

EXHIBIT ARWA-300

REBUTTAL TESTIMONY OF TOM GOHRING, P.E.

1. I am the Executive Director of the Water Forum. I hold a Bachelor of Science degree in Agricultural Engineering from the California Polytechnic State University, San Luis Obispo, and a Master of Science degree in Engineering from the University of California, Davis. I am a licensed professional engineer in the State of California.
2. My professional experience includes engineering design, hydrologic modeling, managing and directing multidisciplinary engineering projects, and directing stakeholder engagement. A copy of my resume, which accurately describes my education and experience, is **Exhibit ARWA-301**.
3. My testimony primarily concerns the development and contents of what the Water Forum, and the American River water agencies that are protestants in this hearing, refer to as the "Modified Flow Management Standard" or "Modified FMS." In particular, as discussed in more detail below, the Modified FMS was developed to address the combination of two factors that could dramatically impact both water supplies in the Sacramento region and the lower American River's environmental resources: (a) the vulnerability of Folsom Reservoir to severely dry conditions, as demonstrated by the Sacramento region's experience during that drought; and (b) the fact that the California WaterFix could increase that vulnerability by enabling Central Valley Project (CVP) operations that would draw the reservoir too low in years preceding severely dry years and therefore reducing any water storage buffer that Folsom Reservoir can provide.
4. In particular, I am responding to statements by witnesses from the California Department of Water Resources (DWR) and the federal Bureau of Reclamation (Reclamation) in this hearing that their modeling analyses do not depict how Folsom Reservoir actually would be operated during future drought conditions. Those witnesses' previous testimony stated that: (a) although DWR's CALSIM II modeling may indicate multiple years of "dead pool" conditions for Folsom Reservoir, those results should be considered "stressed conditions" in which the modeling is not reliable; and (b) DWR's and Reclamation's project operators would operate the CVP and the State Water Project (SWP) in future droughts to avoid those conditions, which I believe would be catastrophic. My experience during 2014 and

2015 in attending American River Group (ARG) meetings led by Reclamation and convening Water Forum Drought Conference meetings involving, among others, Reclamation, has shown me that catastrophic environmental and water supply conditions caused by very low Folsom Reservoir levels effects already are very real possibilities in the American River basin during drought. Because California WaterFix would enable Reclamation and DWR to export more water from Folsom Reservoir, that project would only exacerbate the existing water-supply and environmental risks in the American River basin. The Modified FMS is intended to protect against these risks in the real operations that would occur in what DWR has called the “stressed conditions” that could otherwise harm ecological resources and impair water diversions in the American River basin.

The Lower American River and the Water Forum Agreement

5. I have been the Executive Director of the Water Forum since February 20, 2007. The Water Forum technically is part of the Sacramento City-County Office of Metropolitan Water Planning. When I and others involved in the water community in the Sacramento region talk about the Water Forum, however, what we generally mean is the effort of over 35 cities, counties, water suppliers, environmental groups, business organizations and public stakeholders who signed the Water Forum Agreement in 2000 to manage the region's water resources to meet two co-equal objectives. Those co-equal objectives are:
 - Provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and
 - Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

6. The crux of the Water Forum Agreement is to achieve the above-referenced co-equal objectives in the management of the lower American River. (That agreement was previously submitted as **Exhibit SSWD-8**, and, as of March 23, 2017, it is available on the Water Forum's website at <http://www.waterforum.org/stakeholders/agreement/>.) When I began working as the Water Forum's Executive Director in 2007, the parties to the Water Forum Agreement already had been working to implement that agreement for over six years. The parties were implementing, and continue to implement, seven elements that the Agreement identified as the keys to achieving the co-equal objectives. Those elements are:

- An improved Flow Management Standard for the lower American River;
 - Water conservation;
 - Groundwater management;
 - Increased average annual surface water diversions;
 - Dry year surface water diversion reductions;
 - Lower American River habitat management; and
 - The Water Forum Successor Effort
7. During my time at the Water Forum, I have watched our water and environmental representatives sometimes disagree on issues such as water conservation and groundwater management. I have also watched, however, as those same parties have repeatedly worked through their differences and continued to work together on implementing the Agreement. The Water Forum coalition appears to me to be as strong as or stronger than when I arrived on the scene ten years ago.
8. In particular, in 2015, the Water Forum received the Governor's Environmental and Economic Leadership Award (GEELA) for our work with Reclamation to manage lower American River water temperatures in real-time during drought conditions to protect incubating steelhead. A copy of the program for the 2015 GEELA program, which reflects the Water Forum's award, is **Exhibit ARWA-302**.

The 2006 Lower American River Flow Management Standard

9. Perhaps the most challenging aspect of implementing the Water Forum Agreement has been the implementation of what the Agreement calls "an improved Flow Management Standard for the lower American River." The Agreement describes the state of flow management in the late 1990's as an operations approach derived from 1958's Decision 893 and the Anadromous Fish Restoration Program flow objectives of 1997 that were developed to comply with the federal Central Valley Project Improvement Act. This pre-2000 approach relied on minimum flows of 250 to 500 cubic feet per second (cfs), depending on the time of year, and emphasized increased flows during the spring.

10. In 2004, Reclamation signed a memorandum of understanding with the Water Forum concerning the implementation of a new flow management standard for the lower American River. A copy of that memorandum of understanding is **Exhibit ARWA-303**. In that memorandum of understanding, Reclamation agreed to work jointly with the Water Forum to submit a new flow management standard to the SWRCB for inclusion in Reclamation's water-right permits.
11. My understanding is that, working with numerous federal and state agencies, by 2006, the Water Forum had developed a proposed new flow management standard. That standard, called the 2006 FMS, is described in a draft 2006 technical memorandum and includes provisions for minimum flows, water temperature management, inter-agency coordination through the American River Group (ARG), and ongoing monitoring. The 2006 memorandum is available, as of March 23, 2017, at <http://www.waterforum.org/wp-content/uploads/2015/09/FMS-Technical-Report-2006.pdf>
12. My understanding is that Reclamation began implementing the 2006 FMS shortly after the 2006 draft technical memorandum was issued. Through my consistent engagement in ARG meetings and informal consultations with Reclamation staff about their decisions for managing flows and water temperature on the lower American River, I have observed the 2006 FMS's implementation for the last ten years.

Need for Additional Protection

13. In 2009, the National Marine Fisheries Service (NMFS) issued a new biological opinion under the federal Endangered Species Act concerning the effect of the CVP and the SWP on certain listed salmonid species, including steelhead in the lower American River. Appendix 2-D of that 2009 "BiOp" largely incorporated the 2006 FMS, but it also added American River water temperature management direction that was not included in the 2006 FMS. Appendix 2-D's water temperature management direction for the American River directed Reclamation to use an iterative approach, varying its proposed operations at Folsom Dam and Reservoir, to develop annual management plans to meet temperature objectives below Nimbus Dam. In addition, the 2009 BiOp included actions to address water temperatures in the lower American River. **Exhibit ARWA-304** contains copies of the cover page of NMFS's 2009 BiOp, its Actions II.1 and II.2 and its Appendix 2-D. In response to the 2009 BiOp's direction that Reclamation seek to better manage water temperatures in the lower American River, the Water Forum began working on possible changes to the 2006 FMS to address that concern.

14. The Water Forum's work to develop revisions to the 2006 FMS was further motivated by the review by the Water Forum, American River water agencies and other American River interests of hydrologic modeling results released by DWR and Reclamation. Those results were released as part of the draft environmental impact report/environmental impact statement (DEIR/EIS) for what was then called the Bay-Delta Conservation Plan (BDCP). The BDCP DEIR/EIS modeling indicated that, in future conditions with assumed levels of climate change, Folsom Reservoir would be drawn down to very low levels – approximately 90,000 acre-feet – by the end of September in around 10 percent of water years, with and without the operation of the proposed Delta tunnels. **Exhibit ARWA-305** contains copies of the relevant pages of the DEIR/EIS's modeling appendix, Appendix 5A. I understand that the H1, H2, H3 and H4 scenarios discussed in those pages are, or at least were, variants of the DEIR/EIS's Alternative 4, which was the proposed project in that document. Based on my experience with American River operations and resources, it appeared to me that drawing Folsom Reservoir storage to 90,000 acre-feet – the lowest level that CALSIM II apparently could model – at the end of September in 10% of all years would lead to catastrophic water-supply and environmental impacts in the American River basin.
15. I also understand from the DEIR/EIS result that, for the H3 "proposed project" scenario compared to the No Action Alternative: (A) Folsom Reservoir would be 15,000 acre-feet lower in the driest 10% of years (90% probability of exceedance) at the end of November; and (B) Folsom Reservoir ranges from 30,000 to 80,000 acre-feet lower in 70% of years (20% through 90% probability of exceedance) at the end of June. Such changes in Folsom Reservoir storage would be a significant concern because, based on my observations of the reservoir and my review of numerous CalSim II modeling runs, the reservoir's storage often can reach its lowest point in a year near the end of November and the spring months leading to the end of June are the period when the reservoir is storing water that can be critically necessary later for water supplies diverted from the reservoir and the lower American River, as well as steelhead and Chinook salmon in the river.
16. I note that the modeling results disclosed in the December 2016 final environmental impact report/environmental impact statement (FEIR/EIS) for the California WaterFix shows results for the comparison of the H3 and No Action Alternatives that are similar to the DEIR/EIS's results. **Exhibit ARWA-306** contains copies of the relevant pages of the FEIR/EIS's modeling appendix, Appendix 5A.

17. The DEIR/EIS modeling indicated to me, as an engineer and as someone who had been very involved with American River water management, that the BDCP, now California WaterFix, could significantly impact the implementation of both of the Water Forum's co-equal objectives. The final EIR/EIS modeling indicates the same thing. American River water agency representatives have testified in this proceeding that very low storage levels in Folsom Reservoir any month – particularly in November – can significantly impair their ability to divert water under their water rights and contracts. My experience in the drought conditions of 2015, and in reviewing numerous temperature modeling analyses of the lower American River, has indicated to me that lower Folsom storage in June has a significant adverse effect on cold water resources and consequently the fisheries of the American River. I intend to submit testimony regarding cold water resources of the American River during Part 2 of this proceeding, which the SWRCB has focused on environmental issues.
18. The historic drought conditions of 2013 through 2015 also were a major factor driving the Modified FMS's development. Those conditions resulted in dangerously low storage in Folsom Reservoir and unhealthy fisheries conditions in the lower American River. By early December 2015, Folsom Reservoir was drawn down to its lowest point since it initially filled. Based on my review of information from the California Data Exchange Center, I understand that the reservoir reached its historic low of 135,561 acre-feet of water in storage on December 4, 2015. This level was only 45,000 acre-feet above the bare minimum of 90,000 acre-feet depicted in the modeling results described above. If the winter of 2015-2016 had been as dry as the winters of 2013-2014 and 2014-2015, it is difficult to imagine what sort of impacts would have occurred in the lower American River and the Sacramento region. In addition to endangering the water supplies of approximately 500,000 people in the Sacramento Region, the low reservoir levels also meant a depleted Folsom Reservoir cold-water pool which exacerbated thermal stress to lower American River resident salmonids.
19. Throughout 2014 and 2015, and based particularly on my participation in numerous ARG and other American River meeting with Reclamation's representatives, my observation was that CVP and SWP operations resulted in the creation of water-supply and environmental risks on the American River. My observation was that broader CVP operational priorities resulted in what appeared to me to be releases from Folsom Reservoir that were unusually high, given the current drought conditions. What I understand from my interactions with

Reclamation and my observation of the SWRCB's temporary urgency change process for the CVP and the SWP in 2014 and 2015 is that Reclamation was sustaining the high Folsom releases in order to meet operational objectives of the CVP to maintain Delta water quality conditions in light of other CVP and SWP operational priorities.

20. In 2014 and 2015, water suppliers that are parties to the Water Forum Agreement installed numerous emergency pumps and interties to attempt to move water around the region to satisfy needs, even though demands were significantly reduced as a result of the region achieving a reduction in demand of roughly 30 percent under the SWRCB's emergency drought regulations. For example, at one point, the City of Sacramento needed to install emergency pumps at its Sacramento River diversion because its permanent pumps were cavitating due to low river levels that resulted from Nimbus Dam releases at or below 500 cubic feet per second that occurred in early 2015. The water temperatures in the lower American River at times were high enough that I understand that they could have been lethal for steelhead and fall-run Chinook salmon juveniles. I oversaw efforts by the Water Forum to assist Reclamation in managing the lower American River in real time to avoid as many temperature impacts as possible to listed steelhead. This work was the basis for the Governor's Environmental and Economic Leadership Award that the Water Forum received in 2015.
21. With NMFS having indicated in the 2009 BiOp that Reclamation should improve water temperature management on the lower American River, and the BDCP DEIR/EIS modeling indicating how it was possible that Reclamation might consider operating Folsom Reservoir in future droughts, the 2013-2015 experience confirmed that it was necessary for American River interests to develop changes to the 2006 FMS in the form of a Modified FMS. During my tenure as the Water Forum's Executive Director, I have not seen the parties to the Water Forum Agreement reach any other decision of this magnitude as quickly or unanimously.
22. As I understand it, a key purpose of the BDCP, and now the California WaterFix, is to enable the SWP and the CVP to divert Sacramento River water more reliably, and possibly in greater amount, for exports from the Delta. For example, in DWR's Operations presentation in this hearing, DWR indicated that one purpose of California WaterFix was to "increase opportunity to use existing water rights" by the "[d]iversion of unregulated flow during Excess Conditions" and "[r]e- diversion of stored water in Balanced Conditions." (Exhibit DWR-4e, slide 35.) The BDCP/California WaterFix therefore potentially could

allow Reclamation to export from the Delta more water that is released from Folsom Reservoir, either when the reservoir otherwise might be storing water or when releasing water from the reservoir's storage. To the best of my knowledge, if that were to occur, then the risks to Folsom Reservoir storage could increase.

23. Implementation of California WaterFix therefore would exacerbate the existing significant risks associated with potentially very low carryover storage in Folsom Reservoir by enabling Reclamation to reduce storage in the reservoir in one year going into a winter that potentially might be very dry. Earlier testimony by Jeff Weaver, who has been a Water Forum technical consultant for many years, demonstrates this risk. (See Exhibits ARWA-100 to ARWA-106.) Based on my observations of the American River and Reclamation both before I became the Water Forum's Executive Director and while in that position, my understanding is that drawing Folsom Reservoir storage down to 90,000 acre-feet at the end of September could have significant negative impacts on both of the Water Forum's co-equal objectives.
24. I therefore was seriously concerned to understand that, earlier in Part 1 of this hearing, DWR's and Reclamation's witnesses testified that: (a) DWR's modeling of how California WaterFix might affect Folsom Reservoir is not reliable for "stressed water supply conditions" when "system wide storage levels are at or near dead pool;" (b) Reclamation and DWR simply would attempt to make real-time operational decisions to attempt to avoid CVP/SWP conditions that would significantly impact other water users; (c) they used end-of-September storage as the key indicator to conclude that Folsom Reservoir storage would not be impacted by California WaterFix, even though, as they stated, changes to Folsom storage could occur in other months of the year; and (d) Reclamation and DWR are not offering any water-right terms and conditions to protect other water users if California WaterFix operations were to cause or worsen conditions like those at Folsom Reservoir and in the American River if the reservoir were to be drawn down to 90,000 acre-feet in 10% of future years. (See Exhibit DWR-71, p. 12, lines 15-18; August 10, 2016 transcript, pp. 253-256; August 11, 2016 transcript, pp. 10, 42-44; August 23, 2016 transcript, pp. 207, 211-217; September 22, 2016 transcript, pp. 183-188, 193-210, 213-221, 224-226, 230-233.)
25. I also was seriously concerned to understand that, in the final EIR/EIS for California WaterFix, DWR and Reclamation included a Master Response 47, in which they stated that it was not reasonable for them to model how the CVP and the SWP would respond to future droughts with California WaterFix in place. A copy of that Master Response,

and the cover page to the relevant volume of that final EIR/EIS, are **Exhibit ARWA-307**.

26. The “stressed water supply conditions” that DWR’s witnesses in this hearing are not theoretical concepts for the American River, but rather represent potential calamitous conditions that we nearly experienced in 2014 and 2015 and that we cannot see worsen as a result of the operation of Folsom Reservoir to export more water as a result of California WaterFix’s operation. Reclamation and DWR staff have stated that California WaterFix could cause changes in Folsom end-of-month storage in months other than September. Folsom Reservoir reached its historic low level in December of 2015. Consequently, based on my experience gained through years of involvement in management of Folsom Reservoir and the lower American River and my review of many CalSim II model studies as the project manager for Water Forum technical work, my opinion is that an institutional protection of Folsom Reservoir storage including end-of-December and end-of-May storage requirements is needed to protect the American River's fishery and water supply resources, given that California WaterFix would expand the CVP’s capacity to export water from the reservoir and reduce reservoir levels in months other than September.

Development of the Modified FMS

27. In response to the events and concerns described above, I led the Water Forum’s consultants to develop a modified approach to managing flows and temperature on the lower American River that would, among other things, avoid extreme low storage conditions in Folsom Reservoir. Our work proceeded based on the following three objectives:
- Maintain sufficient storage in Folsom Reservoir to avoid drawing the reservoir down to 90,000 acre-feet during a simulated repeat of the 1976-77 drought and a 2030 level of water demand;
 - Improve conditions for American River steelhead and fall-run Chinook salmon, with special attention to our biggest limiting factor of water temperature; and
 - Avoid redirected impacts to Sacramento River fisheries – especially winter-run Chinook salmon.
28. Over a period of months, the Water Forum technical team and I – in consultation with the water suppliers and environmental groups within the Water Forum – developed revisions to the 2006 FMS to

meet the three objectives above. It is my understanding that this effort merged to a large degree with the efforts of the American River water agencies that have protested the California WaterFix water-right change petition.

29. The Water Forum technical team and I reviewed hundreds of different CalSim II modeling runs and associated analyses of coordinated CVP and SWP operations to seek to identify a "sweet spot" that adequately addressed all three of the above objectives. Our modeling assumed existing regulations and facilities and 2030-level of water demand. Our modeling did not include climate change assumptions because our technical consultants advised me that important updates to the representation of reservoir operations upstream of Folsom Reservoir – primarily Placer County Water Agency's (PCWA) and Sacramento Municipal Utility District's (SMUD) projects – were not represented in any available CalSim II climate change scenarios. The Water Forum technical team decided that it was critical to use the best available representation of hydrologic conditions in the American River basin, so we used modeling that incorporates revised operations by PCWA and SMUD. This issue is discussed in Jeffrey Weaver's testimony, which is ARWA Exhibit-400. Some of the Water Forum's modeling results showed that it would be possible to further enhance benefits to fish in, and water supplies from, the American River, but that the cost would be degrading Sacramento River water temperatures during critical life stages of winter-run Chinook salmon. That was not the "sweet spot" for which we were looking.

30. Ultimately, finding that "sweet spot" involved making a variety of changes to the 2006 FMS that would result in protections to American River environmental and water supply resources while avoiding redirected impacts to the Sacramento River's fisheries. The Water Forum technical team developed a new American River Index that more accurately characterizes water years in the American River basin based on the most up-to-date projections of the operations of the two water projects that affect inflows to Folsom Reservoir, namely Placer County Water Agency's Middle Fork Project and Sacramento Municipal Utility District's South Fork American River Project. The resulting requirements for minimum releases from Folsom and Nimbus Dams involve storing more water in Folsom Reservoir during periods when lower American River salmonids are less sensitive to streamflows and water temperatures.

Contents of the Modified FMS and Modeling of Its Effects

31. Resulting from this work, the major components of the Modified FMS are:
- Minimum Release Requirements from Nimbus Dam that reflect an improved approach to setting minimum lower American River streamflows;
 - End-of-May and end-of-December Folsom Reservoir storage requirements;
 - Water temperature management planning and implementation that takes advantage of generally increased Folsom Reservoir storage and a corresponding larger cold water pool;
 - Continued convening of the American River Group; and
 - A monitoring and evaluation program.
32. The focus of Part 1 of this hearing is the question of whether amending the CVP's and the SWP's water-right permits to authorize diversion and re-diversion of water through the California WaterFix would injure other legal users of water and whether any terms and conditions should be imposed on those permits in order to avoid such injuries. The two portions of the Modified FMS that are most crucial for these purposes are the end-of-May and end-of-December Folsom Reservoir storage requirements and the Minimum Release Requirements from Nimbus Dam. Those two pieces of the Modified FMS work together to ensure that Folsom Reservoir stores enough water to both keep the reservoir's water level above the reservoir's water-supply intake and to maintain lower American River streamflows at levels that would enable downstream water-supply diversions. Consistent with the Water Forum's co-equal objectives, the Modified FMS is an integrated package of water-supply and environmental terms, but the Folsom Reservoir storage requirements and the Minimum Release Requirements from Nimbus Dam are the two parts of the Modified FMS that are most crucial for ensuring that the California WaterFix does not injure American River water agencies as legal users of water.
33. Based on my work with the Water Forum technical team and my review of the results of CalSim II modeling of the Modified FMS under current conditions, I understand that the Modified FMS performs well in those simulations. Jeff Weaver of HDR is a member of the Water Forum technical team and performed CalSim II modeling that simulated CVP and SWP operations over an 82-year period of

hydrology using the current regulatory framework, current hydrologic conditions and a 2030 level of water demand. The results of the simulations showed that the Modified FMS would:

- Maintain Folsom Reservoir storage above 90,000 acre-feet during the simulated 1976-77 drought, and end-of-December storage above 230,000 acre-feet in all simulated years, which would improve water-supply reliability in the Sacramento region and protect the region's water supplies against possible overly aggressive drawdowns of the reservoir as a result of California WaterFix's implementation; and
- Eliminate extremely low releases below 500 cubic feet per second to the lower American River, which would increase water supply reliability for Sacramento-area residents who depend on direct diversion from the lower American River and also improve salmonid habitat.

34. The key results of Mr. Weaver's modeling concerning Folsom Reservoir storage and Nimbus Dam releases are contained in **Exhibit ARWA-402**. I have reviewed those results.
35. The contents of **Exhibit ARWA-308** are the proposed water-right terms and conditions that, if applied, to Reclamation's water-right permits for Folsom Dam and Reservoir – Permits Nos. 11315 and 11316 – would implement the Modified FMS. I understand that the American River Water Agencies group proposes that the SWRCB apply those terms and conditions to Reclamation's Permits Nos. 11315 and 11316 as part of any order approving DWR's and Reclamation's California WaterFix water-right change petition.

Anticipated Part 2 Testimony

36. As discussed above, the Water Forum, in cooperation with the American River Water Agencies, developed the Modified FMS as an integrated solution for water supply and environmental issues in the American River associated with very low Folsom Reservoir storage in very dry years. Accordingly, in Part 2 of this hearing, I plan to present further testimony concerning the environmental benefits of the Modified FMS. I anticipate presenting this further testimony in cooperation with Mr. Weaver and other members of the Water Forum technical team. Our analysis of the Modified FMS's effects on the CVP/SWP system has included, among other parameters, the following, on which I anticipate that the Water Forum technical team will testify:
- Lower American River habitat for salmonid lifestages;
 - Lower American River water temperatures;
 - Shasta Reservoir storage volumes;
 - Shasta Reservoir cold-water pool;
 - Sacramento River streamflows;
 - Sacramento River water temperatures;
 - Oroville Reservoir storage volumes; and
 - Feather River streamflows.
37. **Exhibit ARWA-309** is a PowerPoint presentation that summarizes key points of this testimony. Exhibit ARWA-309 represents the “summary of testimony” requested by the SWRCB.