John G. Williams, Ph.D.
Environmental Hydrology

Comments for the 20 August 2001 Public Meeting on the Legal Classification ofGroundwater

Before I address the specific questions listed in the meeting announcement, I would like to make the general point that the legal distinction between groundwater and surface water is an anachronism that we can no longer afford. The reality is succinctly described by the title of a recent circular from the U.S. Geological Survey:' "Ground water and surface water: a single resource." Recent research2 shows that the bed and banks of many streams are highly permeable to organisms, and well as to water, and many specialized organisms live in the groundwater in alluvial aquifers hundreds and even thousands of meters from streams. There is no doubt that public trust resources in California are strongly affected by unregulated pumping of groundwater, for example along the Carmel River, where unpermitted groundwater diversions dewatered steelhead habitat and devastated riparian vegetation along the river. 3 In fact, even our groundwater resources have been strongly affected by the unregulated pumping of groundwater. In the Central Valley alone, unregulated pumping of groundwater has resulted in the loss of about 25 cubic kilometers of aquifer storage through compaction and subsidence.4 Leaving groundwater unregulated is a policy that has failed.

I. *What is the scope of the SWRCB's water right permitting authority over groundwater?*

By statute, the SWRCB's permitting authority extends to groundwater "flowing in known and definite channels," so the real question involves the meaning of that phrase. Based on the law at the time that the state began issuing water rights permits, which is thoroughly described by C.S. Kinney in *Kinney on Irrigation* (2nd ed,, 1912), the scope of "known and definite channels" is much broader than most people realize. Perhaps the key case is *Los Angeles v. Hunter*, which in 1909 recognized that the groundwater in much of the Sail Fernando Valley was flowing in a known and definite channel. The decision is somewhat confusing, because it also held that the correlative rights doctrine would lead to the same result, and that aspect of the decision has been misinterpreted as expanding the scope of "percolating" groundwater at the expense of water flowing in known and definite channels' However, the court explicitly upheld

' Winter, T.C., J.W. Harvey, O.L. Franke, and W.M. Alley. 1998. Ground water and surface water: a single resource. U.G. Geological Survey Circular 1139, U.S. Government Printing Office, Denver, Colorado.

2 Gilbert, J., D.L. Danielopol, and J.A. Stanford, eds., 1994, Groundwater Ecology, Academic Press; J.B. Jones and P.J. Mulholland, eds., 2000, Streams and ground waters, Academic Press.

3 Kondolf, G.M. and R.R. Curry, 1986, Channel erosion along the Carmel River, Monterey County, California, Earth Surface Processes and Landforms 11:307-319. Williams, J.G. 1989. Interpreting physiological data from riparian vegetation: cautions and complications. Pages 381-386 *in* Proceedings of the California Riparian Systems Conference: Protection, Management in the 1990's, Sept. 22-24, 1988, Davis, California. Gen. Tech. Rept. PSW-110, Forest Service, USDA, Berkeley, CA. Williams, M. and J.G. Williams. 1989. Avifauna and riparian vegetation in Carmel Valley, Monterey County, California. Pages 314-318 *in* Proceedings of the California Riparian Systems Conference: Protection, Management in the 1990's, Sept. 22-24, 1988, Davis, California. Gen. Tech. Rept. PSW-110, Forest Service, USDA, Berkeley, CA.

" Bertoldi, G.L. 1992. Subsidence and consolidation in alluvial aquifer systems. Pages 62-74 *in* Proceedings of the 18th Biennial Conference on Groundwater. U.S. Geological Society, Washington, D.C.

′ This error appears in -A. Hutchins in *The California Law of Water Rights.* Los Angeles v. Hunter says that "These waters percolate, it is true, but only in the sense that they form a vast mass of water, confined in a basin filled with debris, always moving slowly downward to the outlet." Hutchins, citing Hunter, says that the term percolating groundwater "... may contemplate "a vast mass of water confined in a basin filled with detritus, always slowly moving downward to the outlet" or outlets." ..."

875 Linden Lane, Davis, CA 95616
530 753 7081 (voice) 530 756 3784 (fax:
jgwill@dcn.davis.ca.us

the ruling of the lower court that "... the waters developed in the wells of the appellants are part of the subsurface flow of the Los Angeles River," and it is clear from the appellate record that the case was argued as an underflow case. This case also shows that detailed evidence is not required to overcome the presumption that groundwater is "percolating" and so not subject to the SWRCB's permitting authority. I have described this and other relevant cases regarding the scope of the SWRCB's authority in more detail in my comments for the April 24-25, 2000, SWRCB workshop, which are attached. Those comments also speculate on the reasons that there were few cases involving groundwater flo\ving in known and definite channels after the early years of the 20th Century.

The SWRCB's permitting authority also extends to groundwater flowing in known and definite channels that are not associated with surface streams. Kinney distinguished "known independent subterranean streams" from those that are the underflow of surface streams, but said that "the same principles of law of the jurisdiction where the same is found govern [known independent subterranean streams] as governs the surface streams" (p. 2101).

2. *What is the current legal test for determining whether groundwater is subject to the SWRCB's permitting authority?*

The current test follows from the language of the statute: there must be a channel, and, at least in natural conditions, groundwater must flow in the channel. This is described in more detail in an attached 1983 report concerning groundwater in the Carmel Valley.6

3. *Under this legal test, what physical characteristics should the SWRCB evaluate in distinguishing subsurface waters subject to the SWRCB's permitting authority?*

The SWRCB should consider any evidence bearing on the existence of an underground channel and the existence (at least in natural conditions) of groundwater flow in the channel.

4. *What factors has the SWRCB considered in its past decision regarding groundwater classification?*

The SWRCB has considered evidence of various sorts in past decisions. WRO 95-10, regarding the Carmel River, considered only geological evidence that the alluvial aquifer is bounded by less permeable bedrock and hydrological evidence that the groundwater in the aquifer is interconnected with the river and flows in the subsurface channel defined by the bedrock. In the June 1980 Report of Referee, Stony Creek in Colusa County, the SWRCB also considered differences in the quality of the water taken from wells in the area in determining the spatial limits of the subsurface stream. The distinction between older and newer alluvium was also taken as evidence of the bed and banks of the underground channel in this instance. Hence, the bed and banks do not need to be impermeable, any more than the bed and banks of a surface stream need to be impermeable. In a recent decision regarding Garrapata Creek and a staff determination regarding the Big Sur River, geological and topographical evidence were the key factors.

6 Williams, J.G. 1983. Legal status of Carmel Valley groundwater. Carmel River Watershed Management Plan Working Paper No. 6, prepared for the California Department of Fish and Game by the Monterey Peninsula Watei Management District.

Based on a review of cases involving groundwater classification and my personal experience with the SWRCB regarding the Cannel River, it appears that political factors have also been important in the SWRCB's treatment of groundwater classification. Generally, until the last few years, the SWRCB has seemed reluctant to assert its jurisdiction unless it was requested to by some political jurisdiction, for example in the case ofMoro and Chorro creeks or Stoney Creek. In the case of the Carmel River the SWRCB, or at least its staff, worked very hard to avoid having to decide whether to it had jurisdiction, even after the geological and hydrological evidence on the matter was very clear. Although some have claimed recently that the SWRCB recently has tried to expand its jurisdiction over groundwater, the reality is that the Board is now less unwilling to assert the jurisdiction that it has always had.

It may be useful to consider the factors that were considered in early court cases; a list is provided by Kinney:'

> There are a number of methods whereby subterranean waters may be proven to flow in well-defined channels and thus become known. Their courses may be distinctly traced by topographic features of the country, and the geological character of the ground through which they flow; also, by the trees, shrubs, bushes, and grasses which grow along their courses. They may be traced by a series of wells or borings, or by the means of tunnels. Evidence is also admissible to prove this point upon the fact that material of some sort was placed in the stream above and appeared again in openings below; so, also, that the color and character of the water is the same, and different from other water in the immediate neighborhood; and again, by the sound of the water passing underneath the surface of the earth. Evidence may also be admitted of the fact that by the sinking of a second well the flow of the water of a prior well ceased; again, where by the tapping of the underground flow by means of tunnels, springs dry up or their flow is diminished, (footnotes omitted.)

5. *Should the legal test for determining what subsurface waters are subject to the SWRCB's permitting authority be changed? If so, what legal test would be appropriate?*

There are three plausible approaches to modernizing the test for the Board's permitting authority. One would build on the recognition that the SWRCB's permitting authority can apply to large areas, as demonstrated by *Los Angeles v. Hunter,* and that the beds and banks of surface streams are often quite permeable, as demonstrated by recent studies ofhyporheic flow.2 This would allow the SWRCB permitting authority over currently troublesome areas such as the Salinas Valley. This approach has the advantage of not requiring new legislation, and really only involves existing law, but it would still allow better regulation of much of our groundwater resources, and would allow for better protection of the public trust resources in surface streams from groundwater pumping in many s This approach would also allow for a more gradual change.

The second approach, which would be more comprehensive, would change the test to give the state jurisdiction of groundwater pumping that has any significant effect on surface waters.

7 inney,C.S. 1912. Kinney on Irrigation (2nd ed.), pp. 2117-2118.

* Control must be developed over riparian diversions from both surface and subsurface streams in order to provide good protection of public trust resources.

As I understand it, the State of Washington has moved in this direction, but I do not know how that is developing in practice.

The third approach would recognize that the distinction between surface water and groundwater is fundamentally arbitrary, and to abolish the distinction. The legal distinction was based on the idea that too little was known about groundwater to allow for sensible regulation of it. In California this view of groundwater was essentially abandoned in 19029 in *Katz v. Walkinshaw,* 141 Cal. 116. Now, after almost a century, we should complete the job started in that case by the California Supreme Court.

6. *Can quantifiable criteria be established to implement the legal tesfl*

Probably yes, but it should be recognized that quantification in groundwater work is somewhat like quantification in presidential elections in Florida. Aquifer characteristics such as permeability cannot be measured directly, but must be inferred from the application of theory or models to indirect measurements such as of the level of water in wells. Results from pump tests or computer models embody enough assumptions that different practitioners working with the same data can come up with substantially different numbers, so simply having quantitative criteria does not mean having "objective" criteria in the sense that most people understand that term. This is a more serious problem than most practicing hydrologists probably recognize; good discussions of it can be found in a recent book titled "Model validation, perspectives in the hydrological sciences.""

There is also an important issue of spatial scale. Just as surface streams may include islands, subsurface channels under the historic definition may include fairly impermeable deposits and localized areas that may be hydrologically dissimilar. In the spatial domain *of Los Angeles v. Hunter* there were localized areas of artesian water, for example, but these were ignored in the coarse-grained approach taken by the courts. In the Carmel Valley, localized debris flow deposits with low permeability are interleaved with more permeable alluvial deposits. These debris flow deposits can have strong local effects on aquifer characteristics, but these effects wash out at larger spatial or temporal scales. Quantitative criteria that make sense in at a coarse spatial scale may not make sense at a fine spatial scale, and *vice versa.*

For these reasons, subjective judgement will always be involved with quantitative criteria regarding groundwater. It is better to recognize this and leave an explicit role for knowledge and experience in the application of any legal test.

" At the SWRCB's 24-25 April 2000 workshop, several people who should have known better belittled the hydrogeological knowledge extant in the early 20th Century. In fact, workers with the U.S.G.S. had an excellent understanding of the physical systems involved in the relevant cases; see Mendenhall, W.C. 1905. Development of underground waters in the eastern coastal-plain region of Southern California. USGS Water Supply Paper W 0137. 140 p. Mendenhall, W.C. 1905. Development of underground waters in the central coastal-plain region of Southern California. USGS Water Supply Paper W 0138. 162 p. Mendenhall, W.C. 1905. Development of underground waters in the western coastal-plain region of Southern California. USGS Water Supply Paper W 0139. 105 p.

'O .**G**.Anderson and P.D. Bates (eds.) 2001. John Wiley& Sons. See especially the chapter by Oreskes and Belitz.