BEFORE THE STATE WATER RESOURCES CONTROL BOARD

In the Matter of the State Water Resources Control Board (State Water Board) Hearing to consider Monterey Peninsula Water Management District's (MPWMD) Petitions to Change Permits 7130B and 20808 (Applications 11674B and 27614)	Hearing Date: September 24, 2007 Carmel River in Monterey County

TESTIMONY OF DARBY W. FUERST

WATER RESOURCES MANAGER

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

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I, Darby W. Fuerst, provide the following prepared testimony under penalty of perjury, under the laws of the State of California, in relation to Petitions for Change to Permits 7130B and 20808 (Applications 11674B and 27614) of the Monterey Peninsula Water Management District (MPWMD or District) pertaining to the MPWMD Phase 1 Aquifer Storage and Recovery Project (ASR Project).

Q1. PLEASE STATE YOUR NAME AND PERSONAL QUALIFICATIONS.

1. My name is Darby W. Fuerst. My education includes a M.S. degree in water resources administration from the University of Arizona, a B.S. degree in geological sciences from the University of Washington, a B.A. degree in English literature from Occidental College, and an A.A. degree in mathematics from Cañada College. I am a Certified Professional Hydrologist (No. 1658) with the American Institute of Hydrology. My professional memberships include the American Water Resources Association, Groundwater Resources Association of California, and American Geophysical Union. I have 26 years of professional experience in the field of surface water hydrology and water resources administration working for local, state, and federal agencies. Except for a one-year period (October 1988 through September 1989), I have worked for the Monterey Peninsula Water Management District for the past 22 years. I am presently employed by the Water Management District as the Water Resources Manager. My resume is provided as **Exhibit DF-1**.

2. Between December 1995 and June 2001, I served as the General Manager of the Water Management District. As General Manager, I was responsible for all activities of the Water

Management District, including operations of the administrative services, planning and engineering, water resources, and water demand divisions. During my tenure as General Manager, I supervised development of MPWMD's first formal strategic plan, initiated work on the Seaside Basin ASR Test Program, and implemented an Expanded Water Conservation and Standby Rationing Plan. In addition, during this time, I interacted with the Water Right Division staff of the State Water Resources Control Board (SWRCB) on a number of matters relating to the Carmel River system.

3. Presently, as the Water Resources Manager, I am responsible for the management of the programs, services, and staff of the Water Resources Division including surface and ground water data collection programs, development and application of computer simulations models, and administration of the fishery protection activities in the Carmel River basin. In addition to my duties as Water Resources Manager, I am responsible for the development, maintenance, and application of the Water Management District's computer simulation model of the water resources of the Monterey Peninsula area. This model, the Carmel Valley Simulation Model (CVSIM), is the Water Management District's principal analytical tool for assessing the performance of the water resources system under varying physical, structural, and operational conditions. I have been involved with the development, testing, calibration, and application of CVSIM since 1985.

4. In my employment as an hydrologist with the Montana Department of Natural Resources and Conservation (1981-1984) and the National Park Service (1988-1989), I was involved in a number of studies designed to optimize reservoir operations and quantify the amount of water needed to maintain selected instream flow requirements.

Q2. PLEASE PROVIDE AN OVERVIEW OF THE MONTEREY PENINSULA WATER MANAGEMENT DISTRICT AND ITS LEGISLATED FUNCTIONS AND PROGRAM ACTIVITIES.

5. The Monterey Peninsula Water Management District is a special district created by the California State Legislature. Specifically, the California State Legislature created the Water Management District following its passage of a 1977 statute (Water Code Appendix, Sec. 118, et. seq.) enacted into law by the governor, which required ratification by a majority of voters within the proposed MPWMD boundary. That ratification vote occurred in June 1978. MPWMD boundaries encompass the six cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside, the Monterey Peninsula Airport District, and portions of unincorporated Monterey County, primarily in Carmel Valley. With minor exception, the entire California American Water (CAW) Monterey Division distribution system lies within the jurisdictional boundary of MPWMD. MPWMD covers a geographical area of approximately 170 square miles and consists of the urbanized portion of the Monterey Peninsula, and the contiguous unincorporated portions of Monterey County. Based on recent census figures, approximately 112,000 people reside within the MPWMD boundaries.

6. MPWMD is governed by a seven (7) member Board of Directors: Five (5) Directors are elected by voter divisions created within the District; one (1) Director is a member of the Monterey County Board of Supervisors and appointed by the Board of Supervisors; and one (1) Director is a mayor, or member of the governing body, or chief executive officer of a city that is wholly within the MPWMD boundary, and who is appointed by the city selection committee of Monterey County.

7. With respect to water resource management, the MPWMD statute provides the sole legislative authority for integrated management of water resources within the Monterey Peninsula area, encompassing the surface and subsurface waters of the Carmel River, the Seaside Groundwater Basin, and all other water-bearing geologic formations within the MPWMD boundaries.

8. Because the MPWMD statute directs the District to integrate the management of all water resources of the Monterey Peninsula area, MPWMD is uniquely empowered to regulate

and manage all local water distribution systems and water sources. With respect to water system management, the MPWMD controls formation of new water systems and additions of new sources of supply, hookups or service territory to existing systems. The MPWMD controls demand by setting a maximum number of connections and quantity of annual production for each water distribution system. No new CAW water meter is set without a permit from the MPWMD.

9. MPWMD regulates all water distribution systems within its boundaries, including the main and several subsystems (currently Hidden Hills, Bishop, and Ryan Ranch) owned and operated by CAW. CAW must obtain approval of MPWMD to amend its main water distribution system or a subsystem, which includes a change in service area, annual production or connection limit, and/or major water supply facilities.

10. MPWMD uses another unique power given to it under Sections 20 and 364 of the Water Management District statute to cause reductions in the use of surface and groundwater production, and has devised a unique water supply regulatory process to effectively manage the Monterey Peninsula's limited sources of potable water supply. This process involves MPWMD guiding each water distribution system deriving its supply from more than one hydrologic management unit in annually preparing, and updating quarterly, an operational water supply "budget" to ensure compliance with the water management strategy set by the MPWMD. Currently, only CAW's main system draws water from more than one hydrologic unit.

11. Consistent with its legislative mission, MPWMD has adopted numerous rules and regulations, and proactively implements various programs and projects that have effectively promoted water conservation and substantially reduced demand. This MPWMD regulatory function is of critical importance to the community as the Monterey Peninsula area suffers from both a physical shortage of potable water, and a limited quantity of water from both of its principal resources for which legal rights have been secured. The MPWMD *Expanded Water Conservation and Standby Rationing Program* was adopted in 1999 to aid CAW in meeting the

Carmel River production limit set by the SWRCB in Order No. WR 95-10. This program established three "stages" of water conservation that must be continuously adhered to by all CAW water users; sets out prudent water use practices for all customers; and defines "water waste" that is enforced by MPWMD staff. The upper four stages of this program are intended to respond to a drought-driven or other emergency need for water rationing. In conjunction with CAW, the Water Management District also promotes and administers a highly successful water conservation incentive program that provides cash rebates to customers that have purchased water saving plumbing fixtures and water appliances including "dual-flush" toilets, ET irrigation controllers and the other latest advances in water conservation technology. According to a 2006 survey by a national engineering firm, the multi-faceted water conservation regulations and incentive programs operated by MPWMD, have resulted in the lowest average residential water usage (700 cubic feet per month or approximately 170 gallons per day per single-family residence) of any community in California.

Q3. PLEASE DESCRIBE MPWMD'S RELATIONSHIP WITH CAW, ESPECIALLY WITH RESPECT TO THE ASR PROJECT.

12. As described above, the MPWMD regulates CAW's water distribution systems and cooperates with CAW on water conservation programs in the Monterey Peninsula area. In addition, the MPWMD, as part of its Water Allocation Program, mitigates the impacts of CAW's diversions from the Carmel River on aquatic resources, riparian vegetation, and wetlands in the Carmel Valley. The MPWMD also works closely with CAW to develop new sources of supply to (1) replace existing supplies that are being diverted without valid water rights (Carmel River supplies) and existing supplies that are being diverted and that are scheduled for reduction by court action (Seaside Groundwater Basin supplies) and (2) meet future water demands in the Monterey Peninsula area, consistent with local land-use plans.

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13. In this latter role, the MPWMD has provided technical assistance to CAW and its consultants on elements of the proposed Coastal Water Project (CWP). In particular, MPWMD staff has worked with CAW staff and consultants to design, construct, and operate the Seaside Basin ASR Test Program and develop the proposed Phase 1 ASR Project. To formalize this working relationship and satisfy a requirement by the California Department of Health Services (now reorganized as the California Department of Public Health) to clarify and define responsibilities relating to the long-term operation of the Santa Margarita Test Injection Well (SMTIW), MPWMD and CAW developed an ASR Management and Operations Agreement. The intent of this agreement, which was executed in March 2006, was to "set forth general facts and assumptions concerning Aquifer Storage and Recovery (ASR) facilities and operations" and clarify "areas of joint effort and cooperation between parties to facilitate present and future actions". A copy of this agreement is included as **Exhibit DF-2**.

14. As part of this agreement, MPWMD and CAW agreed to "cooperate and support the acquisition of water rights needed for the Water Management District Phase 1 ASR Operations" and "jointly hold all relevant applications and water right permits" (page 3, Section 9, *Water Rights*). Further, MPWMD and CAW agreed to "jointly cooperate and support each other's efforts to extract and use water associated with ASR Operations". In addition, MPWMD and CAW agreed to "enter into good faith negotiations to establish one or more Agreements pertaining to the acquisition and joint ownership of present and future water rights used or usable from any water source suitable to provide potable water for municipal supply for the benefit of the Monterey Peninsula area" (page 3, Section 10, *Future Water Rights* to **Exhibit DF-2**).

Q4. PLEASE DESCRIBE HOW THE PROPOSED PHASE 1 ASR PROJECT WILL HELP CAW RESPOND TO SWRCB ORDER 95-10.

15. Under the Temporary Water Right Permits issued by the SWRCB for ASR testing since 1998, MPWMD, in conjunction with CAW, has been developing an ASR Test Program in the Seaside Groundwater Basin. The ASR Project involves conjunctive use of the Monterey Peninsula's two principal water resources, which allows these limited resources to continue to meet community water demand, while minimizing the impact of that usage on the natural environment. Consistent with MPWMD's statutory mandate to ensure integrated water resource management, the proposed ASR Phase 1 Project entails diverting excess winter flows from the Carmel River Basin approximately six miles through the CAW distribution system and injecting it through two MPWMD constructed and owned ASR wells into the hydrologically separate Seaside Basin. The ASR Phase 1 Project uses water taken during Carmel River high-flow seasonal periods, when there is no adverse environmental impact, and allows this excess water to be temporarily stored in the Seaside Basin.

16. Recovery and use of ASR water stored in the Seaside Basin to meet community water demand during the summer and fall will help offset CAW's need to pump the Carmel River during its lowest flow period. Assuming the necessary SWRCB permanent water right is granted, the ASR Phase 1 Project will constitute the first "new" legal water supply developed on the Carmel River. Thus, CAW will be able to respond to its mandate in SWRCB Order 95-10 to make one-for-one reductions in its current unlawful diversions. The ASR Phase 1 Project will also further MPWMD's efforts to fulfill its statutory obligation to develop new water supplies, and to manage Carmel River water resources in an environmentally sensitive manner.

Q5. PLEASE DESCRIBE MPWMD'S RELATIONSHIP WITH THE SEASIDE BASIN WATERMASTER.

17. On March 27, 2006, Superior Court Judge Roger Randall issued his final Statement of Decision (Decision) in the Seaside Groundwater Basin adjudication lawsuit

(*California American Water v. City of Seaside, et. al*, Monterey County Superior Court Case No. M66343, filed August 14, 2003). A copy of this Decision, as amended, is included as **Exhibit DF-3**. Although not named as a defendant in the lawsuit, MPWMD petitioned to intervene as an interested party in the adjudication, consistent with its statutory responsibility for integrated management of the Seaside Basin and Carmel River water resources. Judge Randall granted MPWMD's petition to intervene. The Decision determined that the Basin was overdrafted; determined groundwater extraction rights of overlying property owners and appropriators (including CAW) who were parties in the lawsuit; and scheduled phased reductions in cumulative groundwater production to eliminate the overdraft, unless and to the extent otherwise offset by replenishment of non-native resources into the Basin. The Decision also created a special master, commonly called a "watermaster" in groundwater adjudications, to achieve the court-mandated physical solution to the overdraft problem through development and implementation of a comprehensive Basin Monitoring and Management Plan. The Seaside Basin Watermaster is comprised of nine entities (or groups of entities) that were parties in the adjudication lawsuit, including CAW and MPWMD.

Q6. PLEASE SUMMARIZE WATER RIGHTS PERMITS 7130B AND 20808 (APPLICATIONS 11674B AND 27614) THAT ARE HELD BY MPWMD.

18. Permit 7130 was issued in 1948. Permit 7130 was split on May 2, 1984, with Permit 7130B assigned to MPWMD. Permit 20808 was issued to MPWMD on October 25, 1995. Permits 7130B and 20808 were amended on January 6, 1999.

19. Under Permits 7130B and 20808, as amended, MPWMD is authorized to divert up to 15,970 AFY and 24,000 AFY of Carmel River water, respectively, to storage in the proposed New Los Padres Reservoir. Under Permits 7130B and 20808, MPWMD is authorized to divert Carmel River water to storage during the seasons of October 1 to May 31 and

November 1 to June 30, respectively. Under Permit 20808, 32 wells are described as authorized Points of Diversions and Rediversion. Under Permits 7130B and 20808, San Clemente Dam is described as an authorized Point of Rediversion for stored water released from the proposed New Los Padres Reservoir.

Q7. PLEASE DESCRIBE MPWMD'S POSITION REGARDING WATER RIGHTS PERMITS 7130B AND 20808.

20. In November 1995, voters within the MPWMD rejected a measure that would have authorized the District to fund and construct the proposed New Los Padres Water Supply Project. This project, which included a dam and 24,000 AF reservoir on the Carmel River, had received state and federal permits necessary to proceed and would have provided CAW with a valid basis of right for all of its existing diversions from the Carmel River.

21. To clarify its position regarding the New Los Padres Reservoir Project following the November 1995 election, the MPWMD Board adopted Resolution No. 96-02 in February 1996. This resolution, which is included as **Exhibit DF-4**, provided direction to staff and the public regarding future action on the New Los Padres Project. In MPWMD Resolution No 96-02, the MPWMD Board directed staff to focus on developing non-dam alternatives such as the ASR Project to meet the community's water supply needs and protect the Carmel River environment.

22. When the MPWMD Board adopted Resolution No. 96-02, it also indicated that staff should take action as needed to preserve and protect existing federal, state, and local permits that had been obtained for the proposed Los Padres Reservoir Project to enable possible future use by the District or others. These permits included Permits 7130B and 20808.

Q8. PLEASE SUMMARIZE THE CHANGES TO WATER RIGHTS PERMITS 7130B AND 20808 FOR THE PHASE 1 ASR PROJECT THAT ARE REQUESTED BY MPWMD.

23. In the revised petitions for change to Permits 7130B and 20808 for the ASR Project submitted on September 15, 2003, MPWMD requested that the place of storage be changed from the proposed New Los Padres Reservoir to the Seaside Groundwater Basin and that San Clemente Dam be added as a point of diversion. As originally requested, up to 7,300 AFY of Carmel River water would be stored in the Seaside Groundwater Basin. For the Phase 1 ASR Project, the maximum amount of Carmel River water that would be diverted for storage in the Seaside Groundwater Basin is 2,426 AFY, which is based on a maximum diversion rate of 6.68 cfs or 13.26 acre-feet per day (AFD) during the specified 183-day season of diversion from December 1 through May 31 (including February 29 during leap years).

24. In addition, for purposes of operating the Phase 1 ASR Project, MPWMD requested changes to permit conditions 2, 7, and 17, as well as removal of conditions 8, 18, 20-30, 32-38, 41-43, 45, and 48-53 from Permits 7130B and 20808.

Q9. PLEASE SUMMARIZE THE BACKGROUND FOR MPWMD'S PETITIONS FOR CHANGE FOR THE PHASE 1 ASR PROJECT.

25. On March 28, 2001, MPWMD representatives met with representatives from California State Assembly Member Fred Keeley's office and the SWRCB to discuss the possibility of modifying Permits 7130B and 20808 to facilitate development of "Plan B", an alternative to CAW's proposed Carmel River Dam and Reservoir Project (CRDRP). Meeting attendees included Elizabeth Barkley, Gary Shallcross, ___ Bassett, Art Baggett, Jerry Johns, Steve Herrera, C. Macdonald, Dave Potter, Dave Laredo, and Darby Fuerst. Members of

Keeley's staff, who were interested in exploring ways that the permits could be changed to legalize additional diversions from the Carmel River for customer use and ASR, convened the meeting. At the meeting, Jerry Johns, who was Assistant Chief of the Water Rights Division at the time, suggested that MPWMD use its existing Permits 7130B and 20808 as the basis for water rights for direct diversion and an ASR project. Specifically, with respect to the ASR Project, Mr. Johns recommended that MPWMD should file Petitions for Change to these permits to allow diversions from the Carmel River during periods of high flow via the CAW system and inject the diverted water into the Seaside Groundwater Basin for later withdrawal. On July 11, 2001, MPWMD and SWRCB staff met in a follow-up meeting to discuss specific filing requirements for the ASR change petitions, including CAW's role, location of the ASR wells in the Seaside Basin, underground storage supplement, and noticing.

26. On October 2001, reliant on Mr. Johns' recommendation, MPWMD filed a single Petition for Change to Permits 7130B and 20808 for an ASR Project. On December 14, 2001, the Chief of the Division of Water Rights requested additional information on the proposed project so that the Division could process the petitions. MPWMD developed the needed information through subsequent testing of the pilot injection well and the full-scale test injection well over a series of seasons.

27. On September 15, 2003, MPWMD filed separate revised Petitions for Change to Permits 7130B and 20808 for the ASR Project.

Q10. GIVEN THAT THE PETITIONS FOR CHANGE RELY ON ONLY PORTIONS OF THE DIVERSION AND STORAGE AMOUNTS CONTAINED IN PERMITS 7130B AND 20808, WHAT IS PROPOSED TO HAPPEN WITH THE REMAINING PORTION OF EACH PERMIT?

28. MPWMD proposes that Permits 7130B and 20808 each be split into two parts: one part to be used in support of the Phase 1 ASR Project (e.g., 7130B-1 and 20808-1), and the remaining portion to be held as a separate permit ("remainder permits"). The proposal is that the portions of each permit pertaining to the Phase 1 ASR Project will contain the conditions proposed for that project by CAW and MPWMD (**Exhibit MPWMD-2**), and that the remainder permits contain the conditions that currently exist in the respective permits. MPWMD intends to maintain the rights in Permits 7130B and 20808 that will not be used for the Phase 1 ASR Project as separate permits, available for other supply projects.

Q11. WHAT ARE EXAMPLES OF OTHER PROJECTS THAT COULD BE SUPPORTED BY THE "REMAINDER PERMITS?"

29. CAW's proposed Coastal Water Project includes an ASR component that has a larger capacity than the Phase 1 ASR Project, and MPWMD and CAW plan to develop an expansion to the Phase 1 ASR Project. CAW and MPWMD anticipate using portions of the remainder permits for the expansion project.

30. In addition, in April 2002, MPWMD filed a Petition for Change to Permits 7130B and 20808 for what may be termed "existing diversions." These petitions have been accepted and were noticed by the SWRCB in July 2002. This petition, if granted, would allow up to 7,909 AFY to be diverted from the Carmel River during high-flow periods. This amount is the difference between the 11,285 AFY that CAW is currently allowed to divert in accordance with SWRCB Order No. WR 95-10 and the 3,376 AFY confirmed CAW rights as specified in the same Order. As proposed in this petition, CAW would not divert more than 11,285 AFY from the Carmel River in a given water year. The benefit of rights under permits issued pursuant to this petition would occur after all CAW diversions from the Carmel River have been legalized in accord with Order 95-10. Assuming there will be a supplemental supply from outside of the

Carmel River watershed, such as a seawater desalination project, alone or in combination with other projects, that would bring CAW's diversions into compliance with Order 95-10, the rights sought under this petition would come into play. During periods when Carmel River instream flow bypass requirements are exceeded, diversions of up to 7,909 AFY, in addition to CAW's recognized rights of 3,376 AFY, could be made during a given water year. Rights for this proposal would rely on the remainder permits.

31. The remainder permits -- Permits 7130B-2 and 20808-2 – could also be used for surface water storage in the Carmel River Basin. As indicated in the Petitions for Change that were submitted in September 2003, the "requested change to MPWMD's permits is not intended to preclude development of the project they presently relate to, the New Los Padres Dam and Reservoir Project. If a decision were made to proceed with the New Los Padres Project, or a similar project such as Cal-Am's proposed Carmel River Dam and Reservoir Project, MPWMD would rely on water rights under permits 7130B and 20808 for such project and would file an application for additional rights for the Seaside Groundwater Basin Full-Scale Injection/Recovery Project". In this regard, while remaining focused on non-dam alternatives, MPWMD staff will take all necessary actions to preserve and protect existing federal, state, and local permits that have been obtained, including Permits 7130B and 20808. Until all CAW diversions from the Carmel River have been legalized in accord with Order 95-10, these and other projects could be developed and be supported by the remaining portions of Permits 7130B and 20808.

Q12. HOW HAS MPWMD RESPONDED TO PROTESTS RECEIVED ON THE PETITIONS FOR CHANGE TO PERMITS 7130B AND 20808 FOR THE PHASE 1 ASR PROJECT?

32. A total of eight protests were filed during the protest period set by the SWRCB. Two of the protests were accepted as valid by the SWRCB: those by NMFS and the California Department of Fish and Game (CDFG). MPWMD responded to these protests by letter. The letter responding to NMFS' protest is dated June 7, 2005, and the letter responding to CDFG's protest is dated July 15, 2005. A series of meetings with the protestants was held over a period of almost two years. The first meeting was held on October 26, 2005, and was between representatives from CDFG and MPWMD. These meetings are continuing and now include representatives from CAW and NMFS. In addition, an informational meeting with MPWMD, CAW, CDFG, NMFS, and CRSA has been scheduled for September 18, 2007, in Monterey. MPWMD provided a significant amount of information to NMFS and CDFG representatives in response to their questions and requests. A total of eight sets of proposed permit conditions were prepared and considered during this time. CAW and MPWMD's proposed permit conditions (**Exhibit MPWMD-2**) are the culmination of these efforts. Any revised permit conditions or settlement agreements that result from these ongoing discussions among the parties will be submitted to the SWRCB as soon as they are agreed upon.

Q13. PLEASE STATE YOUR ROLE IN RESPONDING TO PROTESTS TO MPWMD'S PETITIONS FOR CHANGE.

33. I participated in most of the meetings, both in person and by telephone, held with representatives of NMFS and CDFG. The purposes of the meetings were to provide information in response to questions by NMFS and CDFG representatives, and to develop mutually agreeable permit terms and conditions that would result in NMFS and CDFG dismissing their protests. I provided information on Carmel River hydrology, CAW system operations, and proposed diversion and recovery methods, and on the results of the proposed diversion and recovery methods as simulated by the District's operations model, CVSIM.

Q14. PLEASE PROVIDE AN OVERVIEW OF THE WATER RESOURCES WITHIN THE CARMEL RIVER BASIN.

34. A detailed description of the water resources within the Carmel River Basin, which includes surface water in the Carmel River and its tributaries and subsurface water in the alluvial aquifer that underlies the lower 18 miles of the river, is provided in the Draft Environmental Impact Report/Environmental Assessment (EIR/EA) that was prepared for the proposed Phase 1 ASR Project. This document and companion Final EIR/EA, which was certified by the MPWMD Board in August 2006, was offered into evidence as **Exhibit SWRCB-1**. Specifically, Chapter 8 of the Draft EIR/EA, *Surface and Groundwater Hydrology and Water Quality*, describes Carmel River streamflow and the Carmel River Alluvial Aquifer.

35. **Carmel River Streamflow:** As discussed, streamflow in the Carmel River occurs in direct response to rainfall, with more than 90 percent of the average annual rainfall occurring between November and April. Based on long-term records, annual "unimpaired[1]" streamflow in the Carmel River at the San Clemente Dam site in the Upper Carmel Valley has averaged approximately 70,000 acre-feet per year (AFY), ranging from a minimum of about 3,000 AF in Water Year (WY) 1977 to a maximum of almost 320,000 AF in WY 1983. Note that the median annual streamflow value at the San Clemente Dam site is considered a better indicator of "normal" or "typical" streamflow in the Upper Carmel River Basin. This median amount, i.e., approximately 51,000 AFY, is expected to occur or be exceeded 50% of the time.

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[1] Unimpaired flows refer to the natural flow conditions that existed in the basin prior to water supply development or that have been estimated would have existed in the absence of such development. Unimpaired flows are the flows that would have occurred over time without any surface water diversions, groundwater pumping, or reservoir effects such as flow regulation or evaporation.

36. **Exhibit DF-5** shows the estimated annual unimpaired flows in the Carmel River at the San Clemente Dam site for WY 1902 through WY 2006. **Exhibit DF-5** also indicates the water years that were classified as "dry' or "critically dry". These classifications or water year "types" were determined based on selected exceedence frequency values. These frequency values and associated annual runoff values are shown in **Exhibit DF-6**, which depicts the seven water year types that have been defined for runoff in the Carmel River Basin, i.e., extremely wet, wet, above normal, normal, below normal, dry, and critically dry.

37. As discussed above, the high-flow period in the Carmel River Basin usually occurs between December and May. As shown in Table 8-4 of the Draft EIR/EA (**Exhibit SWRCB-1**), at the 50% exceedence frequency, i.e., median value, the daily unimpaired flow in the Carmel River at the San Clemente Dam site is approximately 40 cfs in December, 100 cfs in January, 170 cfs in February, 170 cfs in March, 80 cfs in April, and 40 cfs in May. Similarly, at the 25% exceedence frequency, i.e., "wet" condition, the daily unimpaired flow in the Carmel River at the San Clemente Dam site is approximately 80 cfs in December, 270 cfs in January, 460 cfs in February, 370 cfs in March, 200 cfs in April, and 80 cfs in May.

38. As indicated in the Draft EIR/EA, streamflow in the Carmel River is measured continuously at six locations. Specifically, the USGS maintains two gages: Carmel River at Robles del Rio at River Mile[2] (RM) 14.4 and Carmel River Near Carmel at RM 3.2. The District maintains four gages: Carmel River below Los Padres Dam at RM 24.8, Carmel River at Sleepy Hollow Weir at RM 17.6, Carmel River at Don Juan Bridge at RM 10.8, and Carmel River at Highway 1 Bridge at RM 1.1.

[2] River miles are referenced from the river mouth, i.e., 0.0 mile, and increase as you move upstream.

39. **Carmel Valley Alluvial Aquifer:** The Carmel River below San Clemente Dam is underlain by alluvium that consists of poorly consolidated boulders, gravel, sand, and silt that were deposited and have been reworked by the Carmel River over the last 10,000 years. The thickness of the alluvium increases in a downstream order from zero feet above CAW's Carmel Valley Filter Plant to more than 200 feet west of Highway 1, near the river mouth. The typical thickness of the alluvium is between 50 and 100 feet. The alluvium, which forms the Carmel Valley Alluvial Aquifer, is unconfined and highly permeable, recharging rapidly after extended dry periods.

40. For descriptive and computer modeling purposes, the Carmel Valley Alluvial Aquifer has been divided into four subunits. Subunits 1 and 2 are collectively referred to as the *Upper Carmel Valley Aquifer* and subunits 3 and 4 are referred to as the *Lower Carmel Valley Aquifer*. In this context, the terms "Upper" and "Lower" refer to upstream and downstream reaches and do not refer to shallow versus deep zones of the aquifer. Hydrogeologically, the Carmel Valley Alluvial Aquifer is a single unit, with subsurface flow able to move from subunit 1 to subunit 4. The subunit divisions were made based the locations of streamflow gaging stations. A map and profile of the Carmel Valley Alluvial Aquifer is shown in **Exhibit DF-7**. This exhibit also shows the locations of CAW's production wells in the Carmel Valley.

41. The volume of groundwater storage in the Carmel Valley Alluvial Aquifer is a function of the geometry of the basin and the porosity of the sediments. Based on available information from logs of existing wells in the basin, District staff has estimated that the total groundwater storage capacity of the alluvial aquifer is approximately 48,000 AF. However, not all of the total storage volume is considered usable. For management and modeling purposes, the total groundwater storage capacity of the alluvial aquifer has been adjusted to exclude non-usable storage that is below the perforations of CAW's production wells and, in the coastal area of the aquifer,

storage that provides subsurface flow to the ocean to safeguard against seawater intrusion. The volume of usable groundwater storage in the Carmel Valley Alluvial Aquifer is estimated at 28,500 AF.

Q15. PLEASE DESCRIBE WATER AVAILABILITY CONDITIONS IN THE CARMEL RIVER BASIN.

42. In SWRCB Decision No. 1632, which addressed the question of the amount of water available for appropriation in the Carmel River system, it was noted that the "Carmel River should be considered at a future hearing for inclusion in the Declaration of Fully Appropriated Streams pursuant to Water Code Section 1206, et seq." (Footnote 36, page 34). In accord with this direction, the SWRCB concluded in Order No. WR 98-08 that the Carmel River system should be added to the Declaration of Fully Appropriated Streams for the period of May 1 to December 31. As a result of this order, no new permits for diversions of surface water in the Carmel River or its tributaries and subsurface water in the underlying alluvial aquifer, i.e., subterranean stream, during the May 1 through December 31 period can be approved.

43. Accordingly, Carmel River water is available for appropriation during the May to December period for diverters with valid rights such as Permit 7130B (October 1 to May 31) and Permit 20808 (November 1 to June 30), subject to SWRCB conditions. In addition, Carmel River water is available for appropriation for new diverters during the period from January 1 to April 30, subject to SWRCB approval and conditions.

44. The key conditions determining the amount of Carmel River water available for diversions under existing, changed, or new water right permits are the bypass flows recommended by the NMFS in their report, *Instream Flow Needs for Steelhead in the Carmel River, Bypass Flow*

Recommendations for Water Supply Projects Using Carmel River Waters, dated June 3, 2002. This report is included as **Exhibit KU-2**. These bypass flows represent instream flows that are needed to protect the aquatic resources in the Carmel River, including the Carmel River steelhead population.

45. The bypass flows represent minimum daily instream flow requirements for specific reaches of the Carmel River below Los Padres Dam to the Carmel River Lagoon for different water year types. The instream flow requirements are tied to different phases of the steelhead lifecycle, e.g., attraction, transportation, spawning, and emigration. During wet, above normal, normal, and below normal water years, i.e., approximately 75% of the time, the minimum instream flow requirements into the Carmel River Lagoon range from 40 to 200 cfs during the December 1 through May 31 period. During dry and critically-dry years, i.e., approximately 25% of the time, the minimum instream flow requirements into the Carmel River Lagoon range from 40 to 150 cfs during the December 1 through May 31 period. These minimum instream flow requirements are summarized in **Exhibit DF-8,** which is taken from **Exhibit KU-2**.

46. Note that this summary also includes a cumulative maximum daily diversion limit of 80 cfs during the December 15 to May 31 period. This maximum diversion limit applies to both CAW and non-CAW diversions of Carmel River water. The maximum diversion limit is intended to ensure that naturally-occurring high flows that are needed for channel maintenance and ecosystem function are preserved. In WY 2006, CAW's maximum daily diversions from the Carmel River during the December through May period ranged from 15 cfs in January to 25 cfs in May. During this same period, the estimated non-CAW maximum daily diversions from the Carmel River ranged from one cfs in December to six cfs in May. Therefore, the actual cumulative maximum daily diversion from the Carmel River during the December 2005 to May 2006 period

ranged from 16 to 31 cfs. For reference, the peak flow recorded at the USGS Carmel River Near Carmel gage in WY 2006 was 4,210 cfs, and occurred on April 5, 2006.

47. Under the bypass flow logic recommended by NMFS, the water right permittee must cease diversion of water when flow in the designated reach of the Carmel River is less than the specified rate. For example, during an attraction event in a normal year, diversions for the Phase 1 ASR project must cease whenever flow to the Lagoon, as measured at the Highway 1 Bridge gage, was less than 200 cfs. Note that, unlike the instream flow requirements that were specified for the New Los Padres Reservoir Project in 1995, MPWMD and CAW would not be required to make reservoir releases to maintain the specified flows in the specified reaches of the Carmel River as part of the Phase 1 ASR Project.

48. To quantify the amount of water available for diversion from the Carmel River for injection into the Seaside Groundwater Basin as part of the Phase 1 ASR Project, District staff modified the District's operations model, CVSIM, to include the minimum daily bypass flow requirements and maximum daily diversion rate. The analysis that was conducted for the Phase 1 ASR Project is similar to the *Water Availability Analysis* that was prepared for the District's Petition for Change to Water Right Permits 7130B and 20808 for a direct diversion project. Note that the Petition for Change submitted by MPWMD in April 2002 for direct diversion rights is different than the Petitions for Change submitted by MPWMD in September 2003 for the ASR Project, i.e., diversion to storage rights. The earlier Petition for Change is referenced because of the methodology that was used and is documented in the *Water Availability Analysis* that was requested by the SWRCB Division of Water Rights. This analysis is included as **Exhibit DF-9**.

49. As indicated in the report, the water availability analysis was conducted to determine whether or not additional Carmel River water is available for lawful diversion, based on current

water rights held by CAW and non-CAW diverters in the Carmel River basin. As explained, the analysis focused on the flows in the Carmel River that would have occurred if CAW's annual diversions from the Carmel River had been limited to no more than 3,376 AFY and non-CAW annual diversions from the Carmel River were no more than 2,940 AFY. By limiting simulated diversions to these levels, the analysis quantified the amount of water that would be available for diversion in excess of legal rights and instream flows needed to protect the environment.

50. **Exhibit DF-10** shows the monthly amounts of water in excess of the bypass flow recommendations adjusted for the NMFS and SWRCB maximum diversions rates. As shown, when the NMFS maximum daily diversion rate (80 cfs for CAW and non-CAW diverters) and the maximum direct diversion rate allowed under SWRCB Permit 20808 (42 cfs) are applied, the average annual amount of excess water that is available for appropriation is approximately 7,200 AFY. Similarly, the median amount of excess water that is available for appropriation is approximately 6,700 AFY. During wet years, more than 11,000 AFY is expected to be available. However, during dry years, no more than 1,700 AFY is expected to be available.

51. For the Phase 1 ASR Project availability analysis, the same approach as described above was used, but different parameters were specified. Specifically, for the CVSIM simulation, it was assumed that CAW and non-CAW users would divert up to 11,285 AFY and 2,790 AFY of water from the Carmel River, respectively. The annual limit specified for CAW is consistent with the maximum amount presently allowed under Order 95-10. By specifying this higher diversion amount for CAW, the analysis quantified the amount of water that is available for diversion in excess of CAW's current diversions that are allowed under SWRCB discretionary enforcement authority and the instream flows recommended by NMFS to protect the Carmel River steelhead.

52. In addition, for the Final EIR/EA simulations, it was assumed that the water for the Phase 1 ASR Project would be diverted by CAW wells in the reach between RM 5.5 and San Clemente Dam. Because the bypass flow recommended for steelhead spawning in the reach above RM 5.5 (90 cfs) is greater than the bypass flow recommended for the reach below RM 5.5 (60 cfs), the amount of water available for diversion for the Phase 1 ASR Project was reduced. This reduction caused the annual yield attributable to the Phase 1 ASR Project to be reduced from 1,050 AFY to 920 AFY. The change in the points of diversion was made to be consistent with the "downstream-to-upstream" diversion directive in Order 95-10 and was responsive to a comment submitted by the Carmel River Steelhead Association (CRSA).

53. Lastly, for the EIR/EA, only the NMFS maximum daily diversion rate of 80 cfs (approximately 159 AFD) for CAW and non-CAW diverters from the Carmel River was applied. The SWRCB maximum daily diversion rate of 42 cfs that was specified in Permit 20808 was not used because it is specific to direct diversions and does not apply to diversions to storage.

54. **Exhibit DF-11** shows the monthly amounts of water in excess of the bypass flow recommendations in the Carmel River system between San Clemente Dam and RM 5.5 during the December through May period for simulated Water Years 1958 through 2002, adjusted for the NMFS maximum daily diversion rate. As shown, the average annual amount of excess water that is available for appropriation is approximately 4,700 AFY. Similarly, the median amount of excess water that is available for appropriation is approximately 4,000 AFY. During wet years, more than 7,600 AFY is expected to be available. However, during dry years, no more than 1,000 AFY is expected to be available.

Q16. PLEASE DESCRIBE THE CURRENT CONSTRAINTS ON THE PHASE 1 ASR PROJECT AND MPWMD'S PENDING PETITIONS FOR CHANGE.

55. Besides the constraints imposed by the natural annual and seasonal variability of rainfall and runoff in the Carmel River system and the instream flow requirements recommended by NMFS to protect the Carmel River steelhead that are described above, the main constraints on the proposed Phase 1 ASR Project relate to adequate water rights and transmission capacity. Each of these is discussed below.

56. **Water Rights:** In order to move the Phase 1 ASR Project forward, MPWMD and CAW must obtain permanent water rights. For testing purposes, MPWMD has obtained ten Temporary Permits (1998-2007) that have allowed CAW water to divert "excess" Carmel River water for injection into the Seaside Basin. CAW's diversions from the Carmel River under the Temporary Permits for injection are separate from CAW's diversions from the Carmel River for customer service. CAW's diversions from the Carmel River for customer service are made under the rights recognized (3,376 AFY) in Order 95-10 and the diversions allowed (up to 7,909 AFY starting in Water Year 1997[3]) in Order 95-10 to protect public health and safety. During the test period, CAW's diversions for injection that were made under MPWMD's Temporary Permits have been additive to CAW's diversions for customer service made under CAW's recognized rights. For example, in WY 2006, CAW diverted 10,542 AF and 411 AF for customer service and injection, respectively, for a total of 10,953 AF. In WY 2003, CAW diverted 11,130 AF and 168 AF for customer service and injection, respectively, for a total of 11,298 AF. Note that, although CAW's

[3] This amount is calculated as the difference between the "conservation measure" required in Condition 3(b) of Order 95-10 for Water Year 1997 and each subsequent year, i.e., 11,285 AFY, and CAW's present legal rights, i.e., 3,376 AFY.

total diversions in WY 2003, i.e., 11,298 AF, exceeded the annual diversion limit specified in Order 95-10, CAW's diversions for customer service under its recognized rights, i.e., 11,130 AF, did not.

57. If MPWMD's Petitions for Change for the Phase 1 ASR Project are approved, CAW will continue to divert Carmel River water for customer service under its recognized rights and will divert Carmel River water for injection under its shared right with MPWMD. **Exhibit DF-12** shows the annual diversions that were simulated under CAW's existing rights for customer service and MPWMD and CAW's shared right for the Phase 1 ASR Project. As shown, for the 45-year period of analysis, CAW's diversions for customer service averaged 9,885 AFY and CAW's diversions for injection averaged 918 AF. CAW's total annual diversions, under its rights and its shared rights, are shown in the fourth column and average 10,803 AFY, ranging between 7,301 and 12,075 AF. The differences between CAW's total annual diversions and the annual diversion limit specified for CAW's diversions for customer service, i.e., 11,285 AFY, is shown in column five. **Exhibit DF-12** also shows the simulated annual flow of the Carmel River at the Lagoon with the Phase 1 ASR Project and associated water year classification.

58. The diversions values shown in **Exhibit DF-12** reflect the operations that were simulated for the Final EIR/EA. Namely, that reductions in CAW's diversions from the Carmel River during the June through November period will be made that are proportionate to the increased production from the Seaside Basin during this time that is attributable to the Phase 1 ASR Project.

59. To address this water right constraint, MPWMD has petitioned for changes to Permits 1730B and 20808, which authorize diversion of Carmel River water to storage. Subsequent to these petitions, which were submitted in September 2003, MPWMD executed an agreement with CAW to jointly hold all water right permits for the Phase 1 ASR Project. As a result, if MPWMD's Petitions for Change for the Phase 1 ASR Project are approved by SWRCB, then MPWMD and

CAW will have a legal right to divert and store up to 2,426 AFY of excess Carmel River water in the Seaside Basin during the December 1 through May 31 period. This right is sufficient for the successful operation of the proposed Phase 1 ASR Project

60. **Transmission Capacity:** As described in the Draft EIR/EA, CAW's ability to deliver sufficient water to the Phase 1 ASR Project site for injection, while meeting customer demand, is a significant limiting factor. Presently, a temporary, above-ground pipeline that connects the Phase 1 ASR Project site with CAW's existing distribution system at the east end of Hilby Avenue in Seaside has been constructed, but is not operational. As designed, this pipeline is limited to a transmission capacity of 3,000 gallons per minute (gpm) or 6.68 cfs. This transmission limit constrains the amount of excess Carmel River water that can be diverted and injected into the Seaside Basin to approximately 13.3 AF per day, or 410 AF per month, or 2,426 AF per injection season, i.e. December 1 through May 31. **Exhibit DF-13** shows the simulated monthly amounts of excess Carmel River water that were diverted for the Phase 1 ASR Project. As shown, an average of approximately 920 AFY of Carmel River water was diverted for injection, given CAW's current limited transmission capacity. Note that this diversion (920 AFY) amount is approximately 20% of the amount of excess Carmel River water that would be available for diversion (4,680 AFY) shown in **Exhibit DF-11**.

61. The injection capacity for the Phase 1 ASR project was sized to match CAW's available transmission capacity. Specifically, the injection capacity for the two ASR wells that were constructed for the Phase 1 ASR Project -- ASR-1 and ASR-2 -- is 3,000 gpm or 13.3 AFD, with both wells operating at the same time.

62. To address this transmission capacity constraint, MPWMD and CAW are working together to bring the temporary pipeline between the ASR site and Hilby Avenue on-line for the

WY 2008 injection season and construct another pipeline from the Hilby Avenue junction south to Highway 218 (Canyon Del Rey Boulevard) to ensure an uninterrupted supply for injection.

Q17. PLEASE DESCRIBE THE CARMEL VALLEY SIMULATION MODEL AND EXPLAIN HOW IT WAS USED BY MPWMD TO EVALUATE THE PHASE 1 ASR PROJECT.

63. The Carmel Valley Simulation Model (CVSIM) refers to a family of computer-based simulation models developed by MPWMD to evaluate the daily performance of the Monterey Peninsula Water Resources System (MPWRS) under varying physical, structural, and operational conditions. The MPWRS includes surface water in the Carmel River mainstem and tributaries and groundwater in the Carmel Valley Alluvial Aquifer and Coastal Subareas of the Seaside Groundwater Basin (**Exhibit J0-2**). These resources are connected by natural and man-made links. Subsurface inflows from the Inland Subareas of the Seaside Groundwater Basin are included in the mass balance calculations for the Coastal Subareas. The MPWRS was defined to reflect MPWMD staff's understanding of the water resources in the Monterey Peninsula area and the interrelationships among these resources. The definition of the MPWRS may change as a greater understanding of the resource is gained or as additional areas are developed.

64. CVSIM operates on a daily time-step and incorporates both surface and groundwater responses and interactions. The model is a dynamic accounting model based on the continuity equation, i.e., inflow – outflow = change in storage. CVSIM accounts for inflows, outflows, and storage changes in two surface reservoirs and five groundwater subunits and subareas. In addition to simulating basin hydrologic processes within the MPWRS, CVSIM includes options for simulating the effects of various facilities, operations, demand management programs, and instream flow requirements. CVSIM is a "lumped parameter" model that aggregates the effects of the

simulations in the Carmel River and underlying alluvial aquifer by river reach. CVSIM includes CAW and non-CAW diversions in the Carmel River and Seaside Groundwater Basins.

65. For the Draft EIR/EA, a new version of CVSIM3[4] (Version 6.3) was developed to assess the impacts of the proposed Phase 1 ASR Project. Version 6.3 was based on an earlier version of CVSIM3 that was used for the impact analysis for MPWMD's *Sand City Seawater Desalination Project*. For the Phase 1 ASR Project EIR/EA, CAW's production sequence in CVSIM3 was changed. In earlier versions, the production needed to meet CAW's simulated daily demand was met by first operating CAW's production wells in the Coastal Subareas of the Seaside Basin and then operating CAW's production sources -- surface water diversions and groundwater extractions – in the Carmel River Basin. For the Phase 1 ASR EIR/EA, CAW's production sequence was reordered so that the daily demand was first met by sources in the Carmel River Basin, and then by sources in the Coastal Subareas of the Seaside Basin. The reordering was done to allow a determination of whether or not there was excess flow in the Carmel River available for diversion and injection into the Seaside Basin.

66. For the Final EIR/EA, a revised version of CVSIM3 (Version 6.4) was developed to address concerns expressed by commenters on the Draft EIR/EA. Specifically, two revisions were incorporated into CVSIM3. First, the logic was revised to require that the water diverted from the Carmel River by CAW for injection would be supplied by wells in the reach between RM 5.5 and San Clemente Dam. This revision was made to ensure that the operations were consistent with Condition 5 of Order 95-10 that requires CAW to satisfy the water demand of its customers by extracting water from its downstream wells to the maximum extent feasible. Second the logic was revised to include more explicit rules governing how and when the injected water in the seaside Basin would be recovered. These "recovery" rules are similar to the bypass flows recommended by

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[4] CVSIM refers to a family of simulation models. CVSIM1 has been used to assess the performance of Carmel River mainstem dam alternatives. CVSIM2 is used to simulate unimpaired flow conditions, and CVSIM3 is used to simulate the performance of the MPWRS under No-Project or non-dam water supply alternatives.

NMFS that govern how and when water can be diverted from the Carmel River for injection. The recovery rules were designed to provide assurance that the excess water diverted from the Carmel River by CAW and injected into the Seaside Basin during the high-flow period would be used by CAW to meet customer demand during the low-flow period, rather than pumping from Carmel River sources. The recovery rules were developed to provide an explicit accounting procedure to track the water injected, stored, and recovered over time. Additional details regarding project operations, project yield, and project benefits, as simulated by CVSIM3, are provided below.

Q18. PLEASE DESCRIBE THE PROPOSED OPERATIONS FOR THE PHASE 1 ASR PROJECT.

67. As indicated in the Final EIR/EA, the simulated operations for the Phase 1 ASR Project were revised to include more explicit rules governing how and when the injected water in the Seaside Basin would be recovered. The recovery rules were developed to provide assurance that the injected water would be used to offset CAW production from the Carmel River during the June through November period. Under the proposed recovery rules, the amount of water that can be recovered each year is tied to the amount of water that was injected during the current year (i.e., during the preceding injection season, and if necessary, injected water in storage from previous years). For the Final EIR/EA, the amount of diverted for injection, the amount of water injected, the amount of water recovered, and the amount of water in storage in the Seaside basin were tracked on a daily basis. In this context, CAW's production of non-ASR water, i.e., naturally-occurring water, from the Seaside Basin was tracked separately from CAW's production of ASR water, i.e., injected water, from the Seaside Basin.

68. The proposed recovery rules were incorporated into the CVSIM3 logic for the Final EIR/EA and are described in various responses to comments in the Final EIR/EA, which refer to the negotiations with CDFG and NMFS that were being held concurrently to resolve their protests of

the District's Petitions for Change for the Phase 1 ASR Project. A concise description of the recovery rules is provided in MPWMD Technical Memorandum 2006-01, which is included as **Exhibit DF-14**. As indicated on page six of the Technical Memorandum, the rules were developed cooperatively with staff from CDFG and NMFS and were intended to be included as permit conditions of the water rights for the Phase 1 ASR Project, if the MPWMD's Petitions for Change were approved. As noted, the final conditions would be prepared and approved by the SWRCB. As indicated, MPWMD and CAW would produce ASR water from storage in the Seaside Basin in accordance with the 11-step protocol described on pages six through eight of the Technical Memorandum.

69. The recovery protocol in **Exhibit DF-14** is essentially the same as the recovery protocol presented in the *Stipulation Relating to Petitions for Change to Permits 7130B and 20808* that was submitted to SWRCB by MPWMD and CAW on August 20, 2007 (**Exhibit MPWMD-2**). Specifically, the protocol described in the Water Management Plan, which is referenced as Exhibit 1 in the proposed change to Condition 17, is based on the protocol in the Technical Memorandum.

70. The major difference between the two protocols is the language in paragraph 9 of the *Water Management Plan*. As proposed, paragraph 9 requires that the "actual amount of ASR water that is recovered each year will be subtracted from CAW's total annual diversions allowance from the Carmel River sources for that year". This means that, under the current Order 95-10 limit, if 285 AF of ASR water were recovered and delivered to the CAW distribution system to meet customer demand, then CAW's diversion limit from the Carmel River would be reduced by 285 AF that year to 11,000 AF. Similarly, if 1,500 AF of ASR water were recovered and delivered to the CAW distribution system to meet customer demand, then CAW's diversion limit from the Carmel River would be reduced by 1,500 AF that year to 9,785 AF. Conversely, if no ASR water was recovered and delivered to the CAW distribution system to meet customer demand, then CAW's diversion limit from the Carmel River would not be reduced that year and would remain at 11,285 AF. In all cases, CAW would have access to 11,285 AF of production to meet customer demand.

The actual amount that CAW's diversion allowance from the Carmel River would be reduced in any year will depend on the actual amount of water that is recovered in that year. The actual amount of water that would be recovered will, in turn, depend on the amount of water injected that year and the amount of carryover ASR water that is available that year.

Q19. PLEASE DESCRIBE THE EXPECTED YIELD FOR THE PHASE 1 ASR PROJECT.

71. As described in the Final EIR/EA, the expected average annual yield for the Phase 1 ASR Project is 920 AFY. **Exhibit DF-15** shows the simulated annual amounts of water injected and recovered in the Seaside Basin for the period of analysis. **Exhibit DF-15** also shows the cumulative amount of ASR water in storage at the end of each water year and the change in ASR storage for each water year. As shown, the annual amount recovered, which is equivalent to the annual yield for the Phase 1 ASR Project, ranges from a minimum of 31 AF in WY 1990 to a maximum of 1,476 AF in a number of years, e.g., WY 1985, WY 1995, and WY 2000. **Exhibit DF-16** shows the simulated monthly amounts of water injected and recovered in the Seaside Basin for the period of analysis.

72. As shown, the maximum annual amount recovered with the Proposed Phase 1 ASR Project is approximately 1,500 AF. This value was derived from a series of CVSIM3 simulations and represents the maximum amount of water that can be recovered in any year such that, as simulated, the long-term average amount of water diverted injection during the December through May period approximates the long-term average amount of water recovered during the June through November period for CAW customer service. By limiting the amount of water recovered each year to no more than 1,500 AF, a portion of the injected water is allowed to accumulate in storage during wet years and is available to augment the amount available for recovery during dry years.

73. As noted in the EIR/EA, the incremental firm yield associated with the proposed Phase 1 ASR Project is part of CAW's overall yield from the MPWRS. For both simulations, i.e., No-Project and Phase 1 ASR Project, overall annual production from the MPWRS to serve CAW's main system was set at a maximum of 15,285 AF. Therefore, any increase in CAW's ability to reliably divert from the Coastal Subareas of the Seaside Basin due to the Phase 1 ASR Project would result in a corresponding decrease in CAW's need to continue to divert from the Carmel River alluvial aquifer. None of the increased yield from the Phase 1 ASR Project will be provided to new connections or intensified existing uses.

Q20. PLEASE DESCRIBE THE EXPECTED IMPACTS ON CARMEL RIVER STREAMFLOW AND CARMEL VALLEY ALLUVIAL AQUIFER STORAGE FROM THE PHASE 1 ASR PROJECT.

74. The potential changes to Carmel River streamflow and Carmel Valley Alluvial Aquifer storage from the proposed Phase 1 ASR Project were analyzed in the EIR/EA and are summarized below. The changes expected during the normal high-flow period (December through May) are presented first and the changes expected during the normal low-flow period (June through November) are presented next.

75. **Carmel River Flow During High-Flow Periods:** Potential changes to Carmel River streamflow from increased diversions during high-flow periods for the Phase 1 ASR Project are **less than significant**. As modeled, increases in CAW's diversions from the Carmel River system would be limited to the December through May high-flow period. Further, diversions for the Phase 1 ASR Project would only be allowed when streamflow in the Carmel River exceeds the bypass flows recommended by NMFS. For the period of analysis, the annual bypass flow requirement in the Carmel River between San Clemente Dam and RM 5.5 averaged 36,710 AFY

and ranged from a minimum of 19,900 AF in WY 1977 to a maximum of 53,340 AF in WY 1983. The median bypass flow requirement at the Carmel River Lagoon was 37,200 AF.

76. **Carmel Valley Alluvial Aquifer Storage During High-Flow Periods:** During the high-flow period of wet and normal years, the proposed Phase 1 ASR Project would cause **less than significant** changes in Carmel Valley Alluvial Aquifer storage. During the high-flow period of dry years, the proposed Phase 1 ASR Project would result in increased storage in the Carmel Valley Alluvial Aquifer during the first three months of the high-flow season (December through February). The increased storage during these months would be due to the reduced pumping from the Carmel Valley Alluvial Aquifer during the preceding low-flow season and is considered a **beneficial change**. During the high-flow period of critically-dry years, the proposed Phase 1 ASR Project would result in increased storage in the Carmel Valley Alluvial Aquifer for the entire high-flow season (December through May), which is also considered a **beneficial change**.

77. **Carmel River Flow During Low-Flow Periods:** During low-flow periods, the Phase 1 ASR Project would cause **less than significant** changes in Carmel River flow at the locations simulated by CVSIM3. It should be noted that, although increased streamflow at the Near Carmel gage was not simulated with the Phase 1 ASR Project, it is likely that streamflow in the 6.4-mile reach between the Narrows (RM 9.6) and the Near Carmel site (RM 3.2) would flow farther and persist longer with the Phase 1 ASR Project. This expectation follows from the fact that, with the Phase 1 ASR Project, more groundwater would be in storage in subunit 3 of the Carmel Valley Alluvial Aquifer and this increased storage would be in the upstream portion of subunit 3. Accordingly, given the same amount of surface water into subunit 3 as the No-Project alternative and greater storage and less pumping with the Phase 1 ASR Project, it is likely that streamflow will flow farther and persist longer before it would percolate into the underlying alluvial aquifer.

78. **Carmel Valley Alluvial Aquifer Storage During Low-Flow Periods:** During low-flow periods, the Phase 1 ASR Project would cause significant **beneficial changes** in Carmel Valley Alluvial Aquifer storage. During low-flow periods of wet years, the Phase 1 ASR Project

would result in increased storage in the Carmel Valley Alluvial Aquifer during most of the low-flow season (July through November). During low-flow periods of normal, dry, and critically-dry years, the Phase 1 ASR Project would result in increased storage in the Carmel Valley Alluvial Aquifer during the entire low-flow season (June through November). This beneficial change is due to the reduced pumping from the Carmel Valley Alluvial Aquifer during the preceding low-flow period.

Q21. PLEASE DESCRIBE THE PROPOSED MITIGATIONS MEASURES FOR THE PHASE 1 ASR PROJECT THAT RELATE TO CARMEL RIVER STREAMFLOW AND CARMEL VALLEY ALLUVIAL AQUIFER STORAGE.

79. The principal proposed mitigation measure for the Phase 1 ASR Project is that the project will operate in accordance with all of the bypass flows recommended by NMFS in 2002. In addition, CAW would be required to utilize water that is available during the low-flow season in the Seaside Basin due to the Phase 1 ASR Project to reduce unlawful diversions from the Carmel River during this time, to the maximum extent feasible.

Q22. SHOULD THE SWRCB APPROVE MPWMD'S PETITIONS FOR CHANGE TO PERMITS 7130B AND 20808 FOR THE PHASE 1 ASR PROJECT?

80. Yes, the SWRCB should approve MPWMD's Petitions for Changes to Permits 7130B and 20808. As discussed above, there is water in the Carmel River system that is available for appropriation during the December through May high-flow period. By storing this water in the Seaside Groundwater basin for recovery and customer use during the June through November low-flow season, CAW will be able to reduce its unlawful diversions from the Carmel River during this time. This reduction in CAW diversions in the Lower Carmel Valley during the low-flow period will result in increased groundwater storage and more persistent streamflow in the uppermost

reaches of Subunit 3 of the Carmel Valley Alluvial Aquifer. This increased storage and streamflow will, in turn, benefit the Carmel River steelhead population.

Q23. UNDER WHAT CONDITIONS SHOULD THE SWRCB APPROVE MPWMD'S PETITIONS FOR CHANGE TO PERMITS 7130B AND 20808?

81. The SWRCB should approve MPWMD's Petitions for Change to Permits 7130B and 20808 under the conditions developed jointly by MPWMD, CAW, NMFS, and CDFG in the protest dismissal negotiations. These conditions were submitted to the Water Rights Division of the SWRCB on August 20, 2007, and are included as **Exhibit MPWMD-2**. These conditions reflect the assumptions that were made for the simulations and impact analyses that were conducted for the Draft and Final EIR/EA for the proposed Phase 1 ASR Project, and are included as **Exhibit SWRCB-1**.

82. If any of the proposed permit conditions in the settlement agreement are inappropriate or unnecessary for SWRCB's approval of MPWMD's Petitions for Change, they should be identified and addressed by MPWMD, CAW, NMFS, and CDFG in a separate agreement. All conditions imposed by SWRCB on Amended Permits 7130B-1 and 20808-1 for the proposed Phase 1 ASR Project should relate directly to this project and should be clear and enforceable by the SWRCB.

Q24. DO YOU WISH TO CLARIFY OR CORRECT ANY STATEMENTS MADE BY OTHERS THROUGH PREPARED TESTIMONY SUBMITTED FOR THIS MATTER?

No, not at this time.

I, Darby W. Fuerst, declare under penalty of perjury that I have read the foregoing "Testimony of Darby W. Fuerst" and know its contents. The matters stated in it are true of my knowledge except as to those matters which are stated on information and belief, and as to those matters I believe them to be true.

Executed on _____, 2007, at Monterey, California.

MONTEREY PENINSULA WATER
MANAGEMENT DISTRICT

_____
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