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Dear Larry,

A letter from you to a Mr. William P. Sullivan was included in a packet of material mailed to the members of the Upper San Pedro Technical Committee. I am assuming that the purpose of the inclusion was to invite comment. I am somewhat disturbed by the first sentence in paragraph five on the first page of the letter--"Current groundwater modeling studies indicate that with continued pumping at the current rate of withdrawal for 100 years, the cone of depression will not directly or appreciably affect the San Pedro River".

As this is inconsistent with all the models we are presently aware of, I am curious as to which current model you refer. The new A.D.W.R model is still in the calibration stage for steady state and is not ready to perform a 100-year transient run. The University of Arizona model developed by Ms. Vionnet and myself was never used, that we are aware of, to perform a 100-year transient run. The 1988 predecessor to our model developed by A.D.W.R., the Putman-Mitchel-Bushner (P.M.B.) model, made predictions only to the year 2000. The USGS Freethey Model, the predecessor to the P.M.B model, only simulated conditions through 1980. These are the most logical candidates for current ground-water modeling studies. Has A.D.W.R. access to other models that I am unaware of, for the upper San Pedro?

I realize that the phrase "directly or appreciably" used in the sentence was written in the spirit of Southwest Cotton, but ground-water models, as well as nature, are oblivious to legal niceties. All of the models mentioned above predict appreciable effects on the river, and on the riparian system in general, by Sierra Vista/Fort Huachuca pumping--even when the agricultural pumping is discontinued. We ran the P.M.B. model with reduced values of agricultural pumping and found that for year

1988, 25.9% of the total ground water pumped was captured from the river, and of that 5.6% was directly pulled from the river and 20.3% was intercepted ground water that would have arrived at the river. Our model predicted that 37.5% of the total ground-water pumping was captured from the river with 1.8% being directly pulled from the river, and 35.7% being intercepted. The differences in the numbers between the P.M.B model and ours are due primarily to the type of river package used. The A.D.W.R. new model will use the same type river package as ours, and we would anticipate more comparable values from it. Needless to say, both models predict an appreciable effect on the river for present pumpage, let alone for 100 years into the future.

As Bob Mac Nish has pointed out, the ability of these ground-water flow models to assess the impact of development on streamflow in the San Pedro and riparian areas is compromised by the lack of resolution in important water-budget components particularly pumpage, evapotranspiration and mountain front recharge; and this is why our effort here at the University has shifted from modeling to data collection activities. Regardless of the potential errors associated with their water budget components, all of these models indicate that pumping within the Sierra Vista Sub-Watershed is having an appreciable impact on the river. If A.D.W.R wishes to rescind its inadequate water supply statement for Sierra Vista, it should do so on grounds other than the simulation results from current ground-water flow models.

Some have made the argument that because the nadir of the cone of depression is above the elevation of the river, Sierra Vista-Fort Huachuca cannot be affecting the river. I would respond to this argument by pointing out that:

1) Even with the discontinuance of the pumping from the agricultural wells along the river, there still are many wells in the vicinity of the river whose pumping would produce a direct effect on the river.

2) Even though at present the nadir of the cone of depression may lie above the river, the majority of the wells within the cone are cased and screened to depths below the river and are, therefore, capable within a 100-year-time interval of extracting water directly from the river.

3) As previously noted, the Sierra Vista/Fort Huachuca is intercepting water that would have arrived at the river to form base flow.

As to the first point, the San Pedro Technical Advisory Committee has reviewed well hydrographs in the vicinity of the river which indicate that a hydrologic connection between the wells and the river exists, and, in all likelihood, that water is being

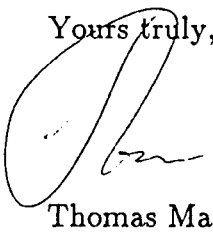
extracted directly from the river.

The second point raises the issue of how the nadir of the cone of depression was established. Was it based on actual measured water levels in pumping wells? Was it based on observation wells in the pumping center, or was it based on pumping levels computed by models? If the determination of the cone of depression was based on static levels or model results, the nadir could be significantly deeper.

Closer examination of the third point reveals an inconsistency in Arizona Water Law. Ground waters intercepted by well pumpage before they can form base flow in a stream are not appropriable. However, surface waters drawn from the stream by well pumpage are appropriable even though they are now ground waters. Yet to the downstream user, trees or critters, these two effects are indistinguishable--there is less water in the stream. I believe this one-way-hydrology interpretation is somewhat unique to Arizona; it is certainly not a Federal concept.

Although the Statement of Adequacy is a very small cannon in your arsenal of defense for the riparian areas in the San Pedro, it is one that I would hesitate to remove from the field. I believe that, under careful scrutiny, the hydrologic data already collected, along with proper interpretation, indicates, and will continue to indicate, "direct and appreciable" effects of ground water pumpage on the San Pedro River. Furthermore, I am afraid that the rescission of the Adequacy Statement might send a signal that would be easily misinterpreted by the water users, the end result being further undesirable effects to the riparian area and, perhaps, intervention on the part of the Federal Court system.

Yours truly,



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