Incident End Date
1952	Flood	Severe winter storms, flooding, and debris/mud flows.	12/17/2010	1/4/2011
1585	Severe Storm(s)	Severe storms, flooding, landslides, and mud/debris flows.	2/16/2005	2/23/2005
1577	Severe Storm(s)	Severe storms, flooding, debris flows, and mudslides.	12/27/2004	1/11/2005
1203	Severe Storm(s)	Severe winter storms and flooding.	2/2/1998	4/30/1998
1046	Severe Storm(s)	Severe winter storms, flooding landslides, mud flow.	2/13/1995	4/19/1995
1044	Severe Storm(s)	Severe winter storms, flooding, landslides, mud flows.	1/3/1995	2/10/1995
979	Flood	Severe winter storms, mudslides, landslides, and flooding.	1/5/1993	3/20/1993
935	Flood	Rain/snow/wind storms, flooding, mudslides.	2/10/1992	2/18/1992
812	Flood	Severe storms, high tides, and flooding.	1/17/1988	1/22/1988
677	Coastal Storm	Coastal storms, floods, mudslides, and tornadoes.	1/21/1983	3/30/1983
615	Flood	Severe storms, mudslides, and flooding.	1/8/1980	1/8/1980
547	Flood	Coastal storms, mudslides, and flooding.	2/15/1978	2/15/1978
253	Flood	Severe storms and flooding.	1/26/1969	1/26/1969

The most significant flood events to affect the county are summarized below:

- **Great Flood of 1862.** The flood of January 1862, called the Noachian Deluge of California, was unusual in two ways: 1) the storm causing the flood occurred during a very severe drought spanning 1856 to 1864; and 2) the flood lasted 20 days, which is considered an extremely long duration. Under normal circumstances, major floods last only a few days. The only structure left standing along this portion of the Santa Ana River was the Aqua Mansa Chapel and residents gathered on a small point of high-land to take refuge from the storm. Miraculously, there were no recorded deaths.
- **Great Flood of 1916.** On January 27, 1916, flood waters inundated a large area along the Santa Ana River, including Main Street in downtown Santa Ana, where the water was 3 feet deep. Adjacent farm lands, which later became the City of Westminster, also flooded. Three vehicular bridges and three railroad bridges were washed away by the flood and four people drowned.
- **Great Flood of 1938.** The flood of 1938 is considered the most devastating flood to occur in Orange County during the 20th Century and affected all of Southern California. The storm began on February 27 and lasted until March 3. In the Santa Ana Basin, 34 people died, and 182,300 acres were flooded. All buildings in Anaheim were damaged or destroyed. Two major railroad bridges, seven vehicular bridges, and the town of Atwood were destroyed. The Santa Ana River inundated the northwestern portion of Orange County and train service to and from Santa Ana was cancelled. The maximum discharge on March 3, 1938, was 46,300 cubic feet per second (cfs), with a gauge height at 10.20 feet. Damage exceeded $50 million.
- **Great Flood of 1969.** The floods of January and February 1969 were the most destructive on record in Orange County. Previous floods had greater potential for destruction, but the county

was relatively undeveloped when they occurred. During the flood of 1969, rain fell almost continuously from January 18 to January 25, resulting in widespread flooding. Orange County was declared a national disaster area on February 5. A second storm hit on February 21 and lasted until February 25 bringing rain to the already saturated ground. This second storm culminated in a disastrous flood on February 25. The storm resulted in the largest peak outflow from Santiago Reservoir since its inception in 1933. The reservoir at Villa Park Dam reached its capacity for the first time since its construction in 1963; the dam had a maximum inflow of 11,000 cfs. The outlet conduit was releasing up to 4,000 cfs yet the spillway overflowed at 1:30 p.m. and continued for 36 hours. The maximum peak outflow from the dam reached 6,000 cfs. Although the safety of the dam was never threatened, the outflow caused serious erosion downstream in the cities of Orange and Santa Ana and in some parks and golf courses. A Southern Pacific Railroad bridge, water and sewer lines, a pedestrian over crossing, and three roads washed out. Approximately 2,000 Orange and Santa Ana residents were evacuated from houses bordering Santiago Creek.

- **Great Flood of 1983.** An intense downpour and high tides associated with El Niño (due to the presence of a low pressure system) caused intense shoreline flooding. Meanwhile the Santa Ana River crested its sides near the mouth of the ocean, creating a disaster for the low-lying areas of Huntington Beach. Floodwaters were 3 to 5 feet deep.
- **1992 Coastal Storms.** In 1992, several coastal storms affected many coastal utilities' storm drain and sewage treatment processes. SOCWA reported significant cracks and damage to its Aliso Creek Ocean outfall.
- **Great Floods of 1993.** An intense storm was concentrated in the Laguna Canyon Channel area extending from Lake Forest to downtown Laguna Beach. In spite of a valiant effort to save downtown merchants by sandbagging, the stores were flooded. Laguna Canyon Road was damaged extensively, as well as homes and small businesses in the Laguna Canyon Channel. There were no fatalities reported.
- **Great Flood of 1995.** A disaster was declared in Orange County after extremely heavy and intense rains exceeded the storm runoff capacity of local drainage systems in many Orange County cities and regional Flood Control District systems. As a result, widespread flooding of homes and businesses occurred throughout these cities. There were approximately 1,000 people evacuated, and extensive damage sustained to both private and public property.
- **Great Floods of 1997/1998.** El Niño storms that occurred during this period created extensive storm damage to private property and public infrastructure, with damages reaching approximately $50 million. Storm conditions caused numerous county-wide mudslides, road closures, and channel erosion. Hillside erosion and mudslides forced the continual clearing of roads of fallen trees and debris. Protective measures, such as stabilizing hillside road slopes with rock or K-rail at the toe of slopes, were taken to keep the normal flow of transportation. Harbors, beaches, parks, and trails also sustained substantial storm damage.
- **2010/2011 Winter Storms.** On January 26, California received Presidential Declaration for the severe winter storms, flooding, and debris and mudflows that occurred December 17, 2010, through January 4, 2011. At the time of the declaration the State of California incurred well over $75 million in damages, while Orange County sustained more than $36 million in damages. Orange County sustained extensive damage to private and public property, as well as critical infrastructure.

- **2017 Winter Storms.** Southern California experienced three storms over six days starting on January 18, 2016. The heavy rains, combined with already saturated soil, produced flash flooding across much of Orange County. Streets flooded with 1 to 3 feet of water in Huntington Beach, Santa Ana, and Newport Beach. Responders conducted rescue operations on the Santa Ana River in the cities of Orange and Huntington Beach. The storms resulted in a Presidential Disaster Declaration for 16 counties throughout the State (MWDOC 2019; Swegles 2017).
- **2019 Winter Storms.** In January 2019 Southern California experienced intense and heavy rainstorms over the course of a week, bringing with it large amounts of rain to the region and planning area. A nearly 3-mile stretch of Pacific Coast Highway in both directions between Warner Avenue and Seapoint Street in Huntington Beach was closed due to flooding. Seal Beach, Huntington Beach, and Fountain Valley each reported roughly 2 inches of rain in 2 hours. Laguna Beach residents were advised to raise floodgates and place sandbags to divert water flow. Sandbags were made available to all residents at Orange County Fire Authority stations and at most cities' public works yards (Fausto 2019).
- **2021 Winter Storms.** On January 28 and 29, 2021, a powerful winter storm and atmospheric river brought heavy rain. A total of 1.5 inches of rain fell across Santiago Canyon in eastern Orange County. Many areas flooded, including Santiago Canyon where mud and debris flows covered roads and damaged homes (Weather.gov 2024).
- **2023 Winter Storms.** On January 14 and 16, 2023, widespread heavy rainfall came in two waves, with the first occurring the afternoon of January 14 into early January 15, and the second occurring the night of January 15 through 16. Rainfall in the first wave ranged from 1 to 2 inches for the coast, 1 to 2.5 inches in the valleys, 2 to 5 inches in the mountains and up to a half inch of rain in the deserts. The second, colder system again produced widespread moderate to heavy rainfall. There were impressive totals for both waves: 2 to 4 inches at the coast, 2 to 5 inches for the inland valleys and 3 to 8 or more inches for the mountains. A lot of flooding occurred in Orange County, San Diego County, and Riverside County (Weather.gov 2024).

3.2.3.3 Location/Geographic Extent

Orange County covers 789 square miles, and its landscape varies from mountainous terrain (in the northeast and southeast) to floodplains (in the central and western section). **Exhibit 3-9** identifies the 100- and 500-year FEMA floodplains within Orange County. A sizable portion of north Orange County, including some of the county's most densely populated areas, is within a 500-year floodplain, which denotes areas with a 1-in-500, or 0.2%, chance of flooding in any given year.

The Santa Ana River, flowing through the heart of Orange County to the Pacific Ocean, is the county's greatest flood threat. Other areas subject to flooding during severe storms include areas adjacent to Atwood Channel, Brea Creek Channel, Fullerton Creek Channel, Carbon Creek Channel, San Juan Creek Channel, and East Garden Grove-Wintersburg Channel. Areas adjacent to Santiago Creek and Collins Channel in the central portion of the county and large portions of the San Diego Creek Watershed in the City of Irvine and unincorporated areas of the county are also subject to inundation. In the southern portion of the county, canyon areas are subject to flooding. The continued development in these areas has made the flood hazard even greater.

According to the 2014 National Climate Assessment Report, as is common in coastal areas, many roads and bridges, high-priced homes, and wastewater systems are located in low-lying areas near

the ocean. Increases in storm water runoff have the potential to overwhelm the capacity of wastewater and drainage systems, flood control channels, and pump stations.

3.2.3.4 Magnitude/Severity

Flood severity is often described in terms of a 100-year flood, describing an event that is likely to occur once in a 100-year period. In other words, there is a 1% probability of an event this severe occurring in any given year. Flood Insurance Rate Map (FIRM) panels produced by FEMA identify areas subject to this level of risk as being within the 100-year floodplain. **Exhibit 3-9** shows these locations throughout Orange County, as well as a 500-year floodplain, which indicates a 0.2% annual chance of flooding.

Floods can also be measured in terms of data collected by U.S. Geological Survey through a nationwide system of stream gauges. The primary gauge on the Santa Ana River is in the City of Santa Ana. During the Great Flood of 1938, this gauge measured a water level of 10.2 feet, compared to a normal height of about 1.44 feet. During both of the two most recent flood events in 2010/2011 and 2017, the river reached 7.6 feet.

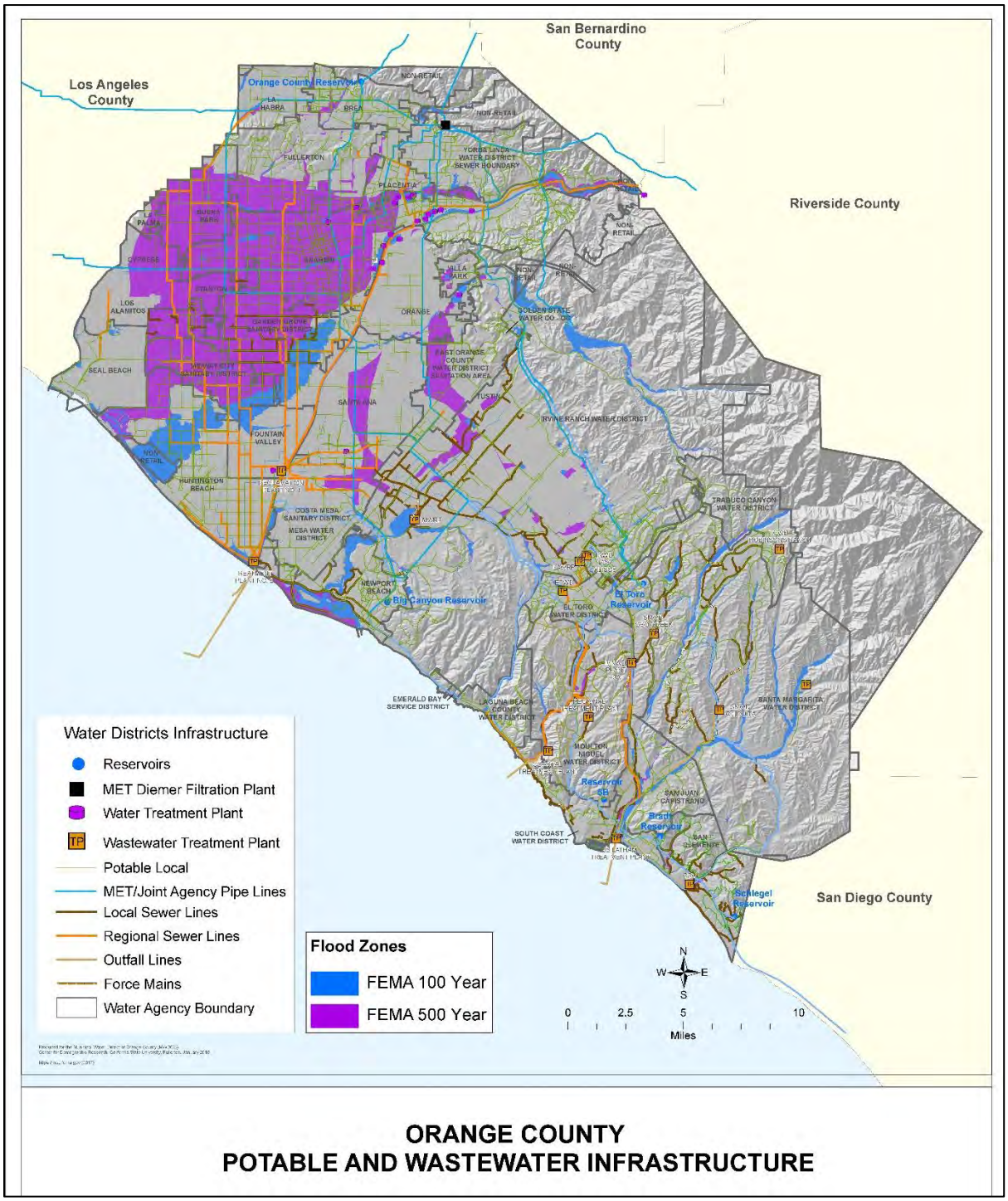
The greatest flood in terms of water flow occurred in 1862, when the Santa Ana River saw an estimated flow rate of 317,000 cfs. This flood was three times greater than the Great Flood of 1938, which had an estimated flow of 110,000 cfs. Peak discharges measured on the Santa Ana River during declared flood disasters since 1993 have ranged from 8,220 to 31,700 cfs.

On December 22, 2010, during the peak of that winter's floods, a weather station in Silverado Canyon recorded more than 7 inches of rain in a single day, according to NOAA climate data. During other flood events in the last 25 years, the maximum daily rainfall recorded within Orange County has ranged from 2 to 4 inches.

3.2.3.5 Probability of Future Occurrences

As mentioned in **Section 3.2.3.4,** FIRM panels depict areas that have a 1% chance of flooding in any given year, identified as a 100-year floodplain, as well as a 0.2% chance, or a 500-year floodplain. Such areas within Orange County are depicted in **Exhibit 3-9.**

Exhibit 3-9. Flood Zones



3.2.3.6 Climate Change Considerations

Climate change is expected to affect California's precipitation patterns, likely influencing future flood events. A 2017 study found that the number of very intense precipitation days in California is projected to more than double by the end of the century, increasing 117%, making it likely that flood events will become more frequent (Polade et al. 2017). More flood events could increase the

frequency of maintenance and repair activities and require operational changes in the planning area functions. Portions of the infrastructure may require modification and retrofit to better accommodate changes anticipated from climate change. As a result, significant investment in future infrastructure may become necessary.

In contrast to the Atlantic and Gulf coasts, where coastal flooding is mainly associated with major storms, flooding along the Pacific Coast is the result of a number of more subtle factors, including tidal cycles, the El Niño climate pattern, distant wind-generated ocean swells, local storms, and the time of year.

3.2.4 Geological Hazards (Expansive Soils, Land Subsidence, Landslide and Mudflow)

3.2.4.1 Description (Nature) of the Hazard

Expansive Soils

According to a scientific paper published in the Journal of Geotechnical Engineering (Day 1994), "expansive soil is a worldwide problem that causes extensive damage to civil engineering structures." Expansive soils are particularly problematic in the southwestern United States and especially in Southern California where there are large clay deposits compounded by "alternating periods of rainfall and drought." The problem with constructing on expansive soils is that the clay, often referred to as adobe, expands rapidly during the rainy season and contracts gradually during the dry season causing "shrink-swell." Shrink-swell is particularly problematic for "slab-on-grade" foundations, which can be placed directly on expansive soil that is constantly in a state of movement as the soil expands and contracts causing the foundation to fatigue and crack. Buildings with balloon frame construction are also susceptible to bowing and cracking when built on expansive soils. Shrink and swell can affect water/wastewater facilities particularly buildings or structures built using slab-on-grade or balloon frame construction techniques.

Expansive soil is also known to "creep" on unstable slopes eventually leading to landslides. Typically, this is found when expansive soil underlies compact topsoil. As the expansive soil expands-contracts, the compact topsoil slides or creeps downhill. Facilities built on unstable slopes with underlying expansive soils are prone to movement and can be damaged or destroyed in extreme circumstances.

Land Subsidence

The United States Geological Survey (USGS) defines land subsidence as a gradual settling or sudden sinking of the ground surface because of subsurface movement of underlying geologic units. Scientists at the USGS have determined that nearly 17,000 square miles in 45 states have been directly affected by land subsidence, caused by aquifer-system compaction, drainage of organic soils, underground mining, hydro-compaction, natural compaction, sinkholes, and thawing permafrost. More than 80% of land subsidence is caused by overuse of groundwater, and the increasing development of land and water resources threatens to worsen existing land subsidence problems (while initiating) new ones (USGS 2024).

Land subsidence in California is mainly caused by groundwater pumping in areas where aquifer recharge is exceeded. Known as "over-drafting," the dewatering of aquifers has led to lower water tables and subsidence, resulting in damage to infrastructure and water quality, and in coastal areas has resulted in the intrusion of seawater. USGS notes "the compaction of unconsolidated aquifer systems that can accompany excessive groundwater pumping is by far the single largest

cause of subsidence" and "the overdraft of such aquifer systems has resulted in permanent subsidence and related ground failures," thus "the extraction of this resource for economic gain constitutes 'groundwater mining' in the truest sense of the term" (USGS 2024). Over-drafting is further exacerbated in hot geographic regions with a large population; this includes much of Southern California.

Landside/Mudflow

Landslide is a general term for a falling mass of soil or rocks. Mudflow consists of material that is wet enough to flow rapidly and contains at least 50% sand, silt, and clay-sized particles. The primary effects of landslides/mudflows can include:

- Abrupt depression and lateral displacement of hillside surfaces over distances of up to several hundreds of feet.
- Disruption of surface drainage.
- Blockage of flood control channels and roadways.
- Displacement or destruction of improvements such as roadways, buildings, and water wells.

Landslides are a type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity. The term "landslide" encompasses events such as rock falls, topples, slides, spreads, and flows. Landslides can be initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance, and change of a slope by man-made construction activities or any combination of these factors. Landslides can occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides (USGS 2000).

Failure of a slope occurs when the force that is pulling the slope downward (gravity) exceeds the strength of the earth materials that compose the slope. They can move slowly (millimeters per year) or can move quickly and disastrously, as is the case with debris flows. Debris flows can travel down hillsides at speeds of up to 200 miles per hour (more commonly, 30 to 50 miles per hour), depending on the slope angle, water content, and type of earth and debris in the flow. These flows are initiated by heavy, usually sustained, periods of rainfall, but sometimes can happen because of short bursts of concentrated rainfall in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions.

A debris or mud flow is a river of rock, earth, and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. This high rate of speed makes debris flows extremely dangerous to people and property in its path. Earthquakes often trigger flows. Debris flows normally occur when a landslide moves down slope as a semi-fluid mass scouring, or partially scouring, soils from the slope along its path. Flows typically move rapidly and also tend to increase in volume as they scour out the channel. Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

Wildland fires on hills covered with chaparral are often a precursor to debris flows in burned out canyons. The extreme heat of a wildfire can create a soil condition in which the earth becomes impervious to water by creating a waxy-like layer just below the ground surface. Since the water cannot be absorbed into the soil, it rapidly accumulates on slopes, often gathering loose particles of soil into a sheet of mud and debris. Debris flows can often originate miles away from unsuspecting persons and approach them at a high rate of speed with little warning.

Natural processes can cause landslides or re-activate historical landslide sites. The removal or undercutting of shoreline-supporting material along bodies of water by currents and waves produces countless small slides each year. Seismic tremors can trigger landslides on slopes historically known to have landslide movement. Earthquakes can also cause additional failure (lateral spreading) that can occur on gentle slopes above steep streams and riverbanks.

3.2.4.2 History/Past Occurrences

Expansive Soils

In 1980, Krohn and Slosson (1980) made an assessment and cost estimate of the damage caused by expansive soils throughout the United States. They estimated that approximately $7 billion in property damage was reportedly attributed to construction on expansive soils. While no recent figures have been identified, the increase in construction activity in areas of expansive soil, especially in Southern California, will undoubtedly cause this number to increase. J. David Rogers of the University of Missouri found that "expansive soils are the second leading cause of property damage in the United States."

There are no reported occurrences of expansive soils causing considerable damage within Orange County; although expansive soils are known to exist. Typically, expansive soils would be identified at a local level on a site-by-site or area basis and are addressed as part of the development review process.

Land Subsidence

The relationship between subsidence and groundwater pumping was not fully recognized until 1928, when O. E. Meinzer, scientist with the United States Forest Service (USFS), realized that aquifers were compressible (Meinzer 1928). By the 1950s, the USGS made a concerted effort to measure the amount of ground subsidence. In 1952, Joseph Poland studied large discrepancies between the U.S. Coast and Geodetic Survey for the Santa Clara and San Joaquin valleys. Poland noted that the increased use of groundwater correlated with the amount of ground subsidence. Poland's work led to the verification of "consolidation theory" or compressible aquifers, as well as leading to the development of "definitions, methods of quantification, and confirmation of the interrelationship among hydraulic-head declines, aquitard (clay) compaction, and land subsidence" (Poland 1972).

Subsidence has historically occurred in Orange County associated with groundwater pumping and from peat decomposition. The areas of historic subsidence associated with groundwater pumping are illustrated in **Exhibit 3-10**. Localized subsidence possibly due to peat decomposition has also been reported in scattered areas inland from the coast between Sunset and Newport Beaches.

Landside/Mudflow

The following identifies some of the more major landslide occurrences within Orange County. There have been no disaster declarations within Orange County associated with landslides/mudflows.

- **1978 Bluebird Canyon, Orange County.** The cost of recovery was $52.7 million (in 2000 dollars) with 60 houses destroyed or damaged. Unusually heavy rains in March of 1978 may have contributed to initiation of the landslide. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide.

- **1980 Southern California Landslides.** The damage was estimated at $1.1 billion in 2000 dollars. Heavy winter rainfall in 1979-1980 caused damage in six Southern California counties. In 1980, the rainstorm started on February 8 with five days of continuous rain and 7 inches of precipitation. Slope failures were beginning to develop by February 15, and then very high-intensity rainfall occurred on February 16. As much as 8 inches of rain fell in a 6-hour period in many locations. Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.
- **1983 San Clemente, Orange County.** The damage to California Highway 1 was estimated at $65 million in 2000 dollars. Litigation at that time involved approximately $43.7 million (in 2000 dollars).
- **1994 Northridge, California Earthquake Landslides.** As a result of the magnitude 6.7 Northridge, California, earthquake, more than 11,000 landslides occurred over an area of 10,000 square kilometers. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. They destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. It caused deaths from Coccidioidomycosis (valley fever) due to spores released from the soil by the landslide activity and blown toward the populated coastal areas.
- **1995 Los Angeles and Ventura Counties, Southern California.** Above normal rainfall triggered damaging debris flows, deep-seated landslides, and flooding. Several deep-seated landslides were triggered by the March storms, the most notable was the La Conchita landslide, which in combination with a local debris flow, destroyed or badly damaged 11 to 12 homes in the small town of La Conchita, about 20 kilometers west of Ventura. There also was widespread debris flow and flood damage to homes, commercial buildings, and roads and highways in areas along the Malibu coast that had been devastated by wildfire 2 years before.
- **1998 Laguna Niguel and Orange County Landslide.** During the 1997/1998 El Niño season, heavy rainfall increased movement on the site of an ancient landslide in Laguna Niguel. The storms in December 1997 had accelerated the landslides' movement and in early 1998, a crumbling hillside forced the evacuation of 10 hilltop homes and more than 10 condominium units resting below. Ultimately four of the hilltop homes collapsed, falling down the hillside into the void created by the slide area. The condominium complex has since been demolished and the site remains open space.
- **2005 Blue Bird Canyon, Laguna Beach, Orange County Landslide.** On June 1, 2005, Bluebird Canyon in Laguna Beach experienced a landslide. Exceptionally heavy rainfall during the winter period was the underlying cause of the instability in an ancient landslide. A 30-acre piece of hillside between 50 to 60 feet deep broke free and fell on the homes below; 15 homes were destroyed, and 32 others had varying levels of damage. The approximate cost of damage was about $35 million.
- **2005 SCWD Landslide Impact to the Joint Regional Transmission Line.** Following a year of heavy rainfall, a slope failure occurred in Laguna Niguel in an area that included a section of the Joint Regional Transmission Pipeline. The pipeline had to be shut down and a temporary pipeline was routed around the slide area while evaluations of the stability of the area were made. Ultimately, the pipeline will be rerouted around the unstable area or located back in the slope after it has stabilized. Because the problem occurred in the winter/spring period and there are other pipelines into South Orange County, no water shortages were experienced.

- **2018 Cannon Cliff, Dana Point, Orange County Rockslide.** Approximately 18 tons of rocks, including a two-ton boulder dropped from the cliff area under Cannons Restaurant and struck a public restroom across from Baby Beach at the north end of Dana Point Harbor. The rocks are part of a 4-to-5-million-year-old rock formation called the Capistrano Formation.
- **2021 Silverado Canyon, Orange County Mudflow.** A powerful storm contained a heavy burst of rain in eastern Orange County that struck the Bond Fire burn scar in Silverado Canyon. In 15 minutes, 0.20 inch of rain fell. A debris flow went over roads and into homes, damaging six homes and eight vehicles in Silverado. The flow also closed a stretch of Silverado Canyon Road.

Rain-induced landslides were reported in Santa Margarita in 1980, 1993, 1995, and 2005. In 1980 rains washed out an access road in Coto de Caza uncovering an 8-inch water line. The same series of storms also exposed a 21-inch trunk sewer line along the Oso Creek in Mission Viejo resulting in damages of $300,000. In 1993, bank failures caused many pipelines to break that had to be replaced, relocated, or re-protected at a cost of nearly $2.1 million. A slope failure in 1995 caused pipeline failures costing nearly $30,000, and in 2005 a reservoir slope failure in Talega Valley cost $350,000. Landslides, resulting in erosion along Aliso Creek, affected the SOCWA's Aliso Creek Effluent Transmission Main (a 36-inch pipeline carrying treated wastewater).

3.2.4.3 Location/Geographic Extent

Expansive Soils

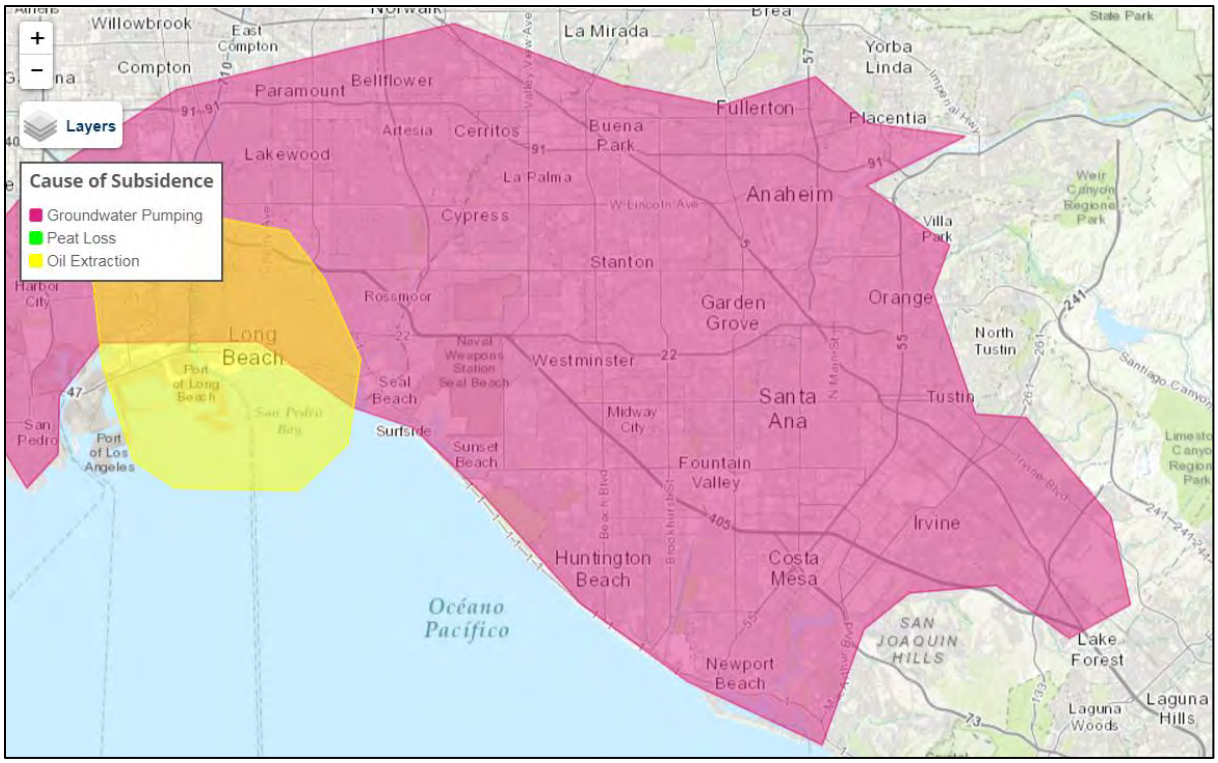
According to the County of Orange General Plan Safety Element (Orange County, 2015), much of Orange County is covered by soil that may cause cracking in concrete foundations. The most prevalent problems occur from clay or "expansive" soils that contract and expand. Problems attributed to expansive soils are usually related to improperly designed or constructed foundations. Due to the diversity of soil conditions, structures are not completely safe from cracking, slipping, or sinking to some degree. Expansive soils are typically mitigated through structural and design regulations as well as through soil treatment techniques. The California Building Code specifically addresses expansive soils in Sections 1804.4, 1806.5, and 1815. The California Health and Safety Code Section 17954 states, "If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision" and "The soil investigation shall be prepared by a civil engineer who is registered in this state." Expansive soils can impact the entire planning area.

Land Subsidence

Currently, land subsidence affects much of the west coast. The area most affected by land subsidence in Orange County is between Newport Beach and Huntington Beach and 5 miles inland from this point. Referred to as Talbert Gap, this area formed a millennia ago from alluvial deposition from the Santa Ana River.

According to the USGS online map viewer, areas starting from Newport Beach up to Seal Beach, and out east to Placentia, experience subsidence impacts due to groundwater pumping. **Exhibit 3-10** shows the areas impacted by subsidence.

Exhibit 3-10. Subsidence



Landside/Mudflow

Exhibit 3-11 illustrates the portions of the planning area susceptible to landslides based upon topography, surface and subsurface geology, borehole data, historical groundwater levels, existing landslide features, slope gradient, rock-strength measurements, geologic structure, and probabilistic earthquake shaking estimates. These areas are primarily comprised of the southern coastal communities and the communities containing steeper topography or located adjacent to mountain areas.

The extent of landslides/mudflows varies throughout Orange County depending on the location and contributing conditions, such as an earthquake, heavy rain, or recent fires. Earthquake-induced landslides are relatively shallow falls and slides, in which highly disrupted masses of rock and soil travel down slopes at high speed. The Northridge earthquake, in Los Angeles County, triggered more than 11,000 landslides in an area of 6,200 square miles. Most slides were shallow, brittle failures of surficial rock and soil.

Deep-seated landslides are triggered by cumulative rainfall during long periods (weeks to years). Resulting landslides are relatively deep earth flows and translational or rotational earth slides and rock slides. Translational landslides are typically a few meters to tens of meters deep, and rotational slides range in depth from several meters to tens of meters. Deep-seated translational and rotational landslides, including rock slides, tend to fail a little at a time and move more slowly than debris flows, but a few do accelerate to rapid movement. A previous landslide within Orange County due to oversaturated soils resulted in a 40-foot landslide below a 5-million-gallon water tank. Other landslides in the county have measured approximately 3.5 acres and 25 acres.

Similarly, short-duration, intense rainfall, and generally greater than 0.5 inch per hour precipitation has the potential to trigger post-fire debris flows. These flows can extend several miles. Documented debris flows from burned areas in Southern California and the western United States have ranged in volume from as small as 600 cubic meters to as much as about 300,000 cubic meters. This larger volume is enough material to cover a football field with mud, rocks, and debris to about 65 meters deep.

3.2.4.4 Magnitude/Severity

Expansive Soils

Damages to property due to erosion and deposition are usually classified as cosmetic, functional, or structural. Cosmetic damage refers to slight problems where only the physical appearance of a structure is affected (e.g., cracking in plaster or drywall). Functional damages refer to situations where the use of a structure has been impacted due to subsidence. Structural damages include situations where entire foundations require replacement due to subsidence-caused cracking of supporting walls and footings.

Buildings and infrastructure across Orange County are vulnerable to the impacts of soil expansion, instability, and erosion-related hazards. Cities in Southern California have established guidelines for construction in areas of expansive soils. The MAs generally conduct soil surveys prior to construction of water and wastewater facilities and take the specific circumstances into consideration during design and construction. The magnitude and severity of expansive soils are similar throughout the planning area.

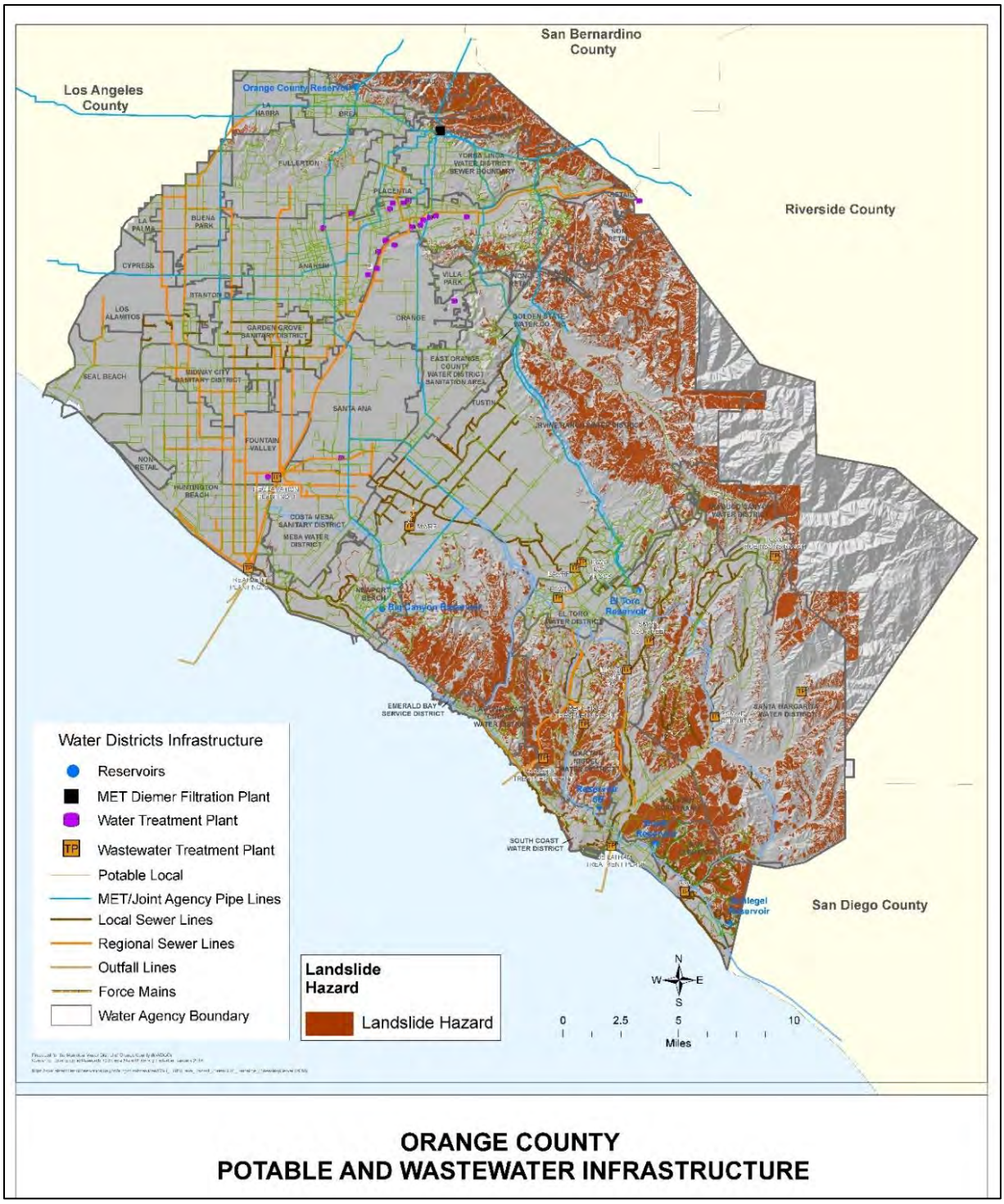
Land Subsidence

The Talbert Gap, as described above, has sustained nearly a century of underground water aquifer pumping, which was used to sustain intensive grazing and agriculture practices. By 1956 the water table had lowered to below sea level allowing saltwater from the Pacific Ocean to intrude through the Talbert Gap. Because of studies identifying subsidence and saltwater intrusion in Orange County, OCWD began a massive management program to minimize the loss of aquifer-stored water and reduce saltwater intrusion. Although subsidence is a concern within Orange County, programs have been implemented to address subsidence issues. The MAs within the portion of the planning area identified as having historic subsidence could continue to be impacted if it is not monitored and addressed.

Landside/Mudflow

Factors included in assessing landslide magnitude/severity include population and property distribution in the hazard area, the frequency of landslide or debris flow occurrences, slope steepness, soil characteristics, and precipitation intensity. The California Geological Survey landslide maps prepared as part of the Seismic Hazard Program (refer to **Exhibit 3-11**) indicate the extent of landslide susceptibility within Orange County, which includes the southernmost coastal areas and eastern areas of the county. These areas would also be more likely to experience mudflows due to the topography of the areas.

Exhibit 3-11. Landslide Susceptibility



3.2.4.5 Probability of Future Occurrences

Expansive Soils

Expansive soils will continue to occur throughout the planning area. Potential impacts associated with these hazards will need to be addressed through site design and development review, including preparation and adherence to geotechnical constraints recommendations.

Land Subsidence

In areas that have experienced decreased precipitation in the summer months and reduced surface water supplies, communities are often forced to pump more groundwater to meet their needs. Orange County has historically experienced long-term droughts, especially in recent years. Although specific areas of excessive pumping, such as Talbert Gap, have been addressed, there is still a high probability that communities within the planning area will continue to experience impacts of these events.

It is important that these communities consider future mitigation actions that will address this hazard, particularly in newly developing areas near water. In areas where groundwater pumping has caused subsidence, switching to surface water supplies can be instrumental. Changing climate norms are expected to affect soil resources and especially during hot, dry years annual grasses that stabilize and protect topsoil often fail to germinate or do not grow well. This leaves soil surfaces highly vulnerable to erosion from wind and precipitation and can further exacerbate the consequences of soil expansion and subsidence.

Landside/Mudflow

A study conducted by Nature Geoscience in 2015 indicated that the projected upsurge of El Niño and La Niña events will increase the likelihood that coastal communities will experience erosion and flooding (Barnard, 2015). This is separate from sea level rise, which has also been identified as a cause of future hazard vulnerabilities. In addition to erosion and flooding, the onset of El Niño and La Niña events will also increase the magnitude and severity of mudflow events. The more recent wildfires also contribute to the probability of mudflows in the event of more intense rainfall over a short duration. Earthquakes of magnitude 4.0 and greater have been known to trigger landslides. The potential for an earthquake to induce a landslide is highly dependent on the location of the earthquake and magnitude in relation to a landslide area. Based on previous landslide and mudflow incidents, along with studies predicting future occurrences, it is reasonable to state that these hazards will continue to impact the jurisdictions identified within the landslide susceptibility areas of Orange County. According to the Planning Team ranking, landslides and mudflows are somewhat likely—having between a 1% and 10% probability in next year or a recurrence interval of 11 to 100 years.

3.2.4.6 Climate Change Considerations

Expansive Soils

It is possible that expansive soils may be affected by climate change, as climate change is expected to bring about more frequent drought conditions and contribute to more intense storms, like El Niño. These extreme conditions could further increase the effects of expansive soils on structures since there could be a change in the physical expansion and contraction of soils in affected areas, potentially increasing damage to structures and infrastructure.

Land Subsidence

As temperatures increase so too will the demand for water usage. The potential that precipitation events could decrease in frequency, while experiencing a potential increase in intensity, could result in less water being recharged into the aquifer/basin. If lower water levels occur within the groundwater aquifer the potential for land subsidence could increase within the affected parts of Orange County.

Landside/Mudflow

Due to the wide variety of factors that can lead to landslides and mudflows, it is possible that climate change could indirectly affect the conditions for landslides and mudflows. Increased frequency and more intense storms may cause more moisture-induced landslides. Warmer temperatures and more frequent drought conditions may lead to more fires, destabilizing soil on slopes, and making future landslide and mudflow events more likely.

3.2.5 Human-Caused Hazards (Contamination/Saltwater Intrusion, Hazardous Materials, Power Outage, Terrorism [Cyber Threat], Terrorism [Mass Casualty Incident])

3.2.5.1 Description (Nature) of the Hazard

Human-caused hazards are distinct from natural hazards in that they result directly from the actions of people. Two types of human-caused hazards include: non-malicious and malicious. Non-malicious hazards refer to incidents that can arise from human activities such as the manufacturing, storage, transport, and use of hazardous materials, which include toxic chemicals, radioactive materials, and infectious substances. Non-malicious hazards are assumed to be accidental and their consequences unintended. Malicious, on the other hand, encompasses intentional and criminal acts involving weapons of mass destruction (WMD) or conventional weapons. WMD can involve the deployment of biological, chemical, nuclear, and radiological weapons with the result of affecting a significant percentage of the population either directly or indirectly. Conventional weapons and techniques include the use of arson, incendiary explosives, armed attacks, intentional hazardous materials release, and cyber terrorism (attack via computer). Typically, conventional weapons have a very specific target and are limited in scope and effect.

Groundwater Contamination

Groundwater contamination occurs when pollutants are released to the ground, navigate through the soil, and ultimately end up in the groundwater. Human activity is almost always the underlying cause of groundwater contamination. In areas where population density is high and human use of land is intensive, groundwater is especially vulnerable. Virtually any activity whereby chemicals or wastes may be released to the environment, either intentionally or accidentally, has the potential to pollute groundwater.

Saltwater Intrusion

When fresh water is withdrawn from aquifers at a faster rate than it is replenished, a draw-down of the water table occurs with a resulting decrease in the overall hydrostatic pressure. When this happens near a coastal ocean area, saltwater from the ocean can intrude into the freshwater aquifer. The result is that freshwater supplies become contaminated with saltwater.

Hazardous Materials

Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. The State of California defines a hazardous material as a substance that is toxic, ignitable, or flammable or reactive and/or corrosive. An extremely hazardous material is defined as a substance that shows high acute or chronic toxicity, carcinogenicity, bio-accumulative properties, persistence in the environment, or is water reactive (California Code of Regulations, Title 22). "Hazardous waste," a subset of hazardous materials, is material that is to be abandoned, discarded, or recycled and includes chemical, radioactive, and bio-hazardous waste (including medical waste). An accidental hazardous material release can occur wherever hazardous materials are manufactured, stored, transported, or used. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas. With respect to water or wastewater systems, concerns arise regarding exposure to these materials via contact or ingestion of drinking water and or discharge of contaminated water into the ocean where exposure to the marine environment and public would be of concern.

Non-malicious hazards can occur because of human carelessness, technological failure, and natural hazards. When caused by natural hazards, these incidents are known as secondary hazards, whereas intentional acts are terrorism. Hazardous materials releases, depending on the substance involved and type of release, can directly cause injuries and death and contaminate air, water, and soils. While the probability of a major release at any facility or at any point along a known transportation corridor is relatively low, the consequences of releases of these materials can be very serious.

The most common sources of contamination to water supply systems are naturally occurring chemicals and minerals (i.e., arsenic, radon, and uranium), local land use practices (i.e., fertilizers and pesticides), manufacturing processes, sewer overflows, and malfunctioning wastewater treatment systems (i.e., nearby septic systems). Although these contaminants present an environmental and human health risk concern, the EPA holds regulations in place to ensure water supply systems do not contain elevated levels of contaminants.

Some hazardous materials also present a radiation risk. Radiation is any form of energy propagated as rays, waves, or energetic particles that travel through the air or a material medium. Radioactive materials (e.g., uranium, plutonium, radium, and thorium) are composed of unstable atoms. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. The process by which an atom changes from an unstable state to a more stable state by emitting radiation is called radioactive decay or radioactivity.

Radiological materials have many uses including:

- Use by doctors to detect and treat serious diseases,
- Use by educational institutions and companies for research,
- Use by the military to power large ships and submarines, and
- Use as a critical base material to help produce the commercial electrical power that is generated by a nuclear power plant.

Radioactive materials, if handled improperly, or radiation accidentally released into the environment can be dangerous because of the harmful effects of certain types of radiation on the human body and the human environment. The longer a person is exposed to radiation and the closer the person is to the radiation source, the greater the risk. Although radiation cannot be

detected by the senses, scientists can easily detect it with sophisticated instruments that can detect even the smallest levels of radiation. Under extreme circumstances, an accident or intentional explosion involving radiological materials can cause very serious problems. Consequences may include death, severe health risks to the public, damage to the environment, and extraordinary loss of, or damage to, property.

Power Outage

A power outage typically occurs during a natural hazard such as extreme weather conditions, earthquakes, flood, fire, or severe winds. An outage can result in damaged power equipment or equipment failures and can affect multiple counties for hours. This type of event can range from a moderate event to a catastrophic regional event that may threaten human life, safety, and health, or interferences with vital services. An outage may occur as a secondary effect of another hazard, or as the result of construction, an accident, or terrorism. Severe winds and flood can bring down trees and tree limbs onto power lines. And these types of events can cause serious safety hazards to the public and emergency responders.

Terrorism (Cyber Threat)

Cyber threats are when an individual or a group threatens or attempts to disrupt the operations and functioning of computer systems belonging to private citizens, religious groups, educational institutions, government agencies, or businesses. These threats include online harassment, hacking, or in-person tampering with electronic equipment. Successful cyber threats can lead to service disruptions, infrastructure damage, and theft and may cause injury or death in severe instances. All of Orange County's water utilities Supervisory Control and Data Acquisition (SCADA) systems, which operate over telecommunication lines and/or radio systems. These systems are vulnerable to hacking and leave utilities open to malicious acts.

Terrorism (Mass Casualty Incident)

Following several serious international and domestic terrorist incidents since the early 2000s, citizens across the United States have paid increased attention to the potential for deliberate, harmful terrorist actions by individuals or groups with political, social, cultural, and religious motives. There is no single, universally accepted definition of terrorism, and it can be interpreted in a variety of ways. However, terrorism is defined in the CFR as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR § 0.85). The Federal Bureau of Investigation further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences. Terrorists can utilize a wide variety of agents and delivery systems.

Water supplies and infrastructure, such as dams, in Orange County are considered as potential terrorist targets. The weapon most likely used could include explosives with the goal of collapsing the dam. Such an event would result in a dam failure and an inundation event with little or no warning. The potential of using other types of weapons such as chemical or biological are considered low due to the large amount of material that would be required to contaminate the water system. This scenario would only apply to those dams where the reservoirs are used for drinking water.

A mass casualty incident describes an incident within the United States where emergency medical services resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. The more commonly recognized events of this type include building collapses, train and bus collisions, plane crashes, earthquakes, and other large-scale emergencies. The most common types are generally caused by terrorism, mass transportation accidents, or natural disasters. Events such as the Oklahoma City bombing in 1995, the September 11 attacks in 2001, and the 2017 Las Vegas Shooting are well-publicized examples of mass casualty incidents.

3.2.5.2 History/Past Occurrences

Groundwater Contamination

Over the last several decades, Orange County's North Basin has experienced industrial solvent spills and leaks from manufacturing, metals processing businesses, and dry-cleaning facilities. As a result, a contamination plume several miles long and over a mile wide currently exists under the cities of Fullerton, Anaheim, and Placentia. The Orange County Groundwater Basin is a source of drinking water for the region, providing most of the water used in 22 cities. The contamination plume has already taken five wells off line, including three of Fullerton's 12 total wells. Those wells draw water from shallower sources closer to the surface and consequently are closer to the pollution. According to the EPA, they have completed the "first phase of the Comprehensive (site-wide) RI/FS, which involved the installation of additional monitoring wells to further characterize the entire site. This report is expected to be completed in December of 2024" (EPA Superfund n.d.).

Saltwater Intrusion

In Orange County, by 1956, years of heavy pumping to sustain the region's agricultural economy had lowered the water table by 15 feet below sea level and saltwater from the Pacific Ocean had encroached as far as 5 miles inland. The area of intrusion is primarily across a 4-mile front between the cities of Newport Beach and Huntington Beach known as the Talbert Gap. The mouth of an alluvial fan formed millions of years ago by the Santa Ana River, the Talbert Gap has since been buried along the coast by several hundred feet of clay. In 1976, the Water Factory 21 Direct Injection Project, operated by OCWD, began injecting highly treated recycled water into the aquifer to prevent saltwater intrusion, while augmenting the potable groundwater supply. This system was shut down to make way for the Groundwater Replenishment System (GWRS) Project, which began operation in 2008. The GWRS provides highly treated water for injection into the seawater barrier system to prevent seawater intrusion into the Orange County Groundwater Basin. As of September 17, 2024, more than 444 billion gallons of water have been successfully treated and injected into the seawater barrier system.

Hazardous Materials

Numerous facilities in Orange County generate hazardous waste in addition to storing and using large numbers of hazardous materials. Although the scale is usually small, emergencies involving the release of these substances can occur daily at both fixed sites and on Orange County's streets and roadways. Facilities that use, manufacture, or store hazardous materials in California must comply with several Federal and State regulations. The Superfund Amendments and Reauthorization Act (SARA Title III), which was enacted in 1986 as a legislative response to airborne releases of methyl isocyanides at Union Carbide plants in Bhopal, India, and in Institute, West Virginia. SARA Title III, also known as the Emergency Planning and Community-Right-To-Know Act

(EPCRA), directs businesses that handle, store, or manufacture hazardous materials in specified amounts to develop ERPs and report releases of toxic chemicals. Additionally, Section 312 of Title III requires businesses to submit an annual inventory of hazardous materials to a State-administering utility. The California legislature passed Assembly Bill 2185 in 1987, incorporating the provisions of SARA Title III into a State program. The EPCRA requirements keep communities abreast of the presence and release of hazardous wastes at individual facilities.

Additional information about the chemicals handled by manufacturing or processing facilities is contained in the EPA's Toxic Release Inventory (TRI) database. The TRI is a publicly available EPA database that contains information on toxic chemical emissions and waste management activities reported by certain industry groups as well as Federal facilities. This inventory was established under EPCRA and expanded by the Pollution Prevention Act of 1990. Facilities that exceed threshold emissions levels must report TRI information to the EPA, which is the Federal enforcement agency for SARA Title III.

Over the past several decades, industrial activities have contaminated Orange County's North Basin, which provides much of the water used in 22 Orange County cities, including parts of Fullerton, Anaheim, and Placentia. Over 5 square miles of contaminants, mostly volatile organic compounds (VOCs), have migrated through the soils and are now leaching into the underlying groundwater. These VOCs have impacted nearby water supply wells causing four of them to be taken out of service. The OCWD, under EPA oversight, is currently conducting an interim remedial investigation and feasibility study to determine the extent of groundwater contamination. The report is expected in December 2024 (EPA Superfund n.d.).

Chemical air emissions, surface water discharges, underground injections, and releases to land are considered chemical releases. The release of a biological agent capable of causing illness in people is considered an infectious release. The only known release of radiological agents into the air in Orange County was the result of an accident at San Onofre Nuclear Generating Station (SONGS). In 1981, an accidental "ignition" of hydrogen gases in a holding tank of the SONGS caused an explosion which bent the bolts of an inspection hatch on the tank, allowing radioactive gases in the tank to escape into a radioactive waste room. From there, the radioactive material was released into the atmosphere. The plant was shut down for several weeks following the event (MWDOC, 2019). This incident occurred during operation of the plant's Unit 1 generator, which has since been decommissioned. No serious injuries occurred.

On February 3, 2001, another accident occurred at SONGS when a circuit breaker fault caused a fire that resulted in a loss of offsite power. Published reports suggest that rolling blackouts during the same week in California were partially due to the shutdown of the SONGS reactors in response to the 3-hour fire. Although no radiation was released, and no nuclear safety issues were involved, the Federal Nuclear Regulatory Commission sent a Special Inspection Team to the plant to investigate the accident.

In June 2013, SONGS permanently closed after faulty replacement steam generators were installed at the nuclear facility. SONGS is currently undergoing the process to decontaminate and dismantle the nuclear facility. As of August 2017, a court settlement requires the operators of SONGS, Southern California Edison (SCE), to relocate the 3.55 million pounds of nuclear waste to another facility. One of the possible sites is the Palo Verde Nuclear Generating Station in Arizona, located approximately 330 miles away. Transportation of nuclear waste poses a concern of environmental and human health risk if radiation is released into the environment.

Power Outage

Orange County has experienced many power outages in the past. There have been small to moderate incidents and several extreme incidents that have lasted hours in certain areas. Power outages are most commonly seen in Southern California when Santa Ana wind conditions occur.

One of the most severe events occurred in September 2011 and is referred to as the 2011 Southwest Blackout. This event affected southern Orange County, the San Diego-Tijuana area, Imperial Valley, Mexicali Valley, Coachella Valley, and parts of Arizona. The incident is known to have been an 11-minute system disturbance which led to cascading outages and 2.7 million customers left without power, some for up to 12 hours. The hardest hit areas of San Diego-Tijuana, experienced street gridlock due to loss of traffic signals, school and businesses closing, flights and public transportation delays, and water and sewage pumping station power loss.

In 2013, a blackout resulted in approximately 123,000 homes and businesses losing power for several hours. Faulty circuits affected people in a number of Orange County communities including Mission Viejo, Laguna Niguel, Ladera Ranch, Coto de Caza, Ortega, San Clemente, Talega, San Juan Capistrano, Dana Point, and Capistrano Beach.

Question to MWDOC and MAs: Have there been any other major power outages/blackouts within the planning area since last update? Unable to locate anything of major significance.

Terrorism (Cyber Threat)

Exhibit 3-12 displays a list of water and wastewater utilities, jurisdictions, and local agencies located in Southern California that were victims of cyber threat events since 2019.

Exhibit 3-12. Southern California Cyber Threat Events

Date of Event	Target Organization	Description of Event
3/11/2019	OC San	OC San was the victim of a phishing data breach. More than 1,000 employee records were accessed as part of the breach through the OC San deferred compensation plan.
10/14/2019	Cucamonga Valley Water District	Cucamonga Valley Water District disclosed a data breach that occurred between August 26, 2019, and October 14, 2019. The breach occurred on a server that is used to accept one-time credit card payments from customers.
12/24/2019	City of Seal Beach	City of Seal Beach was the victim of a ransomware attack that affected city computer systems. The attack was targeted at the city's Information Technology service provider, which allowed the hackers to encrypt city computers with the malware, primarily impacting city email and voicemail functions.
4/23/2023	San Bernardino County Sheriff's Department	The San Bernardino County Sheriff's Department was hit with a cyberattack when a hyperlink loaded with malicious malware was clicked, which resulted in the sudden encryption of many of the department's systems and subsequent ransom demand to restore functionality. San Bernardino County paid a $1.1 million ransom to the hacker, approximately half of which was covered by insurance as Orange County had anticipated the possibility of such an attack.
8/3/2023	California's Prospect Medical Holdings	A California-based company's medical facility services throughout the United States were disrupted by cyber threat

Date of Event	Target Organization	Description of Event
		event. Seven hospitals in Orange and Los Angeles counties including two behavioral health facilities and a 130-bed acute care hospital in Los Angeles were effected.
11/20/2023	Orange County District Attorney's Office	The Orange County District Attorney's Office was targeted by a cyberattack, prompting a shutdown of its information technology system. The District Attorney's Office immediately coordinated with partner agencies, including all law enforcement entities in Orange County, including the Orange County Sheriff's Department. It was unclear exactly what type of information may have been accessed by hackers.

Exhibit 3-13 displays a list of water and wastewater utilities throughout the United States that were victims of a cyber threat event since 2019.

Exhibit 3-13. U.S. Water and Wastewater Utilities Cyber Threat Events

Date of Event	Target Organization	Description of Event
3/14/2019	Fort Collins Loveland Water District	Fort Collins Loveland Water District and South Fort Collins Sanitation District are the victims of a ransomware attack that occurred on February 11, 2019.
3/27/2019	Post Rock Rural Water District	Kansas Waste Water System (WWS) was hacked by a former employee able to use credentials to remotely tamper with facility processes and threaten safety of drinking water.
6/12/2020	Texarkana Water Utility	Texarkana Water Utility was the victim of a ransomware attack.
8/2/2020	Water facility in the city of Oldsmar	Hackers broke into the computer system of a facility that treats water for the City of Oldsmar, Florida. They tried to increase the concentration of sodium hydroxide (NaOH).
1/3/2021	Nevada Water and Wastewater System	Nevada-based WWS was a victim of an unknown ransomware variant that infected its SCADA system.
4/30/2021	Mount Desert Sewage Treatment Plant	A sewage treatment plant in rural Maine suffered a ransomware attack shutting down the control computer.
5/24/2021	WSSC Water	WSSC Water, which provides water to 2 million customers, was hit with a ransomware attack on its non-essential business systems.
1/7/2021	Maine Water and Wastewater System	Maine-based WWS was targeted with ZuCaNo ransomware on its SCADA computer.
1/8/2021	California Water and Wastewater System	California-based WWS was hit with a Ghost variant ransomware attack.
8/4/2021	Limestone Sewage Treatment Plant	A sewage treatment plant in rural Maine suffered a ransomware attack that shut down its control computer.
7/15/2022	Narragansett Bay Commission	The Narragansett Bay Commission, a Rhode Island sewer system operator, was hit with a ransomware attack.
7/26/2023	Johnstown Regional Sewage	Federal and local law enforcement agencies investigated an alleged phishing scam perpetrated against Johnstown Regional Sewage.
11/1/2023	St. Johns River Water Management District	St. Johns River Water Management District, a regulatory agency in Florida that oversees the long-term supply of drinking water, confirmed that it responded to a cyberattack after the Cyber

Date of Event	Target Organization	Description of Event
		Av3ngers said it attacked the organization, providing samples of what it stole.
11/25/2023	Municipal Water Authority of Aliquippa	The Municipal Water Authority of Aliquippa reported being hacked by the Cyber Av3ngers Iranian-backed cyber group.
11/28/2023	North Texas Municipal Water District	The North Texas Municipal Water District (NTMWD) had a cyber security incident that caused operational issues. The Daixin ransomware gang said it was behind the attack, adding NTMWD to its list of victims and claiming to have stolen more than 33,000 files containing customer information.
1/19/2024	Veolia North America	Veolia North America, a subsidiary of transnational conglomerate Veolia, disclosed a ransomware attack that impacted systems in its Municipal Water Division and disrupted its bill payment systems.
2/29/2024	Chelan County Public Utility District	The Chelan County Public Utility District was impacted by a cyber security event that kept a nationwide vendor from mailing and emailing statements.
3/1/2024	Muscatine Power and Water	Muscatine Power and Water warned the public of a ransomware attack discovered on January 26.
3/15/2024	Encina Wastewater Authority (EWA)	Encina Wastewater Authority (EWA) was hit by the BlackByte ransomware group.

Terrorism (Mass Casualty Incident)

While Orange County has not experienced any high-profile attacks by groups or individuals associated with international terrorist organizations, Orange County has several groups for advisory notification, investigation, and analysis of terrorist events and activities. These groups include:

- **Orange County Joint Terrorism Task Force (OCJTTF).** The OCJTTF was formed by the Orange County Sheriff's Department, FBI, and other local police agencies. The OCJTTF is one of 66 joint terrorism task force groups across the United States and the third largest in the Nation. Team members are tasked with collecting, analyzing, and sharing critical information and intelligence involving matters related to any terrorism investigation occurring in or affecting the Orange County area.
- **Orange County Private Sector Terrorism Response Group (PSTRG).** The PSTRG was formed in December 2001 to create a private sector partnership with the Terrorism Early Warning Group to effectively address private sector safety, incident management, employee education, and public health consequences of potential attacks on the critical infrastructure within Orange County. Two large groups involved with PSTRG are the Orange County Business Council, of which 80% of the major businesses in Orange County are members, and TechNet, a consortium of 28 high-tech firms. The objectives of the PSTRG include physical resource sharing, information exchange, virtual reach-back capabilities, and subject/industry matter experts cross-utilization. The PSTRG is an instrument that allows the Sheriff's Department to maximize all resources and prepare community members for the potential of terrorism and recovery in its aftermath.
- **Orange County Intelligence Assessment Center (OCIAC).** The OCIAC was built on the foundation established by the Orange County Sheriff Department's Terrorism Early Warning

Group (TEWG) from 2001 to 2007 and is an Operational Area asset governed by the Orange County Chiefs and Sheriff's Association (OCCSA). The OCIAC is a proactive multi-agency, multi-discipline collaborative that provides comprehensive analysis, intelligence, timely information sharing, and infrastructure protection. Within the OCIAC, the Critical Infrastructure Protection Unit uses a multi-disciplinary team comprised of law enforcement, fire, medical, and private sector experts to conduct vulnerability assessments and provide relevant security updates and training resources to our public and private sector partners in a combined effort to protect Orange County's assets against terrorist attack, criminal activity, and natural disasters.

- **Law Enforcement Mutual Aid.** Orange County law enforcement has long recognized the need for a standardized, uniform, organized response on the part of public safety providers involved in major multi-discipline and multi-jurisdictional incidents. The collaborative efforts of Orange County law enforcement leaders over the past six decades have forged a collective voice in mutual assistance and mutual aid. All major components tasked with public safety (law, fire, health, emergency management) are actively involved in developing emergency plans and insuring emergency preparedness.

3.2.5.3 Location/Geographic Extent

Groundwater Contamination

Groundwater contamination may occur county-wide by means of intentional or accidental spillage to groundwater.

Saltwater Intrusion

Conversely, the coastal area of the Orange County Groundwater Basin is vulnerable to seawater intrusion due to geologic features and increased pumping from inland municipal wells to meet consumer demands. The susceptible locations in the basin are the Talbert, Bolsa, Sunset, and Alamitos Gaps.

Hazardous Materials

Human-caused hazards may affect a specific location or multiple locations, each of which may be a disaster scene, a hazardous scene, and/or a crime scene simultaneously. Accidental hazardous materials release can occur wherever hazardous materials are manufactured, stored, transported, or used. In Orange County, a hazardous material event is most likely to occur within Orange County's industrial areas.

Power Outage

A power outage can cause impacts at the local level and potentially the regional level. As seen from previous occurrences, a severe outage can easily impact several counties at a time. All jurisdictions within the planning area have the potential to be impacted should an event occur; either directly or indirectly. Highly developed communities may see more outage occurrences if a heat wave should occur, due to the number of cooling systems running at once. Water and wastewater facilities with backup generators or alternate power sources are less likely to experience severe losses or disruption.

Terrorism (Cyber Threat)

Since computers are so ubiquitous, a cyber threat could appear in virtually any part of Orange County. In extreme circumstances, a threat could impact the entire county. Cyber threats vary in their length and severity of impact. A minor threat could cause computer systems to slow down for a few minutes and not behave as responsively. On the other hand, a major cyber threat could cause a complete shutdown of critical systems, including those used by banks, healthcare institutions, universities, major businesses, and city governments.

Terrorism (Mass Casualty Incident)

One of the special considerations in dealing with the terrorist threat is that it is difficult to predict. The Department of Homeland Security's National Planning Scenario identifies the possible terrorist strike locations it views as most plausible. Places at risk include cities that have economic and symbolic value, places with hazardous facilities, and areas where large groups of people congregate, such as an office building, sports arena, or amusement park. As such, Anaheim (Disneyland, Angels Stadium, Honda Center), Buena Park (Knott's Berry Farm), and San Clemente (SONGS) are viewed as potential targets.

3.2.5.4 Magnitude/Severity

Groundwater Contamination

The 1974 Safe Drinking Water Act requires the EPA set standards for contaminants in drinking water that may pose health risks to humans. The EPA standard for lifetime exposures in drinking water, the maximum contaminant level (MCL), is the highest amount of a contaminant allowed in drinking water supplied by municipal water systems (EPA Drinking Water n.d.). In Orange County more than 700 monitoring wells assess water quality conditions (OCWD 2015). Thus, it is unlikely that human consumption of contaminated groundwater will occur. A large environmental spill could result in contamination of groundwater; however, the extent and the severity cannot be predicted. Based on historical occurrences, a contamination in the groundwater basin could extend several miles and result in water wells being unavailable.

Saltwater Intrusion

Massive seawater intrusion has been prevented in Orange County by the Orange County Groundwater Basin management programs. However, the threat of saltwater intrusion along the coast is still present. To prevent further intrusion and to provide basin management flexibility, OCWD operates a hydraulic barrier system. A series of 23 multi-point injection wells 4 miles inland delivers fresh water into the underground aquifers to form a water mound, blocking further passage of seawater. Continued injection of recycled water into the aquifer is essential to keep saltwater from intruding into the groundwater table and contaminating a major source of the county's potable water. OCWD maintains the Coastal Aquifer Mergence Zones and Chloride Concentration map, which indicates a 250 mg/L Chloride Concentration Contour. This contour is used to indicate the approximate leading edge of seawater intrusion. OCWD monitors the movement of the chloride contour to provide an indication of whether seawater intrusion is worsening or improving in a given area.

Hazardous Materials

Human-caused hazards have the potential to directly impact water and wastewater systems. A hazardous material spill could be localized and, depending upon when the spill is identified and

addressed, may be contained with limited to no impact on water supplies and systems. However, there is the potential for a hazardous material spill to severely impact water supplies due to groundwater intrusion and direct contamination of a water source. The magnitude and severity of the hazard would be highly dependent upon the type of hazardous material spill, location, and the extent to which the hazardous material extends into the water system. Similarly, an act of terrorism could cause a significant impact to water and wastewater systems depending upon the type of event and whether it occurs at a primary source or is focused to a specific area or system. Human-caused hazards can have a direct impact on water supplies and the ability to provide water services to communities, potentially resulting in significant health and safety issues.

Power Outage

A power outage has the potential to directly impact water and wastewater systems. Disruption of water utilities and systems often requires notification of the public and businesses to curtail usage, boil available water, use bottled water, etc. Firefighting capabilities may also be impacted if an outage causes disruption to water supplies. In areas where telephone service is provided by above-ground lines that share poles with electrical distribution lines, telecommunications providers may not be able to make repairs to the telephone system until electrical utilities restore power lines to a safe condition. This could impact response times to a water or wastewater incident. The impacts of electric utility disruptions are felt most significantly by Southern California communities during the summer months due to cooling demands from higher heat. Any extended electric disruption can also lead to local economic losses when computers, lighting, refrigeration, gas pumps, and other equipment are without power during business hours. A severe power outage also can cause cascading impacts such as transportation incidents, civil unrest, and disease. The magnitude/severity of a power outage would be the same for all jurisdictions within the planning area.

Terrorism (Cyber Threat)

Cyber threats are not measured on any scale, but they can be assessed by determining:

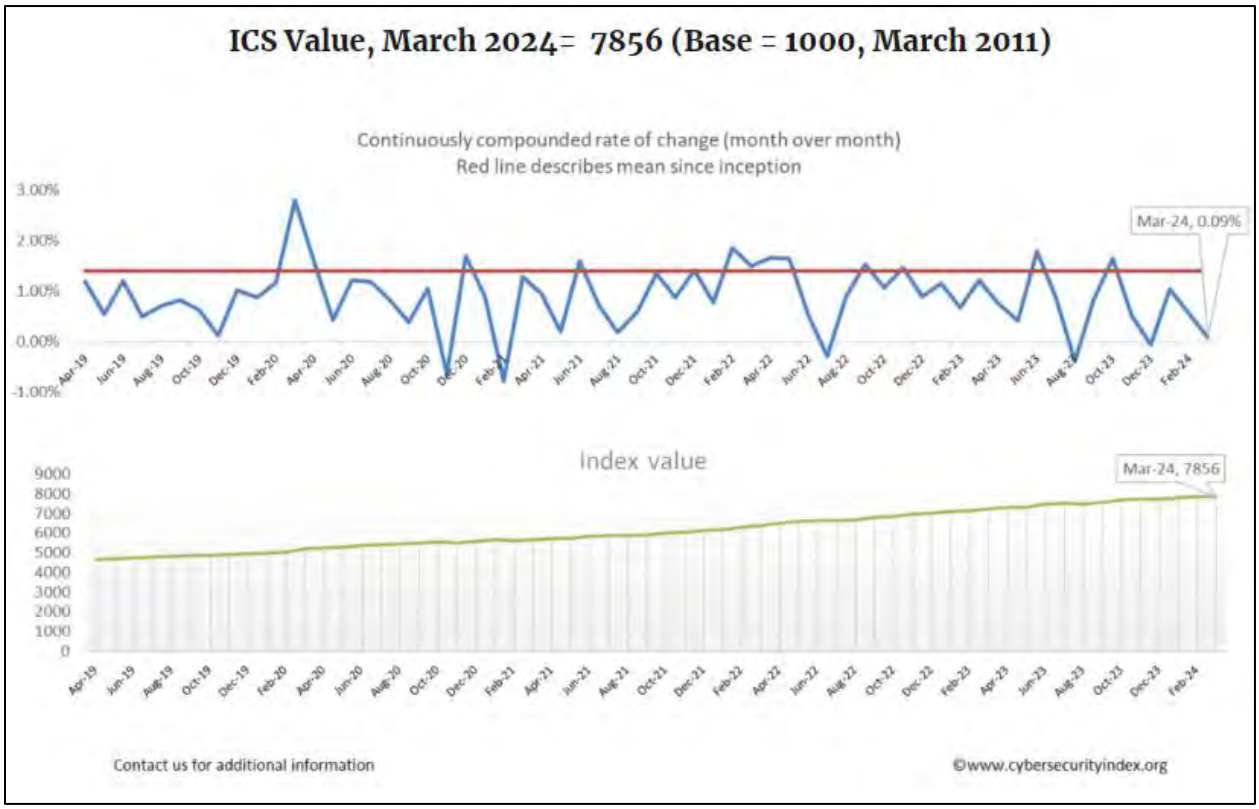
- The type of incident (website defacement, denial of service, unauthorized surveillance)
- The use of malicious software
- The level of security countermeasures that failed to prevent the cyber threat
- The duration of the cyber threat (a few hours, a few days, several weeks, etc.) (Mateski 2012)

Globally, cyber threats are increasing and becoming more sophisticated. The most common types of attacks include:

- Phishing
- Ransomware
- Intellectual Property Theft
- Spyware/Malware
- Unpatched Software

The Index of Cyber Security (NYU 2024) **Exhibit 3-14** can be referenced to understand the status of cyber threats, which identifies the measure of perceived risk. Since 2015, this index has trended upward and appears to have doubled in this timeframe.

Exhibit 3-14. Index of Cyber Security



Source: NYU, 2024

Terrorism (Mass Casualty Incident)

Possible locations that may attract acts of terrorism were discussed in **Section 3.2.5.3**; however, the perpetrators may also choose high-value targets such as electricity-generating facilities, water treatment plants, dams or reservoirs, railroads, highways, and other facilities that could impact governmental operations and services. Mass casualty incidents and acts of terrorism are typically measured by the fatalities, injuries, and destruction they cause, but there is no universally used scale for measuring these events.

3.2.5.5 Probability of Future Occurrences

Groundwater Contamination

Due to the amount and types of urban development that occur within Orange County and the transportation systems that allow for the movement of hazardous materials through the county and greater region, future groundwater contamination is likely. However, as a result of groundwater monitoring and protection systems, human consumption of contaminated groundwater is unlikely.

Saltwater Intrusion

Due to the successful operation of the Orange County Groundwater Basin management programs, the probability of saltwater intrusion in the future is unlikely.

Hazardous Materials

According to the Cal OES, hazardous materials have been released approximately 1,517 times (incidents that were reported to Cal OES) into the environment between the years of 2019 and 2024 in Orange County, for an average of approximately 253 times a year during that period. Thus, the probability of future contamination of the environment is likely. However, human consumption of contaminated groundwater is unlikely due to the constant monitoring of more than 700 wells across Orange County (OCWD 2015).

Power Outage

Power outages are a normal part of life and are unpredictable; they happen for many reasons and can be expected to continue in the future. Water and wastewater systems are most susceptible to failure during extreme weather conditions, fires, and earthquake events. Regional power outages can threaten human life, particularly when outages affect water supply, hospitals, and other healthcare facilities. As both population and climate variability increase across Southern California and puts more pressure on aging distribution systems, it is likely that power outage events will continue to occur. Due to the nature and extent of power outages, the probability for future occurrences would be the same for all jurisdictions in the planning area.

Terrorism (Cyber Threat)

Due to the integrated nature of technology into the everyday lives of residents, businesses, and government operations, it is possible that a cyber incident could emerge in the future as these threats occur on a daily basis across the planning area.

Terrorism (Mass Casualty Incident)

Because of the dynamic nature of the terrorist threat and the open nature of California society, all jurisdictions within California are vulnerable to terrorist attack. One must know the minds and capabilities of various terrorists and terrorist groups; these are characteristics terrorist organizations strive to conceal. Because all terrorists are not the same, the calculation is even more difficult. From the perspective of hazard mitigation, the most often used weapon of terrorists is bombs, and the greatest potential for loss is from weapons of mass destruction (WMDs).

3.2.5.6 Climate Change Considerations

Groundwater Contamination

Climate change can cause more frequent and intense precipitation, which can lead to increased instances of flooding. Flooding can potentially mobilize contaminants in soil, which can then be transported to aquifers. While more intense precipitation events are anticipated, they could be followed by or preceded by droughts, which can potentially cause groundwater levels to decline. As groundwater levels fall, a greater concentration of contaminants occurs, impacting the ability to provide safe potable water to customers. Rising sea levels can lead to an increase in saltwater intrusion, which can contaminate groundwater aquifer/basins in coastal areas. Rising temperatures can increase the temperature of groundwater, which can potentially affect the levels and concentrations of undesirable substances in the water. Increased rainfall (both in intensity and frequency) can lead to more runoff of nutrients into water bodies, which can cause harmful algal blooms. Climate change may also lead to changes in human activities, such as increased pumping, irrigation, or land use, which can also impact groundwater quality and exacerbate other issues associated with groundwater supplies.

Saltwater Intrusion

Climate change has led to an increase in sea levels. When this is combined with increased groundwater pumping, the potential for saltwater intrusion can increase. Sea level rise may also lead to larger areas of coastal lands becoming inundated. With additional areas inundated, the potential for additional seawater displacing fresh water increases. Saltwater intrusion into groundwater aquifers can increase treatment costs for drinking water facilities or render groundwater wells unusable. As sea levels rise, the "salt front" (location of the freshwater-saltwater line) may progress further upstream. This encroachment may be further exacerbated by drought, reduced rainfall, or changes in water use and demand. Saltwater intrusion can result in the need for water utilities to increase treatment, relocate water intakes, or develop alternate sources of fresh water.

Hazardous Materials

Climate change itself has no direct effect on hazardous material releases. However, climate change may increase the frequency or severity of other hazard types, which may result in a hazardous material release as an indirect effect. For example, climate change is expected to cause a 10% to 20% increase in the average intensity of the strong storms that affect Orange County during the winter. An increase in the intensity of these storms increases the chance that such a storm may damage or destroy a hazardous material storage tank, cause a vehicle crash involving hazardous materials, or lead to an incident that results in the release of hazardous materials.

Power Outage

As temperatures increase, so will the increases in demand for utility/energy providers to produce larger quantities of reliable energy to power cooling equipment in homes and businesses. This could cause an increased strain on the current infrastructure and production facilities, possibly leading to an increase in power shortages and a decrease in the current energy grid reliability.

Terrorism (Cyber Threat)

Climate change is not likely to impact cyber threats in the future within Orange County.

Terrorism (Mass Casualty Incident)

Climate change has no direct impact on terrorism, as acts of terror are not directly caused by climate conditions. However, national security experts have raised concerns as early as 2003, if not before, that climate change indirectly affects terrorism by causing food, water, and resource shortages, potentially triggering migrations and economic upheaval that could cause some individuals to commit acts of terror (Schwartz and Randall 2003). More recently, a report prepared by the U.S. Department of Defense (DoD) repeated and expanded upon the connection between climate change and national security, referring to climate change as a "threat multiplier" that can "enable terrorist activity and other forms of violence" (DoD 2015).

3.2.6 Seismic Hazards (Fault Rupture, Seismic Shaking, and Liquefaction)

3.2.6.1 Description (Nature) of the Hazard

Earthquakes are considered a major threat to Orange County, especially when focusing on water and wastewater facilities and pipelines that run throughout the county. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage to

infrastructure, fires, and other threats to life and property. Significant damage and outages of water and wastewater facilities could also occur. The effects could be aggravated by aftershocks and by secondary effects such as fire, landslides, and dam failure. A major earthquake could be catastrophic in its effects on the population and could exceed the response capability of the local communities and even the State.

Following major earthquakes, extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food/water, and temporary shelter would be required for injured or displaced persons. In the event of a truly catastrophic earthquake, identification and burial of the dead would pose difficult problems. Mass evacuation may be essential to save lives. Emergency operations could be seriously hampered by the loss of communications, damage to transportation routes within, to, and out of the disaster area, and by the disruption of public utilities and services. With damage to critical water and wastewater infrastructure there will be significant public health concerns, such as dehydration or exposure to contaminated water, and the potential for reduced fire protection due to limited sources of water. Facilities at greatest risk from severe earthquakes are dams and pipelines. Additionally, damage to water and sewer lines that service commercial and industrial areas could have a significant impact on the economy of the region. Extensive mutual aid for an extended period may be required to bring water and wastewater services back online.

Earthquakes strike with little to no warning, and they can have multiple impacts on an area. After-effects from an earthquake may include impacted roadways, downed power and communication lines, fires, and damages to structures (especially poorly built structures or those already in disrepair). Should a major event occur, major damages and losses should be expected to pumping systems and wastewater treatment infrastructure. Earthquakes are not a seasonal hazard, and thus can be experienced year-round. This fact presents its own set of planning and preparedness concerns.

Seismic-specific building codes can provide MAs with reasonable guidance for structural mitigation. As maintenance and potentially new building occurs within the planning area, seismic retrofitting is highly recommended to prevent extensive damage to essential infrastructure.

For decades, partnerships have flourished between the United State Geological Survey (USGS), Cal Tech, the California Geological Survey (CGS), and California universities to share research and educational efforts with Californians. Tremendous earthquake mapping and mitigation efforts have been made in California in the past two decades, and public awareness has risen remarkably during this time. Major Federal, State, and local government utilities and private organizations support earthquake risk reduction. These partners have made significant contributions in reducing the adverse impacts of earthquakes.

Fault Rupture

Fault rupture occurs when the Earth's surface shifts and cracks along a fault line during a seismic event. While this phenomenon is not especially dangerous in natural environments, issues arise when structures are built near or on top of an active fault. Per the California Geological Survey (CGS), an active fault has experienced surface movement in the past 11,700 years. (CGS, n.d.A)

The shifting and movement of the Earth's tectonic plates are responsible for seismic events. These tectonic plates can pull away from, move toward, or pass by each other. As they do, the plates sometimes lock together. This inability to move creates tension, which is eventually released like a

springboard. The tension dissipates into the Earth's crust. The location at which two tectonic plates join is called a fault line. Fault lines are sometimes visible on the Earth's crust as sudden rifts or anomalies in the landscape's continuity. California's major north-south fault line is the San Andreas Fault, where the North American and Pacific Plates meet. However, constant friction between the two plates over the millennia has caused the areas where the two plates intersect to become fragmented, creating new, smaller faults.

The area near a fault line is at risk of damage due to the potential for a fault rupture—the deformation or displacement of land on either side of the fault—and may move a few inches to several feet in opposite directions. Buildings or infrastructure near a fault line could be severely damaged or destroyed. The fault rupture's direction depends on the fault type: dip-slip faults produce vertical shearing, strike-slip faults produce horizontal shearing, and oblique-slip faults produce both vertical and horizontal shearing. A fourth kind of fault, called a "blind" fault, produces virtually no visible land displacement. Some faults have emerged recently in geologic history. Quaternary faults have developed between the Holocene Era and the present (within the last 1.8 million years). These faults are especially concerning since they are the most likely to be active and cause future earthquakes. (CGS, n.d.B)

Seismic Shaking

Seismic shaking is the motion felt on the Earth's surface caused by an earthquake. In most cases, earthquakes are not powerful enough to cause the feeling of shaking. However, particularly powerful earthquakes can generate significant shaking, causing widespread destruction resulting in property damage.

Liquefaction

Liquefaction is the phenomenon that occurs when ground shaking causes groundwater to mix with the soil. The mixture temporarily becomes a fluid and loses its strength. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength. Lateral spreads develop on gentle slopes and entail the sidelong movement of large masses of soil as an underlying layer liquefies. Loss of bearing strength results when the soil supporting structures liquefies and causes structures to settle and/or collapse from weakened foundations. Liquefaction can also occur independently of an earthquake, if any sudden and significant stress causes the mixing of groundwater and soil. The risk of liquefaction depends on several factors, including the height of the groundwater table and the types of soil in the area. (CGS, n.d.C)

3.2.6.2 History/Past Occurrences

Fault Rupture

There have not been any reports of fault rupture within the planning area, despite some large seismic events in the past. However, the presence of active faults underlying the area make it a very real possibility should a major earthquake occur. The seismic shaking section highlights some of the larger earthquakes that have recently occurred within the planning area.

Seismic Shaking

Southern California and Orange County have experienced several powerful earthquakes. The earliest recorded earthquake in California occurred in Orange County in 1769. To better understand the potential for damaging earthquakes in Southern California, the scientific community has reviewed historical records and conducted extensive research on faults that are

the sources of the earthquakes occurring in Southern California. Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, historic records of past earthquakes are based on observations and the level of information is often dependent upon population density in the area of the earthquake. Since California was sparsely populated in the 1800s, detailed information on pre-instrumental earthquakes is relatively sparse. However, two very large earthquakes, the Fort Tejon in 1857 (magnitude 7.9) and the Owens Valley in 1872 (magnitude 7.6) are evidence of the tremendously damaging potential of earthquakes in Southern California. Other notable earthquakes that have impacted Southern California include the 1910 Glen Ivy Hot Springs Earthquake (Elsinore Fault Zone, magnitude 6.0), the 1933 Long Beach Earthquake (Newport-Inglewood Fault Zone, magnitude 6.4), the 1952 Kern County and Lander earthquakes (magnitude 7.3), the 1971 San Fernando Earthquake (San Fernando Fault Zone, magnitude 6.6), the 1987 Whittier Earthquake (Whittier Fault Zone, magnitude 5.9), and the 1994 Northridge Earthquake (Pico Thrust, magnitude 6.7). The 1987 Whittier Earthquake caused damage to the Puente Hills Reservoir in La Habra and after inspection the reservoir was found to have cracks in the concrete lining.(MWDOC 2019)

Damage from some of these earthquakes was limited because they occurred in areas that were sparsely populated at the time they occurred. However, developed areas were much more severely affected. Damage from the 1933 Long Beach Earthquake was estimated at more than $40 million ($970 million in 2024 dollars), and 115 lives were lost. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons. Earthquakes of great magnitudes have caused lasting effects in developed regions.

The most recent significant earthquake event affecting Southern California was the 1994 Northridge Earthquake. At 4:31 a.m. on Monday, January 17, 1994, a moderate, but very damaging earthquake with a magnitude of 6.7 struck the San Fernando Valley. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures. In this earthquake, 57 people were killed and more than 1,500 people seriously injured. For days afterward, thousands of homes and businesses were without electricity, tens of thousands had no gas, and nearly 50,000 had little or no water. Out of the approximately 66,000 structures inspected, approximately 15,000 structures were moderately to severely damaged, which left thousands of people temporarily homeless. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking, but the earthquake triggered liquefaction, and dozens of fires also caused additional severe damage. The extremely strong ground motion felt in sizable portions of Los Angeles County resulted in record economic losses. The fact that the earthquake occurred early in the morning on a holiday considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open. The direct and indirect economic losses ran into the tens of billions of dollars. Clearly, no community in Southern California is beyond the reach of a damaging earthquake. The historical earthquake events that have affected Southern California are listed below in **Exhibit 3-15.**

Exhibit 3-15. Magnitude 5.0 or Greater Earthquakes in the Southern California Region

Date Location (Magnitude)	
1769 Los Angeles Basin (6.0)	1952 Kern County (7.7)
1800 San Diego Region (6.5)	1954 West of Wheeler Ridge (5.9)
1812 Wrightwood (7.0)	1971 San Fernando (6.5)

Date Location (Magnitude)	
1812 Santa Barbara Channel (7.0)	1973 Point Mugu (5.2)
1827 Los Angeles Region (5.5)	1979 Imperial Valley (6.5)
1855 Los Angeles Region (6.0)	1986 North Palm Springs (6.0)
1857 Great Fort Tejon (8.3)	1987 Whittier Narrows (5.8)
1858 San Bernardino Region (6.0)	1990 Upland (5.7)
1862 San Diego Region (6.0)	1991 Sierra Madre (5.6)
1892 San Jacinto or Elsinore Fault (6.5)	1992 Landers (7.3)
1893 Pico Canyon (5.8)	1992 Big Bear (6.2)
1894 Lytle Creek Region (6.0)	1994 Northridge (6.7)
1894 E. of San Diego (5.8)	1999 Hector Mine (7.1)
1899 Lytle Creek Region (5.8)	2004 San Luis Obispo (magnitude unknown)
1899 San Jacinto and Hemet (6.4)	2008 Greater Los Angeles Area (5.5)
1907 San Bernardino Region (5.3)	2008 Borrego Springs (5.4)
1910 Glen Ivy Hot Springs (5.5)	2009 El Centro/Baja, Ca (5.9)
1916 Tejon Pass Region (5.3)	2010 El Centro/Baja, Ca (7.2)
1918 San Jacinto (6.9)	2010 El Centro/Baja, Ca (5.7)
1923 San Bernardino Region (6.0)	2014 La Habra (5.1)
1925 Santa Barbara (6.3)	2019 Ridgecrest (6.4)
1933 Long Beach (6.3)	2019 Ridgecrest (7.1)
1941 Carpentaria (5.9)	

Liquefaction

Comprehensive, historic accounts of damage to structures from liquefaction are not readily available. Some damage caused by the Northridge Earthquake of 1994, such as damage to the King Harbor area of Redondo Beach in Los Angeles County, was due to liquefaction, as opposed to ground shaking.

3.2.6.3 Location/Geographic Extent

Fault Rupture

The area at risk of fault rupture is limited to areas in the immediate vicinity of a fault. California began extensive mapping of earthquake faults with the Alquist-Priolo Earthquake Fault Zoning Act of 1972. **Exhibit 3-16** shows both the fault zones in Orange County that have been mapped through the act. The Whittier Fault Zone near the county's northern border passes through part of the YLWD. The Newport-Inglewood Fault Zone parallels the coast in western Orange County.

Exhibit 3-16. Alquist-Priolo Rupture Zones



There are many additional large faults that could affect Orange County in addition to the Whittier and Newport-Inglewood-Rose Canyon faults. These include the Elsinore Fault, Peralta Fault, Puente Hills Fault, San Andreas Fault, and San Jacinto Fault. Smaller faults include the Norwalk Fault and the El Modena Faults. In addition, newly studied thrust faults, such as the San Joaquin Hills Fault could also have a significant impact on Orange County. Each of the major fault systems

are described briefly below and are presented in alphabetical order. This order does not place more danger on one fault over another; it is simply for organizational purposes.

- **Elsinore Fault Zone/Whittier Fault/Chino Fault.** Located in the northeast part of the county, the Elsinore Fault Zone follows a general line easterly of the Santa Ana Mountains into Mexico. The main trace of the fault zone is about 112 miles long. The last major earthquake on this fault occurred in 1910 (magnitude 6.0), and the interval between major ruptures is estimated to be about 250 years. Southern California Earthquake Center (SCEC) reports probable earthquake magnitudes for the main trace of the Elsinore Fault to be in the range of 6.5 to 7.5. At the northern end of the Elsinore Fault zone, the fault splits into two segments: the 25-mile-long Whittier Fault (probable magnitudes between 6.0 and 7.2), and the 25-mile-long Chino Fault (probable magnitudes between 6.0 and 7.0). The location of the Whittier Fault makes it especially critical to the Diemer Filtration Plant in Yorba Linda and pipelines bringing water into Orange County and/or from the Diemer Plant, which is located very near this fault.
- **Newport-Inglewood-Rose Canyon Fault Zone.** This fault zone extends from the Santa Monica Mountains in a southeast direction through the western part of Orange County, then continues offshore (not more than 4 miles from the coast) down to San Diego Bay. Originally, this was thought to have been two separate systems; the Newport-Inglewood Fault and the Rose Canyon Fault Line. However, a study prepared in March 2017 found that they are in fact one continuous fault line with three main stepovers. This fault line was the source of the destructive 1933 Long Beach earthquake (magnitude 6.4), which caused 120 deaths and considerable property damage. SCEC reports probable earthquake magnitudes for the Newport-Inglewood Fault to be in the range of 6.0 to 7.4.
- **Peralta Hills Fault.** Limited information is available to paleo seismically characterize the fault and no studies have been undertaken to determine the timing of earthquakes. There is a strong geomorphic expression along Lincoln Boulevard west of Tustin Avenue in the City of Orange. Some believe the fault is not active while others believe it is active. Ongoing research has linked the fault as a back thrust with the Elsinore Fault, with a potential magnitude of 6.8.
- **Puente Hills Thrust Fault.** This is another recently discovered blind thrust fault that runs from northern Orange County to downtown Los Angeles. It is now known to be the source of the 1987 Whittier Narrows Earthquake. Recent studies indicate that this fault has experienced four major earthquakes ranging in magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years.
- **San Andreas Fault Zone.** As the dominant active fault in California, it is the main element of the boundary between the Pacific and North American tectonic plates. The longest and most publicized fault in California, it extends approximately 650 miles from Cape Mendocino in northern California to east of San Bernardino in Southern California and is approximately 35 miles northeast of Orange County. This fault was the source of the 1906 San Francisco earthquake, which resulted in some 700 deaths and millions of dollars in damage. It is the southern section of this fault that is currently of greatest concern to the scientific community. Geologists can demonstrate that at least eight major earthquakes (Richter Magnitude 7.0 and larger) have occurred along the southern San Andreas Fault in the past 1,200 years with an average spacing in time of 140 years, plus or minus 30 years. The last such event occurred in 1857 (Fort Tejon Earthquake). Based on that evidence and other geophysical observations, the Working Group on California Earthquake Probabilities (Field, 2013) has estimated the probability of a similar rupture (magnitude 7.8) in the next 30 years (1994 through 2024) to be

about 50%. The range of probable magnitudes on the San Andreas Fault Zone is reported to be 6.8 to 8.0.

- **San Jacinto Fault Zone.** The San Jacinto Fault Zone is located approximately 30 miles north and east of the county. The interval between ruptures on this 130-mile-long fault zone has been estimated by SCEC to be between 100 and 300 years, per segment. The most recent event (1968 M6.5) occurred on the southern half of the Coyote Creek segment. SCEC reports probable earthquake magnitudes for the San Jacinto Fault Zone to be in the range of 6.5 to 7.5.
- **San Joaquin Hills Fault.** This fault is a recently discovered southwest-dipping blind thrust fault originating near the southern end of the Newport-Inglewood Fault close to Huntington Beach, at the western margins of the San Joaquin Hills. Rupture of the entire area of this blind thrust fault could generate an earthquake as large as magnitude 7.3. In addition, a minimum average recurrence interval of about 1,650 and 3,100 years has been estimated for moderate-sized earthquakes on this fault (Bender, 2000).

In addition to the major faults described above, the rupture of several smaller faults could potentially impact Orange County, including the Norwalk Fault (located in the north of the county in the Fullerton area) and the El Modeno Fault (located in the City of Orange area).

In 2005, MWDOC hired Earth Consultants International to prepare specific ground acceleration and shaking maps for five fault earthquake scenarios in Orange County (Earth Consultants 2005). **Exhibit 3-17, Characteristics of Important Geologic Faults in Orange County**, summarizes the characteristics of these five major geologic faults. Earthquake maps for the individual jurisdictions are included in the Jurisdictional Annexes.

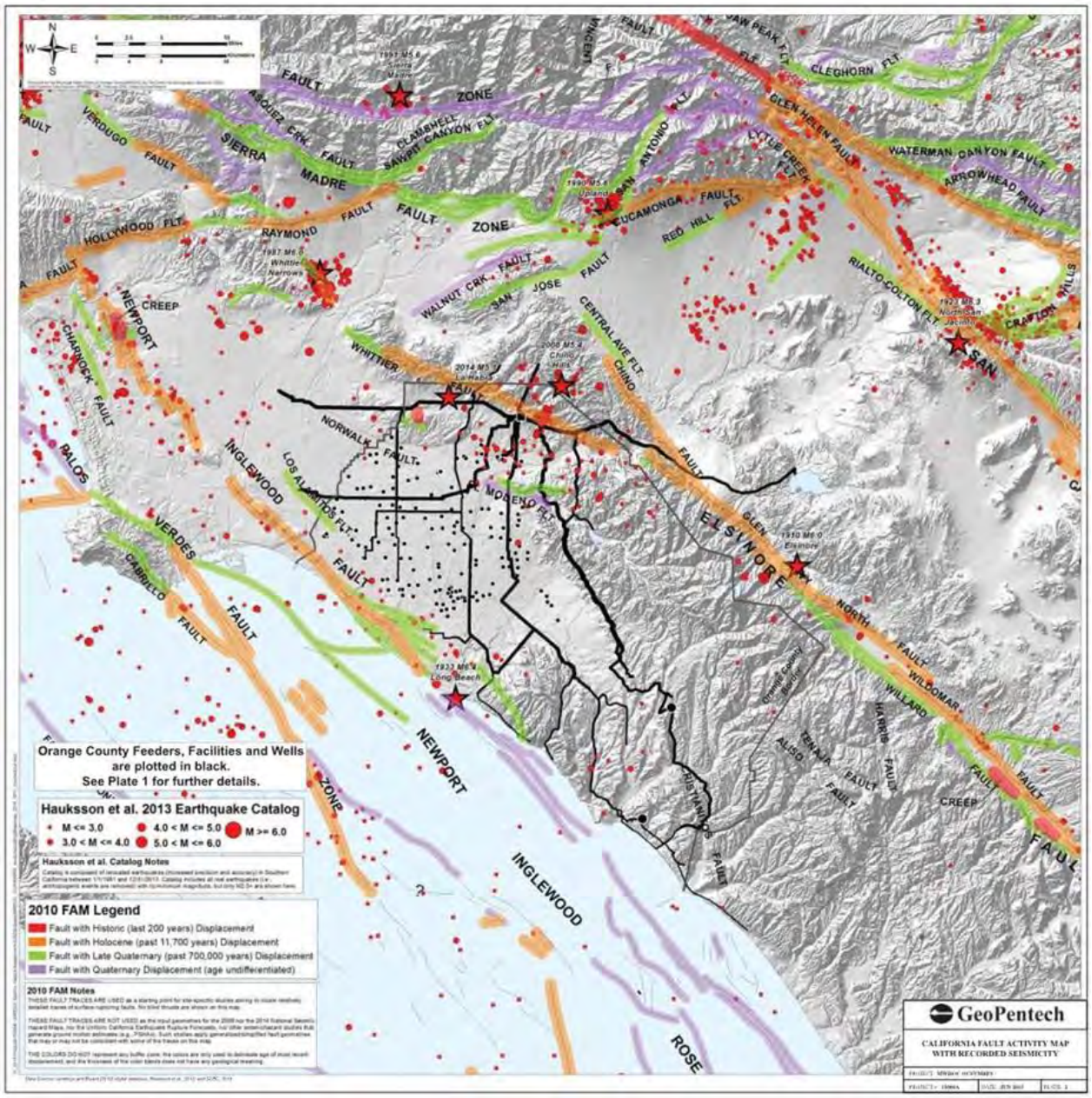
Exhibit 3-17. Characteristics of Important Geologic Faults in Orange County

Characteristic	Newport-Inglewood-Rose Canyon (onshore)	Peralta Hills	Puente Hills	San Joaquin Hills	Whittier
Fault Type	Strike-slip	Thrust	Blind thrust	Blind thrust	Strike-slip
Slip Rate (mm/yr)	1 +/-0.5	Unknown, Prob. <1	0.7 +/-0.4	0.5 +/-0.2	2.5 +/-1.0
Magnitude[1]	6.9	6.8	7.5	6.6	6.8
Recurrence Interval (years)	2,200-3,900	Unknown	2,750	1,600-3,100	1,100
Last Activity (years ago)	6.3 in 1933	Unknown	<3,000	200-300	1,600-2,000

1. The magnitude shown represents the fault's average behavior.
(Earth Consultants 2005)

Exhibit 3-18, prepared for the California Domestic Water Corp., a private wholesaler, shows the location of earthquake epicenters from 1941 to 2013 in and around Orange County, which is outlined in the center of the map.

Exhibit 3-18. Location of Earthquake Faults Bounding the California Domestic Water Corp. Service Area and Orange County

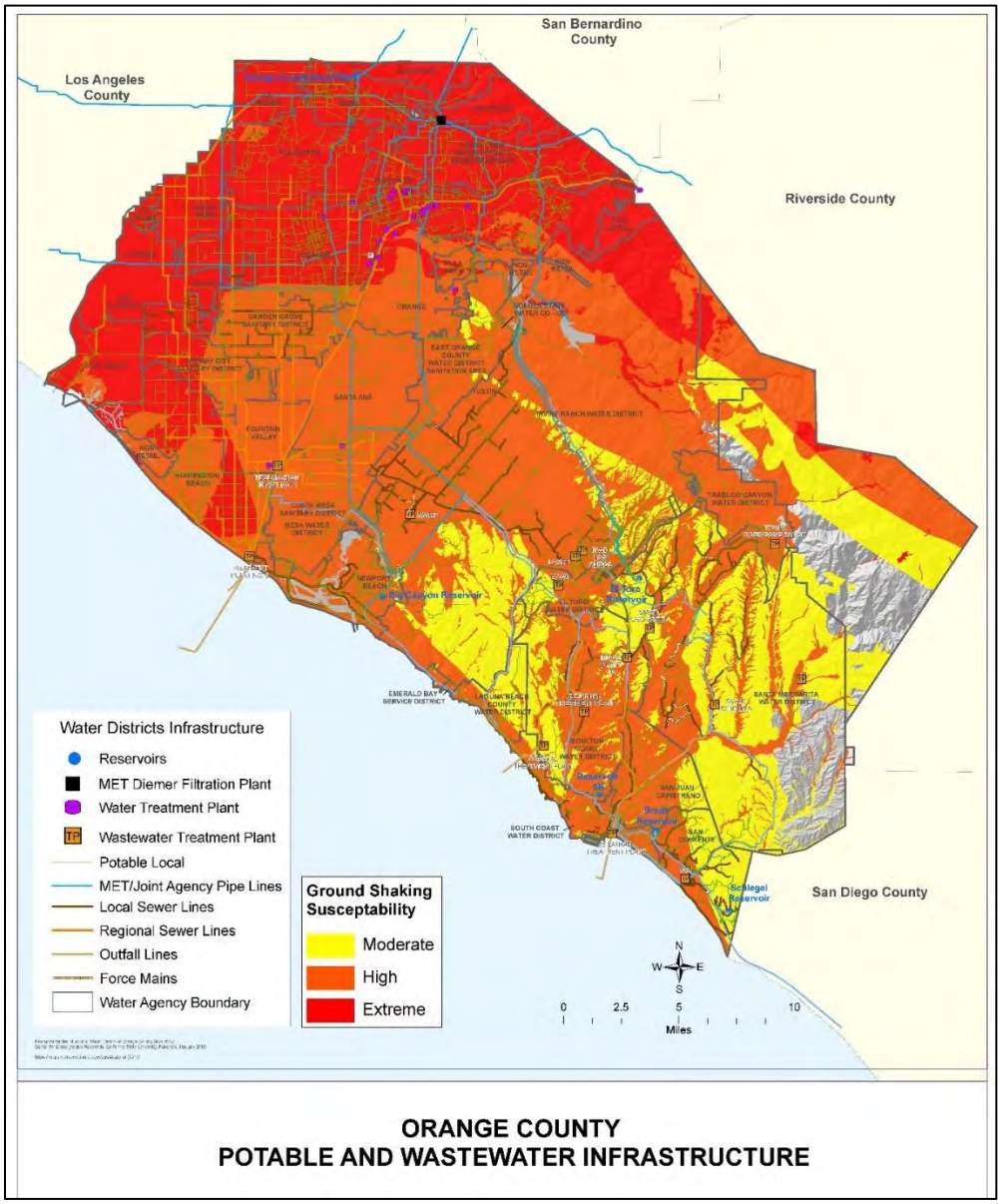


Earthquakes that occur outside of Southern California and Orange County could also have a significant impact on drinking water supplies. Such scenarios include disruptions of the Colorado River Aqueduct, the State Water Project (especially at an area such as the Edmonston Pumping Station and Porter Tunnel bringing water over and through the Tehachapi), and in the Bay-Delta Region, where failure of levees and flooding of islands with saltwater from San Francisco Bay could disrupt water supplies for months or years. Orange County is 50% dependent on supplies from beyond its borders to meet the county's drinking water needs. This leaves it exposed to these occurrences from outside the region.

Seismic Shaking

Nearly all of Orange County is at risk of moderate to extreme ground shaking. **Exhibit 3-19** shows ground shaking severity zones for Orange County. The area's most susceptible to damage from earthquakes based on the shaking intensity hazard map include YLWD and the Cities of La Habra and Buena Park. These communities can be severely impacted by landslides, liquefaction, extensive infrastructure damage, fire, dam failure, and other secondary earthquake effects. A major earthquake could be catastrophic in its effect on the population and could exceed the response capability of the local communities and even the State. Although the above-noted water/wastewater utilities are most likely to experience "extreme" shaking, all of Orange County's water/wastewater utilities fall within a moderate to extreme shaking intensity zone and therefore should expect the potential of damage from an earthquake.

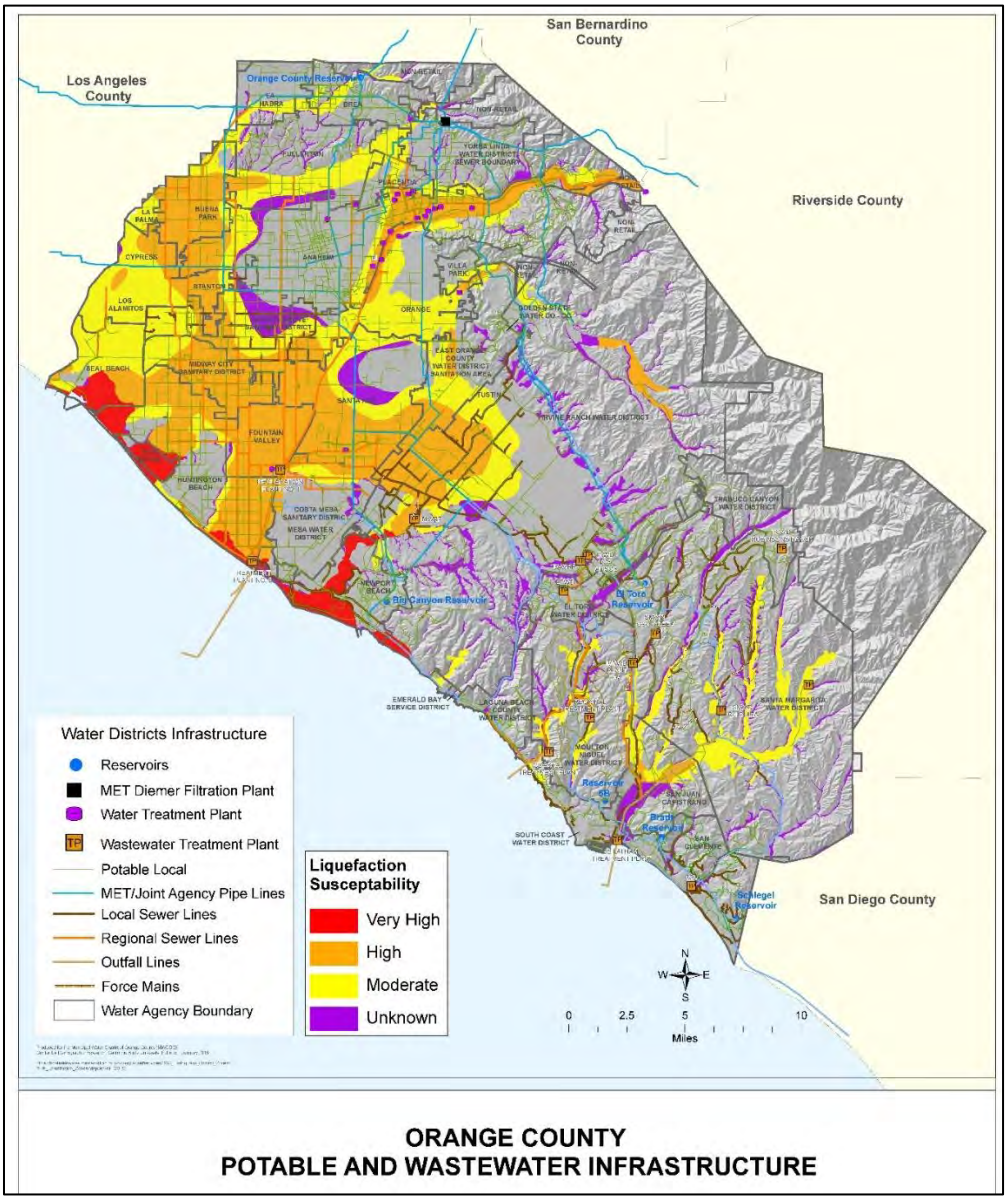
Exhibit 3-19. Ground Shaking Hazard



Liquefaction

The potential for liquefaction exists in areas susceptible to ground shaking with loose soils and/or shallow groundwater. Given the active faults in the region and the presence of geologically young, unconsolidated sediments and hydraulic fills, liquefaction is possible throughout much of Orange County. The California Geological Survey's Seismic Hazards Zonation Program identifies and maps areas prone to liquefaction. These zones for Orange County are shown in **Exhibit 3-20**. The most extensive liquefaction zones occur in coastal areas, including parts of Huntington Beach and Newport Beach, and along Upper Newport Bay. In addition, a 2016 Seismic Hazard Assessment conducted by GeoPentech, Inc., found that the highest liquefaction hazard areas are the flat, coastal portions of the planning area, and the risk decreases moving inland. The areas identified as being highly susceptible to liquefaction are the San Juan Creek/San Clemente Beach areas.

Exhibit 3-20. Liquefaction Susceptibility Zones



3.2.6.4 Magnitude/Severity

Fault Rupture

The planning area has multiple known faults that run through and near the planning area. A significant earthquake along either any of these major faults could cause substantial casualties, extensive damage, and other threats to life and property. The shaking of the ground can also damage or destroy underground utilities or pipelines, potentially leading to the release of hazardous materials and flooding if water lines are breached.

The planning area can expect varying degrees of damage depending on the magnitude and duration of an earthquake along one of these faults within the region. The topography in portions of the planning area means there are areas with critical infrastructure and facilities of concern constructed on or adjacent to slopes, which may be subject to earthquake-induced landslides (reference the landslide hazard profile for further discussion).

Seismic Shaking

Ground shaking is measured using either the moment magnitude scale (MMS, denoted as Mw or simply M) or the Modified Mercalli Intensity Scale. The MMS is a replacement for the Richter scale, which is still often referred to but is no longer actively used, as the Richter scale is not reliable when measuring large earthquakes (USGS 2014). The weakest earthquakes measured by the MMS start at 1.0, with the numbers increasing with the strength of the earthquake. The strongest recorded earthquake, which struck Chile in 1960, measured 9.5 on the MMS (MWDOC 2019). Like the Richter scale, the MMS is a logarithmic scale, meaning the difference in strength between two earthquakes is much larger than the difference in their measurements. For example, a 6.0 Mw earthquake is 1,000 times stronger than a 4.0 Mw earthquake and about 1.4 times as strong as a 5.9 Mw event.

The Modified Mercalli Intensity Scale is based on the damage caused by the earthquake and how it is perceived, rather than an actual measurement. When comparing multiple earthquakes, one event may have a higher Mercalli rating than another even if it released less energy, and thus was measured lower on the MMS. The Mercalli scale ranges from I (instrumental, rarely felt by people) to XII (catastrophic, total damage and lines of sight are distorted). **Exhibit 3-21**, **Comparison of MMS and Modified Mercalli Intensity Scale,** shows a general comparison between the MMS and the Modified Mercalli Intensity Scale. Note that there is some overlap toward the higher end of the Mercalli ratings, with certain intensities produced by multiple ranges of magnitude measurements.

Exhibit 3-21. Comparison of MMS and Modified Mercalli Intensity Scale

Magnitude (MMS)	Modified Mercalli Intensity Scale	
	Intensity	Description
1.0 to 3.0	I	Not felt except by very few persons under especially favorable conditions.
3.0 to 3.9	II	**Weak:** Felt only by a few persons at rest, especially on upper floors of buildings.
	III	**Weak:** Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck.
4.0 to 4.9	IV	**Light:** Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking

Magnitude (MMS)		Modified Mercalli Intensity Scale	
		Intensity	Description
			sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
		V	**Moderate:** Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 to 5.9		VI	**Strong:** Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
	6.0 to 6.9	VII	**Very Strong:** Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
7.0 and greater		VIII	**Severe:** Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
		IX	**Violent:** Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
		X	**Extreme:** Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
		XI	**Extreme:** Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
		XII	**Extreme:** Damage total. Lines of sight and level are distorted. Objects thrown into the air.
(USGS 2017)			

Several faults in Orange County can produce severe to extreme earthquakes. The SCEC and the Working Group on California Earthquake Probabilities have determined the probable magnitude for an earthquake along these major faults:

- **Elsinore Fault Zone.** SCEC reports probable earthquake magnitudes for the main trace of the Elsinore Fault to be in the range of 6.5 to 7.5. The two northern segments, the Whittier Fault and the Chino Fault, have probable magnitudes of 6.0 to 7.2 and 6.0 to 7.0, respectively. The Whittier Fault location is extremely critical because it crosses the two main sources of untreated water being brought into Orange County (Yorba Linda Feeder and the Lower Feeder) and it passes very close to the Diemer Filtration Plant, which serves as the treatment facility for the bulk of Orange County. Metropolitan does not have a backup system to supply treated water to many parts of central and southern Orange County in the event of an outage of the Diemer Plant.
- **Newport-Inglewood Fault Zone.** SCEC reports probable earthquake magnitudes for the Newport-Inglewood Fault to be in the range of 6.0 to 7.4.
- **Puente Hills Thrust Fault.** Recent studies indicate that this fault has experienced four major earthquakes ranging in magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years.

- **Peralta Hills Fault.** The Earth Consultants International study for MWDOC indicates that this may be a back thrust fault to the Elsinore Fault and may be capable of a magnitude 6.8 (Earth Consultants 2005).
- **San Andreas Fault Zone.** Based on that evidence and other geophysical observations, the fault has estimated the probability of a rupture with a magnitude 7.8 in the next 30 years (1994 through 2024) to be about 50% (Field 2013). The range of probable magnitudes on the San Andreas Fault Zone during this period is reported to be 6.8 to 8.0.
- **San Joaquin Hills Fault.** Recent reports have determined that the blind thrust fault can generate an earthquake as large as 7.3. In addition, a minimum average recurrence interval of 1,650 to 3,100 years has been estimated for moderate-sized earthquakes on this fault.
- **San Jacinto Fault Zone.** SCEC reports probable earthquake magnitudes for the San Jacinto Fault Zone to be in the range of 6.5 to 7.5.

Although the San Andreas Fault Zone can produce an earthquake with a magnitude greater than 8.0, some of the smaller faults have the potential to inflict greater damage on the urban core of the Los Angeles Basin. Seismologists believe that a 6.0 earthquake on the Newport-Inglewood Fault Zone would result in far more death and destruction than a larger earthquake on the San Andreas Fault Zone, due to the San Andreas' relatively remote location from the urban centers of Southern California.

3.2.6.5 Probability of Future Occurrences

Fault Rupture

Based on the amount of seismic activity that occurs within the region, there is no doubt that communities within the jurisdictional boundaries of MWDOC will continue to experience future earthquake events. It is reasonable to expect that a major event (5.0 magnitude or higher) and possibly even more severe will occur within a 30-year timeframe.

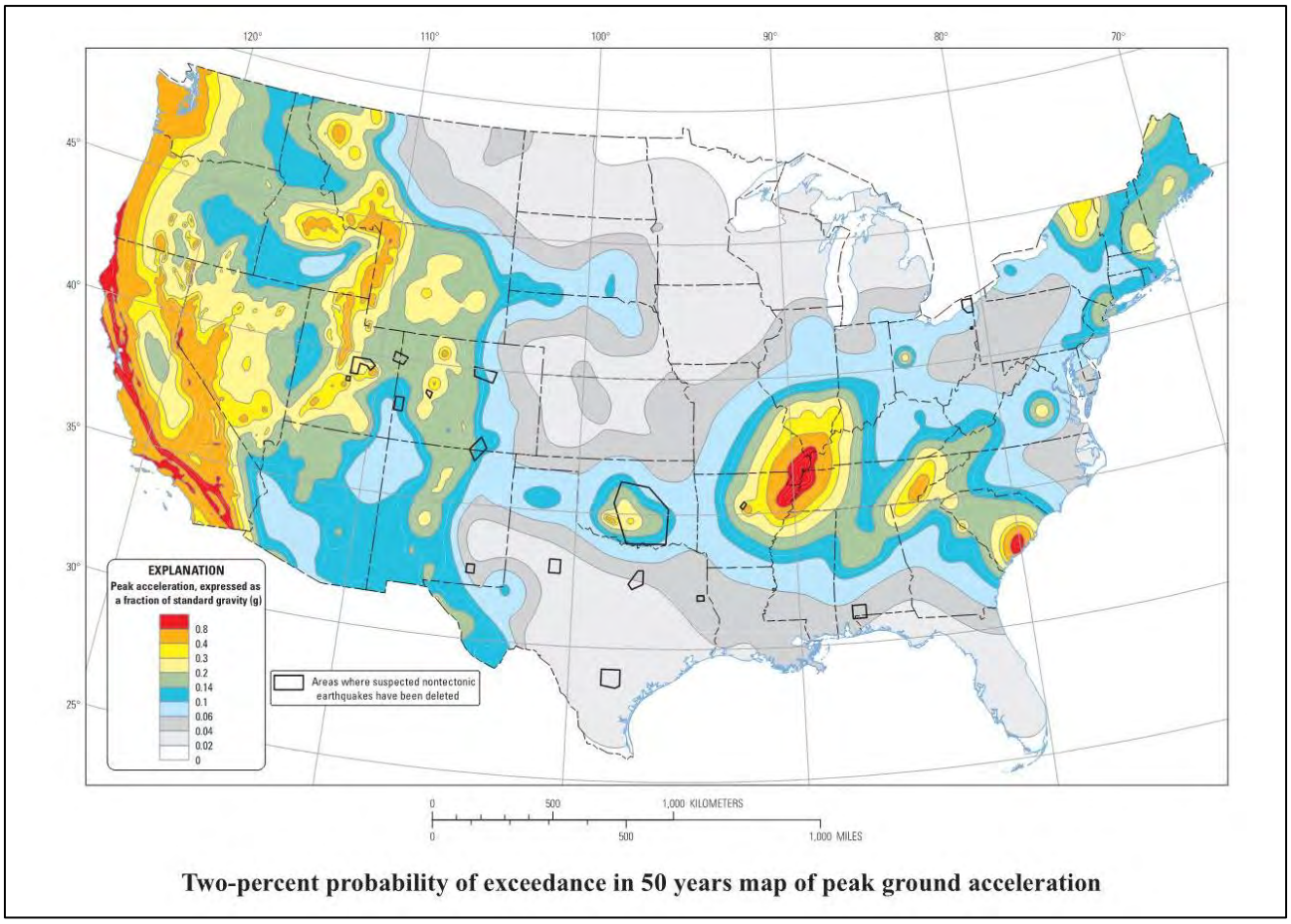
The Third Uniform California Earthquake Rupture Forecast (UCERF3), developed in 2014 by the Working Group on California Earthquake Probabilities and led by the USGS, provides estimates of the magnitude, location, and likelihood of fault rupture for more than 350 fault segments throughout the State. For Southern California, the study estimated the likelihood of a 6.0 magnitude earthquake at 100%, a 7.0 earthquake at 75%, and an 8.0 earthquake at 7% (USGS 2015).

Seismic Shaking

Predicted ground shaking patterns throughout Southern California for hypothetical scenario earthquakes are available from the USGS as part of their ongoing "ShakeMap" program. These maps are provided in terms of Instrumental Intensity, which is essentially Modified Mercalli Intensity estimated from instrumental ground motion recordings. ShakeMaps in graphical and GIS formats are available on the USGS website at: https://earthquake.usgs.gov/data/shakemap/.

In 2014, USGS released a simplified Peak Ground Acceleration (PGA) map to demonstrate the 2% probability of exceedance within a 50-year time period; refer to **Exhibit 3-22**. This analysis was done at the nationwide level. California, and many parts of Southern California, have a risk of high PGA at this probability level.

Exhibit 3-22. United States PGA with 2% Probability in 50 Years



(USGS 2014b)

Liquefaction

Soil liquefaction is a seismically induced form of ground failure, which has been a significant cause of earthquake damage in Southern California. During the 1971 San Fernando and 1994 Northridge earthquakes, significant damage to roads, utility pipelines, buildings, and other structures in the region was caused by liquefaction (a significant amount of this damage type was reported in Los Angeles County). Research and historical data indicate that loose, granular materials situated at depths of less than 50 feet with fine (silt and clay) contents of less than 30%, which are saturated by a relatively shallow groundwater table, are most susceptible to liquefaction. These geological and groundwater conditions exist in parts of Southern California and the planning area, typically in valley regions, stream and river watersheds, and alluvial floodplains.

For liquefaction to occur, three general conditions must be met. The first condition, strong ground shaking for a relatively long duration, can be expected to occur in the planning area because of an earthquake on any of the several active faults in the region. The second condition, loose or unconsolidated, recently deposited sediments consisting primarily of silt and sand, occurs in many valley floors and the larger canyon bottoms prevalent throughout Orange County and the region. The third condition is water-saturated sediments within about 50 feet of the surface. Liquefaction

could occur, but defining the precise likelihood is not possible. Refer to the seismic shaking magnitude/severity section for the probability of a major earthquake occurring in faults within the planning area.

3.2.6.6 Climate Change Considerations

Fault Rupture

Generally, there is no known direct connection between fault rupturing and climate change. Some evidence suggests that greater oceanic pressure on tectonic plates due to melting land ice could influence seismic events' behavior. Still, little indicates that this would play a major factor in any seismic event, including fault rupture.

Seismic Shaking

There is no direct link between climate change and seismic activity, so climate change is not expected to cause any changes to the frequency or intensity of seismic shaking. Some research indicates that climate change could result in “isostatic rebounds,” or a sudden upward movement of the crust because of reduced downward weight caused by glaciers. As glaciers are known to melt when global temperatures increase, climate change could indirectly lead to increased seismicity in Southern California. (Masih 2018)

Liquefaction

While climate change may not impact seismic shaking, it can directly impact liquefication. Climate change is anticipated to change the usual precipitation patterns in Southern California. Periods of both rain and drought are anticipated to become more intense and frequent. This means more precipitation will likely occur during rainy periods, and drought is expected to last even longer. As a result, the water table along the creeks and canyons in Orange County could rise during intense periods of precipitation. Alternatively, a longer-lasting drought may lead to more groundwater withdrawal and could lower the water table. Therefore, climate change could potentially increase during times of intense precipitation or decrease during times of prolonged drought.

3.2.7 Severe Weather (Drought, Extreme Heat, Windstorm [Santa Ana Winds])

3.2.7.1 Description (Nature) of the Hazard

Drought

Many governmental utilities, the NOAA and the California Department of Water Resources, as well as academic institutions, such as the University of Nebraska-Lincoln’s National Drought Mitigation Center, generally agree that there is no clear definition of drought. Drought is highly variable depending on one’s location.

Drought in its simplest definition is an extremely dry climatic period where the available water falls below a statistical average for a region. Drought is also defined by factors other than rainfall, including vegetation conditions, agricultural productivity, soil moisture, water levels in reservoirs, and stream flow.

In effect, there are essentially three forms of drought: meteorological or hydrological drought, agricultural drought, and regulatory drought.

- **A meteorological or hydrological drought** is typically defined when there is a prolonged period of less than average precipitation resulting in the water level in aquifers, lakes, or above-ground storage reservoirs falling below sustainable levels.
- **An agricultural drought** occurs when there is insufficient moisture for an average crop yield. Agricultural drought can be caused by the overuse of groundwater, poor management of cultivated fields, as well as lack of precipitation.
- **A regulatory drought** can occur when the availability of water is reduced due to imposition of regulatory restrictions on the diversion and export of water out of a watershed to another area. A significant percentage of water in Southern California is imported from other regions (Colorado River and Northern California) via aqueducts. Correspondingly, drought in California can be made worse by water availability conditions in the regions at which the water originates.

An example of regulatory drought occurred between 1999 and 2004. A six-year drought on the Colorado River Basin, a major water supply for Southern California, resulted in a draw-down of Colorado River water storage by more than 50%. More recently, beginning in 2008, regulatory restriction in exporting water via the State Water Project combined with unusually dry weather patterns resulted in two years of water rationing in Southern California. Additionally, a meteorological drought can lead to regulatory restrictions; for example, California experienced prolonged drought from 2013 to 2017, resulting in mandatory water restrictions for residents through November 25, 2017.

Even distant droughts may have consequences for the plan area and participating jurisdictions. The great drought of the 1930s, coined the “Dust Bowl,” was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including Orange County, increases in intensive agriculture led to overuse of the Santa Ana River Watershed and groundwater resulting in regional water shortages.

Droughts cause public health and safety impacts, as well as economic and environmental impacts. Public health and safety impacts are primarily associated with catastrophic wildfire risks and drinking water shortage risks for small water systems in rural areas and private residential wells. Examples of other impacts include costs to homeowners due to loss of residential landscaping; degradation of urban environments due to loss of landscaping, agricultural land fallowing, and associated job loss; degradation of fishery habitat; and tree mortality with damage to forest ecosystems. Drought conditions can also result in damage to older infrastructure that is located within dry soils with potential to leak or break. Dead or dying vegetation poses a risk to falling and damaging water and wastewater infrastructure systems.

In Orange County, drought conditions typically result in implementation of large-scale conservation efforts, reducing water supplies to customers and altering the pricing system by implementing higher rates for water usage that exceeds certain levels (e.g., wasteful). Higher rates that may be imposed during a drought could have disproportionate impacts on lower-income households. Reduction in groundwater supplies during drought conditions can also result in the need for water agencies that have high reliance on local groundwater supplies to purchase larger amounts of imported water. Drought conditions have also resulted in drier brush and an increase in the size and severity of wildfires. Water and wastewater infrastructure systems located within areas susceptible to wildfires are at a greater risk of being impacted. Damage or failure to water

and wastewater infrastructure systems can significantly reduce or even interrupt service to customers. For more on wildfire hazards, see **Section 3.2.8, Wildland/Urban Fire.** In addition, climate change may lead to more frequent and persistent droughts in the future.

Several bills have been introduced into Congress to mitigate the effects of drought. In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition, it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated Federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead Federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

Extreme Heat

Extreme heat is a period when temperatures are abnormally high relative to a designated location's normal temperature range. There are generally three types of extreme heat events:

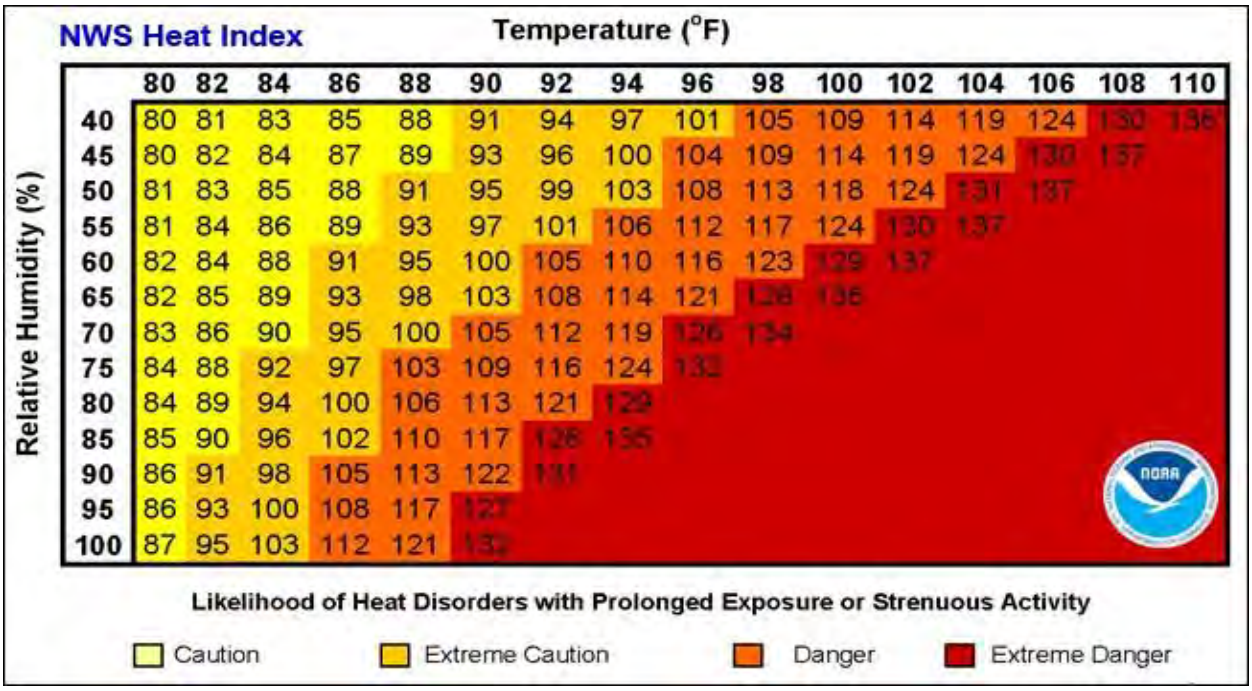
- **Extreme Heat Days:** A day during which the maximum temperature surpasses 98% of all historic high temperatures for the area, using the time between April and October from 1961 to 1990 as the baseline.
- **Warm Nights:** A day between April to October when the minimum temperature exceeds 98% of all historic minimum daytime temperatures observed between 1961 to 1990.
- **Extreme Heat Waves:** A successive series of extreme heat days and warm nights where extreme temperatures do not abate. Although no universally accepted minimum length of time for a heatwave event exists, Cal-Adapt considers four successive extreme heat days and warm nights to be the minimum threshold for an extreme heatwave.

Extreme heat events will have unique metrics from region to region since different areas have different historic high temperatures. For example, an extreme heat day on the coast will have lower temperatures than an extreme heat day in the High Desert.

Humidity plays a factor in people's perception of heat, as humid conditions will make a day feel hotter than a non-humid day even though the temperature may be the same on both days. The difference between the perceived and actual temperatures is known as the "heat index." To illustrate the effect of the heat index, a 90°F day with 50% humidity feels like 95°F, whereas a 90°F with 90% humidity feels like 122°F. **Exhibit 3-23** shows NOAA's National Weather Service Heat Index.

Extreme heat poses several dangers to public health. The human body is vulnerable to long periods of high temperatures and will eventually enter a state of heat exhaustion and dehydration if exposure to heat is extended. If exposure to high temperatures is particularly prolonged to the point that internal body temperature surpasses 105°F, heatstroke may occur, and organ failure and death may soon follow without intervention.

Exhibit 3-23. NOAA's National Weather Service Heat Index



Windstorm

High winds are defined as those that last longer than 1 hour at greater than 39 miles per hour (mph) or for any length of time at greater than 57 mph. High winds that affect Orange County, notably Santa Ana winds, are generally defined as warm, dry winds that blow from the east or northeast (offshore). Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon and forecasters at the National Weather Service in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots. The complex topography of Southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high-pressure area forces air down slope from the high plateau. The air warms as it descends toward the California coast at the rate of 5°F per 1,000 feet due to compression of the air mass. The air is dry since it originated in the desert, and it dries out even more as it is compressed.

3.2.7.2 History/Past Occurrences

Drought

Based on years of recorded water trends in Southern California, it is quite apparent that droughts and water shortages can occur. Paleo records indicate that much more extreme events can occur than those since historical record-keeping began. A significant drought, reported by many of the ranchers in Southern California, occurred in 1860.

The National Drought Mitigation Center maintains a Drought Risk Atlas with historic data on drought classifications throughout the United States. Based on the Palmer Drought Severity Index

(PDSI), there have been eight occasions since records began in 1920 when the monitoring station in the City of Santa Ana recorded "severe" or "extreme" drought conditions for a period of at least 12 months. These periods, based on a "self-calibrating" PDSI, which uses data adjusted to be more sensitive to the local climate, are listed in **Exhibit 3-24**, Severe and Extreme SC-PDSI Drought Periods 1920-2023 Lasting 12 Months or Longer (Santa Ana, California) (NDMC 2024).

Exhibit 3-24. Severe and Extreme SC-PDSI Drought Periods 1920-2023 Lasting 12 Months or Longer (Santa Ana, California)

Drought Start	Drought End	Duration (Months)
February 1961	September 1963	31
March 1971	January 1978	82
May 1984	December 1992	103
January 1994	January 1995	12
December 1999	October 2004	58
January 2006	October 2010	57
December 2011	March 2017	64
January 2020	December 2022	36

Governor Jerry Brown proclaimed a State of Emergency in January 2014; the declaration was not lifted until April 2017. In Orange County, precipitation totals were well below average for five 12-month periods in a row. From July 2013 to June 2014, the weather station in Santa Ana recorded just 4.4 inches or rain, about one-third of the normal annual amount (OC Public Works n.d.). Governor Gavin Newsom issued a series of emergency proclamations beginning in April 2021, initially in only parts of California, but by October of 2021 the drought state of emergency proclamation was extended statewide. Newsom also issued Executive Order N-10-21 in July of 2021, which called for Californians to voluntarily reduce their water use by 15% from their 2020 levels, which was followed by additional water restrictions and regulations. The California Department of Water Resources stated that the State Water Project would not provide water to California farmers unless drought conditions improved in 2022, while many of California's water suppliers were forced to implement water shortage contingency plans to combat low water supplies (Romey et al. 2021).

Extreme Heat

According to NASA's Global Climate Change website, the mean global temperature has increased 1.8°F since 1880, and 17 of the 18 warmest years on record have occurred since 2001 (NASA 2024). The scientific consensus is that these changes are the result of human activity increasing the levels of carbon dioxide and other greenhouse gases in the atmosphere, and that they will intensify. The Intergovernmental Panel on Climate Change forecasts temperatures to rise an additional 2.5 to 10 degrees over the next century. Such drastic changes to the Earth's climate will have significant consequences around the globe. Long-term effects include rising sea levels due to melting ice, changes in precipitation patterns, heat waves, and more frequent and intense storms.

Based on local data from NOAA , Orange County can expect to see its daily maximum temperature increase from a current annual average of 73°F to 78°F by 2100 under a low-emission scenario and 82°F under a high-emission scenario (MWDOC 2019). The county currently experiences an average of 4.5 days a year where temperatures reach 95°F; that is projected to increase to as many as 31 days a year by the end of the century.

Windstorm

Most high wind incidents in the planning area are the result of Santa Ana wind conditions. While high impact wind incidents are not frequent in the area, significant Santa Ana wind events have impacted Orange County. The NOAA Storm Events Database identified 250 events reported within Orange County between January 1, 1950, and June 30, 2024. **Exhibit 3-25**, Major High Wind Events, identifies and describes some of the major events occurring within Orange County.

Exhibit 3-25. Major High Wind Events

Date	Location	Magnitude (kts)	Property Damage (dollars)	Description
12/9/1998	Northeast Orange County	81	50,000	Severely disrupted transportation, power, and daily activities. Broken trees and power poles were common throughout the area and power was knocked out to 180,000 customers. Downed power lines also started several wild fires, damaging one house.
12/3/1999	Santa Ana Mountains and Foothills	104	20,000	Most of the major highways in the Inland Empire and through the Santa Ana Mountains were closed, partially due to two semi-tractor trailers that overturned, partially from blowing dust reducing visibility, and partially from road signs and other debris being blown onto the roads.
3/20 – 3/21/2000	Santa Ana Mountains and Foothills	51	25,000	Damage ranged from downed power poles, trees falling on cars and houses, fruit being knocked off of trees, and blowing sand and dust lowering visibility to zero.
1/5 – 1/7/2003	Santa Ana Mountains and Foothills			Numerous trees and power poles were blown down. At least 60 communities were affected. A commuter train was delayed for several hours in Orange County when power poles were blown down onto the track. A brush fire whipped by the winds, damaged 5 houses and burned 150 acres. Sparks from downed power lines started numerous small brush fires, but these were quickly contained. Many houses and at least 300 parked automobiles were damaged by falling trees.
11/23/03	Santa Ana Mountains and Foothills	50	50,000	Trees, power lines, and signs were knocked down.
12/16/04	Northeast Orange	68	20,000	
2/3/05	Santa Ana Mountains and Foothills	53	5,000	
3/31/05	Northeast Orange	54	5,000	Strong Santa Ana winds caused power outages, blew over big rigs, and knocked down trees.

Date	Location	Magnitude (kts)	Property Damage (dollars)	Description
1/22/06	Santa Ana Mountains and Foothills	62	15,000	Surface high pressure over the Great Basin resulted in gusty Santa Ana winds from the San Bernardino mountains, through the Inland Empire, and into Orange County. Wind gusts over 60 mph toppled trees and power poles. Downed power lines caused sporadic power outages. Most of the property damage that occurred came as a direct result of falling trees.
10/21-22/2007	Santa Ana Mountains and Foothills/Orange County Coastal Areas	74	100,000	Santa Ana winds toppled trees, brought down power lines, and knocked out power to thousands in many parts of Orange County. The strongest winds were felt along the foothills of the Santa Ana mountains and near the Chino Hills area.
12/16/11	Santa Ana Mountains and Foothills	56	15,000	This system set off intense showers and isolated thunderstorms with pea-sized hail (accumulations in Rancho Cucamonga and Mission Viejo), as well as several funnel clouds spotted east of John Wayne Airport. Most of the rain with this system was confined to Orange County, the Inland Empire, and the northern mountains. Heavy rain was observed in Orange County and the Inland Empire on December 15 and 16, with locations there recording between one-quarter and one-half inch. Strong winds were also observed with this storm, especially on December 16, which was a more widespread wind event than early December, impacting all counties, including San Diego County, with warning-level winds. Several wind gusts of 45-65 mph were reported in the Santa Ana Mountains, the Inland Empire and San Diego County Mountains. Several trees and power poles were downed, leaving many without power. Power poles were reported down in Yorba Linda and around 240 customers were reported without power in Tustin.
1/14/14	Santa Ana Mountains and Foothills	67	2,000	The highest wind gusts occurred in the San Diego County foothills and inland Orange County, including the Santa Ana Mountains. Winds downed fiber optic lines near Santiago Canyon in Orange County.
2/12/16	Orange County Inland	52	20,000	Strong northeasterly winds downed numerous trees near Irvine, Santa Ana, and Orange. Approximately 85 customers lost power in the City of Santa Ana.

Date	Location	Magnitude (kts)	Property Damage (dollars)	Description
2/17/17	Orange County Coastal	52	75,000	A strong trough and associated Pacific cold front swept into Southern California from the west, bringing strong winds, heavy snow, and rain. The storm was noteworthy for the strong prefrontal southerly winds that produced significant tree damage over the coast and valleys. In the mountains the ski resorts received 1-2 feet of snow, while elevations as low as 5,000 feet saw a few inches of accumulation. Rainfall ranged from 2-6 inches along the coastal slopes to 1-2 inches at the coast. At the beaches surf heights reached 8 to 12 feet. An isolated peak gust of 60 mph occurred at San Clemente Pier. Numerous trees were downed over the coastal areas.
12/4/17	Orange County Inland	52	15,000	Report of a large tree downed by strong winds in Orange. Tree damage, minor roof damage, and an exploding transformer were also reported in Santa Ana.
10/15/18	Orange County Inland	71	Unknown	A deep low pressure axis extending across Southern California produced strong region-wide Santa Ana winds. The strongest gust reached 82 mph in Fremont Canyon, with widespread gusts above 40-50 mph reported in valley locations. In Orange County, more than 200 trees were downed, and one person was killed when a tree fell onto their vehicle.
10/26/20	Santa Ana Mountains and Foothills	61	Unknown	A strong offshore wind, a “cool” Santa Ana, produced many gusts exceeding 70 mph and a top gust of 88 mph at Fremont Canyon. The winds toppled big-rig trucks and downed mature trees in the northern Inland Empire. The dry winds also contributed to spreading two fires, the Blue Ridge and Silverado fires in eastern Orange County.

Notes: kts = knots. One knot is equal to 1.151 mph.
(NOAA 2024a)

3.2.7.3 Location/Geographic Extent

Drought

Droughts occur over large regions and thus can affect the entire planning area.

Extreme Heat

Extreme heat can occur anywhere in the planning area; however, areas farther from the coast are expected to experience hotter temperatures than coastal communities. For many coastal communities, warmer temperatures are expected to have greater impacts on residents living in

homes without air conditioning. Extreme heat events occurring throughout the planning area could also impact utilities and infrastructure if power loss occurs either due to grid reliability or the use of a public safety power shutoff.

Windstorm

Santa Ana winds blow westward through the canyons toward the coastal areas of Southern California. Orange County commonly experiences Santa Ana winds between October and March. The winds are not location specific, but rather impact the entire planning area in different ways based on location, topography, and the nature of the wind event itself.

3.2.7.4 Magnitude/Severity

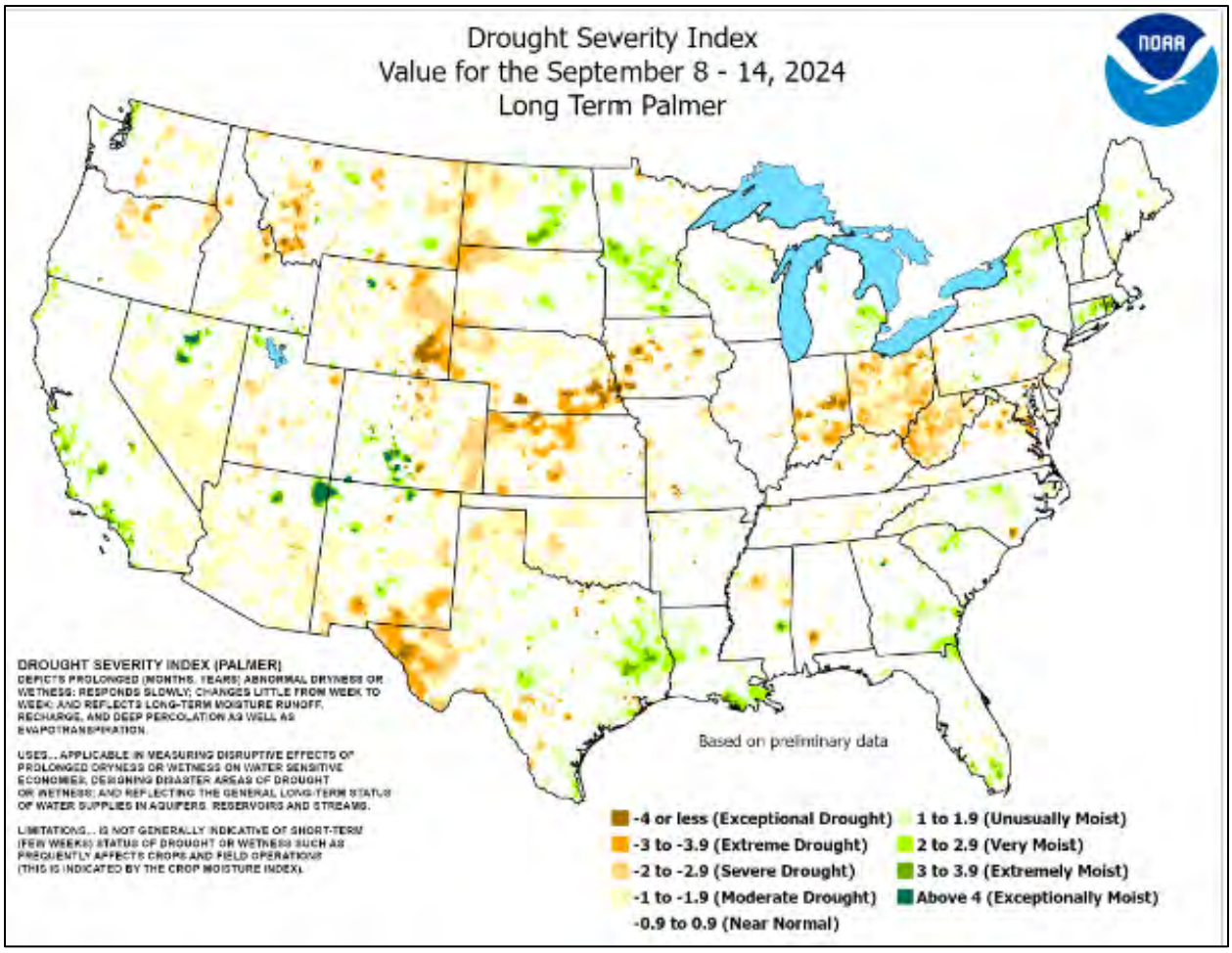
Drought

Of the many varied indexes used to measure drought, the Palmer Drought Severity Index (PDSI) is the most commonly used in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, where 0 indicates normal conditions, negative numbers indicate drought, and positive numbers indicate wet spells; refer to **Exhibits 3-26 and 3-27.**

Exhibit 3-26. Palmer Drought Severity Index

Drought	Wet Spells
-4.0 or less (Extreme Drought)	+2.0 or +2.9 (Unusual Moist Spell)
-3.0 or -3.9 (Severe Drought)	+3.0 or +3.9 (Very Moist Spell)
-2.0 or -2.9 (Moderate Drought)	+4.0 or above (Extremely Moist)
-1.9 to +1.9 (Near Normal)	

Exhibit 3-27. September 8, 2024 PDSI



Extreme Heat

The minimum threshold for an extreme heat day in the planning area is 93.4°F. The minimum threshold for a warm night in the planning area is 65.1°F. These values are displayed below in **Exhibit 3-28** and **Exhibit 3-29**.

Exhibit 3-28. Average Number of Extreme Heat Days

Scenario	Historic (1961-1990)	Projected (2020-2050)	Projected (2050-2070)	Projected (2070-2099)
RCP 4.5	3	8	11	16
RCP 8.5	3	9	18	31

Exhibit 3-29. Average Number of Warm Nights

Scenario	Historic (1961-1990)	Projected (2020-2050)	Projected (2050-2070)	Projected (2070-2099)
RCP 4.5	5	22	32	42
RCP 8.5	5	25	54	88

Cal-Adapt uses an emissions scenario when determining the data in its projections. An emissions scenario is a representation of future greenhouse gas emissions and resulting atmospheric concentrations through time. An emissions scenario illustrates a plausible future so that climate projections for that emissions scenario can be generated, used to inform analysis and decision-making, and compared to other scenarios. The data for these scenarios uses what are called representative concentration pathways (RCPs), which are different scenarios for the future severity of climate change, and comes from California's Fourth Climate Change Assessment, which uses two RCPs from the Fifth Intergovernmental Panel on Climate Change (IPCC) Assessment Report on Climate Change (Cal-Adapt 2024).

- **RCP 4.5 (medium emissions scenario):** A mitigation scenario where greenhouse gas (GHG) emissions peak by 2040 and decline. In California, annual average temperatures under this scenario are projected to increase 2°C to 4°C (35.6°F to 39.2°F) by the end of this century, depending on the location.
- **RCP 8.5 (high emissions scenario):** A no-mitigation scenario where global GHG emissions continue to rise throughout the 21st century. In California, annual average temperatures under this scenario are projected to increase 4°C to 7°C (39.2°F to 44.6°F) by the end of this century.

Based on these scenarios, extreme heat days throughout the planning area could increase from three days to 31 days by the end of the century. In addition, the average number of warm nights could increase from five nights to 88 nights during that same period.

Windstorm

Wind speeds are typically 35 knots through and below passes and canyons with gusts to 50 knots. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas with gusts greater than 100 knots in some areas. Frequently, the strongest winds in the Orange County Groundwater Basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze, which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours. Santa Ana winds are an important forecast challenge because of the high fire danger associated with them. Santa Ana winds can adversely affect power utilities that have transformers and power lines, in turn affecting the ability of some water and wastewater utilities to operate when backup generation is unavailable. The magnitude and severity of Santa Ana winds are similar throughout the planning area.

3.2.7.5 Probability of Future Occurrences

Drought

The University of Nebraska-Lincoln has published PDSI maps analyzing trends over the past 100 years (NDMC 2024). In coastal Southern California, from 1895 to 1995, severe droughts occurred 10% to 15% of the time. From 1990 to 1995, severe droughts occurred 10% to 20% of the time.

Based on the droughts listed in **Exhibit 3-24**, Orange County has been in severe or extreme drought for a total of 443 months, or approximately 35.5% of the time since 1920 and approximately 57.7% of the time since 1960.

Extreme Heat

Given past occurrences of extreme heat events in the planning area, it is expected that these types of events will occur in the future. What is expected in the future is that extreme heat events will

increase in both frequency and duration. With the projected increases in extreme heat days and warm nights, the probability of future occurrence is highly likely.

Windstorm

High winds, including Santa Ana winds, will continue to occur annually in Orange County. The probability of future occurrence throughout the planning area is high.

3.2.7.6 Climate Change Considerations

Drought

Climate change is anticipated to abate drought in certain situations; however, projections suggest that future drought events could become more frequent and intense. In some cases, climate change-intensified weather patterns, like El Niño Southern Oscillation (ENSO), may bring more rain to California and the planning area, reducing drought conditions. In other years, climate change may also prolong the La Niña phase of ENSO, which could lead to longer periods with no precipitation in California.

Climate change is also expected to increase the average temperature and cause more frequent and prolonged heatwaves in the region. During these events, water supplies may be affected within the planning area. Hotter temperatures may also lead to increased surface water evaporation, which could lead to greater water consumption. If a drought occurs coupled with heatwave events, additional strain could be placed on water and wastewater infrastructure.

From a regional perspective, warmer overall temperatures in California are anticipated to reduce statewide water supplies. Much of California's water comes from melted snow in the High Sierra. As the average temperature grows warmer with climate change, the precipitation that falls as snow is expected to shift towards rain. As less snow falls, the amount of melted water from the snowpack in the Sierra Nevada will decrease, reducing the water that will flow into the reservoirs and aqueducts that supply Southern California. Reductions in water availability could strain supplies, impacting the quality and availability of water within the Orange County Groundwater Basin.

Extreme Heat

The primary effect of climate change is warmer average temperatures. The warmest decade on record is 2011-2020, and the warmest three years on record occurred in 2023, 2016, and 2020. As climate change accelerates in the 21st century, it is anticipated that extreme heat events will become more frequent and intense in California. In the planning area specifically, the projected average number of extreme heat days per year could increase from three to 16 (in 2100), assuming global greenhouse gas emissions peak around 2040, then decline. If global greenhouse gas emissions continue to rise until 2100, the number of extreme heat days could increase to as many as 31 days per year. The number of warm nights could increase from five to 42 (in 2100), assuming an emissions peak and decline in 2040 but could increase to as many as 88 if emissions continue to rise until 2100 (Cal-Adapt 2024).

Windstorm

It is anticipated that the atmospheric rivers that deliver storms to Southern California may intensify because of climate change. While the average number of storms in Southern California will remain the same, storms are expected to increase in intensity between 10% and 20% (Oskin 2014). This

increase in storm intensity may also bring more intense winds to the Southern California region, including the planning area.

Studies indicate that Santa Ana wind events may be affected in varying ways by climate change, but it is unknown whether this will affect the frequency and intensity of these events. According to one study that examined two global climate models, there is a projected increase in future Santa Ana events. However, other studies have found that the number of Santa Ana events may decrease by about 20% in the future (Hall et al. 2018). Given the anticipated increases in temperatures throughout the region, future events are anticipated to become more severe in some cases, even if the number of events decreases.

3.2.8 Wildland/Urban Fire

3.2.8.1 Description (Nature) of the Hazard

Wildland Fire

A variety of fire protection challenges exist within Orange County, including structure fires, urban fires, wildland fires, and fires at the wildland/urban interface. This hazard analysis focuses on wildland fires, but also addresses issues specifically related to the wildland/urban interface. There are three categories of interface fires:

- The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas;
- The mixed wildland/urban interface is characterized by isolated homes, subdivisions and small communities situated predominantly in wildland settings; and
- The occluded wildland/urban interface existing where islands of wildland vegetation occur inside a largely urbanized area.

Certain conditions must be present for significant interface fires to occur. The most common conditions include hot, dry, and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). The three primary factors that lead to severe wildfires in Orange County are drought, insect infestation causing tree decimation (bark beetles), and wildfire suppression. Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

A key challenge Orange County faces regarding the wildfire hazard is the increasing number of houses being built in the wildland/urban interface. Every year the growing population has expanded further and further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas and open space areas has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design and capability.

Urban Fire

An urban fire is a fire that causes damage to buildings or infrastructure in an urbanized area. In some minor situations, the fire prompts the evacuation of the building's occupants, and the fire is contained within a short amount of time by firefighting teams or the building's fire suppression systems. In severe cases, the fire leads to the complete destruction of the building and can spread

to other surrounding properties. Common causes of urban fires include stoves that are accidentally left on, short-circuited electrical equipment, or mishandling of household tools. Larger urban fires may be caused by breaches in gas pipelines, large transportation accidents, or downed electrical transmission wires. Fires may also be intentionally started by arsonists.

3.2.8.2 History/Past Occurrences

Wildland Fire

Although no federally declared wildfire disasters have occurred in Orange County, significant wildfires have impacted Orange County and surrounding areas. Since 1950, the NOAA reports 28 wildfire events occurring in Orange County. **Exhibit 3-30**, Major Wildfires, identifies significant fires that have occurred since 1950.

Exhibit 3-30. Major Wildfires

Date	Location	Description
8/22/2000	San Clemente	Hot temperatures and dry conditions allowed a brush fire to quickly race uphill and ignite the underside of two roofs. Fifteen families were evacuated as more than 40 firefighters worked for several hours to control the blaze.
9/11/2000	San Clemente	A wild fire was fanned by east winds and burned 500 acres before being contained.
8/7/2001	Laguna Beach	A wild fire in a steep canyon near the main toll plaza on the San Joaquin Hills Toll Road (Highway 73).
9/9/2001	El Toro	A brush fire burned 30 acres before it was brought under control.
1/23/2002	Trabuco	Santa Ana winds gusted between 60 to 70 mph for several days across Southwest California.
5/13/2002	Mission Viejo	Extremely dry conditions, above normal temperatures, and gusty winds helped a brush fire, started by an arsonist, to quickly consume 1,100 acres before being controlled. Two trucks and one structure were destroyed. Many residential homes suffered smoke damage and residents were evacuated. Traffic was halted on Highway 241. No injuries occurred.
2/6-12/2006		Santa Ana winds and Red Flag conditions resulted in the rapid spread of a wildfire in the Santa Ana mountains. Named the Sierra Fire, this fire burned 10,854 acres from Sierra Peak to the 241 Toll Road. While evacuations were ordered, no structures were burned. Eight minor injuries were reported.
3/11-14/2007	Santa Ana Mountains and Foothills	The Windy Ridge Fire was intentionally set during the early stages of a red flag event at the mouth of Fremont Canyon. Humidity values less than 10% and wind gusts in excess of 40 mph caused the fire to spread quite rapidly across the rain starved hillsides. At the time of the fire, the Santa Ana Fire Station had only measured 1.81 inches of rain on the season, nearly 9 inches below the average rainfall for that date. Mandatory evacuations were posted for 1,200 homes in Anaheim Hills and Orange as the wind-driven fire spread westward. The fire burned 2,036 acres, damaged one home, and destroyed two out-structures before it was extinguished.
10/21/2007	Santa Ana Mountains and Foothills	The Santiago Fire was intentionally set and burned 28,400 acres in Modjeska and Santiago Canyons. The fire destroyed 15 homes and nine outbuildings. An additional 20 structures were damaged. Sixteen firefighters were injured during the blaze.
9/23/2010	Santa Ana Mountains and Foothills	The Long Canyon Fire started in the Cleveland National Forest in eastern Orange County, west of the Ortega Highway near the Riverside County line. Some structures were threatened, but the fire generally burned away from the populated areas, 40 acres total. Three firefighters and one police officer

Date	Location	Description
		suffered non-life-threatening heat-related and smoke inhalation injuries. One of the Cleveland National Forest's fire engines was destroyed by fire, cause unknown, no injuries.
8/5/2013	Santa Ana Mountains and Foothills	The Falls Fire started off Ortega Highway near Decker Canyon, in Riverside. Due to the fire burning on the Trabuco Ranger District, the San Mateo Wilderness, El Cariso Campground, Blue Jay Campground, the Firefighter Memorial Picnic Area and Wildomar Off-Highway Vehicle area were closed. Road closures included Ortega Hwy 74 from Lake Elsinore west to San Antonio Parkway. Evacuations were ordered for Lakeland Village, Rancho Capistrano and Decker Canyon residents. Evacuation perimeter was between Grand/Ortega and Grand/Corydon. No structures were threatened and no injuries. Minor guardrail damage occurred because of a rock fall along Ortega Highway. The fire burned 1,416 acres before being fully contained.
9/12-13/2014	Santa Ana Mountains and Foothills	The Silverado Fire began along Silverado Canyon Road in the Cleveland National Forest of the Santa Ana Mountains. The fire burned at a critical rate of spread, threatening power lines and forcing evacuations and road closures. Mandatory Evacuations were ordered from 30331 Silverado Canyon east to the end of the road (fire gate) and included 50 residences affecting approximately 220 people. The American Red Cross opened an evacuation center at 3:30 p.m. at El Modena High School at 3920 East Spring Street. The 12kV line servicing Silverado residents was down. One pole and the downed lines required replacement. There were 71 customers without power in Silverado Canyon. After burning a total of 1,600 acres, the Silverado Fire was completely contained.
9/25/2017	Santa Ana Mountains and Foothills	The Canyon Fire began near Highway 91 in Orange County. The fire spread rapidly due to dry fuel conditions and very low humidity, and firefighting efforts were hindered by a transition from light Santa Ana winds to onshore flow. This initially pushed the fire into the foothills before sending it back eastward toward Corona. The fire was estimated at 1,700+ acres and was threatening residences. Winds calmed over the ensuing days and the fire was quickly contained at 2,662 acres. The cause of the wildfire was determined to be a roadside flare.
10/9/2017	Orange County Inland	The Canyon Fire began near the 91 Freeway and Gypsum Canyon Road in Anaheim Hills. The fire spread rapidly, threatening numerous structures. In the first 24 hours the fire consumed more than 7,000 acres. In total, 25 structures were destroyed, 55 were damaged, and 9,217 acres burned. Four injuries were also reported. The cause of the fire was reported to be embers from the Canyon Fire which began September 25 and was contained October 4, 2017.
08/06/2018	Cleveland National Forest	The Holy Fire was a wildfire that burned in the Cleveland National Forest in Orange and Riverside Counties, California. The wildfire started on August 6, 2018, at around 1:15 p.m. PDT, in the vicinity of Trabuco Canyon. It burned approximately 23,136 acres, destroyed 18 structures, and caused more than $25 million in damages. Three firefighters were injured battling the fire, no fatalities were reported.
10/26/2020	Santa Ana Mountains and Foothills	The Silverado Fire started near Orange County Route S-18 (Santiago Canyon Road) and Silverado Canyon Road, fueled by strong Santa Ana winds gusting up to 80 mph (130 km/h) and low humidity. The fire burned in a path similar to that taken by the 2007 Santiago Fire, mostly through terrain that had not seen significant burning in the 13 years since that fire. The fire consumed

Date	Location	Description
		over 13,390 acres, destroyed one structure, two minor structures and damaged five others. Two firefighters were seriously burned battling this fire, both men survived. Over 90,000 people were forced to be evacuated as a result.
10/26/2020	Orange County Inland	A second brush fire ignited in Southern California amid dangerous high winds, which prompted evacuation orders for Yorba Linda. The blaze was initially dubbed the Green Fire but was later renamed the Blue Ridge Fire. This brush fire started in the Chino Hills area of Corona, west of the Santa Ana River. Spreading west toward Brea. The fire burned some 13,694 acres destroying one structure and damaging 10 others, as a result over 30,000 people were evacuated.
12/2/2020	Santiago Canyon	The Bond Fire was a wildfire that burned 6,686 acres in the Santiago Canyon area of Orange County, California in December 2020. The fire caused evacuations of 25,000 residents and injured two firefighters. The fire was very close to the burn scar of the Silverado Fire, which took place in October 2020. The fire destroyed 31 structures.
05/11/2022	Laguna Niguel	The Coastal Fire was a brushfire which started in the wilderness area near a Laguna Niguel neighborhood, burned approximately 200 acres and destroyed 20 homes in the neighborhood. One injury to a fire fighter was reported.
09/09/2024	Santa Ana Mountains, Trabuco Canyon	The Airport Fire was unintentionally ignited by an Orange County public works crew using heavy equipment in Trabuco Canyon. The fire burned over 23,000 acres in the Cleveland National Forest, destroying 160 structures and damaging another 34. Although this incident started in Orange County a majority of the affected areas are located in Riverside County on the eastern slopes of the Santa Ana Mountains.

(NOAA 2024a)

At 9:01 a.m. on November 15, 2008, the Corona Fire Department responded to calls reporting a brush fire in Riverside County. Upon arrival it became apparent to first responders the fire would be significant and of a highly destructive nature. At the time of the alarm a Red Flag Warning had been in effect due to low humidity levels, high temperatures, and strong Santa Ana winds. These conditions along with the terrain of the areas burned facilitated the rapid growth and spread of the fire and significantly affected first responder's efforts of containment and in the protection of property and lives. Initial calls reported the fire's location as west of the Green River Exit off the 91 Freeway in Riverside County. From there the fire quickly advanced in a Northwesterly direction towards Orange County where the fire split into two separate branches shortly after crossing over the county line; the first branch of the fire followed the Santa Ana River Basin southwest into Anaheim hills, and the second continued northwest into Yorba Linda. Both branches of the fire became of concern to the water utilities of Orange County as the fire threatened infrastructure or moved into the service areas of Anaheim, Brea, the YLWD, and Metropolitan's Diemer Filtration Plant facility. Eventually, the fire burned through approximately 30,305 acres and damaged or destroyed over 300 structures in Riverside, San Bernardino, Los Angeles, and Orange counties.

A brush fire erupted along State Route 241 near Santiago Canyon Road in Irvine on the morning of July 13, 2015. Campgrounds near Irvine Lake were evacuated, and three abandoned structures caught fire. The blaze encompassed a total of approximately 214 acres. Around one year later, a fire occurred in the Laguna Coast Wilderness Park near Bommer Ridge Trail on June 26, 2017. The fire burned approximately 47 acres and was reported as contained on June 27, 2017. On August 31,

2016, the Holy Fire started in the early morning just east of Trabuco Canyon in the Cleveland National Forest. The blaze did not threaten any homes; however, it was in an area around Holy Jim Canyon that was difficult for firefighters to reach. The fire burned through approximately 150 acres.

Most recently on September 9, 2024, the Airport Fire erupted in the Cleveland National Forest (in the vicinity of Trabuco and Rose Canyons) burning over 23,000 acres in both Orange and Riverside Counties. Impacts associated with the fire included nearly 200 damaged and destroyed structures and 22 injuries. No loss of life was reported as a result of this incident.

Urban Fire

A majority of the water/wastewater infrastructure locations throughout the planning area are located in developed areas. Many of these sites are surrounded by existing developments and run a low risk of ignition due to the use of non-combustible materials, and limited vegetation. Even with these typical site conditions on most utility locations, there is still the potential for fires to occur. To date, no significant fire events within the more developed portions of the planning area have occurred affecting water/wastewater infrastructure.

Note to Staff: if the above statement is not true, please provide information of a historic fire at one of your facilities.

3.2.8.3 Location/Geographic Extent

Wildland Fire

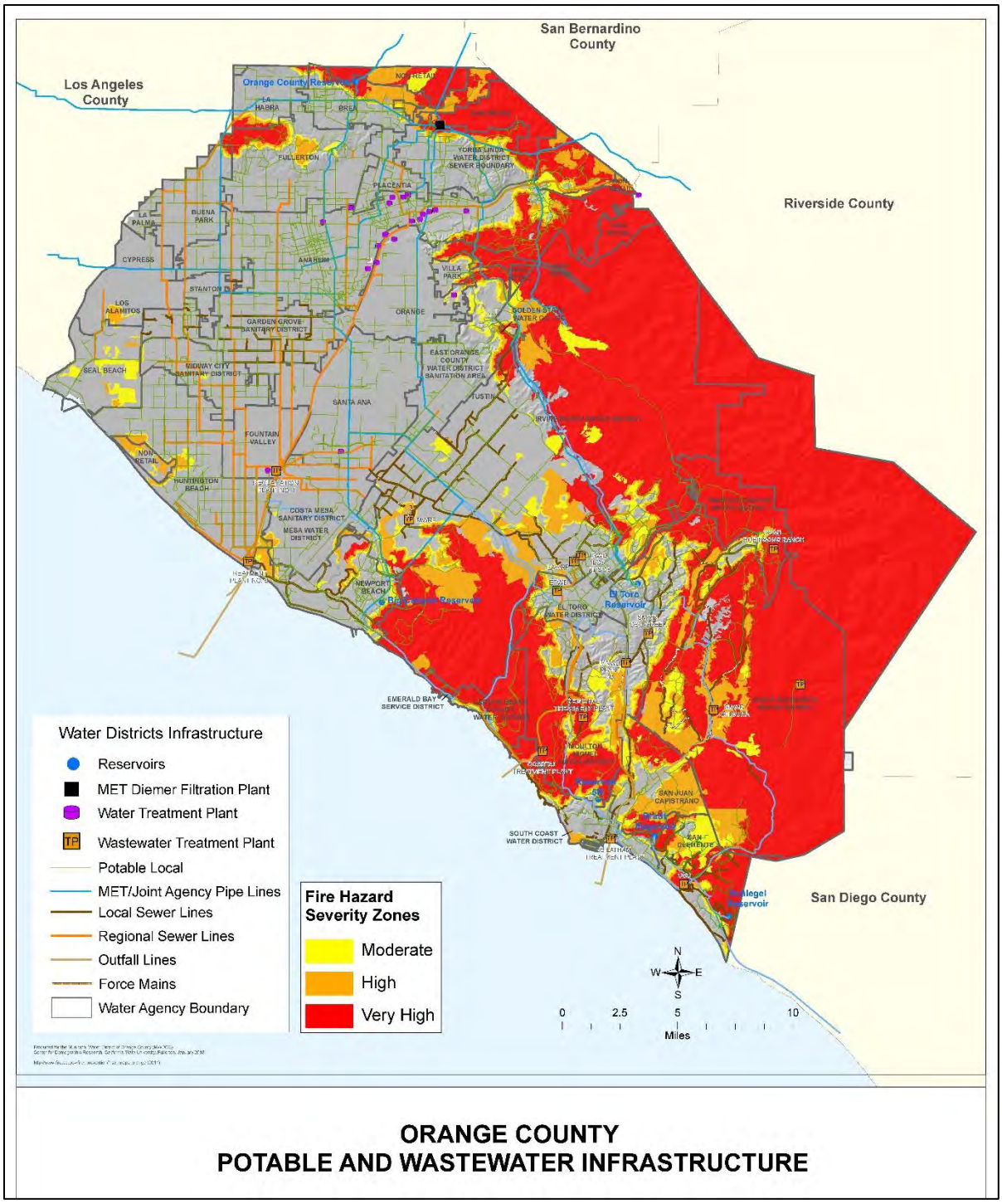
California Department of Forestry and Fire Protection (Cal Fire) prepares fire hazard severity maps including mapping areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), define the application of various mitigation strategies, and influence how people construct buildings and protect property to reduce risk associated with wildland fires. According to **Exhibit 3-31**, the southern and eastern portions of Orange County are located within High and Very High Fire Severity Zones.

Urban Fire

Most buildings in the planning area consist of wooden-frame construction, which is vulnerable to catching fire. Structures that do not have wooden frames, such as large wastewater and processing facilities, pumping stations, and other infrastructure are also potentially at risk of urban fires. These locations contain furniture, papers, chemicals, plant material, textiles, and other objects that can be ignited. Given that a very large portion of the planned area is developed, urban fires can occur at any location.

Fires are also likely to occur where there are other types of major infrastructure, such as gas pipelines, power lines, or highways. For example, Southern California Edison owns and operates above-ground, high-voltage transmission lines strung from towers on rights-of-way throughout the planning area. The planning area is also crisscrossed by multiple freeways (State routes) and interstates. These freeways/interstates facilitate the transportation of people and goods, which lead to an immense amount of traffic every day. If a major transportation accident were to occur on any of these freeways or roads, it could potentially cause a fire and spread to nearby facilities, buildings, and infrastructure within the planning area.

Exhibit 3-31. Fire Hazard Severity Zones



3.2.8.4 Magnitude/Severity

Wildland Fire

California experiences large, destructive wildland fires almost every year, and Orange County is no exception. Wildland fires have occurred within Orange County, particularly in the fall, ranging from

small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem is wildland fire during Santa Ana wind conditions. These conditions have been further exacerbated by more recent drought conditions. Drought causes fuels (both live and dead vegetation) to dry out and become more flammable, increasing the probability of ignition along with the rate of fire spread. If drought continues for an extended period, the number of days with elevated probability of ignition and fire spread increases, raising the risk of widespread burning. The combination of drought conditions, need to maintain water fire flow and the potential for power failure due to Santa Ana wind conditions can impact the magnitude and severity of fires within the planning area.

The magnitude/severity of a wildfire would be dependent upon the location and conditions (e.g., Santa Ana winds) in place at the time. The Fire Hazard Severity Zone maps prepared by Cal Fire (refer to **Exhibit 3-31**) identify the extent and severity of the fire hazard zones within Orange County. Although a fire could start and/or extend beyond these areas, they identify the areas of severity so that measures can be identified to mitigate the rate of spread and reduce the potential intensity of uncontrolled fires that threaten to destroy resources, life, or property.

Urban Fire

A fire can only ignite if three elements are present: heat, fuel, and oxygen. If any one of these elements is removed, the fire will extinguish itself. Throughout the planning area, hundreds of thousands of structures have the ability to provide fuel to an urban fire. The National Institute of Standards and Technology, Fire Research Division has developed a scale that measures the increase in temperature and the kind of fire response that develops. **Exhibit 3-32** shows the progression of temperature relative to fire response.

Exhibit 3-32. Fire Susceptibility Based On Temperature Increase

Temperature (°F)	Response
98.6 °F	Average normal human oral/body temperature.
101 °F	Typical body core temperature for a working firefighter.
109 °F	Human body core temperature that may cause death.
111 °F	Human skin temperature when pain is felt.
118 °F	Human skin temperature causing a first-degree burn injury.
130 °F	Hot water causes a scald burn injury with 30 seconds of exposure.
131 °F	Human skin temperature with blistering and second degree burn injury.
140 °F	Temperature when burned human tissue becomes numb.
162 °F	Human skin temperature at which tissue is instantly destroyed.
212 °F	Temperature when water boils and produces steam.
482 °F	Temperature when charring of natural cotton begins.
>572 °F	Modern synthetic protective clothing fabrics begin to char.
≥752 °F	Temperature of gases at the beginning of room flashover.
≈1832 °F	Temperature inside a room undergoing flashover.

Once a fire has been ignited, it could conceivably grow to an indefinite size if abundant fuel and oxygen are available. For example, a fire that ignites in one structure could hypothetically continue to expand and even spread to other adjacent structures if there was enough fuel to link the structures together. Fires in confined spaces may occasionally burn so intensely that they

consume all the oxygen available and burn out before they can expand. The magnitude and severity of urban fires would be dependent upon the location and the conditions in place at the time. A fire in or near a small structure in an isolated area would not be as severe as a fire in or near a large facility or piece of infrastructure when considering the monetary cost or replacement. However, that same small structure could be a key piece of infrastructure required to maintain the function of services in the planning area and could be considered a greater concern for the people who rely on it for their daily needs.

3.2.8.5 Probability of Future Occurrences

Wildland Fire

Wildfires are a regular feature of many of California's ecosystems and will continue to be in the future. Since the northern, eastern, and southern portion of Orange County are considered wildland/urban interface areas, the county has a higher probability of wildfire risks in those communities and surrounding areas. The specific chance of wildfire in Orange County's wildland/urban interface is not known, but the general vulnerability of the area to fires means that there is a reasonable possibility such an event will occur. According to the Planning Team and based on conditions experienced within the last several years, the probability of Orange County experiencing wildfires is highly likely—near 100% probability in the next year or happens every year.

Urban Fire

If the conditions for an urban fire exist in the planning area, the planning area will forever be at risk of experiencing an urban fire event. It is impossible to predict the precise likelihood and location of an urban fire emerging in the planning area, given how each fire event has unique origins. However, some areas are at an increased risk, including facilities, buildings, and infrastructure located along or adjacent to natural gas transmission pipelines, powerlines, and the many freeways and roads that run through the planning area. Given the vast amount of activity and fuel and chemicals that pass through the region, the likelihood of an urban fire outbreak in the planning area is probable.

3.2.8.6 Climate Change Considerations

Wildland Fire

Climate change is expected to cause an increase in temperatures and more frequent and intense drought conditions. This increase will likely increase the amount of dry plant matter available for fuel, increasing wildfire risk statewide. Climate change is expected to increase the number of acres burned annually in the foothills and mountainous areas of Orange County, which are already highly prone to wildfires. However, increases in fuel supplies could cause wildfires to move faster or spread into more developed areas, increasing the future threat for the planning area.

Urban Fire

While climate change has been linked to a potential increase in wildfire events, it is not clear exactly how climate change could influence the ignition or behavior of urban fires in the planning area.

3.3 Vulnerability Assessment

Vulnerability describes how exposed or susceptible to damage an asset is, and depends on an asset's construction, condition, contents, and the economic value of its functions. A vulnerability

analysis predicts the extent of injury and damage on the existing and future built environment that may result from a hazard event of a given intensity in a given area. Due to the interrelatedness of water and wastewater infrastructure and the role each has in public health and safety, vulnerabilities in one community are often related to vulnerabilities in another. Indirect effects can be much more widespread and damaging than direct effects. For example, damage to a major water utility line could result in significant inconveniences and business disruption that would far exceed the cost of repairing the utility line.

The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to hazards and estimates potential losses. This section focuses on the risks to the planning area; data for each of the MAs was also evaluated and is included here and in the Jurisdictional Annexes.

3.3.1 Asset Inventory

Hazards that occur in Orange County can impact critical facilities located throughout the county. For this 2024 MJHMP, a critical facility is defined as public infrastructure used to provide potable water to the public and maintain wastewater services, necessary to maintain public health and safety. Critical facilities associated with potable water services located within the planning area include: wells, water storage tanks, reservoirs with dams, water treatment plants, pump stations, pressure reducing stations, emergency interties, service connections, pipelines, and administrative buildings and utility yards; refer to **Exhibit 3-34, Summary Assets,** at the end of this section. Critical facilities associated with wastewater services located within the planning area include wastewater treatment plants, lift stations, pipelines, and administrative buildings and utility yards (**Exhibit 3-35**).

3.3.2 Estimating Potential Exposure and Losses

Orange County covers 948 square miles with several different climate patterns and types of terrain, from the coast to the mountains, which allows for several hazards to affect various parts of Orange County, as described above. Due to the vast area, a hazard event could impact a single jurisdiction or multiple jurisdictions.

To assess the changing conditions within the planning area, an updated analysis of new water and wastewater infrastructure constructed since the last update was developed to inform the 2024 MJHMP update. As part of this update, the infrastructure mapping for new assets was overlaid with hazards having a physical geographic location to estimate exposure to water and wastewater infrastructure. Hazard areas and infrastructure overlays were conducted for wildfires, flooding, fault rupture, earthquakes, liquefaction, landslides, and tsunamis; refer also to the Jurisdictional Annexes. Hazards and infrastructure overlays were not conducted for the remaining hazards because data for these hazards was either not available or is not geographically distinct. Many of these hazards, such as drought, power outage, and high winds/Santa Ana winds affect the entire planning area; therefore, all water and wastewater infrastructure could be potentially susceptible to damage from them. For these hazards, quantitative analyses were not performed. Vulnerability assessments associated with these hazards are based on historic incidents and the knowledge that water and wastewater experts have of their critical facilities and the susceptibility of those facilities to these hazards.

For water and wastewater infrastructure pipelines, the length of exposure/impact is given in miles. Other critical facilities are identified by facility/structure type. Exposure characterizes the value of

facilities/structures within the hazard zone and is shown as estimated exposure based on the overlay of the hazard on the critical facilities which are assigned a cost of replacement for each type of facility/structure exposed. These replacement costs for the critical facilities were identified by each MA. The loss or exposure value is then determined with the assumption that the given facility/structure is destroyed (worst-case scenario), which is not always the case in hazard events. This assumption was valuable in the planning process, so that the total potential damage value was identified when determining capabilities and mitigation measures for each MA.

Exhibit 3-33, Unit Replacement Costs of Facilities, provides average replacement costs used for critical facilities and infrastructure listed in all subsequent exposure/loss tables.

Exhibit 3-33. Unit Replacement Costs of Facilities

Abbreviation	Name	Replacement Cost
WST	Water Storage Tank	$20,000,000
RES	Reservoir (with a dam)	$50,000,000
WTP	Water Treatment Plant (Diemer Filtration Plant)	$350,000,000
WTP	Water Treatment Plant by retail agency	$10,000,000
PS	Pump Station (South County Pump Station)	$35,000,000
PS	Retail Water Agency Pump Station	$8,000,000
PRS	Pressure Reducing Station (Metropolitan facility)	$52,000,000
PRS	Pressure Reducing Station for retail agency	$2,000,000
EIT	Emergency Interties	$2,000,000
SC	Service Connector	$3,000,000
ADM	Administration (large administration building)	$8,000,000
LS	Wastewater Pump Station/Lift Station by OC San/SOCWA	$4,000,000
LS	Wastewater Pump Station/Lift Station by retail agency	$5,000,000
WWTP	Wastewater Water Treatment Plant	$30,000,000
WELL	Well	$5,000,000
PP	Power Plant (Metropolitan Yorba Linda Power Plant)	$12,000,000

(1) Based on the highest cost for typical facility from among the MAs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

Exhibit 3-34 provides the total inventory for the critical facilities and infrastructure by jurisdiction. Estimated exposure for critical infrastructure by MA is provided in the Jurisdiction Annexes. **Exhibit 3-35, Planning Area Critical Facilities and Infrastructure Exposure Costs by Hazard,** provides a summary of exposure for the planning area by hazard. The costs identified reflect cost of replacement in a worst-case scenario (defined as the highest cost submitted from among all the MAs in the study process, excluding the regional facilities, as this would overstate the local costs). For example, Garden Grove may have identified a cost of $3 million to replace a well and Buena Park may identify a cost of $3.5 million to replace a well; however, $3.5 million would be used as the replacement cost for all wells within the planning area. This methodology was used for consistency across the planning area and selection of the highest cost helps ensure that appropriate costs are considered when requesting grants. For any detailed proposals submitted to FEMA, actual costs for mitigation and detailed estimates of the benefits of the mitigation measure will be prepared and submitted. The costs included herein provide a relative measure of the impacts of the various hazards.

For additional detail on the exposure of facilities by MA, refer to the Jurisdictional Annexes. The Jurisdiction Annexes include a discussion of hazards and vulnerabilities specific to each MA, a

discussion of their capabilities to address these losses, and identifies the actions to help mitigate damage to their infrastructure against hazards identified in the risk assessment.

3.3.3 Land Use and Development Trends/Changes in Development

The MAs provide water and wastewater services to majority of Orange County, which has a population of almost 3.2 million people. Depending upon the hazard and its magnitude and duration, a considerable number of people and businesses could be impacted. Of primary concern would be a hazard that results in the loss of water supply and wastewater services to the planning area. As discussed previously, a hazard could result in direct physical damage to water/wastewater infrastructure, as well as indirect damage resulting from business disruption.

Although Orange County is urbanized and predominately built out, the Southern California Association of Governments (SCAG) projects continued population, employment, and housing growth into 2040. The County of Orange and its incorporated cities maintain General Plans, which identify the planned growth and development for their respective jurisdictions. The planning area includes a wide variety of residential and non-residential land uses. Water and wastewater service providers will continue to work with the communities they serve to identify service needs, including the construction, expansion, or modification of water and wastewater infrastructure. The construction of new facilities or infrastructure will be completed in coordination with these communities to ensure compliance with appropriate codes and regulations, including consideration of potential hazards.

Population growth and development in Orange County has increased since 2012. According to the Department of Finance, the population for the county is expected to rise by approximately 0.31% in 2024 from the previous year. For a total population of approximately 3,150.835 people living within Orange County. Along with population growth has come an increase in development, increasing demands on water and wastewater infrastructure. Many Orange County cities have seen shifts in development toward higher-density residential and mixed-use development projects in response to the demand for housing.

Due to the highly developed nature of Orange County along with the presence of natural hazards throughout the area such as earthquakes, liquefaction, flood risk, and wildfires, development and population growth has continued to occur within areas of risk. Recent drought conditions have placed greater emphasis on the ability for new development to be served by water supplies and planning for prolonged drought conditions. Water and wastewater agencies continue to coordinate with Orange County, cities, and each other to meet the demands of the respective communities they serve while also strengthening regional and local infrastructure and overall reliability in the event of a hazard. MWDOC and many of the MAs have modified their infrastructure to include EOCs and water infrastructure, to mitigate potential threats.

3.3.4 Vulnerable Populations

Water supplies for safe drinking, sanitation, and hygiene are relied upon by the entire population. However, there are populations within the MA service areas that would be considered more vulnerable in the event of a hazard that affects water and wastewater infrastructure. These populations include those that are reliant on others for their wellbeing, such as young children, individuals with disabilities, individuals' dependent on medical equipment, and individuals with impaired mobility, as well as people with low socioeconomic levels. Vulnerable populations are more significantly impacted in the event of a hazard.

3.4 Summary of Vulnerability

Due to the nature of water and wastewater infrastructure and its location throughout Orange County, there is some form of infrastructure that intersects with a hazard area. **Exhibit 3-34** identifies the infrastructure that intersects with hazards that have a specific geographic area (e.g., fire hazard, liquefaction); however, the entire MA service area also intersects with hazards that are not geographically specific (e.g., drought, power outage). The variety of hazards and the varying magnitude and probability of occurrence make it challenging to assess the hazards that pose the greatest risk to the MAs. The potential losses vary greatly depending upon the hazard and resulting impact to infrastructure. The challenge is further magnified by the potential health and economic impacts that could occur in the event water supplies are disrupted.

Exhibit 3-34. Summary Assets

Member Agency	Facility/Infrastructure																												
	Existing																	Future											
	Wells	Dams/Reservoirs	Water Treatment Plant	Potable Water System Pipeline	Water Storage Tank	Pump Stations	Pressure Reducing Station	Imported Water Connections	Emergency Intertie	Hydrants	Potable Service Connections	Administrative/ Office/Lab/	Wastewater System Pipeline (mile)	Wastewater/Water Reclamation Plant	WW Service Connections	Sewer Lift Stations	Heli Pad/Heli Hydrant	Wells	Dams/Reservoirs	Potable Water System Pipeline	Water Treatment Plant	Administrative/Office/ Maintenance	Water Storage Tank	Pump Stations	Pressure Reducing Station	Wastewater System Pipeline (mile)	Lab	Sewar Lift Station
Metropolitan Water District of Orange County	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange County Water District	901	27	0	15	5	9	0	2	0	0	4	12	40	2	0	0	0	6	0	0	0	0	0	0	1	0	0	0	0
Orange County Sanitation District	0	0	0	0	0	0	0	0	0	0	0	1	380	2	0	16	0	0	0	0	0	0	0	0	0	0	1	0	0
South Orange County Wastewater Authority	0	0	0	0	0	0	0	0	0	0	0	6	25	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
El Toro Water District	0	2	0	168	5	9	19	4	12	1,964	9,871	2	114	1	8,950	11	0	0	0	0	0	0	0	0	0	0	0	0	0
Laguna Beach County Water District	0	0	3	135	21*	14	19	3	14	952	8,800	2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Mesa Water District	9	0	1	317	3	2	0	3	15	3,404	25,300	1	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0
Moulton Niguel Water District	0	0	0	655	28	25	16	12	19	7,168	53,620	2	501	2	50,682	17	0	0	0	2	0	1	0	0	1	10	1	0
Santa Margarita Water District	0	3	0	626	34	21	25	22	4	4,250	54,254	1	630	3	57,537	19	0	0	2	3	0	0	22	21	25	20	0	0
Serrano Water District	2	1	1	43	2	5	0	1	0	370	2,385	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
South Coast Water District	1	0	2	169	14	9	25	4	18	1,694	17,240	9	140	1	14,764	13	0	1	0	0	0	0	1	0	0	0	0	0	1
Trabuco Canyon Water District	2	2	2*	65	9	12	11	2	6	600	4,150	2	47	1	3,670	8	0	1	0	2	0	0	2	2	5	2	0	0
Yorba Linda Water District	10	0	1	354	14	12	45	4	9	4,045	25,471	2	269	0	24,291	1	4	1	0	4	0	0	0	0	2	1	0	0
Irvine Ranch Water District	30	5	4	2,034	49	58	363	21	36	18,929	125,404	8	1,496	3	113,945	11	0	2	0	0	0	0	1	2	1	0	0	0	0
Costa Mesa Sanitary District	0	0	0	0	0	0	0	0	0	0	0	2	224	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0

(1) Regional water systems identified here are co-owned and managed by multiple utilities.

Exhibit 3-35. Planning Area Critical Facilities and Infrastructure Exposure Costs by Hazard

Hazard		Infrastructure Type														Replacement Costs
		Administration Buildings	Interties (#)	Pump Stations (#)	Treatment Plants (#)	Lift Stations (#)	Pressure Control Stations (#)	Reservoirs (#)	Water Storage Tanks (#)	Wells (#)	Effluent Pipeline (miles)	Potable Pipeline (miles)	Wastewater Pipeline (miles)	Manholes	Heli Pad/ Heli Hydrant	
Fire Hazard Zone	Moderate	0	14	13	0	7	0	13	0	0	0.5	45.02	37.78	0	0	$148,340,000
	High	0	5	6	1	0	0	13	0	1	1.0	59.03	66.8	0	0	$172,964,000
	Very High	0	24	48	2	10	1	72	1	5	1.6	151.14	101.75	0	0	$609,812,000
FEMA Flood Zone	100-Year	0	4	2	2	7	0	15	0	9	0.5	38.73	137.84	70	0	$183,256,000
	500-Year	0	18	7	2	11	4	8	0	38	2.1	106.05	308.36	535	0	$297,288,000
Alquist-Priolo Fault Zone		0	0	0	0	0	2	0	0	0	0	4.29	1.81	0	0	$440,000
Ground Shaking	Moderate	0	22	40	0	2	1	50	1	0	0	86.18	53.59	0	0	$391,736,000
	High	4	97	110	11	21	78	55	11	67	5.2	370.53	727.72	5,708	1	$1,387,396,357
	Extreme	1	24	25	1	10	1	43	0	26	0	169.53	391.85	48	2	$561,504,000
Liquefaction	Moderate	0	13	13	3	3	1	14	8	41	0	85.53	484.64	76	0	$321,936,000
	High	3	25	16	6	2	20	17	1	42	0	91.48	198.47	1,075	0	$553,840,000
	Very High	0	0	0	1	0	2	0	0	0	0	10.39	16.74	0	0	$23,104,000
	Unknown	0	13	7	1	1	0	1	0	7	0	54.45	100.4	0	0	$142,080,000
Landslide Zone		0	5	24	0	7	8	28	7	0	2.8	40.83	46.64	17	0	$227,676,000
Tsunami Zone		3	0	58	4	9	77	1	11	10	0.6	6.75	7.42	5,653	4	$299,752,357

(1) Based on the highest cost for typical facility from among the MAs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

SECTION 4: MITIGATION STRATEGY

Planning is the cornerstone to successful hazard mitigation efforts. Citizens, local government, and private interests with proactive policies can reduce damages and impacts associated with natural and human-caused hazards. Benefits realized by implementing hazard mitigation measures include:

- Saving lives by removing people from hazard prone situations.
- Limiting property damage by regulating development in hazard areas.
- Reducing economic impacts by minimizing outages of essential services during and after these events.
- Saving money for taxpayers by reducing the need for services during a disaster.
- Speeding disaster recovery and post-disaster relief funds.
- Demonstrating a strong commitment to the health and safety of the community.

Relocating people, institutions, and businesses from hazard-prone areas saves property and lives. Removal or protection of the structures within hazard-prone areas means that there is less to pay for disaster recovery or for service outages during an event. Having alternative service plans for essential services, such as water and sewer operations, protects structures from fire and allows residents and businesses to continue functioning or to restore normal functions quicker following a disaster. Post-event, recovery crews will have less to do because there will be less damage. Implementation of these measures speeds the overall recovery process.

4.1 Hazard Mitigation Overview

The mitigation strategy and actions were developed by the Planning Team based on an in-depth review of the vulnerabilities and capabilities described in the plan. The mitigation actions described in the Jurisdictional Annexes represent each MA's risk-based approach for reducing and/or eliminating the potential losses as identified in **Section 3, Risk Assessment**.

As part of the update process, the hazard mitigation goals were reviewed and refined. It was determined that the overarching mitigation goals were the same for all MAs. Therefore, one set of goals were identified for the MJHMP, as discussed below. If additional, jurisdiction-specific goals were identified by an MA, they are included in the Jurisdictional Annex.

MAs provided a comprehensive review of their mitigation actions to assess their ability to reduce risk and vulnerability to the jurisdiction from identified hazards. Upon review of each mitigation action, an assessment was made as to whether the mitigation action should be carried forward into the 2024 MJHMP and/or be revised/modified or removed to reflect changing conditions or priorities. Mitigation actions that were deemed complete during the current plan period were identified and removed (refer to the Jurisdictional Annexes). New mitigation measures were also identified.

4.1.1 FEMA's National Flood Insurance Program

In 1968, the U.S. Congress created the National Flood Insurance Program (NFIP) to provide affordable insurance to property owners while also encouraging communities to adopt and enforce floodplain management regulations. Community participation is voluntary; however, it is required to receive certain grants and funding from FEMA. The Orange County Flood Division (OC Flood) is a participant in the program and administers the floodplains within the unincorporated areas of Orange County. Within the incorporated areas, Orange County cities administer their floodplains.

Since the creation of NFIP, OC Flood has worked cooperatively with cities in Orange County to reduce the floodplain area by constructing flood control facilities that provide 100-year flood protection. Such facilities typically traverse through the cities and ultimately outlet into the Pacific Ocean. All cities within Orange County are participants in the program. As participants in this HMP update, both water and wastewater districts do not participate in the NFIP nor do they monitor properties within their jurisdictional boundaries as this responsibility falls on the county or cities they support.

Repetitive Loss Properties

According to the NFIP, a repetitive loss structure is an insured building that has had two or more losses of at least $1,000 each being paid under the NFIP within any 10-year period since 1978. MWDOC and MAs are not participants in the NFIP. Based on this status they do not regulate flood management for other property owners and solely focus on flood management of their owner properties/facilities.

4.2 Hazard Mitigation Goals

Mitigation goals are defined as general guidelines explaining what each jurisdiction wants to achieve in terms of hazard risk reduction and loss prevention. Goal statements are typically long-range, policy-oriented statements representing jurisdiction-wide visions. The goals identified in the previous plan were reviewed by the Planning Team. Through the update process, it was determined that these previous goals were adequate and relevant to MWDOC and the MAs. Based on discussions with the Planning Team only minor revisions to two goals were recommended to better align with current priorities. The following hazard mitigation goals have been identified for this 2024 MJHMP:

- **Goal 1:** Minimize vulnerabilities of critical facilities and infrastructure to minimize damages, loss of life, and injury to human life caused by hazards.
- **Goal 2:** Minimize security risks to water and wastewater infrastructure.
- **Goal 3:** Minimize interruption to water and wastewater utilities.
- **Goal 4:** Improve public outreach, awareness, education, and preparedness for hazards in order to increase the community resilience.
- **Goal 5:** Eliminate or minimize wastewater/recycled water spills and overflows (wastewater agencies).
- **Goal 6:** Protect water quality and supply, critical aquatic resources, and habitat to ensure a safe water supply.
- **Goal 7:** Strengthen emergency response services, workforce training, and education enhancement to ensure preparedness, response, and recovery during any major or multi-hazard event.

The MJHMP goals guide the direction of future activities aimed at reducing risk and preventing loss from natural and human-caused hazards. The goals also serve as checkpoints as the MAs begin implementing mitigation action items. Mitigation goals do not account for implementation cost, schedule, funding sources, etc. Goals represent what each MA wants to achieve, whereas the mitigation actions provide the actions needed to achieve the goals.

4.3 Identify and Prioritize Mitigation Actions

Mitigation actions were identified, evaluated, and prioritized by the MAs. They provide a list of activities that the MAs will use to reduce their risk of potential hazards. Some of these actions may be eligible for funding through Federal and State grant programs and other funding sources as made available by the MAs or other agencies/organizations. The mitigation actions are intended to address the comprehensive range of identified hazards for each MA, while some actions may address risk reduction from multiple hazards.

A detailed list of mitigation actions for each MA is provided in their respective Jurisdictional Annexes. The process used by the Planning Team to identify hazard mitigation actions for this MJHMP included the following:

- Review of the risk assessment presented in **Section 3**;
- Review of the capabilities assessment presented for each MA in the Jurisdictional Annexes; and
- Team discussion of new concerns/issues that need to be addressed to reduce hazards to critical water/wastewater infrastructure.

The mitigation actions identify the hazard, proposed mitigation action, location/facility, local planning mechanism, risk, cost, timeframe, possible funding sources, status, and status rationale, as applicable.

MAs conducted a capabilities assessment (provided in the Jurisdictional Annexes), to identify existing local agencies, personnel, planning tools, public policy and programs, technology, and funds that have the capability to support hazard mitigation activities and strategies outlined in this MJHMP . To identify the capabilities, the Planning Team collaborated to identify current local capabilities and mechanisms available for reducing damage from future hazard events. The capabilities and resources were reviewed while developing the 2024 MJHMP, and opportunities to enhance mitigation were identified where applicable. After completion of the capabilities assessment, each jurisdiction evaluated and prioritized their proposed mitigation strategies and actions.

FEMA's Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria was used to identify, evaluate, and prioritize mitigation actions based on existing local conditions. Using this method each MA considered the STAPLEE criteria regarding the feasibility and implementation of a mitigation action; refer to **Exhibit 4-1, STAPLEE Review and Selection Criteria.** This process was used to help ensure that the most equitable and feasible actions would be undertaken based on each MA's unique capabilities.

Exhibit 4-1. STAPLEE Review and Selection Criteria

STAPLEE Review	Selection Criteria
Social	Is the proposed action socially acceptable to the jurisdiction and surrounding community? Any equity issues involved that would mean that one segment of the jurisdiction and/or community is treated unfairly? Will the action cause social disruption?
Technical	Will the proposed action work? Will it create more problems than it solves?

STAPLEE Review	Selection Criteria
	Does it solve a problem or only a symptom? Is it the most useful action in light of other jurisdiction goals?
Administrative	Can the jurisdiction implement the action? Is there someone to coordinate and lead the effort? Is there sufficient funding, staff, and technical support available? Are there ongoing administrative requirements that need to be met?
Political	Is the action politically acceptable? Is there public support both to implement and to maintain the project?
Legal	Is the jurisdiction authorized to implement the proposed action? Are there legal side effects? Could the activity be construed as a taking? Will the jurisdiction be liable for action or lack of action? Will the activity be challenged?
Economic	What are the costs and benefits of this action? Do the benefits exceed the costs? Are initial, maintenance, and administrative costs taken into account? Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)? How will this action affect the fiscal capability of the jurisdiction? What burden will this action place on the tax base or local economy? What are the budget and revenue effects of this activity? Does the action contribute to other jurisdiction goals? What benefits will the action provide?
Environmental	How will the action affect the environment? Will the action need environmental regulatory approvals? Will it meet local and state regulatory requirements? Are endangered or threatened species likely to be affected?

In some instances, MAs revised the priorities of mitigation actions or removed mitigation actions all together. If the mitigation action was completed and no further action would be needed, the action was removed. However, in some instances it was determined that a mitigation action was no longer relevant due to technical changes or advances, a change in service conditions, or the cost associated with a mitigation that would not result in the benefits needed. To document these instances an additional table was included in the Jurisdictional Annex that highlights actions removed due to completion or if it was deemed unnecessary or infeasible. Some actions that may have been considered lower in priority during the last plan update were elevated due to conditions that either allowed for the action to be prioritized, such as the potential for funding or completion of other mitigation actions that preceded them. Mitigation actions were also prioritized based on more recent experiences associated with drought conditions and wildfires. These hazards and the impact they have had throughout Orange County and the State have resulted in new requirements in how these hazards are addressed in water supply and water and wastewater infrastructure systems.

4.3.1 Hazard Mitigation Benefit-Cost Review

FEMA requires local governments/agencies to analyze the benefits and costs of a range of mitigation actions that can reduce the effects of each hazard within their communities. Benefit-cost analysis is used in hazard mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit-cost

analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now to avoid disaster-related damages later. The analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk.

An HMP must demonstrate that a process was employed that emphasized a review of benefits and costs when prioritizing the mitigation actions. The benefit-cost review must be comprehensive to the extent that it can evaluate the monetary as well as the nonmonetary benefits and costs associated with each action. The benefit-cost review should at least consider the following questions:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action (e.g., which is more beneficial to protect, the fire station or the administrative building)?
- Environmentally, does it make sense to do this project for the overall community?

These questions were used to help determine the appropriateness of mitigation actions. Benefits and costs are a primary motivation for implementing mitigation projects at water and wastewater utilities. Past disasters have shown the benefit-cost of mitigating water utilities against identifiable hazards. For example, a cold weather system that impacted most of the United States resulted in pipeline breaks across the State of California. Those ruptures primarily occurred on a specific type of pipeline that has been gradually phased out of use in California. The replacement of this type of pipeline prior to the cold front could have not only prevented the cost of pipeline breaks, but also costs related to flooding, landslides, loss of water supply, other secondary effects of the broken pipelines.

The final prioritization completed by each MA depended on the direct loss estimations for water/wastewater critical infrastructure along with the secondary costs associated with business loss and recovery. Much of this effort was completed with informal cost-benefit analysis based on the knowledge and expertise of the participants (many of them certified operators, water quality experts, or engineers), previous planning documents, and the concepts identified above. Those actions that did not have adequate benefits were excluded from the list of mitigation actions.

4.4 Regional Considerations

It is envisioned that the mitigation actions for the most part will be implemented on a district-by-district basis. MWDOC will provide facilitation, as appropriate, of this process to help reduce duplication of efforts between jurisdictions and to spearhead coordination of initiatives and action items that could be accomplished more efficiently on a regional level. In its role as a regional planning agency, MWDOC will act as lead on water-related hazard mitigation projects that are regional in nature, such as projects that cross several jurisdictional boundaries and work planned on behalf of Metropolitan. OC San, CMSD, and SOCWA will take the lead on wastewater related hazard mitigation projects that are regional in nature and within their individual service areas.

Section 3: Risk Assessment and Jurisdictional Annexes indicate that each MA is susceptible to a variety of potentially serious hazards in the region. The approach to emergency planning in California has been comprehensive in its planning for and preparedness to respond to all hazards utilizing the SEMS and a coordinated Incident Command System. A program managed by MWDOC, the Water Emergency Response Organization of Orange County (WEROC), acts as a coordination point (Area Command) to support an effective emergency response to major disasters by the

Orange County water and wastewater utilities. WEROC provides services that promote planning and preparedness activities for both the utilities, as well as its own EOC staff. WEROC also helps maintain a turn-key EOC as well as other preparedness and response resources throughout Orange County. WEROC receives guidance from a steering committee, which includes representatives from Orange County water utilities, Metropolitan, the County of Orange and the California Department of Health Service's Office of Drinking Water. WEROC and its steering committee help ensure water and wastewater utilities remain current with Federal and State emergency response procedures and plans for potential disasters.

The Disaster Mitigation Act of 2000 requires that in addition to having emergency response and emergency preparedness documents, regions should develop and maintain a document outlining measures that can be implemented before a hazard event occurs that would help minimize the damage to life and property. MWDOC has accepted the role of coordinating the development the HMP as a multi-jurisdictional plan. All-hazard mitigation planning efforts within the region are the responsibility of the jurisdictions. As noted, the capabilities of the jurisdictions to perform hazard mitigation planning are detailed in the Jurisdictional Annexes.

4.4.1 Regional Fiscal Resources

One of MWDOC's primary roles in coordinating the development of the MJHMP is to identify and obtain grant funding for preparing and implementing certain aspects of the plan. This is consistent with WEROC's role, as a program managed by MWDOC, for hazard mitigation and preparedness. WEROC has received grants to improve the EOCs and to secure water trailers for distribution of drinking water during disasters and will continue to provide guidance to the MAs with hazard mitigation project grant applications and their implementation. Additional fiscal capabilities of the jurisdictions when implementing a hazard mitigation project are detailed in their individual capabilities assessments.

Potential Funding Sources

The following are potential funding sources that may be used to implement mitigation strategies. These funding sources include the following Federal and State sources:

- **Building Resilient Infrastructure and Communities (BRIC):** A competitive FEMA grant program to support states, local communities, tribes, and territories.
- **Hazard Mitigation Grant Program (HMGP):** Provides funding to local, State, tribal, and territorial governments to rebuild in a way that reduces or mitigates future disaster losses in their communities. This grant funding is available after a presidentially declared disaster.
- **Emergency Management Performance Grant (EMPG) Program:** The Federal Government, through the EMPG Program, provides necessary direction, coordination, and guidance and provides necessary assistance, as authorized in this title, to support a comprehensive all-hazards emergency preparedness system.
- **Other Grants:** Other grants may include State of California grants associated with climate change, water infrastructure, homeland security, transportation, or other funding sources that periodically become available. The list below provides some common sources:

    1. Climate Adaptation Planning Sustainable Transportation Planning Grant Program – Department of Transportation

2. Sustainable Communities Competitive – Department of Transportation
3. CAL FIRE Wildfire Prevention Grants Program – Department of Forestry and Fire Protection
4. Integrated Climate Adaptation and Resiliency Program's Climate Adaptation Planning Grant – Office of Planning and Research
5. Small Community Drought Relief Program – Department of Water Resources
6. Addressing Climate Impacts – Department of Fish and Wildlife
7. Cleanup Loans and Environmental Assistance to Neighborhoods (CLEAN) Program – Department of Toxic Substances Control
8. Clean Water State Revolving Fund (CWSRF) Program Construction – State Water Resources Control Board
9. Drinking Water State Revolving Fund (DWSRF) Construction – State Water Resources Control Board
10. Water Recycling Funding Program (WRFP) Construction Grant – State Water Resources Control Board
11. Equitable Community Revitalization Grants (ECRGs) – Department of Toxic Substances Control
12. Water Recycling Funding Program (WRFP) Planning Grant – State Water Resources Control Board
13. Infrastructure State Revolving Fund (ISRF) Program – Infrastructure and Economic Development Bank

SECTION 5: PLAN MAINTENANCE

This section of the MJHMP describes the formal process that will ensure this plan remains an active and relevant document. The maintenance process includes a schedule for monitoring and evaluating the MJHMP annually and producing a plan revision every five years. This section describes how the MAs will integrate public participation throughout the plan maintenance process. It also describes how the MAs intend to implement the MJHMP and incorporate its mitigation actions into existing planning mechanisms and programs. The MJHMP format, organized with Jurisdictional Annexes, allows the MAs to readily update sections when new data becomes available, ensuring the plan remains current and relevant.

5.1 Monitoring, Evaluating, and Updating the Plan

5.1.1 Plan Maintenance

MWDOC will be responsible for initiating plan reviews and coordinating with the MAs. The internal planning teams for each jurisdiction will meet bi-annually to review progress on plan implementation. MWDOC and the MAs will meet annually, or following a hazard event as described below, to monitor the plan's progress and implementation. This will also allow the opportunity for updates to hazards, jurisdictional goals, and mitigation action items, as necessary. If needed, the MAs will coordinate with MWDOC to integrate updates into the plan.

5.1.2 Plan Evaluation

The plan will be evaluated by the MAs at least annually to determine the effectiveness of the plan, and to reflect changes in land development or programs that may affect mitigation priorities. MWDOC and the Planning Team leads (or their jurisdictional representative) will also review the goals and action items to determine their relevance to changing situations in Orange County, as well as changes in State or Federal regulations and policy. MWDOC and MA representatives will also review the risk assessment portion of the plan to determine if this information should be updated or modified, given any new available data or incidents. The MAs will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Any updates or changes necessary will be forwarded to MWDOC for inclusion in further updates to the plan.

MWDOC, with input from the Planning Team, will use the progress report template provided in **Appendix C** to report on annual progress. This will help to ensure consistent and accurate tracking of the plan implementation by each of the MAs. Each MA will coordinate with their responsible departments/agencies identified for each mitigation action. These responsible departments/agencies will help to monitor and evaluate the progress made on the implementation of mitigation actions and report to the MA's Planning Team representative on a semi-annual basis. These responsible departments/agencies will be asked to assess the effectiveness of the mitigation actions and modify the mitigations actions as appropriate. The MJHMP Mitigation Action Progress Report worksheet will assist Planning Team representatives in reporting the status and assessing the effectiveness of the mitigation actions.

The following questions will be considered in evaluating the plan's effectiveness:

- Has the nature or magnitude of hazards affecting the planning area/jurisdiction changed?
- Are there new hazards that have the potential to impact the planning area/jurisdiction?
- Do the identified goals and actions address current and expected conditions?

- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the HMP?
- Should additional local resources be committed to address identified hazards?

Future updates to the MJHMP will account for any new hazard vulnerabilities, unusual circumstances, or additional information that becomes available. Issues that arise during monitoring and evaluating the MJHMP, which require changes to the risk assessment, mitigation strategy, and other components of the plan, will be incorporated into the next update of the MJHMP, described below.

5.1.3 Plan Updates

Title 44 CFR § 201.6(d)(3) requires that local hazard mitigation plans be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for mitigation project grant funding. Monitoring the progress of the mitigation actions, as described above, will be ongoing throughout the five-year period between the adoption of the HMP and the next update effort. The five-year cycle may be accelerated to less than five years based on the following triggers:

- A presidential disaster declaration that impacts one or more of the MAs.
- A hazard event that causes loss of life.

Should a significant hazard occur within the planning area, the MJHMP Planning Team will reconvene within 60 days of the disaster to review and update the HMP, as required.

MWDOC, working in conjunction with the MAs, will serve as the primary responsible agency for updates to the plan. All MAs will be responsible to provide MWDOC with jurisdictional-level updates to the plan when/if necessary, as described above. Every five years the updated plan will be submitted to Cal OES and FEMA for review.

The intent of the update process will be to add new planning process methods, MA profile data, hazard data and events, vulnerability analyses, mitigation actions, and goals to the adopted plan so that the MJHMP will always be current and up to date. Based on the needs identified by the Planning Team, the update will, at a minimum, include the elements below:

- The update process will be convened by MWDOC and a Planning Team comprised of at least one representative from each MA.
- The hazard risk assessment will be reviewed and updated using best available information and technologies on an annual basis.
- The evaluation of critical infrastructure and mapping will be updated and improved as funding becomes available.
- The mitigation actions will be reviewed and revised to account for any actions completed, deferred, or changed to account for changes in the risk assessment or new policies identified under other planning mechanisms, as appropriate.
- The draft update will be made available to appropriate agencies for comment.
- The public will be given an opportunity to comment prior to adoption.
- The governing bodies for each MA will adopt the updated MJHMP.

5.1.4 Adoption

Each jurisdiction is responsible for adopting the MJHMP. This formal adoption should take place every five years. Once the plan had been adopted, MWDOC will be responsible for final submission to Cal OES. Cal OES will then submit the plan to FEMA for final review and approval.

5.1.5 Implementation Through Existing Programs

The effectiveness of the nonregulatory MJHMP depends on the implementation of the plan and incorporation of the outlined mitigation action items into existing plans, policies, and programs. The plan includes a range of action items that, if implemented, would reduce loss from hazard events in the planning area. Together, the mitigation action items in the MJHMP provide the framework for activities that the MAs may choose to implement over the next five years. The MAs have identified the plan's goals and prioritized jurisdiction-specific actions that will be implemented (resources permitting) through existing plans, policies, and programs.

Implementation of the plan will be the responsibility of each MA. Successful implementation is more likely if the plan recommendations are integrated into other plans and mechanisms, such as water and wastewater master plans, urban water management plans, administrative codes, strategic plans, CIPs, and budgets for each of the participating jurisdictions. Upon adoption of the 2024 MJHMP, the MAs can use the MJHMP as a baseline of information on the hazards that impact their jurisdictions. The MJHMP can also build on related planning/design efforts and mitigation programs that are already occurring within the planning area. This will also facilitate applying for funding opportunities as they become available. Progress on implementing mitigation actions through other planning programs and mechanisms should be monitored and integrated into future updates.

By adopting a resolution approving this MJHMP , each MA agrees to reference and incorporate the document into their future local planning documents, codes, decisions, processes, and regulations. The MJHMP will be reviewed and considered by each MA, as applicable plans are created or updated in the future. Upon creating or updating new plans or policies, each MA will review this MJHMP and consider the following:

- What hazard and/or vulnerability information should be considered and/or integrated into this plan?
- Are there opportunities for this plan to support and/or implement mitigation actions?
- What mitigation actions can and should be integrated into this plan?
- Are there other community mechanisms that mitigation can be integrated?
- Is there information from this plan or policy that can be integrated into the next MJHMP update?

Further, the WEROC program manager will establish as an annual agenda item to review and discuss incorporation of the MJHMP into local planning efforts and processes.

Some of the ways each MA will integrate information from this MJHMP into their planning mechanisms are described below.

The timing of updates to plans, programs, and regulatory documents vary depending upon the document and statutory requirements. The information provided in the hazards profiles, vulnerability assessment, and the mitigation actions will be integrated directly or incorporated by reference to support and enhance goals/policies and specific actions for each MA. This will be done as the documents are updated by each MA.

For water and wastewater service providers the most common plans, programs, and regulatory documents expected to integrate information from the MJHMP include water and wastewater master plans, urban water management plans, risk and resilience assessments, and capital improvement programs.

Water and Wastewater Plans will integrate more current hazard and vulnerability information and establish or update their framework for implementing actions identified in the MJHMP. Upon creating or updating any plans, water and wastewater agencies will review this MJHMP to consider the various hazards of concern as part of system design and programming and ensure integration of the mitigation actions into the respective plans. As staff assesses the information and analysis in the current plan it is anticipated that updated hazard information and mitigation actions would allow the MA to modify assumptions on their proposed systems that could increase resilience from potential hazard events.

The Urban Water Management and Planning Act was passed in 2010 and requires water suppliers to estimate water demands and available water supplies. Each water district has an Urban Water Management Plan (UWMP). UWMPs are required to evaluate the adequacy of water supplies including projections of 5, 10, and 20 years. These plans are also required to include water shortage contingency planning for dealing with water shortages, including a catastrophic supply interruption.

UWMPs are intended to be integrated with other urban planning requirements and management plans. Some of these plans include city and county General Plans, Water Master Plans, Recycled Water Master Plans, Integrated Resource Plans, Integrated Regional Water Management Plans, Groundwater Management Plans, Emergency Response Plans, and others. Each water district will review the MJHMP in coordination with preparation of UWMP updates to ensure the most current hazard information is provided and that the appropriate mitigation actions are incorporated.

Additionally, all water utilities are required to conduct RRAs and corresponding ERPs every five years in accordance with the AWIA. The RRAs include a risk assessment process that focuses on potential physical and cyber components of operations and business continuity. AWIA requires water utilities to assess their facilities for all-hazard risks, but specifically calls attention to malevolent acts, physical security, natural hazard risks, cyber security, and fiscal processes security. The corresponding ERP typically addresses protocols for potential emergency events. Both the RRA and the ERP are documents that are considered Protected Critical Infrastructure Information (PCII) due to information within the documents related to the water infrastructure. However, MAs will integrate pertinent information from this mitigation plan into their updated RRAs and ERPs, as well as utilize those documents to continue to update and enhance the MJHMP.

Wastewater agencies are also required to maintain current Sewer Master Plans; Sanitary Overflow Response Plans; and Fats, Oils, and Grease Ordinances. These plans can help to support hazard mitigation efforts, as well as shape future policy to reduce the impacts of sewer system failures.

Each MA has its own budget process, including CIPs that identify capital projects and equipment purchases. These systems provide a link between an MAs general and/or strategic plan and annual budget. As part of the annual review and update of the CIP, the mitigation actions identified in this HMP will be reviewed to determine which actions should be included within the CIP.

This HMP will be added or incorporated by reference into each MA’s emergency plans (e.g., Emergency Operations Plans, ERPs, and Emergency Evacuation Plans) as they are updated. The

hazard profiles, risk assessment, and mitigation actions will be reviewed during updates to these plans. Further, mitigation actions not currently provided in the HMP will be identified for consideration as part of the MJHMP update.

Other opportunities for integration of this MJHMP include education programs and continued coordination between MWDOC, the MAs, and other agencies. Each MA maintains a website and utilizes social media to provide updated information to its community and service area. Hazard information and opportunities for the community to reduce individual exposure to hazards will be provided. Some MAs will also provide in-person educational events and activities to further inform the community.

5.1.6 Continued Public Involvement

MWDOC is dedicated to involving the public directly in review and updates of the plan. MWDOC and a representative from each participating jurisdiction will be responsible for monitoring, evaluating, and updating the plan as described above. During all phases of plan maintenance, the public will have the opportunity to provide feedback.

The most current copy of the plan will be publicized and permanently available for review on MWDOC's website at https://www.mwdoc.com/your-water/emergency-management/emergency-management-resources/. The site will contain contact information to which people can direct their comments and concerns. All public feedback will be forwarded to the appropriate jurisdiction for review and consideration for incorporation (if deemed appropriate) into the next plan update. This information will also be forwarded to MWDOC, responsible for keeping track of public comments on the plan. In addition, copies of the plan will be catalogued and kept at all the appropriate agencies in the county. The existence and location of these copies will also be posted on the MWDOC website. This will provide the public an outlet for which they can express their concerns, opinions, or ideas about any updates/changes that are proposed to the plan.

Point of Contact

The primary point of contact for the HMP is MWDOC Emergency Manager Vicki Osborn. Ms. Osborn (or their designee) provides oversight and support maintenance and implementation efforts as well as future updates. To contact Ms. Osborn and other MWDOC staff, please use weroc@mwdoc.com or 714.963.3058.

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Item No. 5

INFORMATION ITEM
November 4, 2024

TO: **Planning & Operations Committee**
(Directors Seckel, Yoo Schneider, Dick)

FROM: **Harvey De La Torre, General Manager**

Staff Contact: Charles Busslinger and Sarina Sriboonlue

SUBJECT: **STATUS OF MWDOC'S WATER QUALITY AND OPERATIONS MANAGEMENT WORKSHOPS AND NEXT STEPS**

STAFF RECOMMENDATION

It is recommended that the Board of Directors receive and file this report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

Workshop Series Background

On August 29 and October 1, 2024, MWDOC hosted two collaborative workshops on future imported water quality and operations management for Orange County. These workshops were designed to bring together retail water agencies, MWDOC, and Metropolitan Water District (Metropolitan) management. The intent was a regional dialogue forum to share knowledge about the integrated imported water system, and to promote a common understanding of water aging and nitrification issues as we look to the future. The intended audience were member agency managers and senior water operators, as well as Metropolitan management.

Orange County's imported water demands are expected to be influenced by a variety of factors over the next few years, such as:

- Water use efficiency efforts that will continue to reduce overall water demands.
- Additional local supply projects coming online to improve supply reliability.
- Climate change and weather variability which can affect water quality (e.g., as we experienced in the summer/fall of 2023 with Tropical Storm Hilary).

Budgeted: ☐Yes ☐No ☒N/A	Budgeted amount:	Core: ☒	Choice: ☐
Action item amount:	Movement between funds: ☐ Yes ☐ No		

Additionally, COVID-19 accelerated the “silver tsunami” of retirements resulting in numerous staff members at Orange County agencies and at Metropolitan who are now in new positions. However, this presented an opportunity to improve collaboration, share and exchange knowledge, and to better understand the need for and potential impacts of changes to imported water system operations.

Workshop Series Content

The two workshops had approximately 60 attendees each, and both were facilitated by subject matter experts who are highly respected in the industry – Ed Means (Means Consulting) and Dr. Issam Najm (Water Quality and Treatment Solutions, Inc.).

Workshop #1 reviewed state of the science and understanding of nitrification in water distribution systems, provided a foundation for shared understanding of the regional conveyance system, and initiated discussions on future water quality and operations considerations. Presentations and discussions included:

- Metropolitan Conveyance System Operations (Metropolitan)
- Biology of Nitrification (Metropolitan)
- Relationship between Chloramine Chemistry, System Operation, and Nitrification in a Distribution System (WQTS)
- West Orange County Water Board Feeders #1 and #2 Operations (West OC Water Board / City of Huntington Beach)

Workshop #2 dove into the operations of key Orange County pipelines to enhance discussion on future opportunities for collaboration. Presentations and discussions included:

- Operation of Eastern Transmission Main and Local Distribution System – Constraints and Opportunities (Moulton Niguel Water District)
- Operation of South County Pipeline and Local Distribution System – Constraints and Opportunities (Santa Margarita Water District)
- Operation of Joint Transmission Main and Future Doheny Desalination Plant – Constraints and Opportunities (South Coast Water District)
- Discussion of Future Considerations and Opportunities for Collaboration (WQTS and Means Consulting)

Workshop Series Outcomes

The workshop series yielded the following key takeaways:

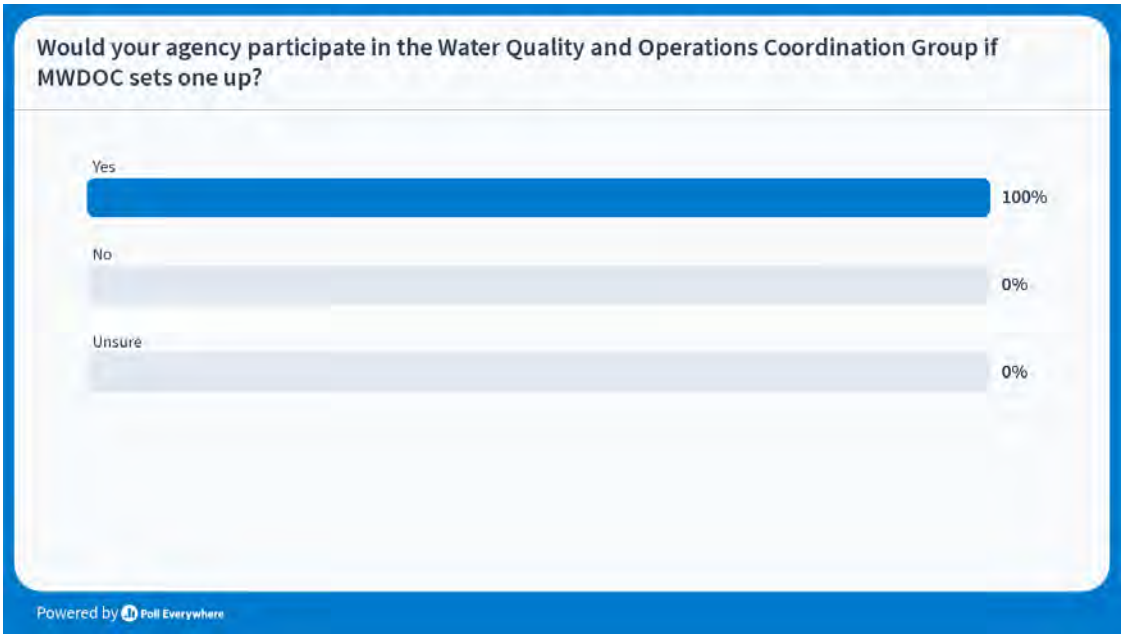
- Unanimous support for more coordination through a structured channel of communication to allow for a more coordinated and efficient response to future events (e.g. quarterly workgroup meetings and topic-specific subgroups).
- Support for exploring/defining a nitrification response and management system, including a data management system, platform, and dashboard that allow for the sharing of more timely data from Metropolitan and retail agencies.
- Support for water quality emergency training “water quality drills”, including simulation of nitrification events. Table-top exercises can help agencies prepare for various scenarios.
- Improved mobile disinfectant boosting capabilities and faster information flow through online analyzers to improve disinfectant management.

Polls conducted during Workshop #2 showed 100% of respondents supported MWDOC standing up a Water Quality and Operations Workgroup (Figure 1) and planned to participate in the workgroup if MWDOC sets one up (Figure 2).

Figure 1 – Workshop Poll: Do you support MWDOC standing up a Water Quality and Operations Coordination Group?



Figure 2 – Workshop Poll: Would your agency participate in the Water Quality and Operations Coordination Group if MWDOC sets one up?



Next Steps

Overall, the two workshops were very successful and met the objectives staff wanted to achieve, which was regional dialogue and education between member agency and Metropolitan staff. To continue this momentum, MWDOC staff intends to set up a Water Quality and Operations Management Workgroup that meets quarterly similar to MWDOC's Water Use Efficiency Workgroup. Participants will continue to be member agency managers and senior water operators as well as Metropolitan management. One meeting topic that has already drawn wide interest and support is improvement and standardization of mobile boosting capabilities.

ALIGNMENT WITH BOARD STRATEGIC PRIORITIES

- ☒ *Clarifying MWDOC's mission and role; defining functions and actions.*
- ☒ *Balance support for Metropolitan's regional mission and Orange County values and interests.*
- ☐ *Strengthen communications and coordination of messaging.*
- ☐ *Work with member agencies to develop water supply and demand objectives.*
- ☒ *Solicit input and feedback from member agencies.*
- ☐ *Invest in workforce development and succession planning.*

List of Attachments/Links:
None



COMMUNITY EVENT

DESIGNING GREEN EXPO
LAGUNA DESIGN CENTER



SPEAKERS BUREAU

WEEA LEADERSHIP
ROUNDTABLE #19



SPEAKERS BUREAU

GREATER IRVINE CHAMBER
BUSINESS ADVOCACY
SPEAKER SERIES
DIR. THOMAS



CA WATER PROFESSIONALS
APPRECIATION WEEK
SOCIAL MEDIA CAMPAIGN -
DEPARTMENTS FEATURED:

- WEROC
- GM & AGM
- PUBLIC AFFAIRS
- WATER LOSS CONTROL
- ENGINEERING
- WATER USE EFFICIENCY
- FINANCE
- ADMINISTRATION





ANNUAL CONFERENCE

PUBLIC RELATIONS
SOCIETY OF AMERICA



6.5% SOCIAL MEDIA
ENGAGEMENT RATE
A Good Rate is 1-5%



COMMUNITY EVENT

YORBA LINDA WATER
DISTRICT OPEN HOUSE

ENGINEERING & PLANNING	
Lead and Copper Rule Revisions – Lead Service Line Inventory Choice Program	In mid-March 2023, multiple agencies requested MWDOC's assistance in complying with the U.S. Environmental Protection Agency (USEPA) Lead and Copper Rule Revisions (LCRR) - Initial Service Line Inventories which all water systems are required to complete and submit to the primacy agency [for California it is the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW)] by October 16, 2024. On September 20, 2023, the MWDOC Board approved a contract award to Hazen and Sawyer (Hazen) to provide technical assistance for a Service Line Inventory shared services program. The shared services program has 13 participating agencies, each with a customized scope of work. No lead service lines were found following an extensive verification process and all 13 participating agencies confirmed non-lead materials. As of October 16, 2024, the compliance date, all 13 participating agencies completed and submitted their initial service line inventories, non-lead designation statement, and all other required submittals to DDW. **The project is complete.** In this final phase, Hazen will transition to each agency the non-proprietary GIS database and supplemental information related to the service line identification methodology to prepare agencies for future maintenance and updates of their initial inventory. This hand-off will prepare participating agencies for success in compliance with future requirements independent of outside services. The USEPA is scheduled to publish the Final Lead and Copper Rule Improvements (LCRI) on October 30, 2024, which will become effective on December 29, 2024. The LCRI will require an annual update of the initial inventory among other requirements.
Shutdowns	**Allen McColloch Pipeline (AMP) Prestressed Concrete Cylinder Pipe (PCCP) Inspection and Rehabilitation** In response to the November 2023 AMP PCCP inspection findings, MET initiated Special Operating Conditions (SOC) for the AMP to reduce pressure on the pipeline. In April 2024, MET shut down the lower reaches of the AMP down gradient of OC-70 and installed steel liners to segments of PCCP between OC-70 and OC-

	88. A bulkhead was also installed down gradient of OC-88 and the upper reaches of the AMP returned to normal operations. The reaches below OC-88 (down gradient of the bulkhead) remain dry to allow for permanent repairs to the most critical PCCP segments in the lower reaches of the AMP. MET's Board awarded a construction contract for the downstream reach work to JF Shea Construction on May 14, 2024 and the contractor mobilized to the first site on June 17, 2024. Construction began in early July 2024 and will continue through the end of January 2025. **The shutdown remains on schedule.** Affected retail agencies have coordinated extensively with neighboring agencies, MET, and MWDOC to accommodate the extended AMP shutdown through January 2025. Planned use of the AMP through OC-88 into the South County Pipeline, the Baker Water Treatment Plant, EOCF#2, ATM, OC Feeder, El Toro Reservoir, Upper Chiquita Reservoir as well as local resources are all being used extensively to support this shutdown.
Water Quality & Operational Planning Workshops	Significant changes to Orange County's imported water demands are expected over the next few years as a number of local supply projects are completed and water use efficiency efforts continue to reduce water demands. The reduction of imported water demands, anticipated to be particularly significant during the winter months, has the potential to increase water aging in the imported water distribution system. The additional water aging potentially could lead to water quality issues (e.g. disinfection by-product formation, disinfectant decay, nitrification). MWDOC hosted two collaborative workshops to bring together retail water agencies, MWDOC, and Metropolitan management. The intent was a regional dialogue forum to share knowledge about the integrated imported water system, and to promote a common understanding of water aging and nitrification issues as we look to the future. The workshops took place on August 29 and October 1, 2024, with approximately 60 attendees per workshop. The 4.5-hour workshops provided a review of the state of the science of understanding of nitrification in water distribution systems, initiated discussions on future water quality and operations considerations, and provided a foundation for shared understanding of operations and control measures. The workshops highlighted Metropolitan's conveyance system operations focusing on Diemer area operations as well as the operations, capabilities, and constraints of key Orange County pipelines and local distribution systems. MWDOC Engineering will provide further details through a presentation at the P&O Committee meeting on November 4, 2024.

General Managers Report
WEROC Status Report

October 2024

SEPTEMBER EVENTS

(EVENTS LISTED ONLY INCLUDE WEROC INVOLVEMENT. EVENTS AND INCIDENTS HAPPEN EVERYDAY, BUT MAY NOT REQUIRE REPORTING, OR COORDINATION WITH WEROC)

Public Safety Public Shut Off (SCE Event)

WEROC AGENCY PLANNING, COORDINATION AND PROGRAM EFFORTS

Airport Fire – Post Fire Debris Flow Planning and Assistance
Vicki has been working with WEROC Agencies that were impacted by the fire and representing agencies on Post Fire debris flow planning with the County, State and Federal agencies such as the BAER team (Burn Area Emergency Response). Vicki has been working also with the County Health Officer to project information on the need to continue the Declaration of Public Heath Emergency as needed by the WEROC agency to take action on mitigation measures before significant rainfall occurs in the burn area. More information on this event can be provided at the request of the MWDOC Board of Directors.

AWIA & Multi-Jurisdictional Hazard Mitigation Multi Plan Project
For the Hazard Mitigation plan refer to the P&O Committee Discussion item #4.
For AWIA activities in the month of October, there were 11 Risk and Resiliency Workshops held for the first half Tier 1 agencies. WEROC staff Janine and Gabby and Vicki have been attending as many meetings as possible to show support for the agency and to provide any information that may be needed.

As of October 28th, only 2 contracts are outstanding, one for the HMP project and one for the AWIA Project. WEROC will work with the agencies to get them signed and finalized.

Cyber Security and OCIAC Partnership
WEROC continues to send out important information to the Cyber Security Distribution Group as received from DHS or the OCIAC. WEROC staff have been providing information to the member agencies as required about highlighted threats to the water industry and other current world events as required.

ERNIE which is the Inland Empire Water and Wastewater preparedness working group had a conference call with Vicki to ascertain if WEROC would be willing to partner with ERNIE in relation to cybersecurity issues. Vicki asked exactly what the expectation of the group are, and they said they would have further discussion and follow up with WEROC. More information to come as these conversations continues.

Great Shakeout - October 17m 2024 at 10:17am
Gabby and Janine prepared and shared an informational presentation for MWDOC Staff for The Great ShakeOut 2024 on October 17. They also tested the AlertOC system with all employees with an outgoing message on the Great ShakeOut.

Operational Area Executive Board and Plans
Vicki is currently reviewing or aiding development/revisions the following plans as the Operational Area Mutual Aid Coordinator for Water and Wastewater as the water and wastewater agency advocate.

- Regional Mutual Aid/Assistance Plans
- Airport Fire Debris Flow Plan

Presentations
On 8/29, Vicki was part of an Emergency Management Panel at the American Planners Association (APA) California Chapter. This panel highlighted how we can plan with Planning Department personnel better and some of the challenges we are facing now and into the future.

Regional Water Distribution Plan
The Water Distribution TTX has been scheduled for November 12th at the County EOC. Additional TTX will be scheduled around the county to maximize participation if required. Janine created and sent out the flyer and will be handling registration. Vicki will be developing the exercise and facilitating the day of.

Training and Exercises

Exercises:

10/24 Gabby attended the IRWD Dam Exercise and supported the exercise by taking notes and pictures. IRWD exercise was a great success which highlighted an agency ability to prepare and continue to identify areas for growth.

10/30 County TTX – Vicki will be attendance of a TTX for County Staff.

10/30 ETWD TTX
Vicki is developing a TTX for ETWD. Scenario will be based on their Dam Plans. Janine will be in attendance as support staff.

11/12 There is a Water Distribution TTX at the County EOC. Vicki is developing and with be facilitating.

WEROC Mobile EOC/Command Vehicle
Gabby continues to work phase 2 of the WEROC Mobile Emergency Operations Center.

OTHER PROJECTS

Janine attended the Orange County Emergency Management Organization Meeting (OCEMO) on Thursday, October 3, 2024.

Vicki and Gabby attended the CESA Southern Chapter Program which consisted of presentations regarding crowd control and awareness of process used by local law enforcement including need to know items of election planning for safety.

Janine attended an informational presentation and tour of the Prado Dam with the county OCEMO organization on Tuesday, October 15, 2024.

Janine is continuing work with the Center for Demographic Research (CDR) on the WEROC Water/Wastewater Atlas. She and Gabby attended a meeting with CDR on Thursday, October 24, 2024. We are now in the final phase and the agencies will begin receiving their maps in November for final examination and review.

Janine attended the City of Anaheim's Supply Chain Resiliency Framework Workshop at Anaheim's EOC on Thursday, October 24, 2024.

Janine attended El Toro Water District's Tabletop and Training that was conducted by Vicki Osborn on Wednesday, October 30, 2024.

Janine is continuing to assist Vicki on the OC Regional Water/Wastewater MJHMP and America's Water Infrastructure Act RRA and ERP with WEROC's participating member agencies.

Janine continues to prepare for the WEROC/OC Sheriff's Emergency Management Division "Emergency Water Distribution Plan Tabletop" taking place on November 12, 2024. She is managing the registrations and meeting preparation along with Sr. Emergency Management Project Coordinator.

Janine and Gabby are working with Dave Anderson on WEROC's file conversion to SharePoint.

Gabby attended the Foundation in Excellence training and graduated from the program on October 23rd.

Status of Water Use Efficiency Projects
October 2024

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
SoCal Water$mart Residential Indoor Rebate Program	MWDSC	Ongoing	Ongoing	In September 2024, 101 high efficiency clothes washers and 8 residential premium high efficiency toilet were installed in Orange County. To date, 130,183 high efficiency clothes washers and 61,750 high efficiency toilets have been installed through this program.
SoCal Water$mart Commercial Rebate Program	MWDSC	Ongoing	Ongoing	In September 2024, 600 commercial premium high efficiency toilets were rebated on in Orange County. To date, 118,997 commercial devices have been installed through this program.
Flow-Monitoring Device Rebate Program	MWDSC	Ongoing	Ongoing	In September 2024, 9 flow-monitoring devices were installed in Orange County. To date, 301 flow-monitoring devices have been installed through this program.
Smart Timer Rebate Program	MWDSC	Ongoing	Ongoing	In September 2024, 87 residential and 38 commercial smart timers were installed in Orange County. To date, 34,790 smart timers have been installed through this program.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	Ongoing	In September 2024, 70 rotating nozzles were installed in Orange County. To date, 583,668 rotating nozzles have been installed through this program.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Rain Barrel Rebate Program	MWDSC	Ongoing	Ongoing	In September 2024, 2 rain barrels were installed in Orange County. To date, 9,018 rain barrels have been installed through this program.
Turf Replacement Program	MWDOC	Ongoing	Ongoing	In September 2024, 19 rebates were paid, representing $707,998.70 in rebates paid this month in Orange County. To date, the Turf Replacement Program has removed approximately 28.5 million square feet of turf.
Spray to Drip Rebate Program	MWDOC	Ongoing	Ongoing	In September 2024, 11 rebates were paid, representing $31,134.94 in rebates paid this month in Orange County. To date, the Spray to Drip Program has converted approximately 4.5 million square feet of standard spray irrigation to drip irrigation.
Tree Rebate Program	MWDOC	Ongoing	Ongoing	In September 2024, 18 rebates were paid for planting eligible trees in Turf Replacement Program project areas. To date, 45 trees have been rebated on through this program.
Landscape Design Rebate Program	MWDOC	Ongoing	Ongoing	In September 2024, no landscape designs received rebates through the MWDOC Turf Replacement Program. To date, 781 landscape design packages and 351 landscape maintenance packages have been delivered to MWDOC Turf Replacement Program customers.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Industrial Process/ Water Savings Incentive Program (WSIP)	MWDSC	Ongoing	Ongoing	This program is designed to improve water efficiency for commercial customers through upgraded equipment or services that do not qualify for standard rebates. Incentives are based on the amount of water customers save and allow customers to implement custom water-saving projects. Total water savings to date for the entire program is 1,307 AFY and 8,704 AF cumulatively.
Recycled Water Retrofit Program	MWDSC	Ongoing	Ongoing	This program provides incentives to commercial sites for converting dedicated irrigation meters to recycled water. To date, 193 sites irrigating a total of 1,753 acres of landscape have been converted. The total potable water savings achieved by these projects is 3,909 AFY and 28,603 AF cumulatively.

Public & Governmental Affairs Activities Report
October 9, 2024 – October 29, 2024

Member Agency Support	Public Affairs Staff: • Began coordinating host sites with MWDOC member agencies for the 2024-2025 Girl Scouts and Scouts BSA Clinics • Invited MWDOC member agencies to participate in the Metropolitan Water District of Southern California (Metropolitan)-led Engineering for Good Program Government Affairs Staff: • On behalf of Trabuco Canyon Water District, solicited and collected letters of support for their USBR WaterSMART grant from elected officials in their service area • Circulated the Grants Tracking and Acquisition report to participating member agencies • Submitted a letter of support for the City of Seal Beach's USBR WaterSMART grant application
Community and Special Events	Public Affairs Staff: • Provided an information booth, promotional items, and rebate information for the Designing Green Expo at the Laguna Design Center. The event was hosted by Curated Connections. • Attended the Yorba Linda Water District Open House and provided a Ricky Raindrop[SM] appearance Government Affairs Staff: • Participated in the OCBC Infrastructure Committee meeting
K-12 Water Education	Public Affairs Staff: • Met with Orange County Department of Education's Inside the Outdoors on Choice School Program progress and family engagement opportunities • Provided information regarding the MWDOC Choice K-12 School Program to the City of Fullerton, City of Buena Park, City of La Palma, City of Anaheim, City of Santa Ana, City of Tustin, and the City of Garden Grove • Shared a statewide survey link from the California Environmental Education Foundation with Orange County teachers to better understand the factors influencing teacher participation in professional learning • Coordinated logistics for a Project WET teachers training co-hosted with the Department of Water Resources, Metropolitan, and California Project WET program. The event is scheduled for November 2.
Workforce Initiative	Public Affairs Staff: • **Speakers Bureau:** o Coordinated and hosted the Water Energy Education Alliance (WEEA) Leadership Roundtable Meeting #19 with guest speaker, Matthew Tessier, Assistant Superintendent, Innovation, San Diego County Office of Education/Linda Vista Innovation Center o Delivered a WEEA 101 and year-in-review presentation at the MWDOC member agency managers meeting • Launched a WEEA LinkedIn profile

	• Shared information with WEEA members and across social media that the American Water Works Association annual scholarship applications are open • Placed a print order of WEEA career brochures for new WEEA sponsor the Moulton Nigel Water District (MNWD)
Digital Communications, Publications, and Media Engagement	Public Affairs Staff: • Completed several updates for the MWDOC.com website • Developed and distributed social media content across all MWDOC social media channels • Developed and distributed social media content across all MWDOC social media channels for the annual Water Professionals Appreciation Week campaign. Eight (8) departments were highlighted through 14 unique employee-centric posts.
Special Projects	Public Affairs Staff: • **Speakers Bureau:** o Attended and provided support for guest speaker Director Thomas at the Greater Irvine Chamber of Commerce October Business Advocacy Speaker Series • Attended the annual Public Relations Society of America conference in Anaheim • Scheduled a local inspection trip with Director Erdman and Director Seckel for January 24, 2025 • Met with Western Municipal Water District to catch up on co-aligned public affairs and workforce development events, activities, and initiatives • Provided 23 variations of the MWDOC brand colors, branded font, and layout preference to MWDOC staff for Centers for Demographic Research to develop a new, modern MWDOC service area map • Supported the MWDOC Finance department by providing cover pages for the year-end financial report • Continued After Action activities for OC Water Summit, **successfully negotiating $6,274.12 in refunds from the Westin** due to issues with the venue Governmental Affairs Staff: • Along with Alex Heide, met with the California Water Data Consortium to discuss streamlined reporting efforts • On behalf of the WACO Planning Committee, reached out to potential speakers for future programs and coordinated meeting details with the November speaker • Staffed the WACO Planning Committee meeting
Outreach Metrics	Public Affairs Staff: • Google Performance Analytics (GM Report Timeframe) o 169 business profile interactions o 3,565 people viewed the business profile • Website Analytics (GM Report Timeframe) o 11,227 pageviews

	o Top pages for this date range ▪ Jeffery Thomas – 1,898 ▪ Karl Seckel – 1,405 ▪ Home Page – 1,275 ▪ Board of Directors – 505 ▪ Water Energy Education Alliance (WEEA) – 455 ▪ Al Nederhood – 450 o ocwatersmartparks.com: 8 site sessions • ocwatersmartgardens.com Analytics (September 2024) o 705 Sessions, 495 New Users o Top pages for this date range ▪ Eligible Sustainability Feature Trees ▪ Landing Page ▪ Helpful Plant List • Social Media (GM Report Timeframe) *According to Hootsuite – the global leader in social media management – a good engagement rate is between 1% to 5%.* *For this period, MWDOC's engagement rate is at 6.43%* o 55,606 post reach (number of people) ▪ 3,575 Post engagement (actions taken – likes, shares, etc.)
Legislative Affairs	Governmental Affairs Staff: • Attended the CMUA Regulatory Committee meeting • Met with staff at IRWD to discuss USBR grants and applications • Filed the Q3 state lobbying report with the Secretary of State • Met with MWD legislative staff to discuss potential 2025 legislation • Participated in the CSDA Legislative Committee Annual Planning meeting • Met with CCEEB staff to discuss legislative priorities in advance of their annual legislative planning meeting