

COMMENTS ON WATER RESOURCES WITHIN THE EXPANDING GROUNDWATER DEPRESSION IN THE PASO ROBLES BASIN EAST OF HIGHWAY 101

W.C. Bianchi, June 2009

The continued drawdown of the groundwater storage in the basin (fall in water table elevation) year by year indicates that groundwater extraction exceeds natural recharge from rainfall, runoff water course percolation and subsurface groundwater flow from peripheral watershed areas. While periodic runoff in the water courses may provide local seasonal basin recharge and water table rise, the magnitude of the drop in water elevation as depicted by Todd (figure B-1 May 2009) from the limited well monitoring would indicate mining of groundwater on a continuing basis.

As a whole, the drawdown of basin ground water elevation is now such that little groundwater is lost as underflow. So the net recharge equates to that amount of water that flows beyond the root zone of the basin vegetative cover plus infiltration from stream channels, ponding/waste disposal/runoff catchment areas less evaporation.

The evaluations that are missing for a determination of the seasonal water balance and water budget trends are:

The estimation of effective precipitation, that amount rainfall that penetrates the soil surface exclusive of interception and direct evaporation off plant cover(can be up to 10% of measured annual precipitation) less runoff . The net inflow into the plant root zone and fractionally into the vadose zone (that portion of the vertical profile below the root zone, unsaturated and above the water table.)

The evaluation of ground water accessibility. That is the storage between the water table and the ultimate maximum well drawdown where water extraction is feasible and water quality is acceptable for use it is intended.

The achievable and sustainable yield (safe yield)

The projection of climate change on sustainability

PROGRAM REQUIREMENTS

Need for expanded monitoring:

Water use and minimum requirements for rural residential and agriculture demand and potential for operational and conservation requirements for achieving this minimum

Evapotranspiration determinations for various urban and Ag land uses on a water year basis for trend studies

Adequate rainfall and evaporation transpiration ET data for an area estimation of net recharge into groundwater storage (expansion of CIMIS stations)

Expanded well measurement network and pump production, and in particular wells classed as agricultural (see Todd figure B-2)

Inventory of well logs, new wells and re-drill deepening occurrences as a measure of the stratigraphy and related site specific accessibility of groundwater within the area

Water quality trends as a response to the above deepening to determine presence of connate water boundary leading to the determination of the maximum depth of fresh water extraction

Repeat 1997 USGS Open File Report 00-447 InSAR study determining seasonal extraction distribution patterns and determine seasonal and total surface subsidence through the measurement period as a result of continued overdraft, potentially giving the extent and distribution of subsurface aquatards (clay lenses) in compression response from increased overburden loading as the water table falls

ACTIONS AND SOLUTIONS

Alternatives to reach sustainability:

Imported water (Coastal Aqueduct? Nacimiento?)

Conservation

- No fresh water use on landscape or horse pastures etc.
- Dry farm agriculture

Promote Groundwater Recharge

Define protect recharge areas within the basin

- Enhance wet year recharge through artificial recharge structures (sand damns and off channel ponding) in and along runoff features and establish programs to maximize soil surface water intake and infiltration, that is, promotion of a no runoff program

- As climate change projects less total precipitation but an increase in the frequency of high intensity storms placement of the recharge structures above depends upon the preservation of the existing sand aggregate bed-load of the natural water courses to spread the water over a maximum land surface thus extraction mining counters recharge engineering strategy

Otherwise start looking at an extraction regulation program and a control program for the hauling of safe fresh water to homes from sources of water surplus. Where ever they may be?

POLITICAL SOCIO-ECCONOMIC ISSUES

Individual property owners over this expanding groundwater depression must recognize that continued depletion of a groundwater supply is a problem for all overlying land owners in common. A political structure directed at the solution of their common problem is required.

Unfortunately, California water law is not written to accommodate the latter without landowner unity of purpose defined by a local vote, through/by State legislation, District formation, or imposed by the authority of the State Water Resources Boards for cause.

Precedent says where the water table falls beyond user access that those with the deepest wells or the economic capability to deepen their wells will survive longest. Even this is conditioned by site-specific geohydrologic conditions at any given location in the basin.