



May 3, 2016

Ms. Sarah Sugar
State Water Resources Control Board
Division of Water Rights
P O Box 2000
Sacramento, CA 95812-2000

SUBJECT: STATE WATER RESOURCES CONTROL BOARD STAFF WORKSHOP ON APRIL 26, 2016 TO SOLICIT COMMENTS REGARDING FEES AND PROCESSING FOR TEMPORARY PERMITS FOR GROUNDWATER RECHARGE AND STORAGE

Dear Ms. Sugar:

E-PUR is pleased to provide our comments on the workshop content and proposed fees for Temporary Permits for Groundwater Recharge and Storage. The April 26th workshop was an excellent forum for both the information presented and the input provided by other members of the audience. We recognize that the official deadline for comments was last Friday April 29th and thus these comments are not timely.

I provided some spontaneous comments at the April 26th workshop in light of the three pending permit filings E-PUR is helping to prepare for our clients under this Temporary Permits program for diversion of high-precipitation events under Executive Order B-36-15 ("the EO"). Some of the commentary I provided on April 26th in regard to fees is supported by E-PUR's recent work filing for Limited Water Use Licenses and Temporary Water Rights Transfers in Oregon where I am a Certified Water Rights Examiner. Those Limited Licenses and Temporary Transfers bear some of the characteristics of a Temporary Permit in California in terms of their durability and thereby their associated filing fees. Time was short to provide more formal comments but our interest in providing potentially useful comments to aid the State Water Board's formulation of these current Temporary Permits for Groundwater Recharge and Storage under the EO is high. As a result we took our thoughts forward from an internal review with clients to provision of the following written comments to you after your deadline. I must state that these comments are solely the responsibility of E-PUR as to their content.

Our comments are divided into three areas that we divided out from the workshop announcement and presentations,

(1) TEMPORARY PERMIT FEES UNDER THE EO

(2) DEMONSTRATION OF BENEFICIAL USE FROM TEMPORARY PERMITS UNDER THE EO, AND

(3) THRESHOLD CRITERIA FOR WATER CONSIDERED AVAILABLE FOR DIVERSION IN TEMPORARY PERMITS UNDER THE EO

COMMENTS FOR TEMPORARY PERMIT FEES UNDER THE EO

A low flat-fee structure for these types of Temporary Permits under the EO is thought to be appropriate. Given the uncertainty of both quantities of water available for diversion in any 180-day period and the quantity or rate at which diverted water can be recharged to groundwater the value of the trial project is unknown. The uncertainty, the short duration, and the need to encourage such projects suggests that the current fee structure could be modified to range between perhaps \$100 and \$1,200. The setting of specific

26 East Wyandotte Street
Stockton, CA 95204
Phone: (209) 451-5933

fees for a Temporary Permit between the two end points could perhaps be based upon the number of points of diversion (PODs), places of use (POU), and/or areas of recharge (AOR). Thus a 1 POD, 1 POU, 1 AOR project would cost \$100 with an additional \$100 for each additional POD, POU, or AOR up to a maximum of \$1,200. This would provide for staff review and filing of each of the mechanistic points of law in each permit application. As commenters from the two issued Temporary Permits under the EO in 2016 noted on April 26th, higher permit fees would deter such projects coming to fruition particularly in light of the multitude of other challenges they have; for instance the potential for consequential liability from errant discharges, Scott Valley Irrigation District's April 26th anecdotal comment on flooding a nearby structure's basement. These Temporary Permits under the EO need be relatively inexpensive to the applicant and timely considered, and both of these goals were clearly met in the manner State Water Board executed in late 2015 to early 2016.

Renewal of a Temporary Permit under the EO for groundwater recharge to storage could be done for a \$100 fee if there are no modifications to the extant Temporary Permit. Modified Temporary Permit applications under the EO could be treated as if they are new Temporary Permit applications for Groundwater Recharge and Storage subject to the original flat fee structure listed above to revise any and all of the requested or required high-precipitation-event-driven Temporary-Permit modifications.

The State Water Board might consider that these are Temporary Water Right Permits for high-precipitation events and not conventional Temporary Permits or Standard Permits for flow diversion. Thus these Temporary Permits under the EO for high-precipitation events have very limited practical value and monetary value to the applicant/appropriator, even if renewed repeatedly. These Temporary Permits are seemingly intended for trial projects or one-time projects. If a trial project is successful in capturing a high precipitation type of event then the appropriator(s) might prepare for a conventional Temporary or Standard Permit based upon criteria such as high-precipitation events or the more conventional high surface-water flow events. Fees for those types of future permit applications could be set in a manner similar to the current Standard Permit fee structure, at that time with regard to the nature of these less-reliable ephemeral high-precipitation and/or high-flow event diversions. Standard Permits for Groundwater Recharge and Storage may have more tangible practical and monetary value in allowing appropriation of surface water to Groundwater Recharge and Storage in any given period in which water was deemed available for diversion. Thus permit fees for Standard Permits might be set in the present or future to take account of the uncertain quantity and timing of excess water availability for appropriation which degrades the intrinsic value of the water right to the appropriator.

COMMENTS ON DEMONSTRATION OF BENEFICIAL USE CONSIDERATIONS FOR TEMPORARY PERMITS UNDER THE EO

The POU could be utilized in the permit provisions as the principal criterion for defining Beneficial Use of groundwater recharge for storage. This will in all likelihood be in areas removed from the AOR and perhaps the area of the appropriator (for example the boundaries of an irrigation district may not fully circumscribe the water-right permit's stated and mapped POU).

The nature of Beneficial Use could be described and requested by the appropriator and placed into the permit provisions granted by the State Water Board. For example the Beneficial Uses for the appropriated surface water to Groundwater Recharge and Storage could be specified as multi-purpose-use and placed into the permit provisions with an overall provision of timing, rate, and duty of the diversions allowed but without specificity as to the rate or duty to be provided for each type of use. For example the permitted



Beneficial Uses could include irrigation, commercial, and domestic uses of water, as well as habitat uses of water.

We believe it best that the appropriator not be required to demonstrate usage of any or all of the stored water in the hydraulic year in which it was stored. Otherwise requiring annual withdrawal or accounting of recharged water under the Beneficial Use requirement in state law may remove the concept of carryover water storage from a Temporary Permit (or ultimately a Standard Permit for Groundwater Recharge and Storage).

As for quantities of water and accounting to Beneficial Uses of the water, we would comment that a last-in to first-out accounting method for water use does not appear to be advisable. Such an accounting system while simple in character would eliminate any availability of banked water as carried over storage for subsequent years. Instead our recommendation would be to use stored water accounting using the quantity of water diverted and stored in each hydrologic year as compared to the estimated water consumption in the POU for the Permit net of the quantity of surface water delivered to meet that consumptive demand within the POU. DWR ratings of crop consumptive use and domestic consumptive use over the appropriators permitted POU along with any known or estimated M&I and domestic water use provides the total annual use of water in the POU. The quantity of groundwater withdrawn from the stored recharge water is the quantified difference from subtracting direct surface water supplied and this relatively precise estimate of consumptive use over the entire POU. In many cases or years this calculated and accounted quantity of groundwater withdrawn will greatly exceed the quantity estimated as diverted to groundwater storage, thus cleaning out the groundwater recharged to storage that year. This is a similar outcome as last-in to first-out but is quite different in practice and under water law. Further, this accounting method has precedent in practice and may be a more workable and effective intermediary step for a variety of reasons until such time as a more uniform framework of monitoring and regulating groundwater extractions and quantifying natural groundwater discharges can evolve under the SGMA. Keeping it simple for these Temporary Permits for both the permit holder/appropriator and the State Water Board is a good common goal for specified and enforceable permit provisions.

If habitat use or environmental benefit is part of the nature of the Beneficial Use of groundwater recharge to storage then a portion of the recharged water could be allocated to that use. In the case of habitat water use, 25 to 50% of the quantity recharged could be specified as being required to be left each year for groundwater flow support to a water body. Quantification of this will be required by accounting groundwater extractions in the area between the area of recharge and the place of use (i.e., the riparian habitat or stream course); this will require working out the concept of overliee's groundwater rights and having proper monitoring to constrain the small amount of native groundwater recharge and underflow available for overliees. The quantity of water extracted in the POU is of great uncertainty and would only be enforceable in a properly adjudicated basin at present. However, the appropriator of the surface water could define for the permit provisions what the POU(s) is/are and who will be allowed to withdraw groundwater in the POU(s) and how much. It will then be the appropriator's obligation to provide evidence to the State Water Board each year the quantity of surface water diverted to recharge groundwater and the quantity extracted mechanically within the POU from that annual quantity or the cumulative quantity. Quantification of the remaining water for habitat support can be quantified as a volume and as a percentage of the amount recharged that is then available for in-stream flow or habitat consumptive use. This quantification could be considered ancillary information. More importantly permit provisions for habitat uses could specify a fixed groundwater pressure-elevation be maintained within an

offset of the habitat area that indicates a discharge condition for habitat uses exists. It is recommended that only in extreme cases should habitat water quantification be done by direct measurement upstream or downstream at gauging stations coupled with a groundwater model calibrated to groundwater-pressure elevations, river stage, and land surface uses; such measures are extraordinarily expensive and yet still contain a great deal of uncertainty as to the quantities of water and as to the cause and effect of active recharge and extraction on the measured and modeled values for habitat contribution.

Further thoughts on the legal and physical concepts of carryover storage for groundwater recharge to storage beyond these Temporary Permits include the idea that groundwater extraction to put “stored water” to use could be made a requirement of the appropriator. Groundwater users in the basin could be required to specify their extraction of stored water to the appropriator who maintains the accounting of water to a Water Right Permit. This will become possible in a matter of years under the SGMA but at present is most likely not a workable permit provision for the appropriator or for the State Water Board under these Temporary Permits for Groundwater Recharge and Storage.

COMMENTS ON THRESHOLD CRITERIA FOR AVAILABLE WATER UNDER THE EO

The language of the EO is worded for high-precipitation events, not high-flow levels. Thus a common point of reference in describing or defining high precipitation events is to use the terminology developed by [NOAA’s National Weather Service Hydrometeorological Design Studies Center \(HDSC\)](#) to describe precipitation events by their average recurrence interval (ARI). Using this terminology may make the State Water Board’s role more straightforward in considering the proper criterion for these Temporary Permits to be afforded expedited processing under the EO. NOAA’s National Weather Service Hydrometeorological Design Studies Center (HDSC) has been responsible for creating and publishing rainfall frequency atlases (e.g. 100-year 24-hour rainfall depth) for the United States since 1953. In 2003, the HDSC began updating the rainfall/precipitation frequency values for regions of the country as part of a series of atlases known as [NOAA Atlas 14](#).¹ NOAA Atlas 14 not only provided updated information but also established clearer terminology.

An excerpt from a scholarly article is provided that may prove useful to the State Water Board. The following excerpt is taken from (Parzybok, 2011).²

“Although rainfall frequency estimates have been available since the 1950s, they have been largely overlooked as a means of translating actual rainfall observations into an ARI and instead used primarily for the design of infrastructure. This translation has been hampered by the generalized, hard-copy maps of rainfall frequency estimates ... Before an ARI can be computed for a given rainfall depth and duration, a tedious interpolation of known rainfall frequency estimates needs to be drawn from the rainfall frequency maps. This is changing since rainfall frequency estimates from NOAA Atlas 14 are available online ... Access to reliable rainfall measurements at locations of interest is perhaps another reason that has hampered more frequent calculations of ARIs associated with rainfall amounts. {continued}

¹ Bonnin, G. M., D. Todd,, B. Lin, T. Parzybok, M. Yekta, and D. Riley, (2003) “Rainfall-Frequency Atlas of the United States”, NOAA Atlas 14, Volume 1, NOAA, National Weather Service, Silver Spring, Maryland.

² Parzybok, T. W., B. C., D. M. Hultstrand, 2011. “Average Recurrence Interval of Extreme Rainfall in Real-time”, Earthzine, Posted April 11, 2001 under Articles, Disasters, Extreme Weather Events

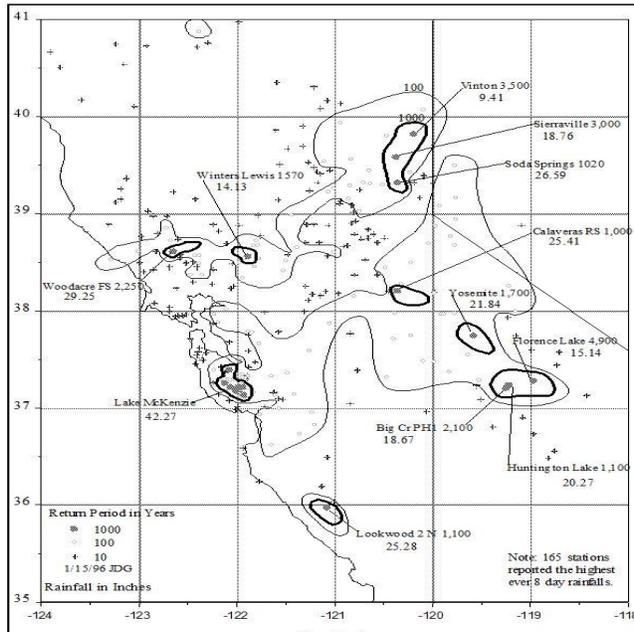


Figure 1. Total storm rainfall map for central California for the period December 19-27, 1955 from Historic Rainstorms in California. Rainfall values shown in call outs, while symbols and contours depict ARI (Goodridge, 1997).³

However, given today’s radar-adjusted rainfall products and the plethora of rain gauge observations/networks, observed rainfall amounts are no longer lacking {emphasis added} in most parts of the United States. Real-time rainfall maps and observations are available from a number of on-line sources, including [CoCoRaHS](#), [Meteorological Assimilation Data Ingest System \(MADIS\)](#), and the [NWS](#) ... **The ARI of rainfall does not necessarily equate to a flood of the same ARI** {emphasis added}. The degree of flooding from heavy rainfall depends on the rainfall intensity, duration, topography, soil conditions, ground cover, basin size and infrastructure design.”

Therefore it is recommended that the State Water Board request or require of project proponents to develop ARI ratings for precipitation events in their permit related watershed(s). Then project proponents for these Temporary Permits under the EO could declare what ARI precipitation events they are requesting diversions from, for what duration, and the rationale for the selected ARI-equal-or-exceed interval and the requested rate and duration of diversion under such ARI conditions. Perhaps this rationale could also be useful under conventional Temporary or Standard Permits where the request is for high-precipitation events *in lieu* of or in addition to consideration of high flow events as the threshold criteria for enabling a right to appropriate water to groundwater recharge for storage. This has added advantages over just holding these storm events in surface water impoundments by utilizing the additional storage capacity and properties of aquifers.

All nuisance water could be considered available for Groundwater Recharge and Storage. This is surface water that would otherwise cause erosion and other levee instability issues anywhere in engineered water

³ Goodridge, J.D. (1997). “Historic Rainstorms in California”. California Department of Water Resources, Sacramento, 1997.



delivery systems, or moderate flooding in low lying areas(as compared to actual flood flows in riverine systems).

All riverine flows in the closed Tulare Lake Basin and other closed basins, not considered appropriated for existing surface-water rights, could be considered available (i.e., 100% Exceedance flow in each riverine system within that basin), since there are no other outlets in a closed basin than useless evaporation and useful evapotranspiration. Enhancement of groundwater recharge beyond natural percolation may be strongly encouraged by water availability ratings in closed basins.

The permit threshold bar for high flow exceedances could be established and those exceedance level flows or higher be made available to be delivered to downstream users. For example a 10% Exceedance flow threshold (or higher) could be used to legally allow Sierran water that might be controllable at flood protection facilities to instead be released to such groundwater recharge facilities. Such an approach can do two things that are beneficial for water use; first it enables water to be stored in a manner that reduces or eliminates evaporational losses from a surface reservoir, and second it provides additional flood control capacity in the event of additional high-precipitation events.

As to the State Water Board’s consideration of criteria for (1) expedited processing, (2) water availability, and (3) thresholds for diversion based upon flow rates, these do not appear to be relevant to the EO given its language in regard to high precipitation and not high flow. However, at least the latter two subjects could be relevant to Temporary or Standard Permits written outside of the EO and thus some thoughts and comments are offered now for consideration because the question has been posited by the State Water Board in its April 26th announcement and presentation. For item (2) it would appear to us that one set of available criteria for water available for diversion in “excess stream flow” would be to select a criterion for flow exceedance by stream segment based upon ambient flow ratings in the watershed taking account of existing water rights on capture and delivery of such flows upstream or downstream of the requested diversion and appropriation. For example, a threshold of 50% Exceedance flows as “water available for diversion” would set a defined criterion to use to protect existing senior rights from injury without a case by case evaluation of storm events or high flows. This criterion Exceedance flow number could be higher or lower; we assert 50% Exceedance flows just as a reference point for thoughtful consideration by the State Water Board of this general concept of a criterion flow. It could easily be 80% Exceedance flows, a much lower flow threshold. For Item (3) in regard to thresholds for diversion, it would appear that a large range of flow exceedance percentages could be used to consider water available for diversion. Flows above a low flow rate of 90% Exceedance flows may be available if the Delta or other riverine systems are considered in “excess” at their terminus to a higher order river or at their delta. This availability assessment for divertible water can then subsequently account for the consumptive or storage use of water by senior water rights in that same time period (e.g., month of the year); this provides for direct quantification of available water based upon flow exceedances in each year irrespective of any need for a declared water-year-type (e.g., Wet Year) as a pre-condition of these appropriative storage rights. At the top end of riverine flood flows that produce “water available for diversion” yet preserving channel forming flows for habitat needs, a criterion of below the 1% Exceedance flow rate could be used to make water available for diversion. It is recommended that the State Water Board protect “channel forming” habitat flows only above a very high flow criterion like 1% Exceedance flow. This recommendation is made in light of how many of the state’s rivers are hydraulically regulated by engineered structures and in light of the prevalence of human inhabitation of floodplain areas protected by levees and these flow regulatory structures. Thus channel forming flows may only be available above a low frequency flow event (i.e., when



flood waters are uncontrollable). Thus these channel forming flows could be an exception written to permits meaning that the State Water Board could Notice a Temporary Action or Change of Use for Surface Water on its part as “channel forming” flows rather than on the appropriator’s part. Such a Change of Use declaration from the State Water Board could be used to interrupt diversions by many or all senior appropriators on a watershed’s riverine system or that of a portion or sub-watershed and not just modern appropriative permits during catastrophic level flooding. This may sound a bit crazy to be issuing a cessation on diversions during a flood event but the diversions are effectively trivial compared to a major flood event. Flood event water is generally dangerous for damaging the recharge facilities’ integrity. It is the major flood events that produce channel forming flows. Legally this would amount to an instream flow right provided for habitat maintenance that has an *a priori* seniority of time-in-memoriam but that in effect curtails virtually no significant diversions available to groundwater recharge to storage. A perhaps controversial legal position, but also a logical position in regard to appropriative water rights particularly for such short duration and extreme flow events.

CLOSING

In closing I want to say that E-PUR is pleased to have this opportunity to provide comments in support of you developing a successful and effective groundwater recharge to storage program now and into the future. Please feel free to contact me if you wish to discuss any of them by phone in Stockton at (209) 451-5933 or via email at jlambie@e-purwater.com.

E-PUR, LLC

Sincerely,

A handwritten signature in black ink that reads 'John M. Lambie'. The signature is written in a cursive style with a long, sweeping underline.

John M. Lambie, PE, PG, CEG
Principal Groundwater Hydrologist

cc: Mr. Darren Tran, SWRCB
Ms. Amanda Montgomery, SWRCB
Ms. Barbara Evoy, SWRCB
Dr. Thomas Harter, UC Davis
Dr. Helen Dahlke, UC Davis

JML:irl