

EXHIBIT FOLSOM-1

TESTIMONY OF MARCUS YASUTAKE, P.E.

1. I have been the City of Folsom's Environmental & Water Resources Director since July 2013. In that position, I am responsible for all matters related to the City's water system and supplies. Prior to assuming my current position, I worked as an engineer in the City's Utilities Department since November 2006. I have a Bachelor of Science Degree in BioResource and Agricultural Engineering and a Masters of Science in Water Engineering from California Polytechnic State University, San Luis Obispo. I am a registered California civil engineer, registration number 69158.
2. **Exhibit Folsom-3** is a joint PowerPoint presentation that summarizes key points of this testimony. Exhibit Folsom-3 represents the "summary of testimony" requested by the SWRCB.

The City's Water Demands

3. The City is located in northeastern Sacramento County and provides retail water service within the City's city limits to approximately 63,400 people. An area within the City's city limits known as the American Canyon area receives retail water service from San Juan Water District (SJWD). The number of people within the American Canyon area is a small percentage of the number of people within the rest of the City's city limits.
4. As a result of the City's acquisition of water supplies from Southern California Water Company (SCWC), discussed in further detail below, the City also serves areas outside of its boundaries, primarily the Aerojet property that is adjacent to the City. **Exhibit Folsom-4** is a map showing the City's limits and water-service area.
5. In 2013, the latest year before the City began implementing significant water conservation measures in response to the drought, the Governor's drought proclamations and the SWRCB's conservation regulations, the City delivered 24,400 acre-feet of water within its water service area. The City's last 10 years of water deliveries within its water service area are stated in **Exhibit Folsom-5**. The City projects that the retail water demand within its water service area will be approximately 28,600 acre-feet per year in 2030.
6. The City is working with Aerojet to develop means of reducing Aerojet's demand on the City's water supplies. This involves Aerojet routing water that it treats as part of its U.S. Environmental Protection Agency-ordered groundwater extraction and treatment (GET) program back to Aerojet facilities for non-potable industrial use. Aerojet's GET program addresses groundwater contamination on Aerojet's property.

7. The City is highly dependent on surface water diverted directly from Folsom Reservoir. All of the City's water supplies currently are diverted through the municipal and industrial (M&I) intake in Folsom Dam. A single pipeline delivers the City's raw water supply from Folsom Reservoir to the City's drinking-water treatment plant. **Exhibit Folsom-6** is a photo showing the pipeline that delivers non treated water from Folsom Reservoir to the City of Folsom's water treatment plant.
8. The City's boundaries generally do not overlie usable groundwater in significant quantities. One golf course within the City's boundaries uses groundwater that the course itself pumps. Although the golf course does operate two non-potable groundwater wells, the groundwater production does not meet spring and summer demands for golf course landscape irrigation. Due to the limited groundwater capacity at the golf course, the City delivers treated water during the spring and summer when groundwater production cannot meet the non-potable landscape irrigation demands of the golf course. In addition, the contamination originating from the Aerojet property could affect the City's ability to pump local groundwater for potable use.

The City's Historic Senior Water Rights on the American River

9. The City's primary water supply is water diverted under a 1851 appropriative water right in the South Fork of the American River through a series of contracts. The City is a successor to what I understand to be the most senior water right on the South Fork of the American River, with the priority date of 1851. A copy of the original 1851 filing in El Dorado County, with a typed transcription of its text, is **Exhibit Folsom-7**.
10. The City's predecessor, Natoma Water Company, signed a Contract for Relocation, Rearrangement, or Alteration of Facilities with the United States, effective June 18, 1951. A copy of the contract is **Exhibit Folsom-8**. The 1951 contract recognized the 1851 water right and allowed for the construction of Folsom Dam. (Contract, first through fifth recitals, p. 2.) The 1951 contract contains no shortage provision and does not reduce the water supply available to the City under its senior water rights in dry years. (Contract, Article 3, pp. 6-7.)
11. The 1951 contract requires the United States to deliver "as much water as the Contractor may request" up to 32,000 acre-feet per year (AFY) at a rate not to exceed 60 cfs.
12. In 1964, Southern California Water Company (SCWC) acquired the Natomas Water Company and succeeded to its rights under the 1951 contract. The City acquired rights in the water supply previously owned by Natomas Water Company through an December 1, 1967 Co-Tenants Agreement with SCWC. A copy of this contract is **Exhibit Folsom-9**. Under the Co-Tenants Agreement, the City acquired the right to 22,000 AFY of the water rights recognized under

the 1951 contract with the United States, and SCWC retained a right to 10,000 acre-feet per year.

13. Effective June 22, 1971, the City signed a contract with the United States for conveyance of the City's 22,000 AFY under the 1951 contract and the 1966 Co-Tenancy Agreement. The contract recognizes the City's interest in the 1851 water right. A copy of that contract is as **Exhibit Folsom-10**.
14. In 1994, the City and SCWC signed an agreement under which the City was re-allocated 5,000 AFY of the 10,000 AFY that SCWC had retained under the 1966 Co-Tenancy Agreement. A copy of the 1994 agreement is **Exhibit Folsom-11**. In letters dated August 16, 1996 and September 10, 1996, the Bureau of Reclamation (Reclamation) acknowledged and accepted this reallocation of water from SCWC to the City. Copies of these letters are **Exhibits Folsom-12** and **Folsom-13**.
15. The water to which the City has rights under the 1851 right and the above-referenced contracts now totals 27,000 AFY. This water is the City's primary water supply to serve its current water service area and to meet its projected future demands.

The City's CVP Water-Service Contract

15. In 1990, Congress enacted Public Law 101-514, which, in section 206(b), authorized and directed the Secretary of the Interior to enter into a new Central Valley Project (CVP) water-service contract with Sacramento County Water Agency (SCWA) for 22,000 AFY for use within Sacramento County. A copy of section 206(b) is **Exhibit Folsom-14**.
16. On April 8, 1999, the United States and SCWA signed a contract under P.L. 101-514 for 22,000 AFY of CVP water-service contract water. **Exhibit Folsom-15** is a copy of that contract. The contract acknowledges that the City would subcontract for 7,000 AFY of that water. (See pages 3-4 and 15 of the contract.) Under the contract, the point of delivery to the City is Folsom Dam.
17. On April 25, 2000, the City and SCWA signed the CVP subcontract for 7,000 AFY. **Exhibit Folsom-16** is a copy of that contract.
18. Under the CVP subcontract, the City's use of water delivered under the subcontract is limited to its "East Area." **Exhibit Folsom-17** is a map showing the City's water service boundaries, including the East Area.
19. The City currently is working with SCWA and Reclamation on an assignment of the City's interest under the subcontract so that the City would have a direct contractual relationship with Reclamation. The City anticipates that this assignment will be completed in 2016.

Risks of Injury to the City's Water Supply by Proposed California WaterFix Project

20. As discussed above, Folsom has water rights to receive surface water supplies from the American River and contracts that provide for those supplies to be delivered from Folsom Reservoir through the Folsom Lake M&I intake. Normally, raw water is delivered to Folsom, Roseville, SJWD, and Folsom Prison via Folsom Dam's Pumping Plant. **Exhibit Folsom-18** illustrates Folsom Reservoir operational elevations, including the municipal and industrial (M&I) water supply intake used by the City.
21. The M&I intake is the only existing physical means by which Folsom can access its surface water supplies.
22. Folsom Reservoir's maximum storage volume is approximately 977,000 acre-feet of water. As shown on Exhibit Folsom-18, the center line of the M&I water intake is at elevation 317 above mean sea level (msl), at which point the reservoir holds approximately 65,000 acre-feet. If the lake were to drop to this level, the M&I water intake would be exposed (partially out of the water).
23. However, even before the M&I intake pipe is exposed, Folsom and the others who depend on the M&I intake pipe would have water supply problems because the intake pipe becomes unsafe to use when there is not enough water in the reservoir above it. When the lake level is at 330 ft. msl, or about 89,000 acre-feet of water in storage, the existing pumping plant could incur damaging vortices because too little water would be present above the dam's M&I raw water intake. When there is not enough water above the raw water intake to take the place of the water that is being pumped out, pumping through the intake causes a vortex of air to form, which has a cyclone-like shape and depth. Because of the vortex, air could be carried into the pipe and ultimately reach the pumps themselves. Air in the pumps causes cavitation, which in turn causes destructive shock waves to the pump impellers. Because of these risks, the M&I raw water intake pipe at Folsom Lake becomes unusable when the reservoir level drops too low, even if the intake is still submerged. **Exhibit Folsom-19**, "Increasing Water Supply Pumping Capacity at Folsom Dam, January 1996, ESA Consultants, Inc." discusses this phenomenon.
24. Operational levels at Folsom Reservoir during the 2014-2015 drought have proven that these risks to the City's surface water supplies are real. After the calendar year of 2013 was historically dry and January 2014 also was dry, Folsom Reservoir dropped to 162,617 acre-feet by early February, according to information available from the California Data Exchange Center (CDEC). During November and December 2013, according to the City's review of information from CDEC, Reclamation was releasing between approximately 1,100 and 1,500 cubic feet per second (cfs) from the reservoir to the lower American River. Based on my conversations with Reclamation staff and others at that time, I understand that those releases were intended to protect fall-run Chinook salmon redds that resulted from fall 2013 spawning. At that release rate, without additional precipitation, we estimated that the water

level in Folsom Reservoir would have dropped below the top of the M&I intake by the end of March 2014.

25. **Exhibit Folsom-20** are photographs of Folsom Reservoir from late January 2014 several weeks before the reservoir reached its low point that winter. **Exhibit Folsom-21** is a widely circulated photograph comparing the condition of Folsom Reservoir at full storage in 2011 and early in 2014. I observed the reservoir in the conditions of full storage in 2011 and during early 2014. Exhibits Folsom-20 and Folsom-21 accurately depict the condition of the reservoir at those times. Fortunately, Reclamation and the State Water Resources Control Board recognized the need to ensure adequate carryover storage for the City and other municipal water suppliers to be able to meet minimum health and safety requirements, and the rate of release from Folsom Reservoir was reduced. Reclamation informed us that its goal was to try to manage the remaining supplies to attain an end-of-September storage at Folsom Reservoir of 293,000 – 297,000 acre-feet, under the 90% exceedance forecasts, as contemplated by the Drought Operations Plan Reclamation and DWR submitted to the SWRCB in April 2014.
26. 2015's risks to the City's water supplies were just as serious, but progressed differently. With very little snowpack, Folsom Reservoir's storage peaked at about 577,381 acre-feet on April 28, 2015, based on CDEC information. Storage then declined steadily throughout nearly the entire remainder of 2015.
27. Throughout 2014 and 2015, the City's representatives engaged in frequent communications with Reclamation representatives concerning planned operations of the CVP and Folsom Reservoir. Based on those conversations, I understand that Reclamation relied heavily on releases from Folsom Reservoir in the spring and summer of 2015 to contribute to the implementation of Bay-Delta water quality requirements while attempting to maintain cold-water storage in Lake Shasta to attempt to support winter-run Chinook salmon spawning in the Sacramento River.
28. Throughout 2015, there was serious concern that continued dry conditions eventually would result in Folsom Reservoir's water level dropping below the level where the dam's M&I intake would be rendered unsafe to use. A repeat of the extremely dry conditions in late 2013 and early 2014 could have created that situation. Reclamation's planning to avoid this condition was a major topic of discussion between the City and Reclamation throughout 2015.
29. In 2015, Reclamation staff, including Central California Area Office Manager Drew Lessard, informed the City that, if Folsom Reservoir's water level were projected to decline towards 330 feet msl, then Reclamation would plan to serve the City and Folsom Prison by activating a temporary pump station floating in Folsom Reservoir, with emergency pumps and pipes installed to pump water over Folsom Dam to the City's drinking-water treatment plant. **Exhibit Folsom-22** shows a figure of the initially proposed emergency pump

facilities. Activating these emergency facilities would allow Reclamation to avoid the vortex rendering the M&I intake unsafe to use at low lake levels.

30. Reclamation never has used such emergency facilities as the primary source of water to the City before. Reclamation had used similar facilities in February 2009, after an error by a Reclamation construction contractor collapsed Reclamation's raw water pipe that conveys the City's raw water supply from Folsom Reservoir to the City's water treatment plant. That event occurred, however, when Folsom Reservoir contained more than 170,000 more acre-feet of water, it was raining, water system demands were low, and the City had filled all of its storage reservoirs in anticipation of the brief pipeline outage that had been anticipated and scheduled. Reclamation's plan to serve the City through emergency facilities in 2015 therefore had never been used as a possible longer-term response to low Folsom Reservoir storage.
31. Reclamation in fact did install the floating pump station and associated pipes. Reclamation notified the City that this equipment was complete and field tested on October 2, 2015. **Exhibit Folsom-23** shows pictures of the floating pump station and related facilities.
32. The floating pump station's capacity is only 30 cfs. The physical capacity of the floating pump station is one-half of the 60 cfs Folsom is entitled to take under its historic water rights under the Co-Tenancy Agreement and its delivery contract with Reclamation. Moreover, the 30 cfs would be divided between the City and Folsom Prison based on historic demands of water delivered by Reclamation to the City and the prison during fall and winter seasons, so the impact on the City's water rights would be even greater as deliveries were reduced to accommodate demands at Folsom Prison.
33. So far, Folsom Reservoir's lowest level in the 2015-2016 water year that began October 1, 2015 has been 135,561 acre-feet on December 4, 2015. This water level information is based on the City's review of information from CDEC. **Exhibit Folsom-24** consists of pictures of Folsom Reservoir from September and November 2015. I observed Folsom Reservoir conditions at this time, and these pictures reflect the reservoir conditions that I observed. My understanding is that this is the lowest level to which Folsom Reservoir ever has been drawn since it initially filled in the 1950s.

**Risks of Injury to the City's Water Supply by the
Proposed California WaterFix Project**

34. The hydrologic modeling on which the Bay-Delta Conservation Plan draft environmental impact report/environmental impact statement (DEIR/EIS) and the California WaterFix recirculated draft EIR/supplemental draft EIS (RDEIR/SDEIS) are based indicates that, with operation of the proposed California WaterFix project under the one modeled climate change scenario and with demand growth, Folsom Reservoir would be drained to approximately 100,000 acre-feet at the end of September during 10% of all years in the future. These results are shown, in among other places, Figure 8

of the RDEIR/SDEIS's hydrologic modeling Appendix B. A copy of that figure is **Exhibit Folsom-25**. It is not clear if this is the lowest possible level to which Folsom Reservoir would be drawn with the California WaterFix project because 100,000 acre-feet appears to be the lowest level for the reservoir depicted in the modeling.

35. In addition, the modeling does not appear to reflect realistic CVP/State Water Project (SWP) operations. For example, I understand that the H4 scenario that is part of the DEIR/EIS's Alternative 4 and the RDEIR/SDEIS's Alternative 4A involves higher Delta outflows than the H3 scenario that is part of those Alternatives. Figure 8 in the RDEIR/SDEIS's hydrologic modeling Appendix B, however, shows that end-of-September Folsom Reservoir storage would be significantly higher in the driest of years under the H4 scenario than under the H3 scenario. As noted above, a copy of that figure is Exhibit Folsom-23. Neither the modeling results depicted in Figure 8 of the RDEIR/SDEIS (Exhibit Folsom-25) nor the modeling results depicted in Exhibit 14 of DWR-514, discussed below, are consistent with the City's experience during the drought conditions in 2014 and 2015, when I understand from our extensive communications with Reclamation staff that Reclamation was releasing water from Folsom Reservoir in the spring and summer specifically to maintain Bay-Delta outflows in light of the Coordinated Operations Agreement and because Reclamation needed to try to hold water in Lake Shasta to maintain a cold-water pool to support later winter-run Chinook salmon spawning.
36. In spring 2016, in preparation for this hearing, Reclamation and DWR released new modeling of the project; this modeling had not previously been included in the RDEIR/SDEIS. DWR-514 summarizes the results of the Spring 2016 modeling. Figure 14 of DWR-514 shows Simulated End of September Folsom Storage under the Spring 2016 modeling. According to Figure 14, with the proposed project, in 5% of the years, Folsom Reservoir storage will be drawn down to 90,000 acre-feet or less at the end of September. Again, it is not clear whether the actual lake level would be less than 90,000 acre-feet because 90,000 acre-feet is the lowest value that can be obtained under the Spring 2016 version of the model.
37. At 90,000 acre-feet of storage, as projected by DWR-514, the lake level elevation of Folsom Reservoir is about 330 feet above msl – just at the level where the effects of the vortex could be encountered and the M&I intake becomes unsafe to use. Even if the more generous lake level projection of the RDEIR/SDEIS modeling is accepted, the end-of-September storage for Folsom Reservoir with the project would be 100,000 acre-feet (or less) in 10% of the years. At this level, Folsom Reservoir would be only 10,000 acre-feet away from potentially encountering the vortex – and this level is more than 11,000 acre-feet below the margin of safety established in 2015 when Reclamation announced it would implement emergency measures if the lake dropped below 111,945 acre-feet (or 340 feet above msl).

38. The DEIR/EIS, the RDEIR/SDEIS, the draft and final Biological Assessments, and the evidence submitted at this hearing do not contain any CVP/SWP operations plan that demonstrates how the CVP and SWP would operate with the proposed Delta tunnels in place. It therefore is possible that, with the tunnels in operation, Folsom Reservoir could be drawn down at least as far as stated in Figure 14 of DWR-514, that is, to 90,000 acre-feet of storage, or less, at the end-of-September. While Reclamation and DWR's operators, Ron Milligan and John Leahigh, testified that the projects would not actually be operated as depicted in the modeling, without an operations plan or other enforceable criteria in place, the City of Folsom and the other agencies dependent on Folsom Reservoir water supplies do not have any assurance that the operations shown in the modeling will not be carried out.
39. If Folsom Reservoir were drawn down as far and as often as projected in either the RDEIR/SDEIS modeling or the spring 2016 modeling, these drawdowns would create recurring serious risks to the City's water supplies, notwithstanding the fact that the City holds the majority of the highest priority appropriative water right in the South Fork of the American River and a settlement contract with the United States that contains no provisions for dry-year reductions.
40. During those projected conditions, the City's ability to divert water through Folsom Reservoir's M&I intake and the other facilities used for normal operations would be compromised, and it could become necessary instead to use the emergency facilities, as proposed by Reclamation in 2015, during 5% - 10% of years. Except for a preliminary test lasting a few hours in 2015, those facilities' capacity to deliver reliable water supplies to the City is untested. These facilities' limited capacity would severely constrain the City's water supplies because those facilities can only divert 30 cubic feet per second. Even if the City received the full 30 cfs, this would equate to only 21,719 AFA, more than 12,000 acre-feet less than the amount of water the City is entitled to receive. Table A compares the volume of water that can be diverted with the physical capacity constraints of the emergency facilities to the volume of water that the City is entitled to receive and is anticipated to need at full build-out. Table B compares the flow required at Folsom's water treatment plant to the volume available through the emergency facilities. To meet the peak summer demand that occurred in 2013, which was 35 million gallons per day (MGD), Folsom would have needed to receive 54.2 cfs, which is significantly more than the 30 cfs maximum volume that the emergency facilities can deliver. In other words, the amount of water that can be supplied through the emergency measures is not sufficient to meet the City's peak summer demands, even with drought conservation standards in place. As Table B shows, this problem will only get worse in the future as demands increase, since the flow required for the Water Treatment Plant to meet demand at full build-out is projected to be 77.4 cfs.

Table A

Emergency Pump Station Flow (CFS)	30
Emergency Pump Station Volume (AF/YR)	21,719
Percent of City's Total Water Supply (34,000 AF)	63.9%
Percent of City Demand at Build-Out (32,000 AF)	67.9%

Table B

Flow Required (MGD)	Flow Required (CFS)	% of Emergency Flow (30 CFS)
35	54.2	55.4%
40	61.9	48.5%
45	69.6	43.1%
50	77.4	38.8%

35 MGD is the peak summer demand in 2013
50 MGD is the maximum capacity of the water treatment plant at build-out

41. Through the California WaterFix project, Reclamation proposes to make voluntary, discretionary changes to the CVP. Figure 14 of DWR-514 shows that, with the California WaterFix project, Folsom Reservoir will be drawn down to 90,000 acre-feet of storage – slightly above 330 feet above mean sea level – in 5% of all years. In other words, in one out of every 20 years, California WaterFix will draw Folsom Reservoir down to a level that Reclamation has deemed would be unsafe to divert water through the M&I intake to Folsom and the other agencies that rely on that intake for their water supplies. Obviously, this poses a serious risk of injury to the City’s primary water supply.
42. With California WaterFix, as proposed, there is a great deal of uncertainty as to how the project will be operated. However, as indicated above, Folsom would be injured if Folsom Reservoir is frequently operated to the low lake levels proposed under the California WaterFix project, which interfere with Folsom’s ability to exercise its water rights. To assure continued reliability of its municipal and industrial water supplies, Folsom needs further assurances and protections that the California WaterFix project will not injure Folsom’s ability to exercise its water rights.