California Sportfishing Protection Alliance

"An Advocate for Fisheries, Habitat and Water Quality"

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Ms. Jennifer Marr
Statewide Infrastructure Investigations Branch
Division of Statewide Integrated Water Management
California Department of Water Resources
Jennifer.Marr@water.ca.gov
Via e-mail

Dear Ms. Marr:

The California Sportfishing Protection Alliance (CSPA) respectfully submits these comments on the Discussion Draft of the White Paper entitled *Flood MAR – Using Flood Water for Managed Aquifer Recharge to Support Sustainable Water Resources* (November, 2017, hereinafter *MAR Discussion Draft*).

CSPA believes there may be opportunities for managed groundwater recharge using high flows in rivers in some circumstances. However, CSPA is concerned about the loss of surface flows, particularly in watersheds that are already over-appropriated and in rivers in which required flows are already insufficient.

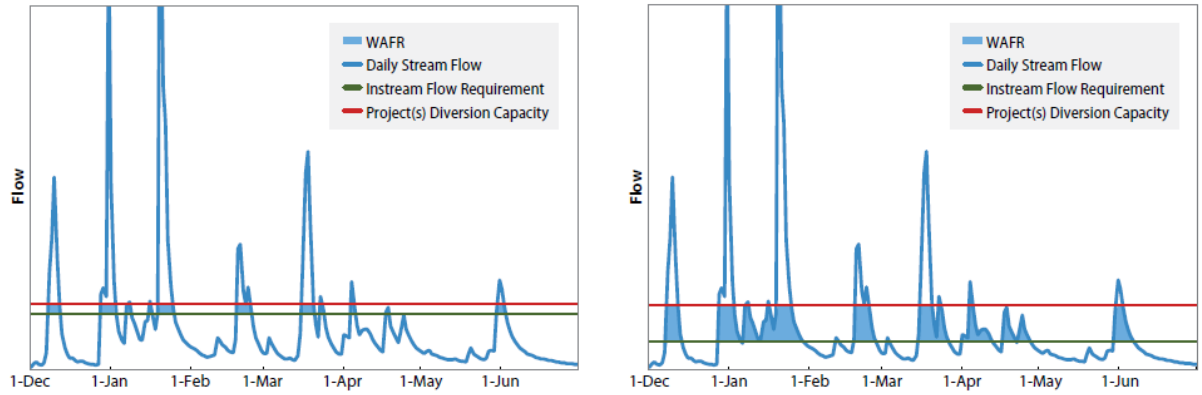
The diversion of surface water to groundwater in overappropriated watersheds and/or from rivers whose flow requirements are inadequate to protect instream resources defeats the stated purpose of increasing sustainability. Therefore, CSPA recommends several general approaches for placing appropriate limits on diversions of surface water to groundwater. CSPA also recommends several policy approaches that may benefit surface water and groundwater resources, as well as the people and other life forms that these resources support. Finally, CSPA comments on the necessary legal framework for using surface water to replenish groundwater.

Hydrological framework of "flood flows"

The *Draft Water Available for Replenishment Report* (hereinafter, *Draft WAFR Report*, January, 2017 available at: https://d3.water.ca.gov/owncloud/index.php/s/FUKYqcl1LblWTeZ) recognized that there is a potential range of surface water that may be available for replenishment of groundwater. This range depends on both regulatory and physical limitations. Generally, pages 25-27 of the *Draft WAFR Report* discuss these options. The *MAR Discussion Draft* figures 7 and 8 borrow from pages 25-27 of the *Draft WAFR Report*.

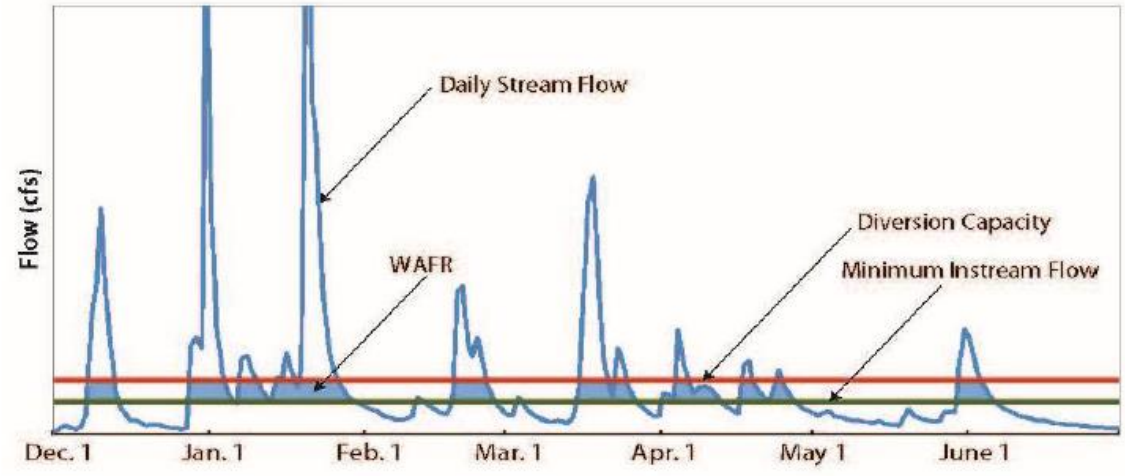
Below is pasted Figure 4 from p. 25 the *Draft WAFR Report.* This figure conceptually demonstrates potential ranges of surface water available for groundwater replenishment.

Figure 4. Lower Uncertainty Range Estimate (left) Upper Uncertainty Range Estimate (right) Conceptual Projects, with WAFR for Multiple Streams



The present *MAR Discussion Draft* downplays the important nuance that the potential range incorporates. Figure 7 in the *MAR Discussion Draft* is pasted below:

Figure 7. Surface Water Available for Replenishment



The narrative in the *MAR Discussion Draft* that is directly below this Figure 7 reads as follows:

> This white paper uses the term high flows to designate the flows in a channel that are above regulatory instream flow requirements (the combination of regulatory environmental/water quality flows and water required to satisfy water rights). A similar designation was used in the WAFR analysis conducted for SGMA. It generally considered surface water available when streamflow exceeded existing water demands

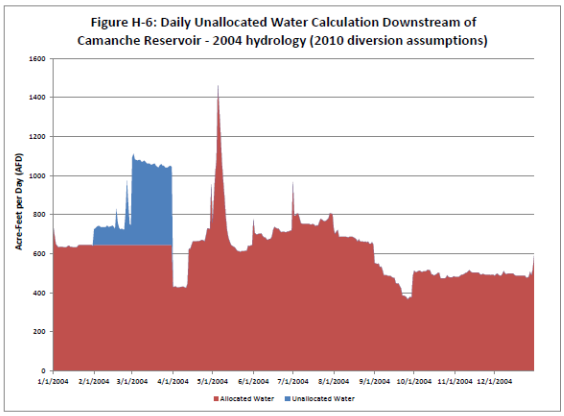
and minimum instream flow requirements, and provided some opportunity for additional beneficial use. (*MAR Discussion Draft*, p. 19).

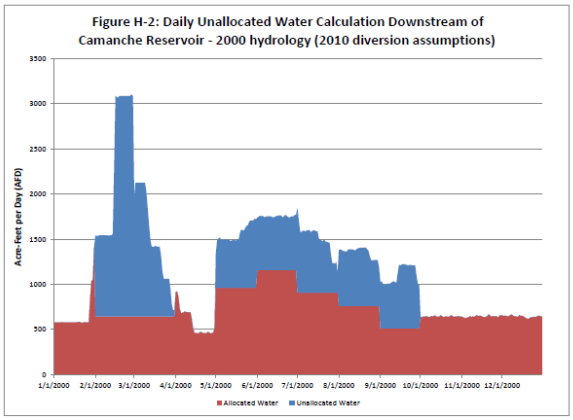
This narrative on p. 19 of the *MAR Discussion Draft* contains an oversimplification that obscures a fundamental point. All streamflow in a river that exceeds "existing water demands and minimum instream flow requirements" is not necessarily ***available*** for appropriation for groundwater replenishment or any other particular use. It is fair to say that it is unallocated or unappropriated. However, whether it is "available" is a legal and regulatory question that requires definition.

The figures pasted above are helpful in conceptualizing availability. However, it is important to recognize their limitations. The hydrographs represented above generally represent an unregulated system, or a system without storage. These hypothetical hydrographs are driven by unimpaired flow. In an unregulated system, setting a higher minimum instream flow does more than allow less total diversion of water out of the system. It also maintains much of the hydrological variability that is achieved during small flow pulses. In the contrasting hydrographs shown above from Fig. 4 of the *Draft WAFR Report*, a regulatory requirement that allowed the lower minimum flow in the hydrograph on the right would mostly or entirely eliminate the small flow spikes that (without diversion for replenishment) currently appear in January, April and May.

If the hydrographs above represented a regulated system, the green line would be the required minimum instream flow. Assuming it was on hand, storage would make up the differential between the blue line and the green line whenever the blue line fell below the green line. Thus, the blue line would follow the green line in those cases where the blue line now falls below the green line. A real-world example is found in the two figures of hydrographs pasted below that represent actual annual flow in the Mokelumne River at the Camanche gage just downstream of Camanche Dam. These are from the document entitled "*MokeWISE Program Final Memorandum*: *Water Availability Analysis* (9 Jan. 2015). The document is available at: https://azslide.com/appendix-g-water-availability-analysis_59c210bc1723dd7d5d1d1ed1.html[1] Note that the units for the y-axis in the hydrographs below are acre-feet per day, not cfs.

[1] "MokeWISE" was a voluntary stakeholder collaborative funded by a DWR grant. The collaborative evaluated opportunities and obstacles for water development projects in the Mokelumne River watershed, as well as opportunities for habitat improvements, and issued a final report. Appendix G of that report is titled "Water Availability Analysis" and is the source of the figures below.





Each hydrograph above represents a calendar year. The red shaded area represents "allocated water": water that is required for minimum instream flow plus water released to meet downstream water deliveries. The blue shaded area represents "unallocated water." Note that the scales on the y-axis are different: 2000 was a much wetter water year than 2004 in the Mokelumne watershed.

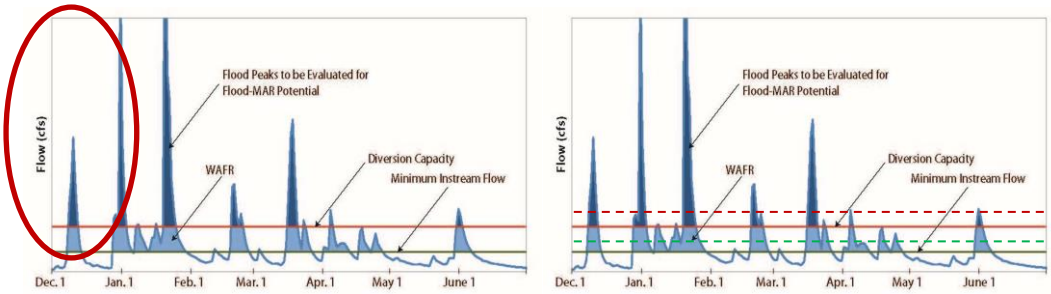
In the left-hand hydrograph above (for the year 2004), the horizontal line at the top of the red area in the first three months generally represents the flow requirement: there are few required downstream deliveries until the irrigation season starts. The blue area from about February 1 through April 1 represents flood releases. In 2004, irrigation deliveries evidently started in mid-April, which is apparent from the sharp increase in releases at that time. By the beginning of October, releases are once again largely limited to the required instream flow; the required flow increased on October 1. Since 2004 was a relatively dry year, there were no flood releases after the spring. The large spike on about the first of May was likely a release to stimulate outmigration of juvenile salmon.

The right-hand hydrograph above (for the year 2000) shows the hydrograph for a wetter water year. Wet year minimum flows are higher. Irrigation deliveries did not start until about May 1. There are two sets of flood releases in 2000: one set in the winter and spring to stay under the flood curve, and a second set from late spring into the fall to bring Camanche Reservoir down to the winter flood storage curve that goes into effect in early November. As CSPA understands East Bay Municipal Utility District's (EBMUD) operation of Camanche Reservoir, the timing and volumes of the spring releases in the winter-spring of 2000 were largely required by the Army Corps' flood curve. However, while the volume of the summer-fall releases was largely required by the Army Corps' requirement to draw down the reservoir to a specified level, EBMUD had considerable discretion about the timing of the summer-fall releases.

Additional approaches to defining water available for replenishment: unregulated systems

Using the hydrographs reproduced above for both unregulated and regulated systems, it is possible to consider additional approaches to defining "available" water.

The *Draft WAFR Report* contemplates different minimum flow levels (as in the unregulated hydrographs shown above). Below certain levels, no diversions for replenishment would be allowed. But above the minimum flow level, diversion would be allowed up to the capacity of the diversion works. A different approach would be to allow no diversions from the first two pulses of the water year, as illustrated in the modified hydrograph shown on the left below:



No diversion for replenishment would be allowed of the pulses inside the red circle. A variation on this approach would be to set a threshold in acre-feet, prior to which no diversions for replenishment would be allowed. One could compare this to a deductible in an insurance plan.

A second variation, shown on the right above, would be to restrict diversions above a specificed minimum instream flow to a ***percentage*** of the flow above the minimum. One could compare this to a co-payment in an insurance plan. Limiting diversion to a percent of flood flows (flows above the minimum required flow and the flow needed to meet existing deliveries) would have the effect of maintaining some of the shape of the hydrograph. It would also increase the flow level at which the capacity of the diversion works was reached. While it is more difficult to demonstrate this visually on a conceptual graph (i.e., without re-graphing actual data), the dotted green line represents where the hydrograph in the range below the dotted red line might peak if the hydrograph did not exceed the dotted red line.

The set of hydrographs from the Mokelumne reproduced from the MokeWISE Report above allows visualization of the additional conceptual approaches in a regulated system to the use of "flood flows" for groundwater replenishment.

In a year like 2004 (Figure H-6), the total amount of flood flows was on the order of 15,000 acre-feet: 400 acre-feet per day for about a month, plus a small additional increment. In this circumstance, it would be appropriate to disallow any diversion for groundwater replenishment. The instream benefit would greatly outweigh the recharge benefit. The "deductible" concept would be appropriate here.

In 2000 (Figure H-2), there were two distinct sets of flood releases. The first was during the time when unregulated runoff was entering Camanche Reservoir (and EBMUD Pardee Reservoir immediately upstream of Camanche). Although it would be appropriate to limit diversion for replenishment to a percentage of the flood flows, in much of this year the size of any diversion works would likely limit such diversion to a small percentage in any case. A good rule of thumb for required pass-through of inflow to the Bay-Delta would be a percent of

February-June unimpaired flow, as suggested conceptually by the State Water Board for the update of the Bay-Delta Plan.

The summer "flood flows" shown in the Mokelumne River in the year 2000 represent release of stored water from EBMUD's facilities or from PG&E's reservoirs farther upstream. Much of the Mokelumne River fisheries benefit of these releases would be improved water temperature for resident or oversummering *O. mykiss*. However, flow through the Delta could also be beneficial in maintaining the Low Salinity Zone west of the Delta. A percent of the flow would again be an appropriate consideration.

One can imagine a situation in which an entity would pay EBMUD to store water in Camanche Reservoir for summer release for downstream replenishment. This opportunity might be exercised in drier years, so that some recharge benefits were gained and diversion facilities could be used even in years without flood flows. Under these circumstances, it is more conceivable that full diversion of this stored water would be allowed. The release of this stored water, over and above minimum requirements and water needed for other downstream diverters, could still have a summer water temperature benefit in the Mokelumne River upstream of the point of diversions, assuming of course that the river would be used for conveyance to the point of diversion for groundwater replenishment.

Water Rights

Another way of making the diversion of surface water for groundwater replenishment more acceptable is to use existing water rights. This is particularly important in overappropriated watersheds. Bluntly, senior diverters in some overappropriated watersheds need to reduce their irrigation diversions in order to maintain a sustainable water balance. The over-diversion of water, particularly to new acreage, consititutes in the opinion of CSPA an unreasonable use of water. One way of maintaining the water rights associated with these senior diverters would be to require a reduction of irrigation diversions and routine water sales from the baseline condition, but to allow diversion for groundwater replenishment up to the full amount of the water right in very wet water years such as 2017.

If, for example, an irrigation district were required to reduce its baseline diversions by 10% in all water years, it could divert up to that 10% for groundwater replenishment in very wet years like 2017. In most watersheds, there would still be substantial flood flows in years like 2017 that were not diverted for replenishment or for irrigation. This would be a more sustainable business model than the current rags-or-riches paradigm that plagues irrigators in many watersheds. Under an improved model, irrigation districts would deliver as a baseline condition an achievably smaller but more reliable amount of irrigation water. Using the generally unused portion of their water right for replenishment in very wet years would create a more reliable groundwater situation to call on in critically dry years or in dry year sequences.

In any event, there are additional water rights concerns that groundwater replenishment raises. Groundwater replenishment is not a designated beneficial use. CSPA does not support making it one. Allowing water rights simply to divert surface water to underground storage will in all likelihood perpetuate the rob-Peter-to-pay-Paul paradigm that water users in many

overappropriated watersheds seem all too eager to apply. Devoting a portion of existing rights to recharge, within the constraints of reasonable use, is a better model. New rights may be possible, with long-term demonstration of beneficial use of water. However, new rights would need to be carefully conditioned in recognition of the importance of flood flows and would need to preserve the value and instream functions of existing flood flows.

Finally, diverting water for groundwater replenishment under a never-ending series of temporary rights or emergency proclamations is unacceptable. Groundwater replenishment is going to occur. It needs an appropriate legal framework. It needs real water rights for the diversion of surface water. It needs CEQA review.

Conclusion

In sum, the presence of water in a surface river or stream, over and above the sum of the required minimum instream flow and water required for existing diversions, does not make that water "available" for replenishment. It is important to maintain the existing benefits of high flows. This letter has suggested some conceptual approaches to maintaining those benefits, keeping any diversion of surface water for groundwater replenishment within the framework of reasonable use. In addition, the use of surface water for groundwater replenishment needs to take place within the appropriate legal framework of real (not temporary) water rights and CEQA review.

Thank you for the opportunity to comment on the Discussion Draft of the White Paper entitled *Flood MAR – Using Flood Water for Managed Aquifer Recharge to Support Sustainable Water Resources.*

Respectfully submitted,

Chris Shutes
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California Sportfishing Protection Alliance