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8 SUPERIOR COURT OF CALIFORNIA
9 COUNTY OF LOS ANGELES
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11 **ANTELOPE VALLEY GROUNDWATER**
12 **CASES**

13 Included Consolidated Actions:

14 Los Angeles County Waterworks District No.
15 40 v. Diamond Farming Co.
16 Superior Court of California
County of Los Angeles, Case No. BC 325 201

17 Los Angeles County Waterworks District No.
18 40 v. Diamond Farming Co.
19 Superior Court of California, County of Kern,
Case No. S-1500-CV-254-348

20 Wm. Bolthouse Farms, Inc. v. City of Lancaster
21 Diamond Farming Co. v. City of Lancaster
22 Diamond Farming Co. v. Palmdale Water Dist.
23 Superior Court of California, County of
Riverside, consolidated actions, Case Nos.
RIC 353 840, RIC 344 436, RIC 344 668

24 Rebecca Lee Willis v. Los Angeles County
25 Waterworks District No. 40
26 Superior Court of California, County of Los
Angeles, Case No. BC 364 553

27 Richard A. Wood v. Los Angeles County
28 Waterworks District No. 40
Superior Court of California, County of Los

Judicial Council Coordination
Proceeding No. 4408

Lead Case No. BC 325 201

**TENTATIVE DECISION PHASE
THREE TRIAL**

Judge: Honorable Jack Komar

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3 Cross-complainants Los Angeles County Waterworks District No. 40, City of Palmdale,
4 Palmdale Water District, Littlerock Creek Irrigation District, Palm Ranch Irrigation District,
5 Quartz Hill Water District, California Water Service Company, Rosamond Community Service
6 District, Phelan Piñon Hills Community Services District, Desert Lake Community Services
7 District, North Edwards Water District (collectively, the "Public Water Producers")¹ brought an
8 action for, *inter alia*, declaratory relief, alleging that the Antelope Valley adjudication area
9 groundwater aquifer was in a state of overdraft and required judicial intervention to provide for
10 management of the water resources within the aquifer to prevent depletion of the aquifer and
11 damage to the Antelope Valley basin.

12 Several of the cross-defendant parties (collectively, the "Land Owner Group") also
13 sought declaratory relief in their various independent (now coordinated and consolidated)
14 actions.

15 The first issues to be decided in the declaratory relief cause of action are the issues of
16 overdraft and safe yield. The remaining causes of action and issues are to be tried in a
17 subsequent phase or phases.

18 This Phase Three trial commenced on January 4, 2011 and continued thereafter on
19 various days based upon the needs of the various parties and the Court's availability.
20 Appearances of counsel are noted in the minutes of the Court.

21 At the conclusion of the evidence, the Court offered counsel the opportunity to provide
22 written final arguments and the invitation was declined by all counsel. On April 13, 2011, the
23 Court heard oral argument and the matter was ordered submitted.
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28 ¹ The City of Los Angeles, though not a water producer in the Antelope Valley adjudication area, joined with the
Public Water Producers.

1 The Public Water Producers (and others) have alleged that the basin is in a condition of
2 overdraft and have requested that the Court determine a safe yield and consider imposition of a
3 physical solution or other remedy to prevent further depletion of the water resource and
4 degradation of the condition of the aquifer.

5 Several parties in opposition to the request of the Public Water Producers have
6 contended that while there may have been overdraft in the past, currently the aquifer has
7 recovered and is not in overdraft. These same parties contend that it is not possible to establish
8 a single value for safe yield; instead they have requested that the Court determine a range of
9 values for safe yield.

10 The Court concludes that the Public Water Producers have the burden of proof and that
11 the burden must be satisfied for this phase and purpose by a preponderance of the evidence.

12 The law defines overdraft as extractions in excess of the “safe yield” of water from an
13 aquifer, which over time will lead to a depletion of the water supply within a groundwater basin
14 as well as other detrimental effects, if the imbalance between pumping and extraction
15 continues. (*City of Los Angeles v. City of San Fernando* (1975) 14 Cal. 3d 199; *City of*
16 *Pasadena v. City of Alhambra* (1949) 33 Cal. 2d 908, 929; *Orange County Water District v.*
17 *City of Riverside* (1959) 173 Cal. App. 2d 137.) “Safe yield” is the amount of annual
18 extractions of water from the aquifer over time equal to the amount of water needed to recharge
19 the groundwater aquifer and maintain it in equilibrium, plus any temporary surplus. Temporary
20 surplus is defined as that amount of water that may be pumped from an aquifer to make room to
21 store future water that would otherwise be wasted and unavailable for use.

22 Determination of safe yield and overdraft requires the expert opinions of hydrologists and
23 geologists.² Experts in the field of hydrogeology routinely base their opinions and conclusions
24 concerning groundwater basin overdraft on evidence of long-term lowering of groundwater
25 levels, loss of groundwater storage, declining water quality, seawater intrusion (not an issue in
26

27 ² All the experts offer estimates. The American Heritage College Dictionary, Third Edition, defines an “estimate”
28 as, *inter alia*, “[a] rough calculation, as of size” or “[a] judgment based on one’s impressions; an opinion.”

1 this case), land subsidence, and the like. Experts also conduct a sophisticated analysis of
2 precipitation and its runoff, stream flow, and infiltration into the aquifer, including such things as
3 evapotranspiration, water from other sources introduced into the aquifer (artificial recharge), as
4 well as the nature and quantity of extractions from the aquifer and return flows therefrom.

5 Generally, neither overdraft nor safe yield can be determined by looking at a
6 groundwater basin in a single year but must be determined by evaluating the basin conditions
7 over a sufficient period of time to determine whether pumping rates have or will lead to
8 eventual permanent lowering of the water level in the aquifer and ultimately depletion of the
9 water supply or other harm. Recharge must equal discharge over the long term. (*City of Los*
10 *Angeles v. City of San Fernando, supra*, 14 Cal. 3rd at pp. 278-279.)

11 The location of the Antelope Valley adjudication area boundaries was the subject of the
12 Phase One and Two trials in this matter. The Court defined the boundaries of the valley aquifer
13 based upon evidence of hydro-conductivity within the aquifer. If there was no hydro-
14 conductivity with the aquifer, an area was excluded from the adjudication. The degree of hydro-
15 conductivity within the Antelope Valley adjudication area varies from area to area. Some areas
16 seemingly have fairly small or nominal hydro-conductivity but must be included in this phase of
17 the adjudication. Pumping in those parts of the basin may be shown to have *de minimis* effect
18 on other parts of the aquifer while pumping in other areas within the basin appears to have very
19 large impacts on adjacent parts of the basin. All areas were included within the adjudication area
20 because they all have some level of hydro-conductivity, some more and some less. How to deal
21 with those differences is ultimately a basin management decision that is well beyond the scope of
22 this phase of trial.
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24

25 **Overdraft**

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27 The preponderance of the evidence presented establishes that the basin is in a state of
28 overdraft. Reliable estimates of the long-term extractions from the basin have exceeded reliable

1 estimates of the basin's recharge by significant margins, and empirical evidence of overdraft in
2 the basin corroborates that conclusion. The basin has sustained a significant loss of groundwater
3 storage since 1951. While pumping in recent years has reduced and moderated the margin
4 between pumping and recharge as cultural conditions have changed and precipitation has
5 increased with the appearance of wetter parts of the historical cycle, pumping in some areas of
6 the aquifer is continuing to cause harm to the basin. The evidence is persuasive that current
7 extractions continue to exceed recharge and therefore that the basin continues to be in a state of
8 overdraft, although by a much reduced amount. Since 1951³ there is evidence of substantial
9 pumping (principally agricultural in the early years of the period) coinciding with periods of
10 drought, with continuous lowering of water levels and subsidence extending to the present time,
11 with intervals of only slight rises in water levels in some areas.

12
13 In the areas of increased pumping, in particular in the Palmdale and Lancaster areas, there
14 is a continual lowering of water levels such that it may have a serious effect on water rights in
15 other areas, causing cones of depression, altering natural water flow gradients, causing the
16 lowering of water levels in adjacent areas, and causing subsidence and loss of aquifer storage
17 capacity. Given population growth, and agricultural and industrial changes, the valley is at risk
18 of being in an even more serious continuing overdraft in the future.

19 While the lowering of current water levels has slowed, and some levels in wells in some
20 areas have risen in recent years, significant areas within the aquifer continue to show declining
21 levels, some slightly so, but many with material lowering of water levels.

22 Thus, the Antelope Valley adjudication area has been in a state of overdraft for more than
23 50 years based on estimates of extraction and recharge, corroborated by physical evidence of
24 conditions in the basin as a whole, and while the annual amount of overdraft has lessened in
25 recent years with increased precipitation and recharge, the effects of overdraft remain and are in
26 danger of being exacerbated with increased pumping and the prospective cyclical precipitation
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28 ³ Precipitation and well records prior to that year are too sketchy to be relied upon.

1 fluctuations shown by the historical record. The physical evidence establishes that there was
2 significant subsidence occurring throughout the valley ranging from two to six feet or more in
3 certain areas of the valley caused by such pumping and that measurable water levels fell in a
4 substantial part of the valley. While some of the ongoing subsidence may be attributable to
5 residual subsidence (from earlier periods of shortfall) that would not seem to be an explanation
6 for the extent of continued subsidence.

7 8 **Safe Yield**

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10 A calculation of safe yield is necessary to manage the basin or create a physical solution
11 to a potential or actual continuing overdraft. A determination of safe yield requires an initial
12 determination of average annual natural or native recharge to the aquifer from all sources. The
13 only source of natural or native recharge for the Antelope Valley is precipitation that recharges
14 the aquifer and it is therefore necessary to ascertain average annual precipitation. The
15 calculation of annual average precipitation can only be determined by using a baseline study
16 period that covers precipitation in periods of drought and periods of abundant precipitation over
17 a sufficient period of time that a reliable estimate of average future recharge based on
18 precipitation can be made.

19
20 One expert selected two shorter base periods (the total time span of which was
21 considerably less than the 50 year period the court believes is more credible), each having a
22 different estimated average natural recharge based upon different precipitation averages from
23 each base period. If the purpose of selecting a base period is to determine average recharge over
24 time based on precipitation, choosing two consecutive periods of time with two different average
25 numbers would not serve that purpose and would preclude estimating a single safe yield. A base
26 period that calculates average precipitation over a representative period of time permits reliable
27 predictions about future natural recharge based on regular recurring precipitation cycles. A
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1 period of precipitation fluctuations from 1951 to 2005 satisfies that standard. Shorter periods do
2 not.

3 The total amount of extractions of water by pumping is not seriously in dispute by any of
4 the experts who testified. All seem to agree that pumping currently is estimated to range from
5 130,000 to 150,000 acre feet a year. The major area of dispute between the parties is the average
6 amount of natural recharge, which also involves disputes concerning return flows, the amount of
7 native vegetation water needs, evapotranspiration, stream flow, runoff, groundwater infiltration,
8 specific yield, lag time, bedrock infiltration, agricultural crop needs, and the like. Other sources
9 of recharge to the basin, including artificial recharge-water pumped into the aquifer from
10 external sources are not in dispute.

11 Evidence established that during the entire historical period presented, populations
12 increased within the valley and water use changed in a variety of ways. There has been a shift in
13 some areas to urban uses and away from agriculture although in recent years agricultural
14 pumping has also increased. The nature of agricultural duties has changed as well. The type of
15 irrigation used by farmers has become more efficient and less water is needed per acre
16 (depending on the crops grown) with more efficient uses of water. But there has also been an
17 increase as well as a change in the nature of the type of agriculture in the valley in material
18 quantities in recent years. More of such changes may occur and it is important to both current
19 and future generations to ensure that the water resources within the Basin are managed
20 prudently.

21 The Court heard from a very large number of experts, some of whom have provided
22 opinion testimony of what constitutes safe yield. All the experts testifying acknowledged that
23 changes in the selection of a base study period, lag time, agricultural water duties,
24 evapotranspiration, specific yield, runoff quantities, well level contours, bedrock infiltration,
25 return flows, playa evaporation relating to run off and bedrock infiltration, chloride
26 measurements, satellite imaging, and agricultural and municipal pumping estimates, among
27 others, would affect the ultimate opinion of natural recharge and return flows.
28

1 The opinions of all the experts are estimates, based upon their professional opinion. All
2 of the opinions were critiqued by other experts who often had different opinions. The Court
3 recognizes the imprecision of the various estimates and the fact that an estimate by definition is
4 imprecise. But because estimates lack precision does not mean that the Court cannot rely upon
5 such estimates. The scientific community relies upon such estimates in the field of
6 hydrogeology and the Court must do the same.

7 Reasonable experts can differ as to reasonable estimates of natural recharge and
8 virtually all other components of water budgets, computations of change of storage, and the
9 like, all the while using the same formulae and scientific principles to reach their conclusion.
10 For example, all the experts could agree on the definition of "Darcy's Law" and the physics
11 principle of "conservation of mass" but still reach different conclusions.
12

13 Some of the experts opined that the basin was not in overdraft and that recharge was in
14 excess of or in balance with extractions so that there was a surplus in the aquifer. One expert
15 opined that loss of storage was merely space for temporary storage. Observable conditions in the
16 valley are inconsistent with those conclusions. If there were a surplus, even in the shortened
17 base periods used by the some experts, there should not be subsidence of land, nor the need to
18 drill for water at deeper and deeper levels in those parts of the aquifer most affected by the
19 overdraft. The physical condition of the valley is inconsistent with those estimates that there is
20 and has been a surplus of water in the aquifer.


21 The selection of a safe yield number for an aquifer the size of the Antelope Valley is
22 made difficult because of not only its size but because of the complexity of its geology. As
23 reflected above, hydroconductivity varies considerably between various parts of the aquifer.
24 Hydroconductivity between some portions of the aquifer and others is so slight as to be almost
25 (apparently) nonexistent. Pumping in those areas may have little or no effect on other areas of
26 the aquifer. The Antelope Valley basin is not like a bathtub where lowering and raising of water
27 levels is equal in all parts of the "tub."
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1 Therefore, assigning a safe yield number (what quantity of pumping from the basin will
2 maintain equilibrium in the aquifer) may require different numbers for different parts of the
3 aquifer. No attempt has been made in this phase of trial to define geological differences in the
4 valley that would justify different safe yield numbers for different parts of the valley in light of
5 the decision in Phase Two regarding conductivity (the Phase Two trial focused on
6 hydroconductivity for purposes of determining necessary parties to the action).

7 Weighing the various opinions, however, the Court finds by a preponderance of the
8 evidence that setting a safe yield at a conservative 110,000 acre feet a year will permit
9 management of the valley in such a way as to preserve the rights of all parties in accordance
10 with the Constitution and laws of the State of California. Some portions of the aquifer receive
11 more recharge than others and pumping requirements vary. These differences require
12 management decisions that respect the differences in both the geology and the cultural needs of
13 the diverse parts of the valley.
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15 It should not be assumed that the safe yield management number may not change as
16 climate circumstances and pumping may change, or as the empirical evidence based on
17 experience in managing the basin suggests it is either too high or too low.
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21 Dated: 5-4-2011



Hon. Jack Komar
Judge of the Superior Court