

**IN THE OFFICE OF THE STATE ENGINEER
OF THE STATE OF NEVADA**

IN THE MATTER OF APPLICATIONS 53987)
THROUGH 53992, INCLUSIVE, AND 54003)
THROUGH 54021, INCLUSIVE, FILED TO)
APPROPRIATE THE UNDERGROUND)
WATERS OF SPRING VALLEY, CAVE)
VALLEY, DELAMAR VALLEY AND DRY)
LAKE VALLEY HYDROGRAPHIC BASINS)
(180, 181, 182 AND 184), LINCOLN COUNTY)
AND WHITE PINE COUNTY, NEVADA.)
_____)

**CLOSING STATEMENT OF CORPORATION OF THE
PRESIDING BISHOP ON BEHALF OF THE CLEVELAND RANCH**

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PRELIMINARY STATEMENT

Cattle have been raised on the Cleveland Ranch since at least the 1870s. That long tradition is threatened with practical extermination by at least 12 of the applications submitted by SNWA.

These proceedings began with the unequivocal prediction that the springs and the wetlands on the Ranch would go dry if the protested applications are granted. The evidence admitted since then has clearly and unequivocally demonstrated that this dire prediction will come true.

SNWA presented weeks of testimony through a host of witnesses supported by tens of thousands of pages of exhibits. If sheer quantity of evidence is the determining factor, SNWA should probably prevail; if, however, the *quality* of evidence is assessed, that is, the effectiveness of SNWA's evidence to prove the propositions on which it has the burden of proof, then the balance tips decidedly against SNWA. The SNWA witnesses presented a lot of good science and credible theories, but glaring omissions and a persistent failure to acknowledge the logical gaps in its studies means that SNWA has failed to meet its clear evidentiary burden on critical issues.

One of those critical issues is the requirement that SNWA prove that its applications will not conflict with existing water rights. That led to SNWA Exhibit 337, which used the SNWA hydrologic model to predict drawdown at certain springs. That exhibit, however, only reported results based *on an arbitrary fifty-foot criterion*, omitted the actual drawdown predicted by its own model at each spring, and failed to report the results of the full 200-year simulation. When the SNWA model was carefully analyzed *using only SNWA's own data*, Drs. Jones and Mayo demonstrated that:

(1) the 12 protested wells will directly conflict with the Ranch's water rights and will cause all of the Ranch's springs and its sub-irrigated pastures to go dry;

(2) the 12 protested wells will create a massive aggregate cone of depression that will dominate Spring Valley in the vicinity of the Ranch with drawdowns up to 200 feet;

(3) the extensive drawdowns are likely to cause substantial subsidence and the permanent loss of aquifer storage capacity;

(4) the protested wells will result in substantial and perpetual groundwater mining; and

(5) the drawdown will result in significant and irreversible impacts on unique animal and plant communities dependent on the current hydrological regime, destroying plant communities on which the Ranch relies.

Although SNWA presents its project as an ET salvage program, its current applications cannot capture most of the ET and will instead result in substantial groundwater mining. Simply put, SNWA has the wrong wells in the wrong number and in the wrong places for an ET salvage project.

SNWA's response to these problems is to point out limitations of its *own* hydrologic model; to offer soothing assurances of its good intentions; and, to promise to monitor, manage and mitigate (in part by adding 50 to 100 additional wells in a new well field design) the inevitable harmful effects of its proposed pumping. Nevada law does not give the State Engineer authority to grant applications based on good intentions or soothing assurances. Rather, the State Engineer “shall reject” and “refuse to issue the requested permit” when the applicant has not met its burden of proof. NRS 533.370(5).

I. THE BURDEN IS ON SNWA TO PROVE THAT ITS APPLICATIONS MEET THE STATUTORY CRITERIA

The State Engineer “shall reject” an application and “refuse to issue the requested

permit” where “[1] there is no unappropriated water in the proposed source of supply, or [2] where its proposed use or change conflicts with existing rights or with protectable interest in existing domestic wells ..., or [3] threatens to prove detrimental to the public interest.” NRS 533.370(5). The State Engineer must also consider “[w]hether the proposed action is environmentally sound as it relates to the basin from which the water is exported.” NRS 533.370(6). Applications must also be rejected when they cause groundwater mining. (Ruling # 5726.)

The burden is on SNWA to prove that these applications meet the statutory standards. *See Bacher v. Office of State Engineer*, 122 Nev. 1110, 1116, 146 P.3d 793, 797 (2006) (“NRS Chapter 533 prescribes the general requirements *that every applicant must meet to appropriate water.*”) To the extent there are gaps in the evidence, SNWA has not met its burden of proof and its applications must be denied.

The Nevada Supreme Court has long noted the importance of the role entrusted to the State Engineer in determining water rights. Thus, in *Ormsby County v. Kearney*, 37 Nev. 314, 142 P. 803, 811 (1914), Chief Justice Talbot's concurring opinion observes that "[t]o this end, the state engineer may proceed in the manner directed by the statute to obtain the *best evidence to be had*, whether judgment, documentary, or oral, and to *carefully and accurately determine the relative rights of water users.*" [Emphasis added.]

To withstand judicial review, the State Engineer's determination must be supported by "substantial evidence." *See Bacher*, 122 Nev. at 1121, 146 P.3d at 800 (the "court's review focuses on whether the record includes substantial evidence to support the State Engineer's decision"). "Substantial evidence" means such evidence "which 'a reasonable mind might accept as adequate to support a conclusion.'" *Id. quoting State, Emp. Security v. Hilton Hotels*, 102

Nev. 606, 608, 729 P.2d 497, 498 (1986).

Quantity alone does not equal substantial evidence -- both the quantity *and* quality of the evidence presented must be considered. *Hilton Hotels*, 102 Nev. at 608, fn. 1, 729 P.2d at 498, fn. 1, quoting *Robertson Transp. Co. v. P.S.C.*, 159 N.W.2d 636, 638 (Wis. 1968) ("We [equate] substantial evidence with that quantity and quality of evidence which a reasonable man could accept as adequate to support a conclusion."). Vague, uncertain, and speculative evidence does not meet the "substantial evidence" test. See e.g. *Peardon v. Peardon*, 65 Nev. 717, 765, 201 P.2d 309, 333 (1948) ("substantial evidence" is "[s]omething of substance and relevant consequence, and not vague, uncertain, or irrelevant matter not carrying the quality of "proof" or having fitness to induce conviction."). For example, in *Bacher*, the Supreme Court reversed the district court's affirmance of the State Engineer's approval of an interbasin groundwater transfer because the evidence of the applicant's need was not based on specific facts, but speculation:

When reaching his decision to grant Vidler Water's application, the State Engineer considered the proposed power plant second phase expansion, the mall expansion, the MGM Grand employee housing, an industrial park, and a theme park. Both the State Engineer's decision and the record suffer from a fundamental defect: neither specifies how much afa of water each project would require and how that quantity would be reduced by Primm South's unused water permits. ***Without this specificity, a reasonable mind could not accept as adequate the conclusion that Vidler Water had justified a need to import 415 afa of water from the Sandy Valley Basin. Because he failed to make the necessary calculations to determine Primm South's future water usage by project and the support of that usage by the imported water, the State Engineer's decision is not supported by substantial evidence.*** We therefore conclude ***the State Engineer abused his discretion in finding that Vidler Water had presented sufficient evidence to justify a need to import water*** under NRS 533.370(6)(a). [Emphasis added.]

122 Nev. at 1122-23, 146 P.3d at 801; see also *id.*, 122 Nev. at 1123, fn. 37, 146 P.3d at 801, fn. 37 ("Some projects... had contingencies attached to them. In other words, the projects may be speculative in nature speculative evidence of development projects is not sufficient to

survive a substantial evidence inquiry on review").

In *People v. Tri-Union Seafoods, LLC*, 90 Cal. Rptr. 3d 644, 658 (Cal. App. 2009), a case brought by the state for alleged failure to label tuna with warnings for the presence of methylmercury, the appellate court affirmed judgment for the defendants, explaining the applicability of the substantial evidence standard to expert testimony:

The substantial evidence rule applies equally to expert and lay testimony. Thus, ***expert testimony does not constitute substantial evidence when based on conclusions or assumptions not supported by evidence in the record..., or upon matters not reasonably relied upon by other experts....*** Further, ***an expert's opinion testimony does not achieve the dignity of substantial evidence where the expert bases his or her conclusion on speculative, remote or conjectural factors....*** When the trial court accepts an expert's ultimate conclusion without critically considering his or her reasoning, and it appears the conclusion was based on improper or unwarranted matters, we must reverse the judgment for lack of substantial evidence.... On the other hand, the trial court is free to reject testimony of a party's expert, so long as the trier does not do so arbitrarily. [Internal citations omitted.] [Emphasis added.]

Where an expert's opinion is based on statistical sampling, as is Dr. Fenstermaker's opinion, particular caution is required. Even more caution is warranted when an expert such as Dr. Rowley testifies about theories that cannot be tested or measured, caution is particularly warranted. See *Abarca v. Franklin County Water District*, 761 F.Supp.2d 1007, 1021 (E.D. Cal. 2011), quoting *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 590 (1993) ("Reliable testimony must be grounded in the methods and procedures of science and signify something beyond 'subjective belief or unsupported speculation'"). *Daubert* identifies the factors relevant to "reliability" as including (1) whether the theory can be and has been tested; (2) whether it has been subjected to peer review; (3) the known or potential rate of error; and (4) whether the theory or methodology employed is generally accepted in the relevant scientific community. *Abarca, id.; Daubert*, 509 U.S. at 593-94. However, even given a solid methodology, the conclusion may be unsupportable. Thus, the State Engineer may conclude that there is "simply

too great an analytical gap between the data and the opinion proffered." *Abarca, id.*, citing *General Elec. v. Joiner*, 522 U.S. 136, 146 (1997).

**II. ONLY SNWA'S 19 APPLICATIONS ARE BEFORE THE
STATE ENGINEER; DUE PROCESS PROHIBITS
CONSIDERATION OF FUTURE APPLICATIONS OR
INTENTIONS**

At various points in this hearing when SNWA's witnesses were challenged regarding the results of pumping under these applications, the witnesses suggested that the State Engineer should consider not just these applications, but SNWA's intention to design a new well field, to pump intermittently, or to stop pumping if interference results.

Dr. Watrus testified, for example:

Q. You indicated just a few minutes ago that you haven't settled on any of the well locations?

A. That's correct.

Q. You have 19 applications pending which have specific points of diversion, but you contemplate moving them?

A. We have 19 points of diversion that we plan on drilling and determining then if they are the best locations. If not, for example, the 54012 example I gave the other day, if that turns out not to be an appropriate location, we would look to move it, yes.

(Tr. 10/11/2011 at 2642.)

Experts for the Ranch, and others, were criticized by SNWA for pointing out the results of pumping under the applications that are actually before the State Engineer. That's not what we actually intend to do, seemed to be SNWA's frequent refrain.

SNWA's witnesses acknowledged that its current proposal and well-field design are defective and, without drastic changes, will result in incomplete ET capture and groundwater mining. Dr. Watrus explained, "If there were effects, clearly we would stop pumping, move the

pumping around, do the things [sic]. It wouldn't just stay the maximum volume and continue to have these effects." (Tr. 10/10/2011 at 2558 (Watus).) In another candid concession that the pending 19 Applications are not adequate to reach SNWA's stated goal, Dr. Prieur testified that SNWA may need as many as 50 to 100 additional wells to accomplish its purposes. (Tr. 10/10/2011 at 2534.)

The Hearing Officer made it clear that the 19 applications, and *only* those applications, are before the State Engineer:

[SNWA has] applied for a diversion rate from specifically 19 wells, and that's all the State Engineer is considering. He's not considering a different well field.... We're talking about the applications under consideration here.... [A]nd we've had people in here arguing, Well, I'm going to move the well field other places. And I have said that's not what we're considering. We're considering the applications that are before us.

(Transcript 10/10/2011 pp. 2507-08.)

There are 19 applications before the State Engineer for rejection or approval, each requesting a specific amount of water from a specific point of diversion, as required by statute.¹ NRS 533.370(2) ("the State Engineer shall approve or reject each application"). SNWA's attempt to inject future applications and the possibility of different well locations into these proceedings, and to explain that its applications do not reflect its intentions, is inconsistent with the applicable statutory scheme and fundamental principles of due process. "Inherent in any notice and hearing requirement are the propositions that the notice will accurately reflect the subject matter to be addressed and that the hearing will allow full consideration of it." *Public Serv. Comm'n of Nevada v. Southwest Gas Corp.*, 99 Nev. 268, 271, 662 P.2d 624, 626 (1983). The Protestants prepared for these hearings based on the content of the applications actually filed

¹ An application to appropriate water in Nevada "shall contain," among other things, "[t]he name of the source from which appropriation is to be made," "[t] amount of water which it is desired to appropriate," and "[a] substantially accurate description of the location of the place at which the water is to be diverted from its source." NRS 533.335.

by SNWA. They would be severely prejudiced by any ruling granting some or all of SNWA's Applications based on SNWA's good intentions or the possibility of future changes. These Applications must be resolved on their face.

Nevada Power Company v. Public Service Commission, 91 Nev. 816, 544 P.2d 428 (1975), rejected what SNWA has attempted here. Nevada Power Company filed applications for seven rate increases which were consolidated into one proceeding. The reason given in the applications for the rate increase was the increased cost of fuel. At the hearing, however, the Company "attempted to support the rate increase" by using "numerous items that were not considered in or noticed when the seven original applications were filed." *Id.* at 818. The Commission rejected the evidence, stating in its final order, "A person examining these applications should be able to rely on the factors stated by the Applicant" and that "were the Commission to hear and issue orders on matters not submitted by the Applicant in its application, there would to that extent be a denial of fairness and due process through inadequate Notice." *Id.* at 819. The Nevada Supreme Court agreed and held that the hearing could not go beyond the contents of the seven applications that were filed. *Id.* at 822-23.

This is not just a matter of procedural correctness. A vested water right "is regarded and protected as property." *Application of Fillippini*, 66 Nev. 17, 22, 202 P.2d 535, 537 (1949). The "utilization of water by grazing livestock," for example, "constitutes sufficient appropriation to establish a vested water right" in a spring that is used for this purpose. *Waters of Horse Spring v. State Engineer*, 99 Nev. 776, 778, 671 P.2d 1131, 1132 (1983) (cattle ranching operation had vested right to water of springs). Such rights are therefore entitled to the protections of due process. *Revert v. Ray*, 95 Nev. 782, 787, 603 P.2d 262, 264-265 (1979). Further, "[w]ater law proceedings are special in nature and strictly limited to the procedures provided by statute." *In*

re Application No. 71860, Slip Copy 2011 WL 1744157 *2 (Nev. Apr. 29, 2011) citing *Filippini*,² 66 Nev. at 27. “The procedural rights of parties before an administrative body cannot be made to suffer for reasons of convenience or expediency.” *Bivens Constr. v. State Contractors’ Bd.*, 107 Nev. 281, 283, 809 P.2d 1268, 1270 (1991).

The State Engineer must “approve or reject” the 19 applications filed by SNWA based on what has been applied for, not based on SNWA’s claimed good intentions, soothing assurances, or future plans to change designs, add wells, pump less, and so forth.

III. THE RANCH SPRINGS WILL GO DRY IF THE 12 PROTESTED APPLICATIONS ARE APPROVED

The Ranch’s protest is supported primarily by the work of Dr. Alan Mayo and Dr. Norm Jones contained in CPB_011. They analyzed the impact of the 12 protested applications on the Ranch’s water rights. Their work is based entirely on SNWA’s own model. *Nothing* was changed. They simply performed analysis that SNWA either did not perform or performed but did not report. Jones and Mayo “took the output from the SNWA model *without any modifications* to the model and developed more detailed drawdown maps of the output from the model into the vicinity of the Cleveland Ranch in the center of Spring Valley.” (Tr. 11/16/2011 at 6002 (Jones), emphasis added.)

A. Jones and Mayo Used SNWA's Own Data And Model to Prove The Devastating Impact On The Ranch's Water Rights

Jones and Mayo used the SNWA model to predict drawdown of the water table at the site

² Water rights are treated as real property under Nevada law such that interfering, directly or indirectly, with the Ranch's water rights may invoke eminent domain claims. *Filippini*, 66 Nev. at 21-22, 202 P.2d at 537 (“the owner of a water right does not acquire a property in the water as such, at least while flowing naturally, but a right gained to use water beneficially which will be regarded and protected as real property”); *Carson City v. Estate of Lompa*, 88 Nev. 541, 542, 501 P.2d 662 (1972), *citing* prior version of NRS 37.010(3) (water rights can subject to eminent domain as a separate interest in real property); and *Dermody v. City of Reno*, 113 Nev. 207, 931 P.2d 1354 (1997), *citing Lompa* (“Nevada law is clear that appurtenant water rights are a separate stick in the bundle of rights attendant to real property. As such, they may be condemned separately”).

of each water right and to show the drawdown. (Tr. 11/16/2011 at 6000-01.) Dr. Watrus criticized their use of SNWA's regional model to make site-specific predictions. (Tr. 11/16/2011 at 2645.) This was Dr. Watrus's only criticism of the work performed by Jones and Mayo.

Q. But I'm asking if you have any other criticisms of their work?

A. I do not.

(Tr. 10/11/2011 at 2646.)

And Dr. Watrus acknowledged that his own analysis included site-specific predictions:

Q. Now, those conflicts with existing rights, that's the subject of your report [SNWA Exhibit 337]?

A. It is.

Q. And you went through right by right and calculated what you think the impact would be?

A. I attempted to do just that.

Q. Yes. Site specific work?

A. Site specific work.

(Tr. 10/11/2011 at 2643.)

In fact, Dr. Watrus did “[e]xactly what Aquaveo did” and Watrus could have reported “the exact drawdown at a specific location”³ (Tr. 10/11/2011 at 2646 (Watrus).) He simply chose to report the drawdown in terms of plus or minus 50 feet instead of reporting the actual drawdown. Why? “50 feet was just chosen as – as my gut confidence in this prediction.” (Tr. 10/11/2011 at 2645.) It was “a nice round number.” (Id.) (See also SNWA Exh. 337 Table

³ Jones and Mayo likewise were criticized for using the model based on the points of diversion of the 19 wells assuming full buildout and assuming full pumping so that SNWA was taking the maximum amount of water it applied for. But, again, that is exactly how SNWA used its model and what SNWA asked for in its applications. (Tr. 10/10/2011 at 2555-56 (Watrus).) “Pumping continues at the full maximum volume throughout the simulation period.” (Tr. 10/10/2011 at 2557 (Watrus).) That is what has been applied for by SNWA.

6.2, Watrus Oct. 10.)⁴ As expert Dr. Jones explained:

Our report has been criticized by the SNWA because we used the model to analyze impact at site-specific locations. However, the SNWA used the model in the same fashion, as documented in Exhibit 337. The only difference is the manner in which the site-specific values were reported. They reported values using the 50-foot threshold criteria, and we showed the actual model results, the actual drawdown values in more detail.

(Tr. 11/16/2011 at 6010.)⁵

B. Properly Analyzed, the SNWA Data Discloses An Ever-Increasing Aggregate Cone of Depression That Will Consume The Springs And The Wetlands

In Ruling # 5726, the State Engineer explained that “[w]ater-level drawdown will occur in a cone of depression around the pumping wells, which will eventually coalesce, resulting in wide-spread water-level declines.” Ruling # 5726 at 35. Jones and Mayo presented a series of drawdown maps showing the aggressive growth of the aggregate cone of depression for the years 2042, 2062, 2082, 2117, and 2242. (CPB_011 at 23.)⁶

The first set of drawdown maps shows the aggregate cone of depression for these years assuming all 19 wells are pumping. The first map, CPB_011 Fig. 9 (Appendix at A) shows that as early as 2042, the year all the wells are completed, “we start to see some light blue areas in the middle of the map which corresponds to drawdowns on the order of about 40 to 50 feet.” (Tr. 11/16/2011 at 6003 (Jones).)

The next map (CPB 11 Fig. 10, Appendix at B) shows twenty years after completion of

⁴ Even this was more than SNWA presented in the 2006 hearing on these applications when “none of [SNWA’s] witnesses presented any testimony or evidence pertaining to the magnitude or timing of water-level declines, decrease in spring flows, or impacts to existing rights.” Ruling # 5726 at 35.

⁵ From the very beginning, Jones and Mayo acknowledged that the regional nature of the SNWA model introduced uncertainty because of the large grid cells, some elevation errors and model calibration errors. Nonetheless, they noted: “When looking at an individual spring the point in time at which the spring is predicted to go dry may be off by several years (either too early or too late), but the overall trends provides [sic] an estimate of when the springs will go dry.” CPB 11, pg. 47.

⁶ Dr. Jones explained that “when you pump an individual well, it develops what is called a cone of depression, which is an area of drawdown surrounding the well. When you have a well field such as this where the cones of depression overlap, it forms what we call an *aggregate* cone of depression” (Tr. 11/16/2011 at 6003, emphasis added.)

the wells “and as you can see at this point, the aggregate cone of depression is getting larger and deeper. The light blue to light green areas shown in the center of the aggregate cone of depression correspond to drawdown levels on the order of 60 to 80 feet, *and as you can see, they’re starting to overlap many of the water rights locations associated with the ranch.*” (Tr. 11/16/2011 at 6003-04 (Jones), emphasis added.)

Just 40 years after the wells are completed the drawdown map (CPB_11 Fig. 11, Appendix at C) shows “green and light yellow areas, which correspond to drawdown values on the order of 100 feet.” (Tr. 11/16/2011 at 6004 (Jones).)

Seventy-five years after completion of the wells, “the bulk of the aggregate cone of depression is in the yellow to red range, which corresponds to drawdown levels on the order of 120 to 150 feet.” (Tr. 11/16/2011 at 6004 (Jones) referring to CPB_11 Fig. 12, Appendix at D.)

SNWA also prepared a drawdown map for this same 75-year period. SNWA's map, however, was buried as one of 10 tiny thumbnail maps at the back of SNWA Exhibit 337. As presented, it was so small that it could not be used to make meaningful conclusions. (Tr. 11/16/2011 at 6002 (Jones).)⁷ Compare SNWA’s 75-year drawdown map, SNWA Exhibit 337 Plate 2 (Appendix at E) to the 75-year drawdown map prepared by Jones and Mayo (after enlarging the relevant area) (CPB_11 Fig. 12, Appendix at D).

The colors are different, but they show the same thing—100 to 150 feet of drawdown after 75 years of pumping! The exact convergence is not surprising because both maps were prepared from the same model and the same data -- but it does serve nicely to validate the accuracy of the other maps Jones and Mayo extracted from SNWA's model.

Watrus and Drici reported simulated model results for only 75 years after completion of

⁷ Curiously, this is the only observed instance in all the SNWA exhibits where critical information was presented in a thumbnail sized map. It would have been more candid and forthright for SNWA to have presented drawdowns in the necessary detail as Jones and Mayo did.

the wells, even though, as Dr. Watrus testified, the water rights being requested do not end after 75 years; they run in perpetuity. (Tr. 10/11/2011 at 2657.)

What happens two hundred years from now? A drawdown map produced by Jones and Mayo, CPB_011 Figure 13 (Appendix at F), shows drawdowns “as high as 200 feet” in most of the aggregate cone of depression. (Tr. 11/16/2011 at 6005.)

Watrus and Drici actually ran model simulations to predict drawdowns out to the year 2254, but did not deign to include those results in their report for SNWA. Their results, like Jones' and Mayo's results, show that the drawdown continues:

Q. Did you run results out to the full 2254?

A. Yes.

Q. But you didn't include those in your report?

A. They're not included in the report.

Q. And didn't they show substantially greater drawdowns occurring?

A. *Throughout time drawdowns were continuing to increase, yes.*

(Tr. 10/11/2011 at 2650-51 (Watrus) (emphasis added).)

Dr. Jones pointed out a couple of additional concerns about this final map, CPB_011 Figure 13 (Appendix at F). First, the “north[west] corner of this aggregate cone of depression ... corresponds to the Cleve Creek alluvial fan,” and by this point the alluvial fan is “substantially dewatered,” which is critical because this fan “is a source of the water to the springs that are on the fringe of the alluvial fan” (Tr. 11/16/2011 at 6005 (Jones).)⁸ Second, it shows that the drawdown “doesn't reach a state of equilibrium. The longer the wells are pumped, the larger and

⁸ The map likely underestimates the drawdown in the alluvial fan because of a conductivity anomaly in the model. (See Jones's at Tr. 11/16/2011 at 6006.)

deeper the aggregate cone of depression.” (Tr. 11/16/2011 at 6004-05.)

C. Even With Removal of the Four Wells Previously Denied, SNWA's Model Demonstrates Dramatic Drawdown

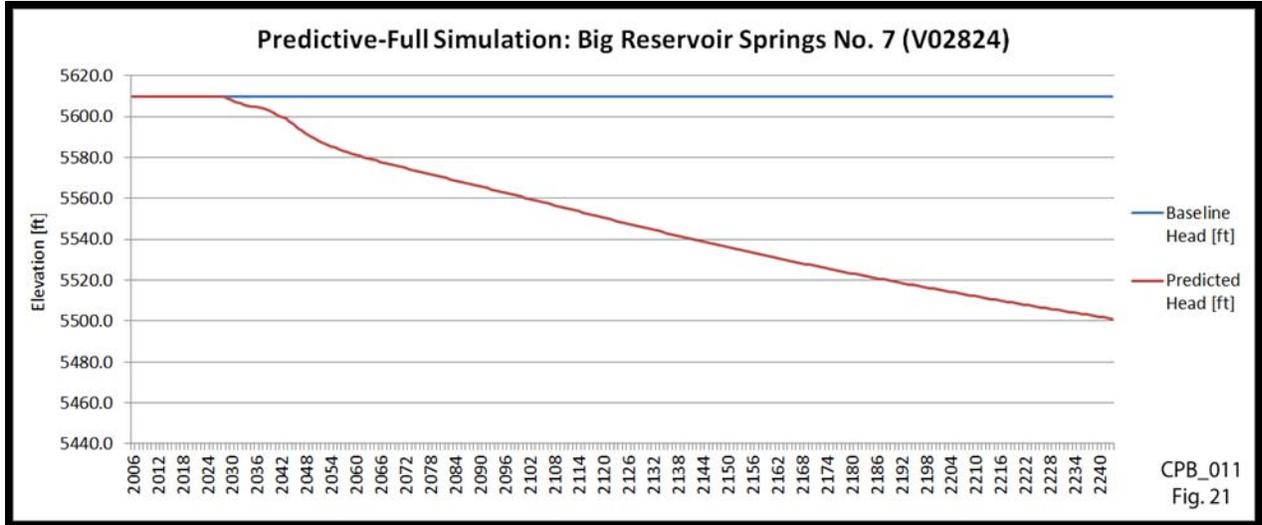
Jones and Mayo also ran the same simulations without the four wells that were previously denied. In other words, they predicted what the drawdown would be even if those four wells were denied again. These maps show “less drawdown in the northern end of the ... aggregate cone of depression. But there’s still substantial drawdown on the order of 120 to 160 feet resulting from the remaining wells” after 200 years. (Tr. 11/16/2011 at 6007 (Jones).)⁹

Jones and Mayo also ran model simulations to predict what the impact would be on the Ranch’s water rights if all 12 of the protested applications are denied and only the remaining 7 are granted. CPB_11 Fig. 19. This map shows “very small levels of drawdown” (Tr. 11/16/2011 at 6008 (Jones).)

D. Analyzing The Drawdown Over Time Only Serves to Confirm The Extent of The Disaster Looming

Jones and Mayo then used the output from the SNWA model to generate time-series plots to show the water level at specific points in time at the location of each water right. (Tr. 11/16/2011 at 6008.) These time-series plots are represented in CPB_011 Appendix B. To use one as an example, here is CPB_011 Figure 21, which shows the drawdown at Big Reservoir Springs No. 7 located on the Ranch.

⁹ Maps for the years 2042, 2062, 2082, 2117 and 2242 are found in CPB_011 Figs. 14 to 18.



The horizontal blue line represents what the water level is with no pumping, and the descending red line represents the water-level decline if all 19 applications are granted. (Tr. 11/16/2011 at 6008 (Jones).) Once all of the wells are constructed, “you get a steady, almost linear decline” and “the drawdown levels are quite substantial over this period of time.” (Tr. 11/16/2011 at 6009 (Jones).)

A summary of the maximum drawdown at the location of each of the Ranch’s water rights is presented in Table 7 of CPB_011.

Table 7 Maximum Predicted Drawdown at Wells and Springs Located in the Alluvial Fan or Valley Floor.

Name	Permit	Max Drawdown [ft]		
		Full	Minus4	Minus12
Mud Springs 1,2, and 3	3973	-35.7	-4.7	0.0
South Millick Spring	8721	-15.6	-4.0	0.0
Bastian Creek Allotment	18841	-159.7	-78.8	-0.5
Bastian Creek Allotment	18842	-167.4	-94.1	-1.0
Bastian Creek Allotment	18843	-163.5	-86.4	-0.8
Cleveland Creek Supp	54204	-102.2	-19.3	-0.3
Cleveland Creek Supp	54205	-141.6	-37.6	-0.6
T Property	67333	-18.3	-3.0	0.0
Rogers Area Supp	69726	-23.2	-5.4	0.0
Rogers Area Supp	69727	-21.2	-5.1	0.0
Murphy Springs	V02817	-72.9	-8.9	-0.1
Big Reservoir Springs No. 1	V02818	-68.8	-7.3	-0.1
Big Reservoir Springs No. 2	V02819	-72.1	-8.1	-0.1
Big Reservoir Springs No. 3	V02820	-75.6	-9.4	-0.1
Big Reservoir Springs No. 4	V02821	-97.6	-17.3	-0.2
Big Reservoir Springs No. 5	V02822	-78.5	-10.3	-0.1
Big Reservoir Springs No. 6	V02823	-84.3	-12.0	-0.1
Big Reservoir Springs No. 7	V02824	-108.4	-22.2	-0.3
Big Reservoir Springs No. 8	V02825	-97.9	-17.0	-0.2
Big Reservoir Springs No. 9	V02826	-97.1	-16.8	-0.2
Big Reservoir Springs No. 10	V02827	-99.3	-18.1	-0.2
Big Reservoir Springs No. 11	V02828	-84.4	-12.0	-0.1
South Bastian Spring 2	P01	-166.6	-92.5	-1.0
South Bastion Spring	P02	-164.7	-89.3	-0.9
Cleveland Ranch Spring - North	P03	-107.9	-22.9	-0.2
Cleveland Ranch Spring - South	P04	-113.2	-29.3	-0.2
Cleveland Well	P05	-167.9	-57.5	-0.9
Fera Well	P06	-102.1	-38.6	-0.3
Layton Spring	P08	-178.3	-114.7	-2.0
North Cleveland Unit Spring	P09	-8.7	-1.5	0.0
North Millick Spring	P10	-14.4	-3.8	0.0
Rogers Ranch Spring	P11	-21.8	-4.1	0.0
Unnamed Spring #1.1	P13	-133.8	-42.2	-0.4
Unnamed Spring #1.2	P14	-133.6	-42.5	-0.4
Unnamed Spring #2.1	P15	-129.9	-41.5	-0.3
Unnamed Spring #2.2	P16	-128.1	-40.9	-0.3
Unnamed Spring #3.1	P17	-128.7	-41.7	-0.2
Unnamed Spring #3.2	P18	-129.8	-42.7	-0.2
Unnamed Spring #3.3	P19	-132.2	-44.4	-0.3
Unnamed Spring #4	P20	-145.1	-53.8	-0.4
Unnamed Spring #7	P21	-183.0	-102.6	-2.0
Unnamed Spring #8	P22	-185.8	-108.3	-2.3

CPB_011
Table 7

The “Full” column shows the drawdown after 200 years if all 19 applications are granted. “[A]t least half of them are over a hundred feet. Many of them are over 150 feet. Some approach 185 feet of drawdown” after 200 years. (Tr. 11/16/2011 at 6009 (Jones).) The “Minus4” column shows the results without the four previously denied applications. “[T]here’s

substantially less impact, but there's still water or drawdown levels ... between 50 and [100] feet. Some exceed 100 feet even with this condition." (Tr. 11/16/2011 at 6010 (Jones).) If all 12 applications that CPB has protested are denied, "there's negligible drawdown at each of these locations as shown in the Minus12 column." (Tr. 11/16/2011 at 6010 (Jones).)

Dr. Jones summarized that SNWA's own model "shows that the project would result in substantial drawdown of the water rights locations corresponding to the Cleveland Ranch, and that drawdown is likely to have severe impact to wells, springs and sub-irrigated lands associated with the ranch." (Tr. 11/16/2011 at 6011.)

SNWA criticized Jones and Mayo for using SNWA's regional model to predict site-specific drawdowns. As noted, Watrus and Drici used it for exactly the same thing, but chose instead to report results using an arbitrary 50-foot threshold. Dr. Jones agreed that a local model is more useful than a regional model for making such predictions. Dr. Jones also agreed that site-specific values based on regional models "must be used with caution," but, he explained, important conclusions can be drawn when the site-specific numbers derived from a regional model show a consistent pattern or trend, which these results do. Dr. Jones draws two important conclusions from the site-specific numbers:

First of all, the time series plots consistently show a steady downward trend in the water levels over time, and none of these plots indicate the model reaches an equilibrium condition ... after a certain period of time. That's significant. The longer you pump, the more drawdown will occur at these locations.

Second, the drawdown values simulated by the model are large and relatively uniform, especially at the ranch and south end of the ranch. And this is consistent with what we see in the drawdown maps.

(Tr. 11/16/2011 at 6010-11(Jones).)

The model results consistently show significant and continuous drawdown. These

predictions may not be perfectly precise, but the overall conclusion of continuous drawdown is strongly confirmed by the model results.

To the extent SNWA's model has limitations, it defeats SNWA's case. The burden in these proceedings is on SNWA. SNWA's complaint that its model cannot accurately predict what will happen merely amplifies SNWA's failure to present evidence to support its case. Instead, SNWA's repeated response is to forget the model and pump away, monitoring and mitigating as the drawdown occurs. If that is the course, then these proceedings have served no purpose. In any case, the "best available science" (NRS 533.024) presented in this case persuasively shows that the pumping proposed under these 12 protested applications would create a massive aggregate cone of depression as the result of continuous drawdown.

Such drawdown creates "a real risk for subsidence, and of course ... the main problem with subsidence is the permanent loss of storage to the aquiver [sic]." (Tr. 11/16/2011 at 6005-06 (Jones).) SNWA does not deny this risk. Dr. Watrus testified that the factors controlling subsidence in Spring Valley are not understood (Tr. 10/11/2011 at 2613), which presumably means that SNWA does not, and would not, know how to prevent it.¹⁰

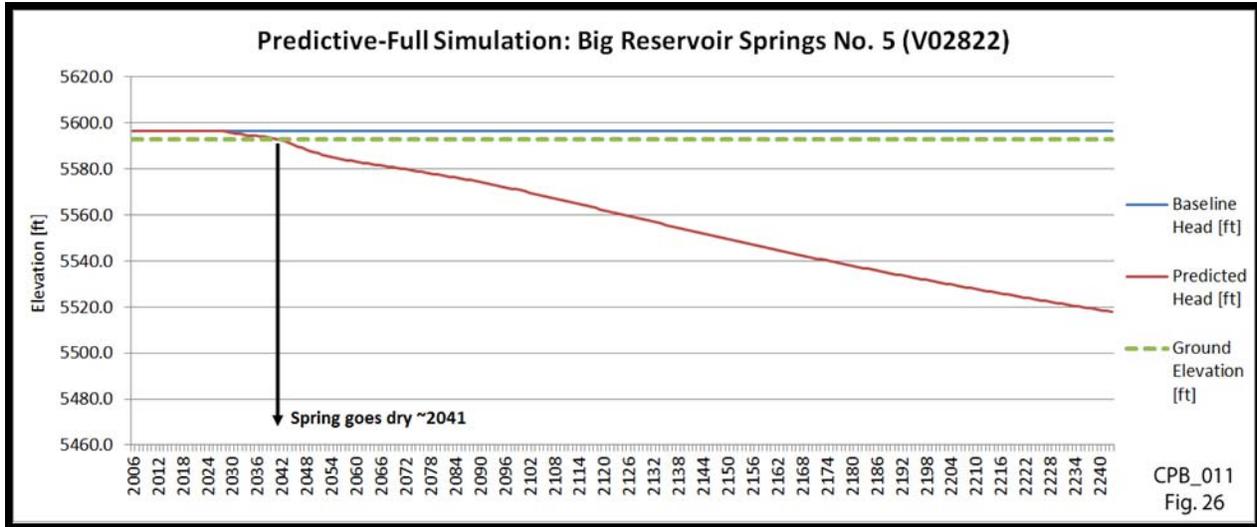
IV. THE DRAWDOWN IS NOT ENVIRONMENTALLY SOUND AND WILL INTERFERE WITH THE RANCH'S WATER RIGHTS

Most of the Ranch's water rights are associated with springs. (CPB_6, CPB_011 at p. 44.) Most of these springs occur at the edge of the alluvial fans, where SNWA's wells will cause substantial drawdown. *Id.* Jones and Mayo used SNWA's model—again without any changes—to analyze the impact of the drawdown on these springs. The result? They will go dry.

The analysis shows that *all* of the Ranch springs in the valley will go dry. (CPB_011

¹⁰ Watrus testified that, in areas outside of Spring Valley, he is aware of subsidence of an average of one foot of decline for every 20 feet of drawdown. (Tr. 10/11/2011 at 2613.)

Table 8.) As an example, consider CPB_011 Figure 26, which shows the analysis for Big Reservoir Springs No. 5.



The horizontal blue line represents the baseline value and the descending red line represents the model simulated head from the predicted model. Dr. Jones explains that

if you look at the intersection between the [red] line and the green line, at that point, the simulated head drops below the spring elevations and therefore, the model would indicate that the spring goes dry at that point, which in this case is approximately 2041.

(Tr. 11/16/2011 at 6013 (Jones).) SNWA’s model shows “that virtually all of the springs go dry just after a few years” (Tr. 11/16/2011 at 6013 (Jones).)¹¹ Dr. Watrus acknowledged that, in his simulations, 15 of the 31 springs had a drawdown of greater than 50 feet after just 75 years. (Tr. 10/10/2011 at 2587.)

There is uncertainty in predicting precisely when each of the springs will go dry, but SNWA’s own model shows that they will all go dry.

SNWA’s project would also eliminate the sub-irrigated lands that currently supports

¹¹ Dr. Jones explained that the model results show that some of the springs start out dry as the result of a calibration error in SNWA’s model. The baseline should be shifted up 15 to 20 feet. But “that doesn’t change the overall conclusions here,” it simply means it will take a few years longer for the springs to go dry; but they will still go dry. (Tr. 11/16/2011 at 6015.)

much of the Ranch. SNWA's expert, Dr. Burns, testified that the current sub-irrigation "is represented in our ET estimate and our ground water ET estimate." (Tr. 9/29/2011 at 744.) In other words, this water is part of the perennial yield that SNWA intends to capture.

Mr. Prieur acknowledged that the very purpose of lowering the water table is to eliminate the loss of water through evapotranspiration:

Q. Doesn't the program contemplate lowering the water table?

A. The water table is lowered as – as a result of any pumping in – pumping, yes.

Q. Yes. And the purpose of that was to, among other things, to eliminate the loss of water that normally would occur through evapotranspiration?

A. Yes.

(Tr. 10/10/2011 at 2502.)

The high water table in Spring Valley is what sustains both the springs and sub-irrigated lands on the Ranch. (Tr. 11/17/2011 at 6233 (Sanders).) Lowering the water table would destroy these water rights and devastate the Ranch. The springs are the primary source of water for the cattle. (Tr. 11/17/2011 at 6233 (Sanders).) Additionally, the high water table supports the production of quality forage: "The naturally irrigated land is very productive and it's very high-quality forage." (Tr. 11/17/2011 at 6232 (Sanders).) Without water and quality forage, the Ranch simply cannot survive.

The Ranch manager, John Sanders, explained: "if the springs go dry, we lose the source for cattle water as well as ... the forage production that that water and those springs produce." (Tr. 11/17/2011 at 6233 (Sanders).) Much of the Ranch grazing allotments would become inaccessible to the cattle. "Cattle can only travel so far in the day before they have to turn

around and go back [to their drinking water], so if we lose these spring sources, we will not be able to access large portions of the allotment where cattle just will not be able to physically reach before they're turning around and heading back for water.” (Tr. 11/17/2011 at 6233-34 (Sanders).)

As the water table goes down, the good forage will be replaced first by cheatgrass and then by shrubs. Dr. McLendon explained that grasses “need more water or more resources in general” than shrubs and “the more water available to them the more productive they can become and be more competitive against the shrubs.” (Tr. 10/05/2011 at 1653.) “Secondly, and even more importantly, a high water table inhibits shrub encroachment. Most shrubs do not tolerate saturated soils.... So a high water table inhibits most shrubs and favors grasses.” (Tr. 10/05/2011 at 1653 (McLendon).) Dr. McLendon acknowledged that the grasslands are the most beneficial for cattle ranches, and the grasslands are the first to go as the water supply depletes. (Tr. 10/05/2011 at 1755.)

Dr. Robinson explained that “losses of ET to the basin are going to have dramatic impacts, devastating impacts ... irreversible impacts on the ecosystem, wetlands, meadows, everything.” (Tr. 11/17/2011 at 6356.) Even a ten-foot drop in the water table will eliminate most of the wetlands. (Tr. 11/17/2011 at 6320-22 (Robinson).) Those wetlands act as filters that improve the quality of groundwater and surface water. (Tr. 11/17/2011 at 6327 (Robinson).) “[O]nce a wetland is gone, trying to pump more water back onto it doesn't restore the wetland, necessarily. Once you've lowered the water table significantly, pumping more water just tends to run back down to the sponge, back down to the groundwater, but it doesn't restore the wetland ecosystem” (Tr. 11/17/2011 at 6328 (Robinson).) The loss of the wetland ecosystem damages grazing. “[T]o graze the same number of animal units, you're going to need two to

seven times as much land.... because now it takes more land to produce the same amount of animals.” (Tr. 11/17/2011 at 6328 (Robinson).)

Dr. Robinson explained what will happen to the currently productive meadows if the water table is lowered just ten feet:

Well, if you start with a wet meadow that has a water table within or near the surface, or a grassland meadow even, with a water table within one to five feet of the surface, ... those meadows go away, because there's no longer water to support them. So, they're going to transition to some sort of a shrub community.

Those transitions are going to be dramatic in the overall effect on the ecosystem.... So there's a dramatic decrease in the amount of vegetative production or biomass production, which then is going to affect things like the grazing rights, as well as the physical properties that are out there. You decrease vegetative cover, you increase bare soil. You increase bare soil, you increase erosion potential and the potential for dust erosion or dust generation.

(Tr. 11/17/2011 at 6333-6334 (Robinson).)

What will replace the high-quality forage? “[Y]ou've heard people talk about cheatgrass, probably til you're sick of it, but cheatgrass is one of those quick-growing annuals that takes advantage of really [shallow] surface ... water, but in so doing it robs it from other plants. So you're going to have transitions that are essentially, in many cases ... irreversible.” (Tr. 11/17/2011 at 6336 (Robinson).)

There is plenty of cheatgrass seed around the Ranch ready to populate the de-watered ground. Cheatgrass has already replaced the higher quality forage after a fire occurred on the slope of the alluvial fan near the Ranch. (Tr. 11/16/2011 at 6167, 6172 (Drew).)

Cheatgrass is not adequate cattle feed. “It's a good feed for about 60 days in the spring when it's green and actively growing,” but not after that. The best that can be said is that it “can keep a cow alive.” (Tr. 11/17/2011 at 6230 (Sanders).)

The Ranch depends on the naturally occurring high water table. Lowering the water table

will dry up the springs the cattle rely on for water and cause the loss of the high-quality forage they graze. If the high-quality forage is lost, production is lost. Furthermore, whatever replaces the high-quality forage will be less reliable because it will be dependent on annual precipitation.

The loss of high-quality forage will lower the cattle weight and lower reproduction rates.

Sanders explained how cattle partition their nutrient intake:

[T]here's a partitioning effect where basically cattle will first take care of – the mother cow will first take care of her own survival. Her heart will continue to beat, she will breed and she will get along. Then she'll take care of her own growth and development if there's extra nutrition that available. Past that, she'll take care of any lactation for any young that she might be rearing at that time. And then lastly, on that partitioning of nutrients, if they are sufficient, she'll take care of reproduction for next year's cattle crop.

(Tr. 11/17/2011 at 6234.)

The south unit of the Ranch near Hiko, which has no springs and no sub-irrigation, provides a useful comparison. It “is wholly dependent on precipitation.” (Tr. 11/17/2011 at 6231 (Sanders).) Sanders explained that the cattle on the south unit of the Ranch are of lower weight and do not reproduce at the same rates as the cattle in Spring Valley.

Basically [it's] because of the lack of quality forage and/or the lack of forage in general. The cattle cannot produce as well on the southern ranges year in and year out as they do up around the Cleveland [Ranch] area. We typically are looking at a [wean] weight of 430, 450 pounds for our steers coming off the desert, and this year, for example, our [wean] weight of some of our steers on the Cleveland [Ranch] approach 600 pounds.

(Tr. 11/17/2011 at 6231-6232.)

The reproduction rate on the southern end is between 65 and 75 percent, but at the Cleveland Ranch it is over 90 percent. (Tr. 11/17/2011 at 6234-35.) The difference is attributable to the availability of water.

SNWA's response is that plant succession can be managed as depth to groundwater increases and that any harmful effects can be mitigated. However, several critical factors to

managing plant succession, such as timing and amount of precipitation, presence and influence of noxious weeds, altered fire cycles and climate change, simply cannot be managed. Mitigation actions described by SNWA, including manipulation of livestock grazing and irrigation, are not viable on the Ranch as SNWA does not control the grazing permits nor the water rights. Dr. McLendon testified, for example, that one of the important ways to manage plant succession is by controlling grazing. “You manage grazing by numbers of animals, types of animals, length that they’re allowed to graze an area, rotations system.” (Tr. 10/05.2011 at 1723.) McLendon acknowledges that livestock “are heavy utilizers of grasses” and “they select grasses more than shrubs in most seasons.

So, therefore, the presence of livestock grazing puts additional ecological stress on grasses than would normally be there without the livestock. So heavy grazing, overgrazing can put too much stress on those grasses and cause them to decrease substantially and then therefore open the door – open an opportunity for shrubs to increase.

(Tr. 10/04/2011 at 1636 (McLendon).)

This hardly lends comfort to a cattle ranch. The message is: We’re going to take your water and you can mitigate by reducing the number of cattle and letting them graze less.”

Irrigation is another important part of managing plant succession. “Irrigation is managed by amount of water applied, season of water applied, when it’s applied, and where it’s applied.” (Tr. 10/05/2011 at 1723 (McLendon).) So, again, the Ranch would be limited in how much and when it irrigates.

Finally, there is no guarantee that any of this management and mitigation would be successful. Dr. McLendon testified that if the water table drops 10 meters or more—far less than SNWA’s model predicts—the ability to manage plant succession decreases dramatically. (Tr. 10/05/2011 at 1757.) Dr. Burns explained that you can irrigate to mitigate the effect of lowering

the water table beneath the rooting depth, (Tr. 10/04/2011 at 1635-36.) but this requires drilling more wells and pumping more water. In other words, mitigating the effects of lowering the water table requires pumping more water, which will lower the water table even further, requiring further mitigation. SNWA's plan, apparently, is to mitigate by doing more of what created the need for mitigation.

The project will eliminate the springs and high-quality forage on which the Ranch relies. It is not environmentally sound. SNWA's own experts admit that the soundness of the project depends entirely on the success of the monitor-manage-mitigate plan. (Tr. 10/10/2011 at 2534-35 (Marshall and Luptowitz).) The State Engineer should deny the 12 applications protested by the Ranch both because they will interfere with the Ranch's water rights and grazing operations and because the project is not environmentally sound. NRS 533.370(5) and (6).

V. SNWA'S PROJECT WILL RESULT IN CONTINUAL GROUNDWATER MINING, WHICH IS PROHIBITED IN NEVADA

When asked why SNWA's proposed project is not groundwater mining, Dr. Watrus responded that SNWA "will not in all likelihood be awarded" what it has applied for and, besides, SNWA's intentions are good: "We have no intention of pumping above the perennial yield year." (Tr. 10/11/2011 at 2609.) This proceeding, however, is not concerned with SNWA's intentions, but rather, with SNWA's applications.

The 12 applications protested by the Ranch should be denied because they will result in continual and significant groundwater mining. The water that is available for appropriation in Spring Valley is the water that is currently being lost to evapotranspiration. As currently constituted, the SNWA well field design will not capture significant portions of the ET and can only make up the difference through groundwater mining. In Ruling # 5726, the State Engineer stated, "Mining of ground water is not acceptable and appropriation of this magnitude will lower

the water table” (Ruling # 5726 p. 52.)¹² SNWA needs to start over with a plan that is actually designed to capture ET without harming existing water rights.

Groundwater mining is an easy concept to understand: it simply means taking more water out of the ground than is being put back in. It is tied to the concept of perennial yield:

The perennial yield of a ground-water reservoir may be defined as the maximum amount of ground water that can be salvaged each year over the long term without depleting the ground-water reservoir. Perennial yield is ultimately limited to the maximum amount of natural discharge that can be salvaged for beneficial use. The perennial yield cannot be more than the natural recharge to a ground-water basin and in some cases is less. If the perennial yield is exceeded, ground-water levels will decline and steady-state conditions will not be achieved, a situation commonly referred to as ground-water mining.

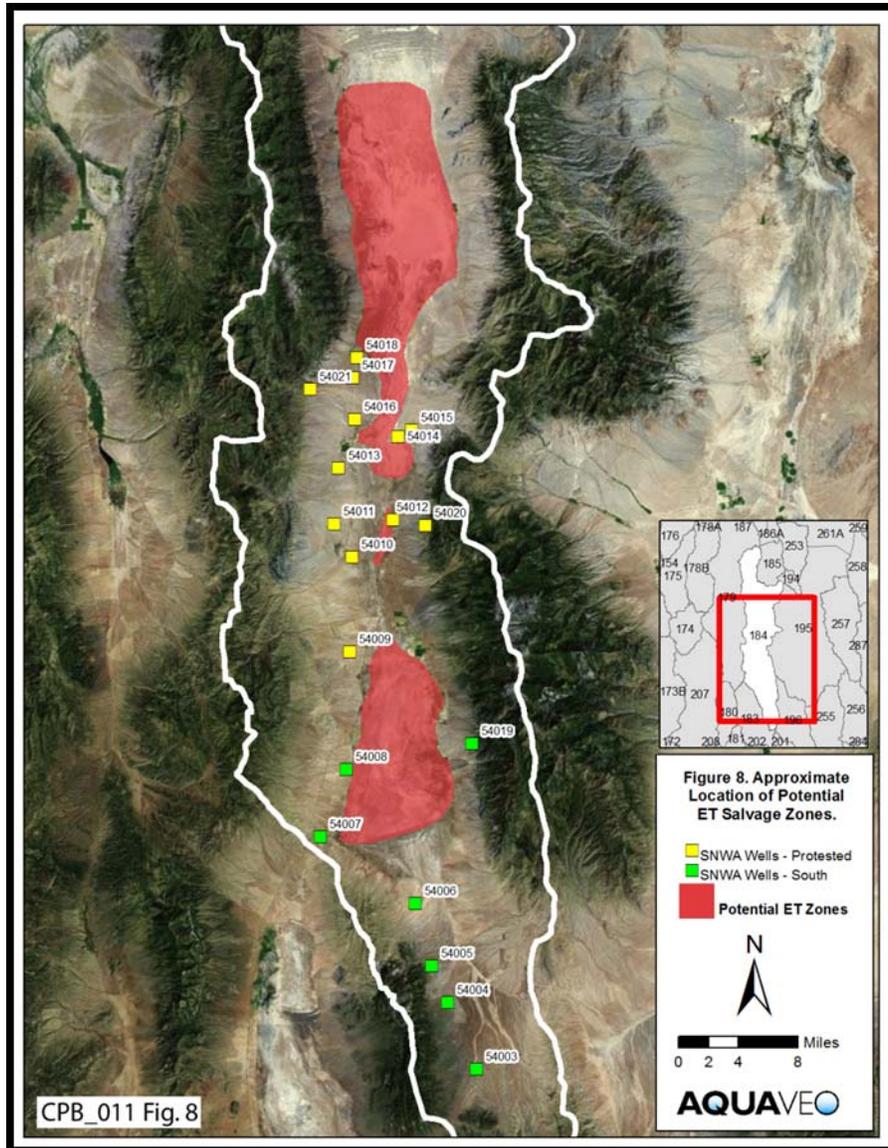
(Ruling # 5726 at 26-27.)

The State Engineer’s April 2007 Ruling explains that “[i]n most Nevada basins, ground water is discharged primarily through evapotranspiration (ET). In those basins the perennial yield is approximately equal to the estimated ground-water ET; *the assumption being that water lost to natural ET can be captured by wells and placed to beneficial use.*” (Ruling # 5726 at 27 (emphasis added).) After discussing various studies and reports, the State Engineer found “that a reasonable and conservative estimate of the perennial yield of the Spring Valley Hydrographic Basin is 80,000 acre-feet. *This estimate relies on the capture of ground-water ET as the limit*

¹² It has long been the policy of the State Engineer's Office to prohibit groundwater mining and it has regularly denied applications which would result in groundwater mining. See e.g., 07/09/1964 Ruling #707, pg. 1 (extraction of any additional water would have an adverse effect on existing water rights within the basin); 02/03/1969 Ruling #1327, pg. 1 (existing groundwater rights exceeded estimates of recharge to the basin); 04/26/1972 Ruling #1842, pg. 1 (existing groundwater rights exceeded estimated recharge); 04/13/1975 Ruling #2045, pg. 1 (existing groundwater rights exceeded the perennial yield); 04/10/1979 Ruling #2453, pgs. 4-5 (additional withdrawal of water would result in groundwater mining); 01/13/1988 Ruling #3486, pg. 6 (additional withdrawal of water would result in groundwater mining); 12/28/1989 Ruling #3664, pg. 9 (existing groundwater rights exceeded annual recharge within the basin); 05/21/1990 Ruling #3708, pgs. 3-4 (existing groundwater rights substantially exceeded the perennial yield); 01/23/1990 Ruling #3679, pgs. 11-12 (existing groundwater rights exceeded perennial yield); 04/16/2007 Ruling #5726, pgs. 52-53 (mining of groundwater is not acceptable); 06/17/2007 Ruling #5750, pgs. 21-22 (withdrawal of substantial amounts of groundwater in excess of perennial yield would result in groundwater mining); and 10/14/2011 Ruling #6151, pg. 4 (approval of application would result in withdrawal of groundwater in substantial excess of perennial yield).

of the perennial yield.” (Ruling # 5726 at 32 (emphasis added).)

ET has to be captured either before it enters the ET area—*e.g.*, as runoff—or by lowering the groundwater table below the root extinction depth so that the plants cannot use it. Dr. Mayo testified that one of the first things he noticed when he looked at SNWA’s plan was the design and location of the wells. There are “too few wells” and the wells are screened too deep to capture ET. (Tr. 11/16/2007 at 6034.) This was not an ET-salvage project at all, he reasoned, but a groundwater-mining project. Dr. Jones and Dr. Mayo looked at where ET is occurring. In CPB_011 Figure 8, they show where ET is occurring and where SNWA’s proposed wells are located.



“[Y]ou can see the bulk of the 12 wells in question are concentrated around the center of the valley” where they will not be able to capture the ET. (Tr. 11/16/2011 at 6035 (Jones).)

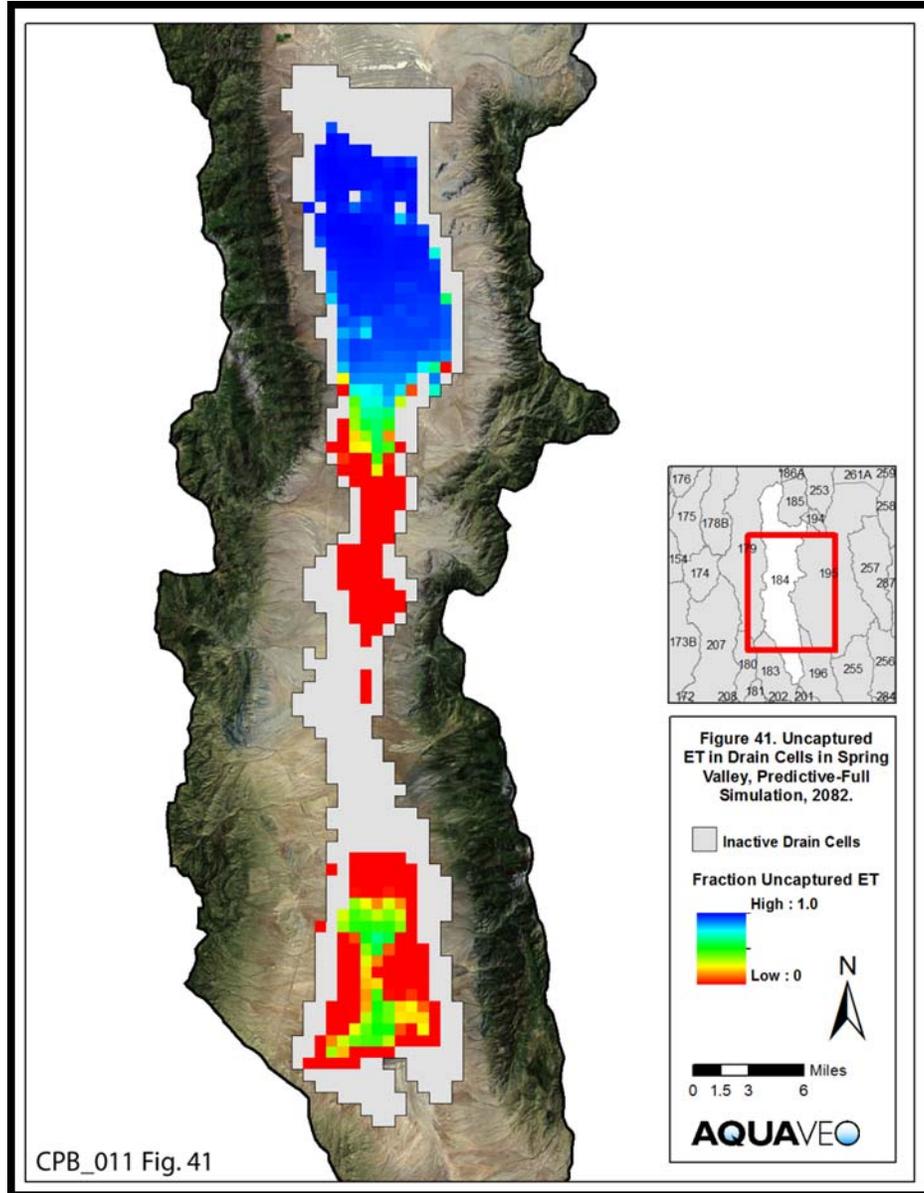
Dr. Jones then used SNWA’s model—once again, without any changes—to determine where ET capture occurs in Spring Valley. Dr. Jones explained that “the SNWA model uses the drain package to simulate evapotranspiration in Spring Valley.” (Tr. 11/16/2011 at 6035.)

When applied to evapotranspiration, the elevation that’s assigned to the ... drain cells corresponds to what we call the extinction depth in the evapotranspiration zone. And this is the ... lower limit of the phreatophytes....

Once the water table goes above that – if the water table is above the extinction depth, then water is discharged from the aquifer to the surface through the drain package. And once it drops below that – the losses to ET are eliminated and the water is then available for pumping by the SNWA wells.

(Tr. 11/16/2011 at 6035-6036 (Jones).) In other words, if roots can reach the water, ET is going to occur.

Using the SNWA model, Dr. Jones did a spatial analysis and generated maps showing how much ET is being captured in the zone where ET is occurring. The first map, CPB_011, Figure 41, shows the percentage of ET remaining uncaptured in the year 2082, which is 40 years after the completion of SNWA's wells.



[T]he red cells are the locations where ... the discharged ET has been completely captured. Meaning at this point in time, the water table is below the extinction depth and there is zero discharge to ET. The blue cells represent zones where the initial discharge to ET is pretty much unchanged.... So ... in those ... blue zones, there is still ground water actively discharging through evapotranspiration.... [T]he other colors represent some fraction in between.

(Tr. 11/16/2011 at 6037-38.)

Figures 42 and 43 show the same data for the years 2117 and 2242, respectively.

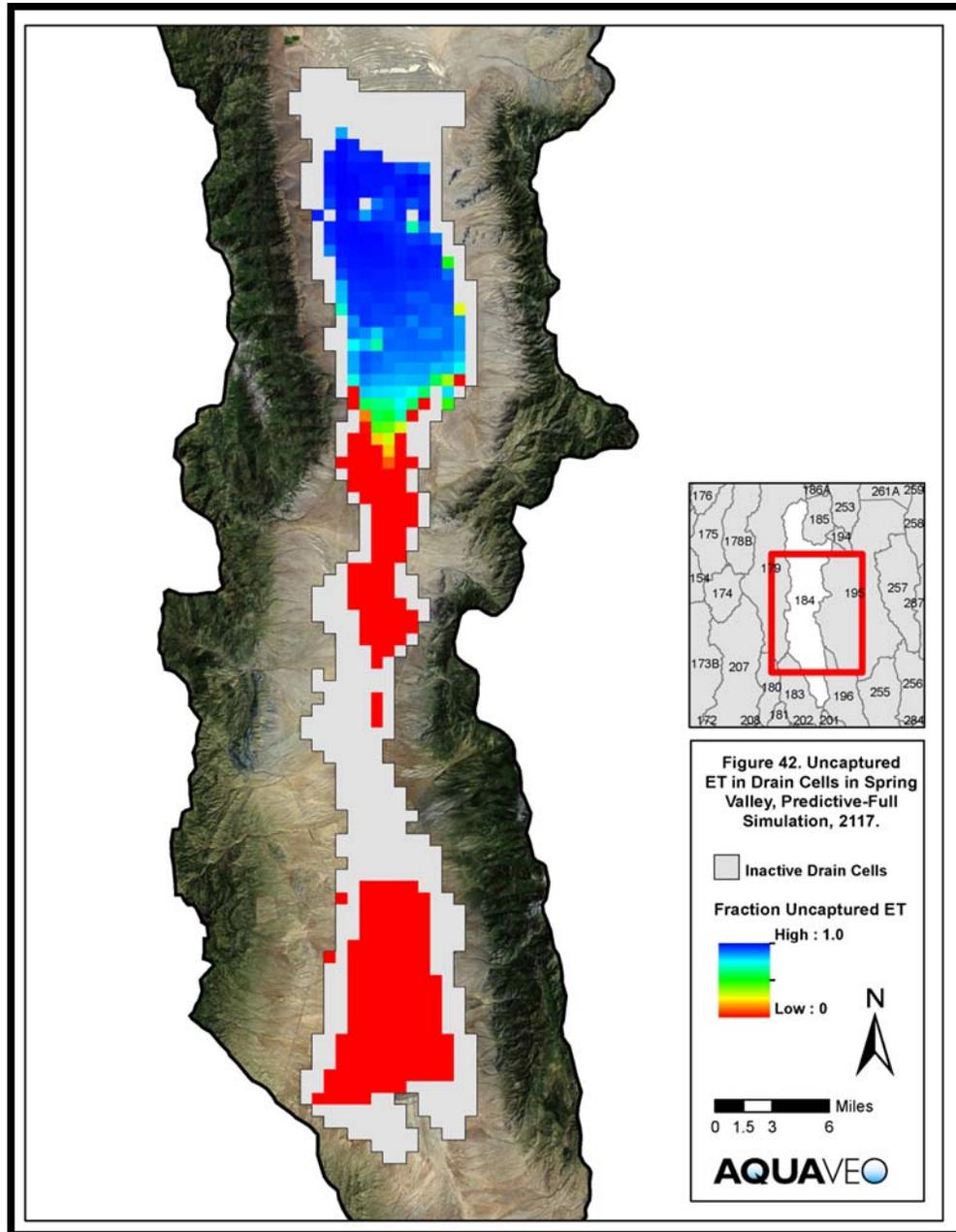
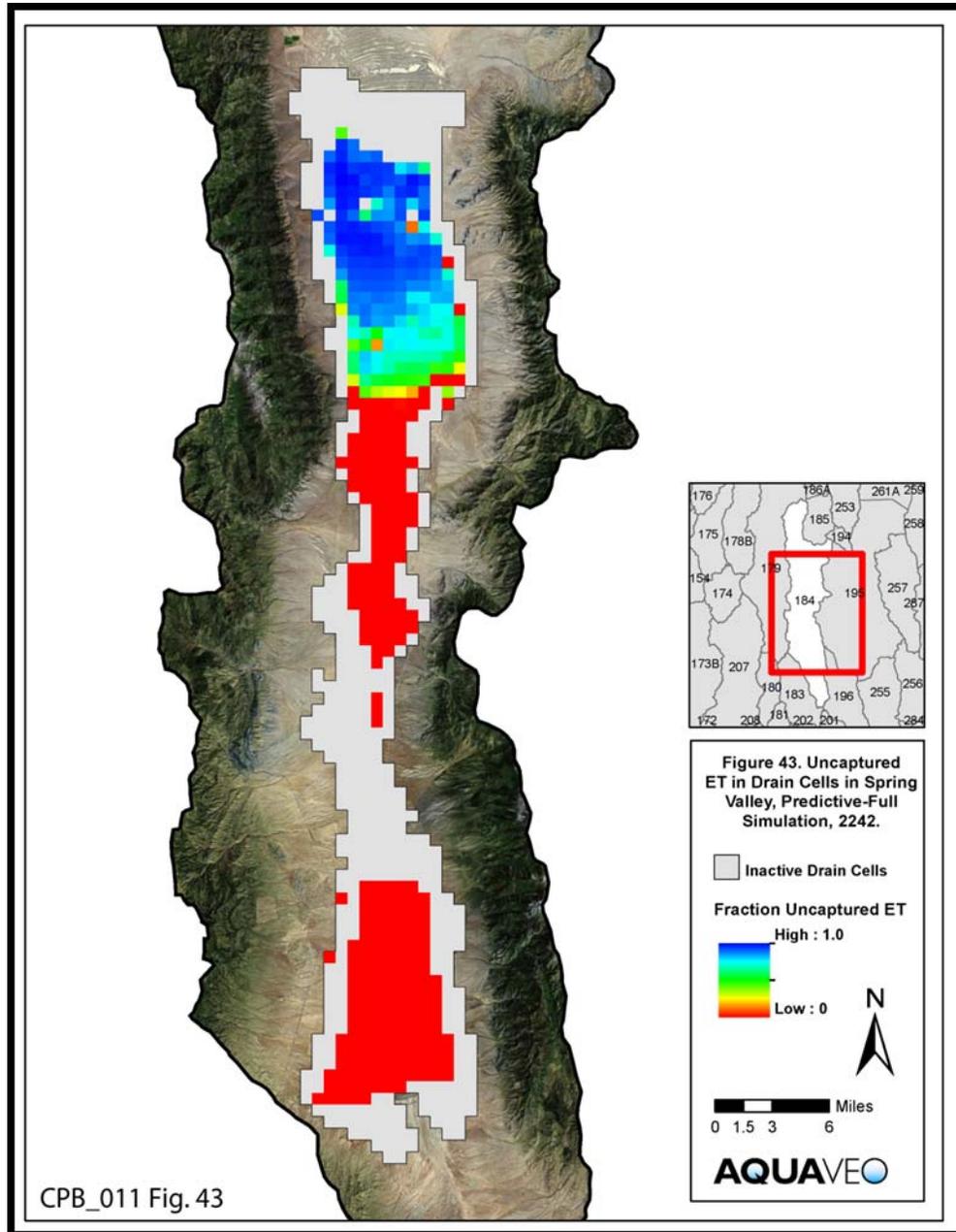


Figure 43 shows that after 200 years of pumping “at the center and southern parts of the valley, we have complete ET capture,” which is unfortunately where the Ranch is located, which means the springs are dry and the sub-irrigated lands are gone (and so is the cattle-ranching business—though the model can’t simulate that). (Tr. 11/16/2011 at 6038, 6039.)

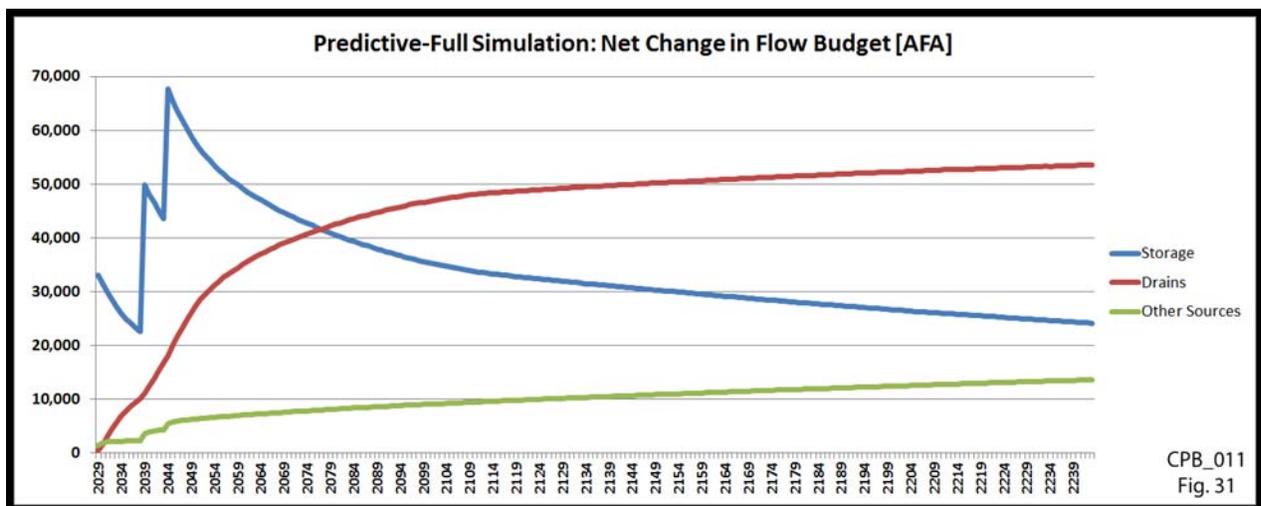


“But in the northern part of the valley, there’s still substantial amounts of evapotranspiration which remains uncaptured.” (Tr. 11/16/2011 at 6038 (Jones).) In short, SNWA’s water is coming primarily from the center and southern parts of the valley. “And this creates a water imbalance and results in groundwater mining because that evapotranspiration at the northern end of the valley was part of the ET discharge that’s used to calculate the perennial yield.” (Tr.

11/16/2011 at 6038-39 (Jones).)

In addition to this spatial analysis, Jones and Mayo performed a flow-budget analysis, which is a “systematic accounting for each of the major sources of water in the groundwater flow system ... in Spring Valley.” (Tr. 11/16/2011 at 6039 (Jones).) The purpose of this analysis is “to determine the source of water extracted by the proposed SNWA wells and how those sources change over time.” (CPB_011 at 54 (Jones).) In other words, the flow-budget analysis shows what fraction of the water being pumped is coming from ET salvage, from aquifer storage, or from some other source such as interbasin transfer.

The results of this analysis are shown in CPB_011 Figures 30 through 39. To demonstrate, here is CPB_011 Figure 31.



CPB_011
Fig. 31

All of the numbers on this chart represent a net change in the flow budget resulting from the SNWA wells. In other words, the numbers are found by calculating the difference between the flow budget numbers output from a model run with the SNWA wells pumping at the requested rate and a version of the model where the SNWA wells are not simulated. The green line represents the net change in flow between Spring Valley and adjacent valleys, which shows that the SNWA wells result in a net change of about 10,000 AFA into Spring Valley from

adjacent valleys. (Tr. 11/16/2011 at 6040 (Jones).) The red line, labeled “drains,” represents the captured evapotranspiration. (Tr. 11/16/2011 at 6040 (Jones).) And the blue line represents water being taken from storage (i.e., groundwater mining). (Tr. 11/16/2011 at 6040 (Jones).)

The red line shows that ET capture “increases during the first few decades and then it essentially flattens out” or “maxes out at about 50,000 acre-feet per year.” (Tr. 11/16/2011 at 6040 (Jones).) In other words, SNWA’s model shows that of the 91,000 AFA SNWA has applied for, the most it will capture from ET is 50,000 AFA—the rest will come from other sources. The blue line shows what is “essentially groundwater mining, long-term extraction from storage.” (Tr. 11/16/2011 at 6041 (Jones).)

In other words, the flow-budget analysis shows that substantial groundwater mining continues indefinitely:

[I]f there were complete ET capture and if the system had reached a state of equilibrium, we would expect that blue line to go to zero indicating at some point it no longer needs to extract water from storage to come up with the 90,000 acre feet. But that, it never gets to zero over the 200-year range of the simulation. At the end, it’s still substantially above zero, around 23,000 acre-feet per year.

(Tr. 11/16/2011 at 6041.)

Figure 32 of CPB_011 shows the same thing in another way.

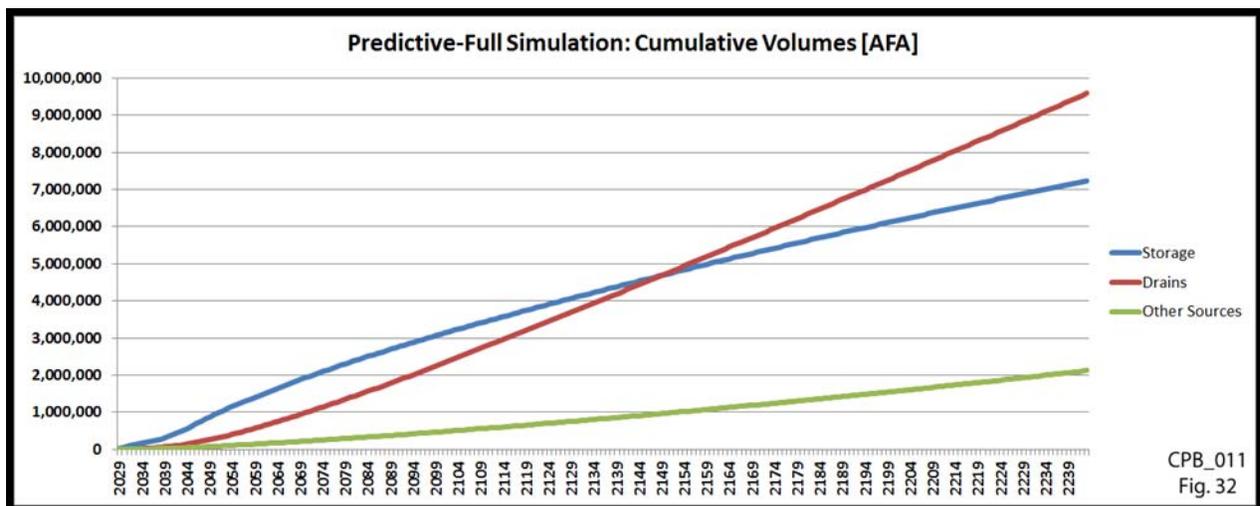
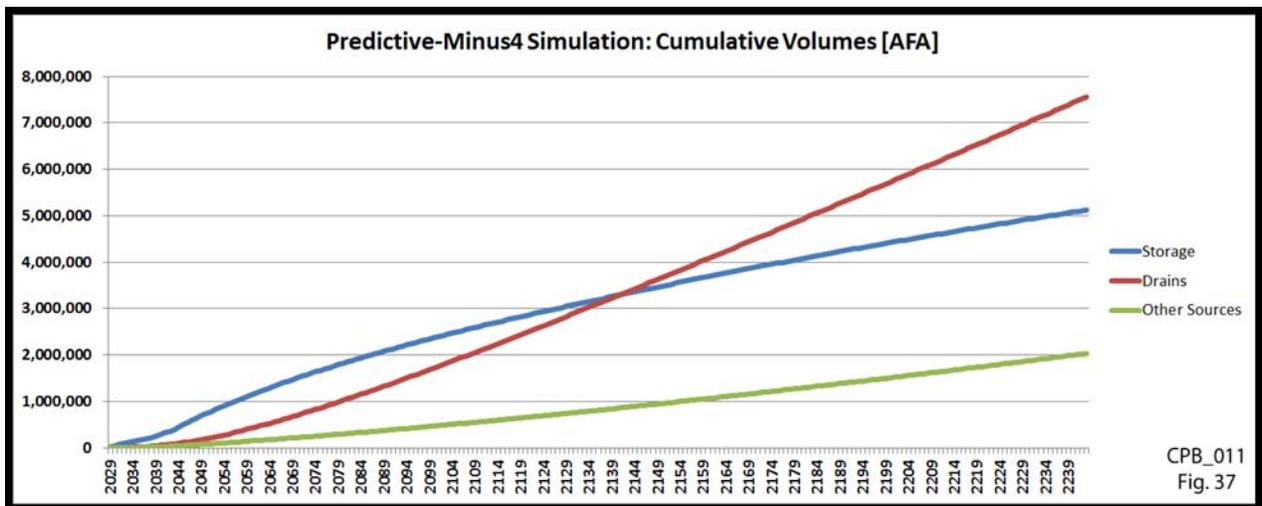
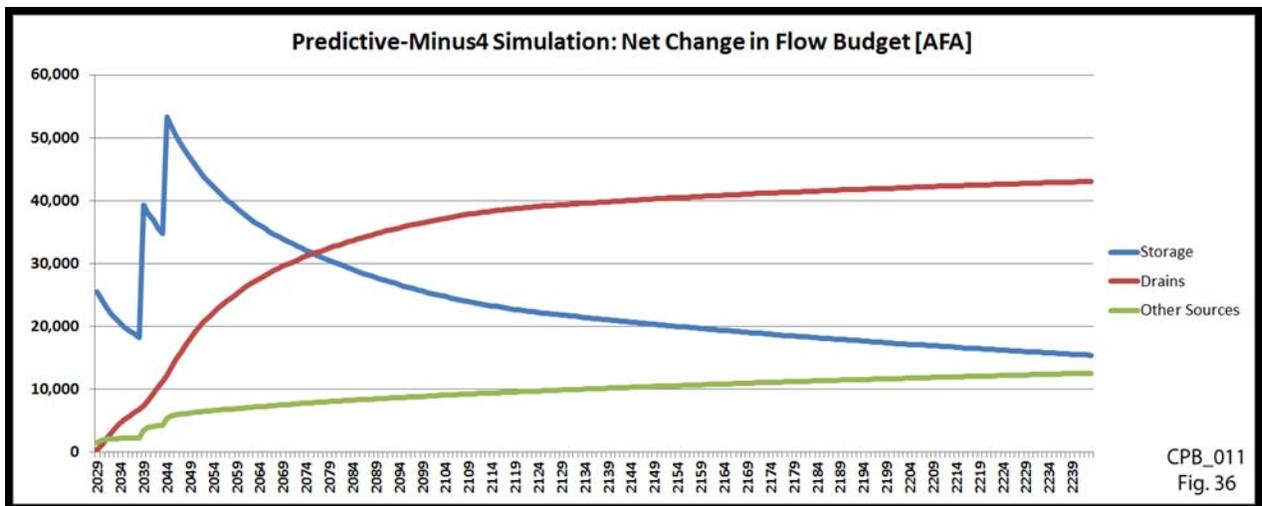


Figure 32 looks at cumulative flow volumes that “take the amount from all of the previous years and add it together and put that on a plot.” (Tr. 11/16/2011 at 6042 (Jones).) This graph again shows “a steady increase in ... the ET capture line. And if this were a system that eventually reaches a state of equilibrium, we would expect that blue line to flatten out.” (Tr. 11/16/2011 at 6042 (Jones).) This is another way of showing that SNWA’s project will result in continuous groundwater mining.

This holds true even if the four previously denied wells are removed from the simulation.



Even without these four wells, “after 200 years, there’s substantial groundwater mining still occurring with this simulation.” (Tr. 11/16/2011 at 6043 (Jones).) Dr. Jones explained that the problem is not only the pumping rate, but the distribution and design of the wells:

Q. So even reducing the ... demands on the system by taking four wells out, you still don’t approach equilibrium?

A. Yeah, what ... this indicates is reducing the [pumping] rate doesn’t solve the ... problem.... [I]t doesn’t solve the problem of groundwater mining. It’s the primary flaw in the system, and it’s the – where the wells are located. And not – it’s not completely related to the pumping rate, ***but the distribution of the wells and the depth from which they’re drawing water is what results in the groundwater mining.***

(Tr. 11/16/2011 at 6043, emphasis added.)

The water available for appropriation in Spring Valley is the uncaptured ET. (Ruling # 5726 at 32.) ET salvage occurs when the water table is lowered beneath root depth due to pumping. The water table drops below the root extinction depth, and water previously lost to ET can be captured for use by the wells. In order for this to work in a sustainable fashion, the water table must be lowered over a large region. In this case, SNWA’s own models show that an aggregate cone of depression will occur in a concentrated area, resulting in extreme levels of drawdown in that area. This results in incomplete ET capture and continuous and substantial groundwater mining. Unfortunately, the cone of depression includes the Ranch, which will suffer from the destruction of the springs and the loss of sub-irrigation, along with subsidence and the permanent loss of storage capacity.

SNWA does not deny that groundwater mining will occur as a result of pumping what it has applied for. Dr. Watrus admits that the model results show that groundwater mining will occur, but says this is only a simulation, and in real life we can trust SNWA to manage the effects: “management is our key to reducing the effects.” (Tr. 10/11/2011 at p. 2657-58.)

Q. Okay. Well, isn't it true though that ... SNWA ... would have the right to pump the full amount of whatever water rights are granted by the State Engineer?

A. Sure.

Q. Okay. So then what assurance could the State Engineer have that any given time or even on an extended time the full amount would not be pumped?

A. The State Engineer can order that. If a conflict arises that somebody complains about, the State Engineer can look at that and make the determination that we must stop pumping. That decision is his.

(Tr. 10/11/2011 at p. 2658.)

SNWA's answer is that the parties must trust SNWA to pump only what it can without interfering with existing rights and, if SNWA violates that trust, bring the issue to the State Engineer. But that is not consistent with Nevada law. *Ruddell v. Sixth Judicial Dist. Ct. in and for Humboldt County*, 54 Nev. 363, 17 P.2d 693, 695 (1933) ("The purpose of the Water Law is perfectly obvious. It seeks not only to have the water rights adjudicated but to have them adjudicated in such a proceeding as to terminate for all time litigation between all such water users."). There is no doubt that the Applications actually filed by SNWA and at issue in these proceedings conflict with existing water rights. SNWA's professed good intentions are irrelevant. When an application conflicts with the Ranch's existing water rights, the State Engineer "shall reject" and "refuse to issue the requested permit." NRS 533.370(5).

VI. THERE IS MUCH LESS WATER AVAILABLE FOR APPROPRIATION THAN SNWA CLAIMS

The Ranch does not deny that there is unappropriated water in Spring Valley—not as much as SNWA says there is, but there is some unappropriated water. The State Engineer estimated in 2007 that the safe annual perennial yield is 80,000 AFA. This was reconfirmed in

the more recent inventory. From this amount should be deducted 14,203 AFA in committed rights, and at least 8,000 AFA (10%) for future growth; and 1,265 AFA for future domestic use, as was previously done in Ruling # 5726, which leaves 56,532 AFA available for appropriation.

SNWA settled on an estimate of 94,800 AFA, most of which is from the part of Spring Valley where the Ranch is located. This estimate, contained in SNWA Exhibit 258, is based primarily on the work of Dr. Rowley and Dr. Fenstermaker.

Dr. Rowley presented a unique theory about the role of faults as barriers and conduits for water flow in both the alluvial and carbonate aquifers. But he acknowledged that his theory cannot be measured or tested—it is “largely theoretical.” (Tr. 10/03/2011 at 1322-23.) He also acknowledged that reasonable professional geologists can and do disagree with his theory. (Tr. 10/03/2011 at 1296.) A theory that cannot be measured or tested is not substantial evidence on which to base this momentous decision.

Dr. Fenstermaker testified at length about her ET calculations based on remote sensing and a variety of other techniques. She acknowledged that her approach was based on “emerging” techniques. (Tr. 9/29/2011 at 756.) She also acknowledged that “there are not a lot of measurements encompassing the whole valley ...” (Tr. 9/29/2011 at 759.) She admitted that there is not even five years worth of data. (Tr. 9/29/2011 at 760.) And she acknowledged that she does not know if the limited data she does have is representative of a longer period of time.¹³ (Tr. 9/29/2011 at 762.) “And I doubt that really anybody could make that assessment because of the lack of measurement data within the state of Nevada,” she conceded. (Tr. 9/29/2011 at 762.) Because of the lack of data, she admitted an inability to make any long-term projections. (Tr. 9/29/2011 at 763.) Finally, she admitted her approach has only a 68% accuracy rate. “And so

¹³ It is likewise difficult to see how limited data from only seven test towers can be representative of a valley of over 1,600 square miles. See SNWA Exhibit 363 at 2-3.

even a 32 percent error or, if you will, a 68 percent accuracy for remotely-sensed data product is considered quite good.” (Tr. 9/29/2011 at 678-769.)

Watus admitted that “we don’t have a lot of information on the precipitation and how much it falls. The recharge is not a measureable value as Mr. Burns has already described.” (Tr. 10/10/2011 at 2565.)

Furthermore, SNWA’s ever-increasing perennial yield estimate fails to account for two other important factors: (1) uncaptured ET, and (2) replacement wells. SNWA’s witnesses acknowledged that uncaptured ET and the water pumped by replacement wells should be subtracted from available perennial yield, but this was not done in SNWA’s calculations.

Q. Okay. Now I’m trying to figure this from the management point of view. As you’re monitoring the way the program is going, the program will not eliminate all of the native phreatophytes in Spring Valley, will it?

A. I don’t know. You know, it depends on the pumping and so forth. I don’t believe it would.

Q. Well, if there are phreatophytes left in the wild, there’s going to be some evapotranspiration loss through those plants. Doesn’t that have to be subtracted from the calculation of available ET salvage?

A. Well, it would – if there’s some remaining, there would be some component that – that remains, yes.

(Tr. 10/10/2011 at 2508-09 (Prieur).)

Q. Would the – volume of water from these replacement wells have to be subtracted from the calculation of ET salvage?

A. I think, again, it would depend on the – the depth of those wells or what the flow path is that we’re intercepting. But it would seem, if it was connected and it was being – basically intercepted from ET, that it would make sense that it would.

(Tr. 10/10/2011 at 2510 (Prieur).)

The amount of uncaptured ET is actually quite significant. The analysis by Drs. Mayo and Jones demonstrated that SNWA's wells can capture only 50,000 AFA of ET (Tr. 10/16/2011 at 6040). Comparing that to the State Engineer's estimate of 80,000 AFA perennial yield means that 30,000 AFA of ET is going uncaptured (resulting in 30,000 AFA of groundwater mining). Subtracting 30,000 AFA from the 56,532 AFA otherwise available for appropriation *means only 26,532 AFA is available* before reduction for replacement wells.

**VII. THE SUPERFICIALLY SOOTHING MANTRA OF
"MANAGE, MONITOR AND MITIGATE" PROVIDES
NO PROTECTION TO THE RANCH**

Throughout the six weeks of hearings, SNWA frequently deflected criticism and concerns by invoking the mantra of "manage, monitor and mitigate." At its core, that means nothing more than "please trust us to do the right thing when things go bad."

The heart of the "manage, monitor and mitigate" claim is the 2006 stipulation (the "Stipulation") entered into between SNWA and three bureaus of the Department of the Interior. State Engineer Ex. 41. Unfortunately, the Stipulation serves only the interests of SNWA and provides no substantive protection of any kind to the Ranch or any other protestant. Recital G of the Stipulation recites that common goals of the stipulating parties are to protect *federal* water rights and resources but it makes no reference to the protestants' rights.¹⁴

In furtherance of the common goals of the Stipulation, SNWA has presented some detailed monitoring plans such as SNWA Exhibits 149 and 365. However, despite the sheer bulk of those exhibits, nothing there expands on the rights protected, or not protected, by the

¹⁴ Recital H of the Stipulation is particularly interesting because it describes one of the goals of the stipulating parties as the management of "the development of groundwater by SNWA in the Spring Valley HB in order to avoid unreasonable adverse effects to wetlands, wet meadow complexes, springs, streams, and riparian and phreatophytic communities . . ." That common goal is remarkable because it seems completely at odds with ET salvage. ET salvage necessarily requires the elimination of phreatophytic communities and ultimately the elimination of wetlands, wet meadows and streams.

Stipulation. In fact, these reports are remarkable for how little they say about key features. In Exhibit 365, which addresses biological monitoring, the entire discussion of mitigation measures consists of 33 words saying, in effect, that something undefined will be done in response to changes induced by groundwater pumping. Ex. 365 Sec. 8.4.

In SNWA Exhibit 149, which is entitled "Hydrological Monitoring and Mitigation Plan for Spring Valley," the entire discussion of mitigation actions consists of one-half page promising to mitigate any injury to federal rights and pledging in some undefined manner to "implement management and mitigation actions relative to injury to private or non-Federal water-right holders." Ex. 149 Sec. 6.0.

To implement the Stipulation, the parties established a Technical Review Panel ("TRP"), a Biological Working Group ("BWG") and an Executive Committee. Stipulation Sec. 2, pg. 6. Exhibit A to the Stipulation outlines the plan for monitoring, managing and mitigating the development of groundwater. The common goals identified here are the protection of federal water rights and resources. Ex. A Sec. 1A. Nothing is said about protection of State-managed wildlife such as the Sage Grouse.

In the event that any of the parties to the Stipulation are concerned about injury to federal interests, they may initiate a TRP consultation. Ex. A Sec. 3(E)(I), pg. 11. Within 30 days the TRP must talk about the problem. If the TRP cannot make a consensus decision, then it can refer the problem to the Executive Committee, which will talk about it. Ex. A Sec. 3(E)(I)(I)2, pg. 14. If the Executive Committee does not agree, then the issue can be referred to either the Nevada State Engineer or a neutral third party. There is no requirement, however, that the Nevada State Engineer be involved. Ex. A Sec. 3(E)(II), pg. 14.

Similar provisions and outcomes prevail under Exhibit B to the Stipulation concerning

biological monitoring, but the outcome remains the same. In the event of any issues, all that SNWA has done is agree to talk about the problem. Missing from the plan is any protection for the Ranch or similarly situated protestants. It is important to note that there is no express requirement in the Stipulation or its exhibits that SNWA must report any perceived problems. There is only the provision that, if a problem is reported, then the parties will begin the long process of talking about it.

Once a problem is identified, there is no requirement that interested parties such as the Ranch be notified of the problem. All the talking sessions take place behind closed doors, away from the purview of the public and the protestants. And the problems are only revealed to the State Engineer if, and only if, the parties decide to disclose them. These potential delays can be critical. For example, when Mr. Felling examined Dr. Rowley, Mr. Felling pointed out that, when the de-watering pumping was renewed at the Ruth Mine, it was only weeks before adverse impacts were felt miles away at Murray Springs. TR 10/03/11 at 1352

The Stipulation is wholly lacking in standards, thresholds or triggers that might define a problem or might initiate corrective action if something starts to go wrong. For example, how many acres of wetlands have to disappear before someone at SNWA is obligated to concede action must be taken? How many springs have to go dry to initiate corrective action?

If it becomes obvious that corrective action needs to be taken, there is no provision under the Stipulation allowing anyone to do anything. As Mr. Marshall acknowledged in his testimony, if he saw a disaster looming, he does not have the authority under the Stipulation to stop pumping. All he can do, if he chooses to do so, is begin the cycle of consultations within the various committees. That is not meaningful protection.

There are no enforcement provisions. If an adverse event occurs, SNWA is obligated to

discuss it through all the various committees and up to a neutral third party. But, if SNWA does not like the decision of the neutral third party, it is not obligated by the Stipulation to abide by the neutral's decision. There is no provision for enforcement of the neutral's decision.

Monitoring, no matter how carefully done, is only an expression of good intent; it is not a guarantee against damage. Tragic mistakes happen under the best of monitoring plans. Mr. Marshall testified about the manage and monitor program in place at Devil's Hole. There, despite the best intentions and the best science, a mistake was made that killed approximately one-third to one-half of the entire population of Devil's Hole pupfish. Monitoring an environmental tragedy is not the same thing as preventing it.

VIII. RECOMMENDATIONS

What should be done? For a project of this magnitude to be designed and constructed correctly, the first thing that needs to happen is development of a local groundwater model for Spring Valley. (Tr. 11/16/2011 at 6046 (Mayo).) Among other things, such a model would help analyze how much water is actually available. (Tr. 11/16/2011 at 6046 (Mayo).) With that model, a pumping scheme could be developed with many, many shallow wells that could be tested by the model. "And then by doing so, you could determine where wells could be placed so that they would not be impacting existing water rights." (Tr. 11/16/2011 at 6046 (Mayo).)

Then, as Dr. Mayo testified, "you could probably com[e] up with a project that would ... capture ET and not damage existing water rights." SNWA, however, has not done so. (Tr. 11/16/2011 at 6047 (Jones).)

Dr. Jones agrees, but adds:

[I]f there were a redesigned system, I don't think the measure of success should be [complete ET capture] for the entire valley because that ... would interfere with the [Ranch's] existing water rights through sub irrigation and spring flow.... [T]here could be some ET capture as long as it were properly distributed through

the valley and in such a way that it didn't impact existing water rights. (Tr. 11/16/2011 at 6047.) But Dr. Jones concludes, "The system that's proposed does severely impact existing water rights." (Tr. 11/16/2011 at 6047.)

IX. CONCLUSION

SNWA was in a tough spot. The Supreme Court reversal, with its one-year limitation, may have pushed SNWA to a determinative hearing long before it was really ready. Certainly a lot of good baseline work had been done. On the key factors of how much groundwater is available and a proper well field design, however, SNWA was simply not prepared.

Part of the problem surely arises from the fact that the present management regime inherited 19 applications that were filed in 1989. The proposed points of diversion in those applications are simply inadequate to produce a true ET salvage program. Perhaps SNWA clings to those outdated applications in an effort to claim some right of priority. Even that seems a bit tenuous because there are so few competing applications filed in recent years.

As the flaws in SNWA's program were revealed, SNWA responded in turn that it could overcome each flaw by its "manage, monitor and mitigate" mantra. Such a subjective and arbitrary solution is not part of the Nevada statutory framework. Protestants such as the Ranch can take little comfort in the obvious fact that, if SNWA's project is built out, the personnel who will be "managing, monitoring and mitigating" will surely be different than those who avowed their good intentions in the recent hearings.

When the project is built out, it will be cheaper to pump water from Spring Valley to Las Vegas than it would be to pump water from Lake Mead.¹⁵ That means SNWA always has a financial interest in pumping the most water it can from Spring Valley. That incentive will only

¹⁵ John Entsminger testified that the operation cost to pump groundwater to Las Vegas from Spring Valley is \$215 per acre foot. The cost to pump to Las Vegas from Lake Mead was \$262 per acre foot, or about 20% more. TR 10/10/2011 at 2394.

increase in dry seasons or droughts. That is also exactly when the Ranch and the environment will be under the greatest stress with respect to water. Whose interests are likely to be sacrificed under the banner of expediency then?

In the long term, "manage, monitor and mitigate" reduces or eliminates the State Engineer's role and really means to put protection of the Ranch's interests in the hands of the very entity from which it needs protection.

Dated this ____ day of December, 2011.

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Bishop on Behalf of the Cleveland Ranch

CERTIFICATE OF SERVICE

I certify that on this 22nd day of December, 2011, a true and correct copy of the foregoing Closing Statement of Corporation of the Presiding Bishop on Behalf of the Cleveland Ranch was served on the following persons as follows:

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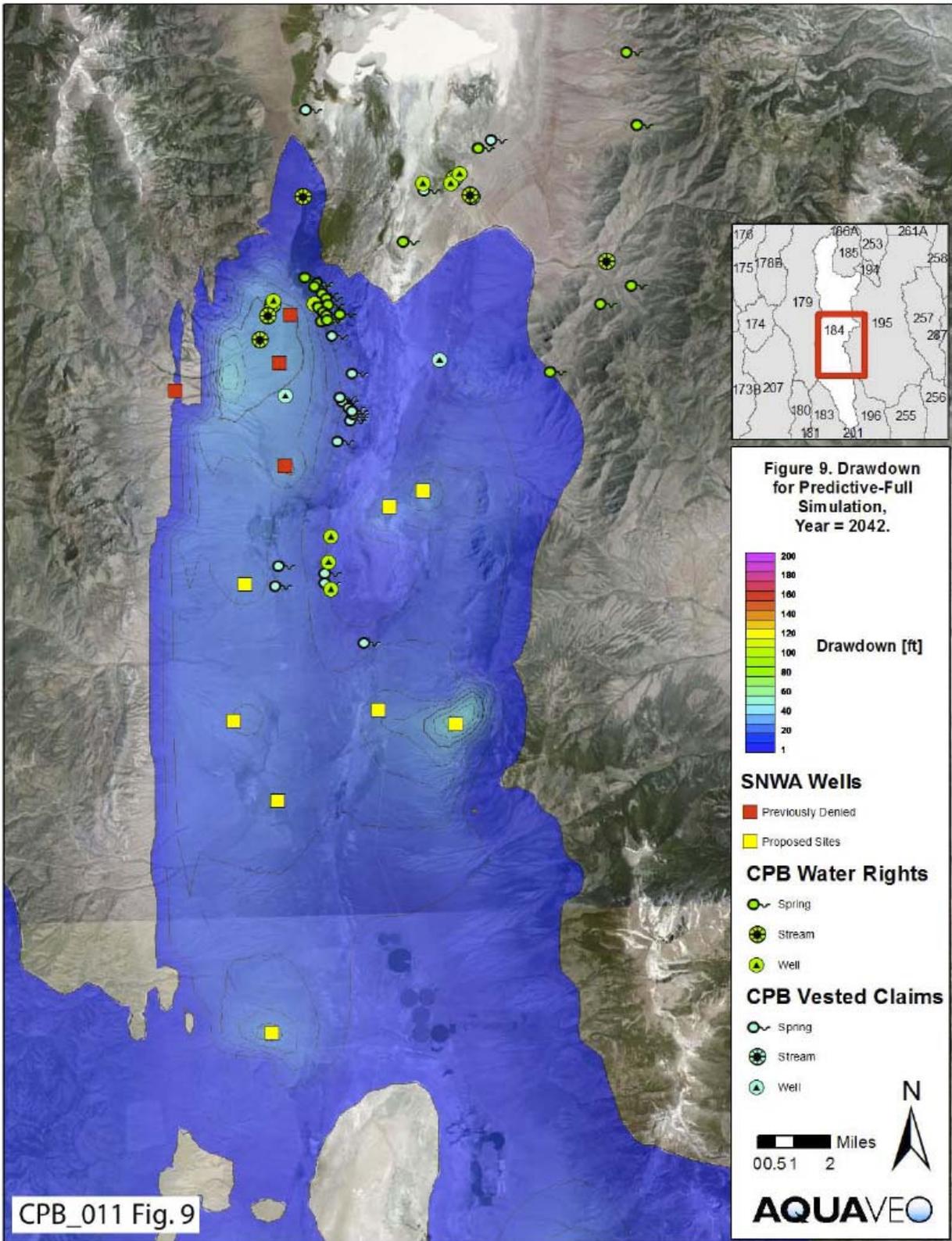
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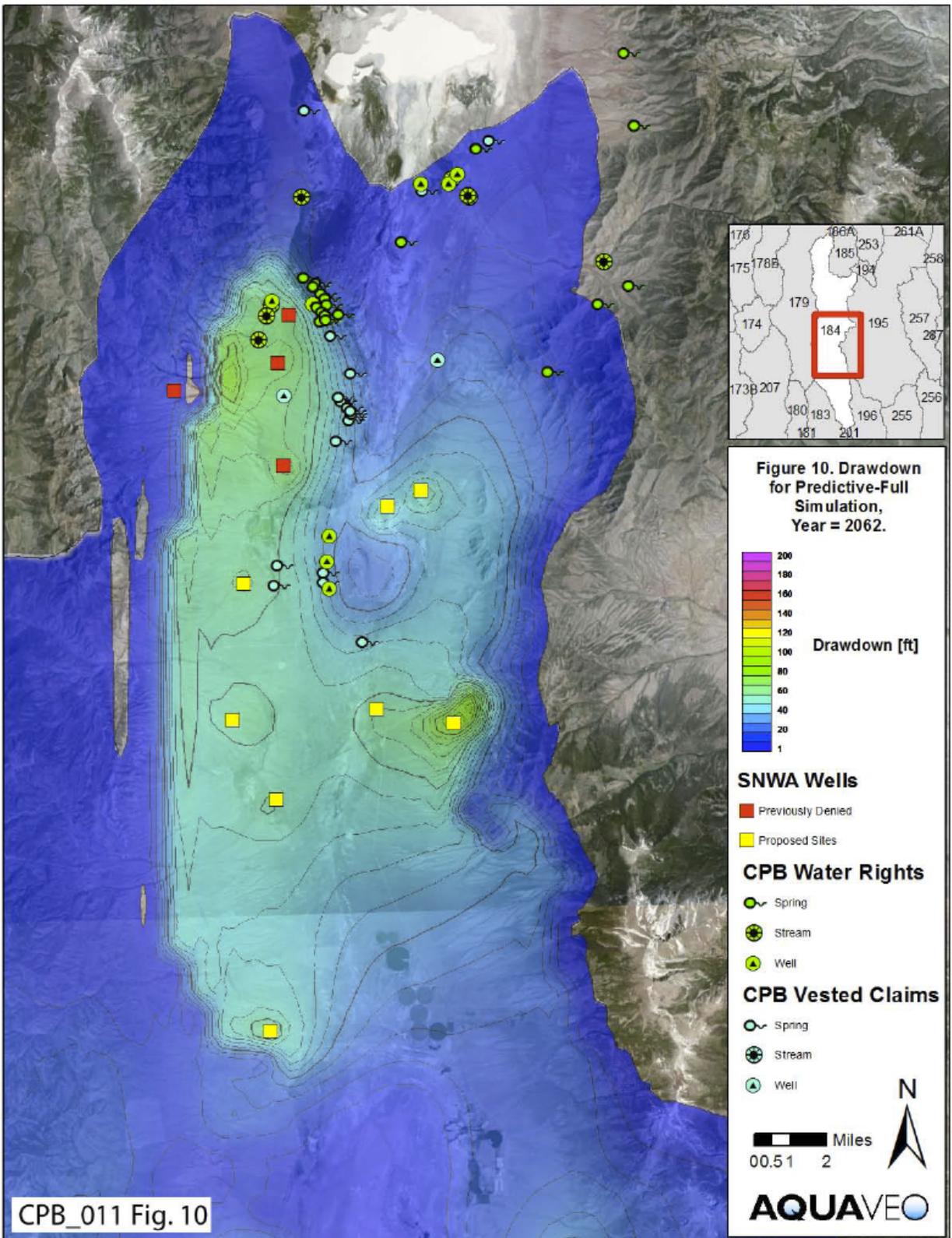
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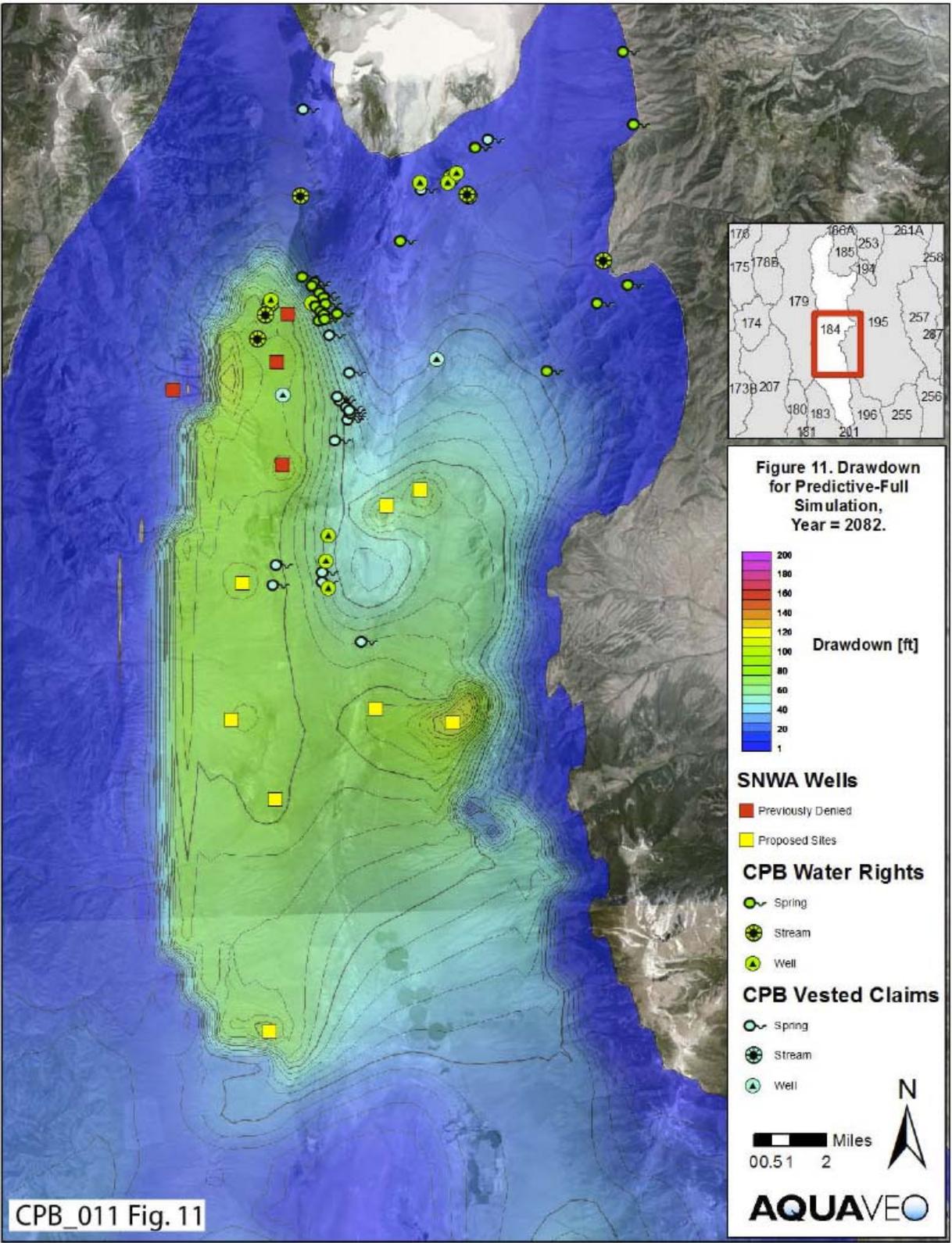
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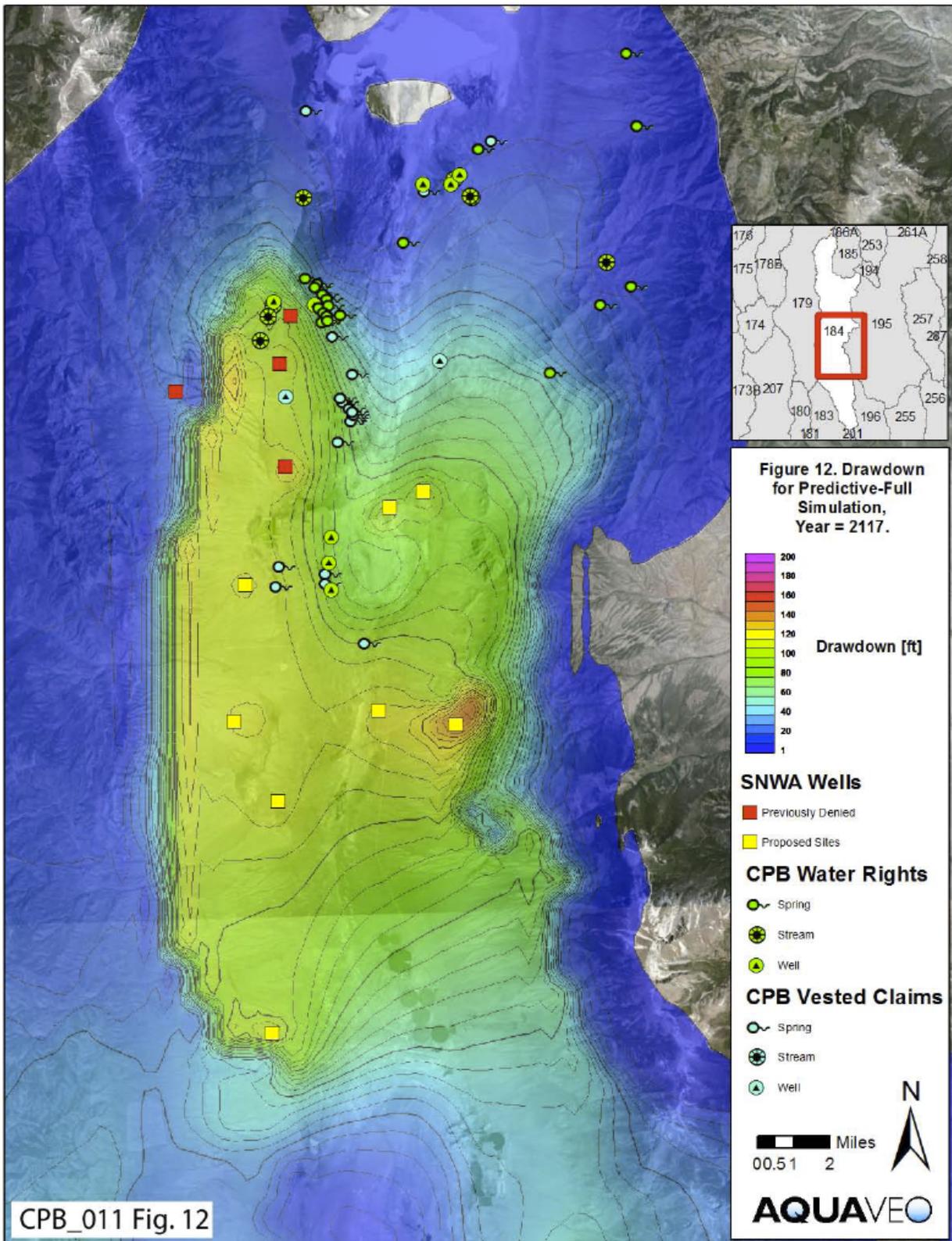
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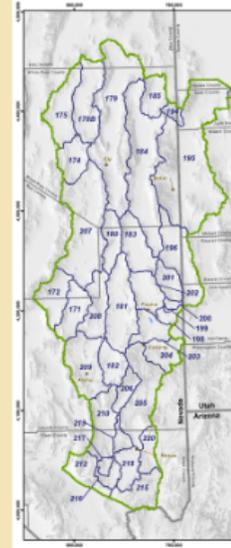
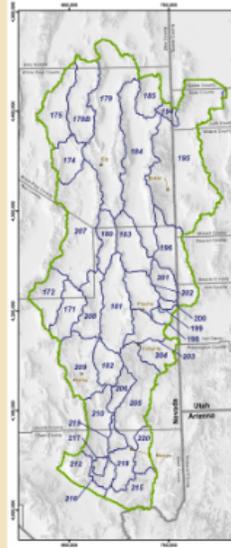
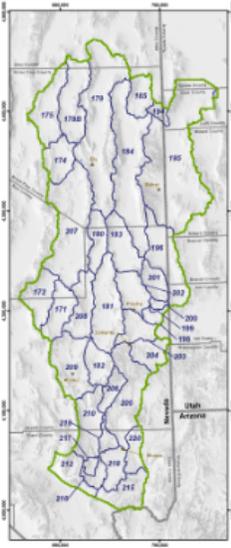
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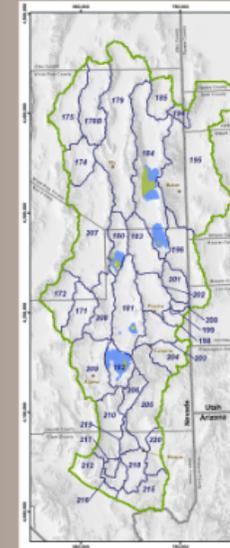
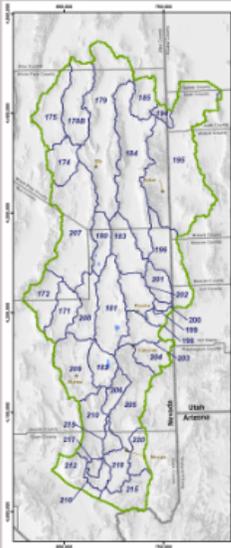
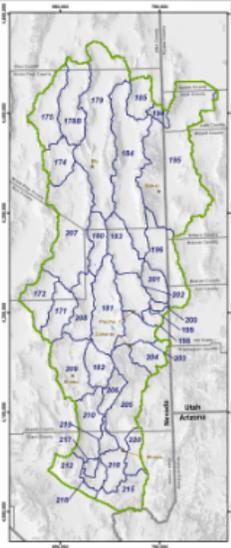
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Baseline



POD¹

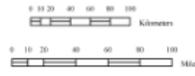


Legend

- ★ Town
 - State Boundary
 - ⬢ CCRP Model Boundary
 - County Boundary
 - ⬢ Hydrographic Area within Model Boundary²
- ¹ Depicted drawdowns do not include effects of Baseline pumping.
² Hydrographic Area number shown.

Drawdown (feet)

- 0 - 50
- 100 - 150
- 200 - 250
- 50 - 100
- 150 - 200
- 250 - 500



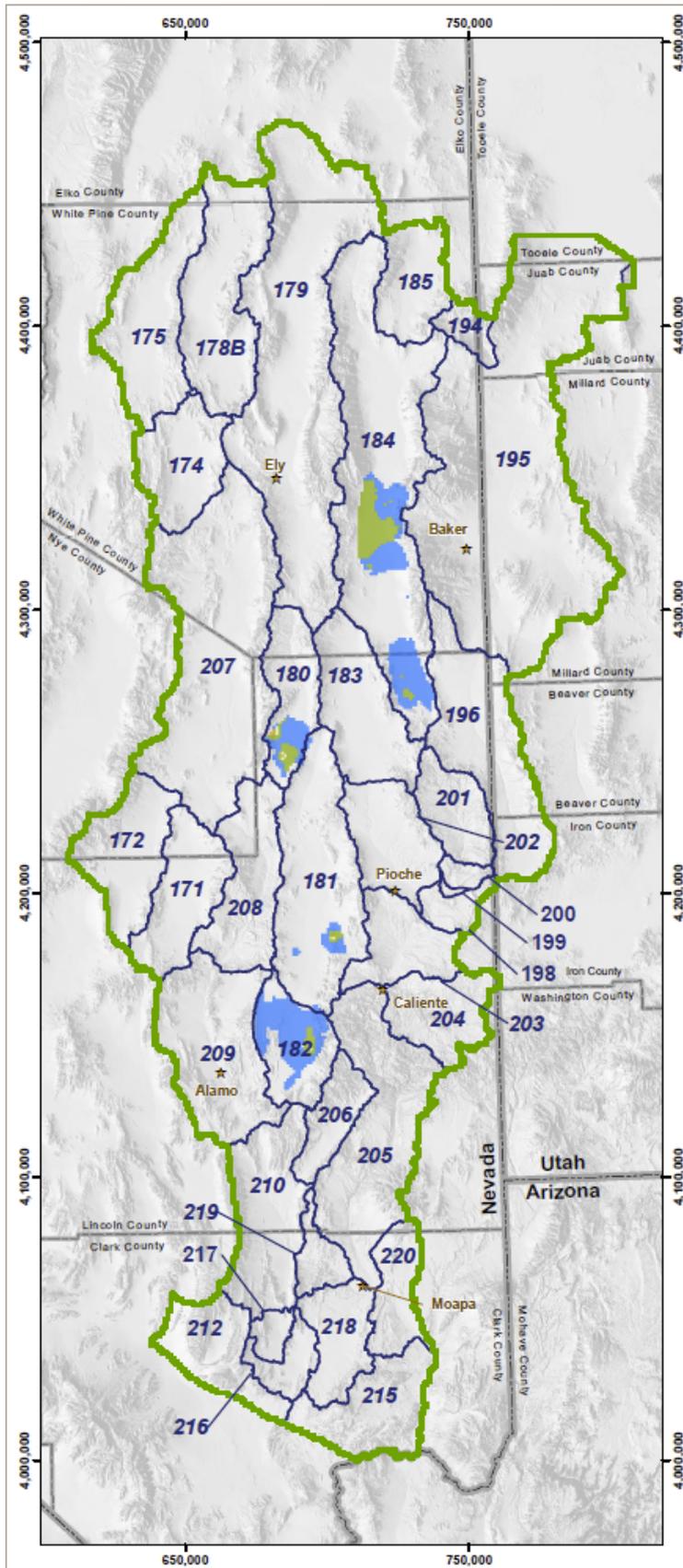
Grid based on Universal Transverse Mercator projection, North American Datum 1983, Zone 11N meters. Elevation developed from 30m DEM, Sea Level 47° Arcsinh 5.57°

PLATE 2 - SIMULATED DRAWDOWN CONDITIONS FOR THE BASELINE AND POINTS OF DIVERSION MODEL SIMULATIONS

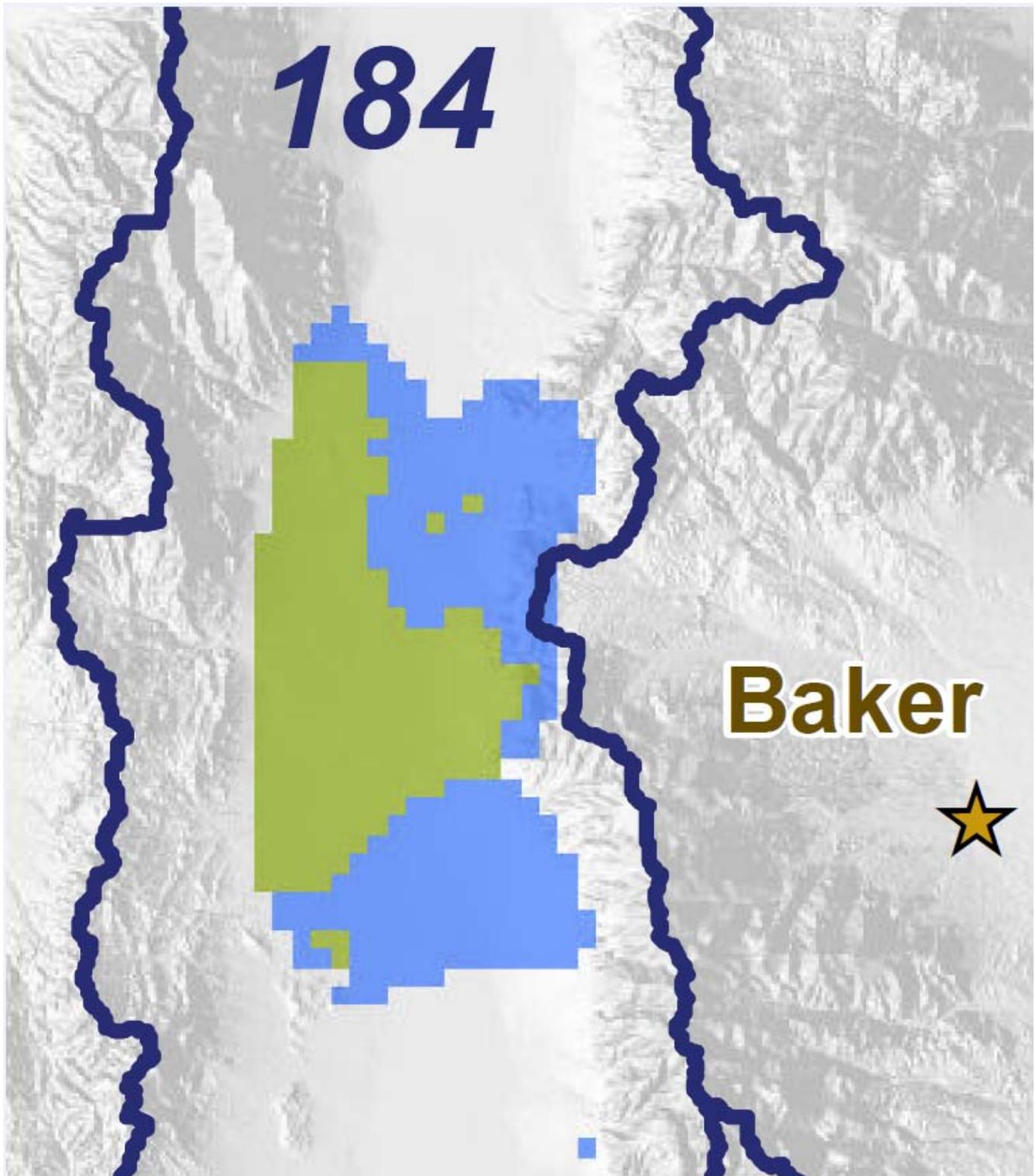
SNWA_337 Plate 2

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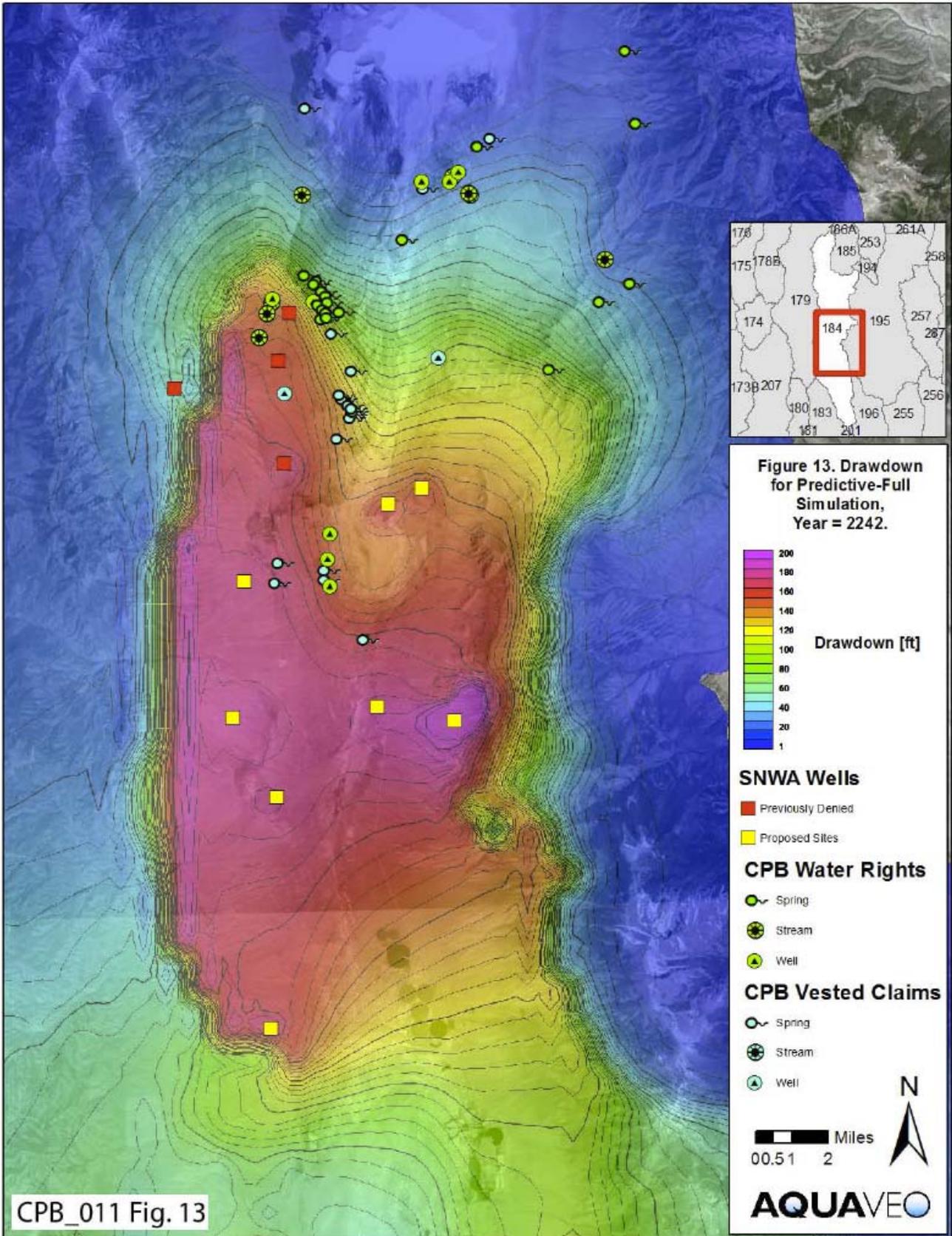
SNWA EXHIBIT 337
PLATE 2
APPENDIX E 1 of 3



2117 (POD)
 SNWA EXHIBIT 337
 PLATE 2
 APPENDIX E 2 of 3



**CENTRAL SPRING VALLEY
2117 (POD)
SNWA EXHIBIT 337
PLATE 2
APPENDIX E 3 of 3**



APPENDIX F