Policy and management issues pertaining to parcel BLK094

Rationale

The Bristlecone Chapter of CNPS is calling attention[1] to a management problem in parcel BLK094. We focus on this parcel (as opposed to other parcels also affected by pumping-induced drawdowns) because baseline data under the Inyo-LA Long Term Water Agreement (LTWA) suggest meadow habitat in BLK094 was in particularly good condition. BLK094 had a relatively high biological resource value, and degradation is proceeding rapidly under LTWA management.

Background

Parcel BLK094 is classified as Type C, groundwater dependent meadow, under the LTWA. The average water table depth under the parcel in 1986 was shallow enough to support the meadow vegetation originally mapped by Lee in 1912,[2] and mapped again by DWP in 1986. The drawdown DWP initiated in 1987 lowered the water table under this parcel dramatically, and groundwater hasn't been accessible to graminoid (meadow) vegetation since.[3]

The management problem

The biological rationale for the LTWA is that groundwater dependent vegetation can tolerate drawdowns of "one to several years."[4] The "drought hardiness" of this vegetation means "constant water table/root zone contact is not required for … survival."[5] This was the stated reason alternative 3 in the LTWA EIR -- maintaining water tables permanently in rooting zones -- was rejected in favor of the LTWA.

Management of parcel BLK094, however, has not conformed to the LTWA one-to-several-year drawdown model. Instead, the drawdown has lasted almost two decades and is effectively *permanent*: chances of water table recovery to grass the rooting zone under current management are negligible.[6] This is the management problem.

The single biggest cause of the management problem is excessive pumping from wells 351 and 356. These wells provide water to Blackrock Fish Hatchery,[7] which had previously depended upon flow from Blackrock Spring. The flow from Blackrock Spring averaged about 8000 af/yr[8] until DWP dried it completely in 1972. Pumping from wells 351 and 356 is exempt from the LTWA's On/Off protocol because it is compensatory mitigation for the drying of Blackrock Spring.[9] The wells typically are pumped to produce over 12,000 af/yr, at least 50% more water than the average spring flow.

Ecosystem effects

The water table under BLK094 – classified as a meadow – is now held at depths in which shrublands are expected to occur instead of meadows.[10] A variety of data

suggest that this expectation is being met: Total perennial cover as estimated by field monitoring and live cover estimated by satellite imagery are now diminished relative to LTWA baseline conditions,[11] shrub cover is increasing relative to grass cover[12] and in places even the trajectory of the shrub invasion (from west to southeast) is evident.[13]

Comparison with an adjoining meadow parcel, BLK099, reinforces the conclusion that groundwater drawdown is a primary cause of the BLK094 meadow degradation. In parcel BLK099 no comparable shrub invasion is occurring, grass is not declining, and perennial cover approximates baseline conditions. Unlike the permanent drawdown under BLK094, water tables under BLK099 recovered to the bottom of the grass rooting zone in 1996 and have remained there ever since.[14]

A Management Solution

Limiting TS wellfield pumping to 8,000 af/yr could allow water table recovery to the grass rooting zone under BLK094 in as few as 4 years.[15] This restriction on TS pumping could be accomplished by putting a ceiling of 8,000 af/yr on combined pumping from exempt wells 351 and 356. This would guarantee the Blackrock Hatchery all the water it formerly received from Blackrock Spring.

Pumping in TS wellfield could be reduced even without a formal ceiling on the exemptions. No volume of pumping is specified as a minimum (or maximum) necessary to comprise the compensatory mitigation,[16] and, in practice, pumping from the exempt wells has varied greatly over time.[17] DWP has never offered a public explanation of how it determines the amount of pumping from wells 351 and 356 in any given year and Inyo has never asked for one.

The Policy Problem

The EIR to the LTWA repeatedly emphasizes the primacy of management to "avoid" impacts rather than allowing them to become significant and mitigating after the fact.[18] Groeneveld warned that even when the "one to several-year" drawdown model is applied there would be a real danger of shrub invasions and noted the "burden for the monitoring is to detect such trends for vegetation change *in advance* when they have the potential for violating the agreement [LTWA] and then to adjust management practices to curtail the changes."(Italics added)[19]

On the other hand, DWP under Mayor Hahn recognized no obligation to avoid impacts at all. In responses to Inyo County's dispute resolution cases in 2000 and 2001 DWP asserted that the LTWA simply provides a method of determining after the fact whether pumping impacts have occurred.[20]

Which of these readings of the LTWA does the Standing Committee endorse? This is a serious policy problem.

In the case of BLK094, monitoring has detected strong negative trends and the Technical Group has not adjusted management. Can the Standing Committee agree that the Technical Group is obligated under the LTWA to modify management to attempt to avoid an impending impact? Or does the Standing Committee interpret the LTWA as DWP did, and believe that no action is required except mitigation after the fact? Or is Standing Committee agreement not possible on this issue? Past performance of the Technical Group suggests it is unlikely to make any change in management for BLK094 without clear direction from the Standing Committee.

Conclusion

At the scale at which management is conducted under the LTWA, existing data are more than adequate to show that:

1) Current groundwater management under BLK094 amounts to a permanent drawdown, and as such is inconsistent with the LTWA's model for impact avoidance;
2) Serious negative trends in ecosystem condition are occurring at BLK094;
3) The negative trends are precisely those expected to occur as a result of a permanent drawdown;
4) The single biggest obstacle to compliance with the LTWA's model for impact avoidance at BLK094 is pumping from exempt wells 351 and 356;
5) Reducing pumping from the TS wellfield to 8,000 af/yr by reducing pumping from wells 351 and 356 could allow rapid water table recovery while still providing ample water for Blackrock Fish Hatchery.

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[1] City of Los Angeles Department of Water and Power and County of Inyo 1991. Response to comments on September 1990 draft environmental impact report. Vol. I. pg 2-29:

> "However should it be believed that a significant effect on the environment (as defined under CEQA) has or will occur due to the project, any person may bring the matter to the attention of Los Angeles or Inyo County and/or employ any other available legal right or remedy, including CEQA."

[2] Lee, C.H. 1912. An intensive study of the water resources of a part of Owens Valley, California. Water Supply Paper 294. Department of the Interior, United States Geological Survey. Government Printing Office, Washington, DC Plate XXV., pg. 76.

[3] Manning, S.J. 2006. Status of re-inventoried vegetation parcels according to the Drought Recovery Policy, 2005. Inyo County Water Department Report. May 9, 2006. Fig. 27. http://www.inyowater.org/ICWD_Reports/DRP_2005/DRP05.pdf.

City of Los Angeles and Inyo Count. 1990. Green Book for the Long-Term Groundwater Management Plan for the Owens Valley and Inyo County. June 1990. Section III.G.5.e., pg. 40. http://www.inyowater.org/Water_Resources/Greenbookversions.htm

[4] City of Los Angeles Department of Water and Power and County of Inyo 1990. Draft Environmental Impact Report. Water from the Owens Valley to supply the second Los Angeles Aqueduct Vol I SCH #89080705. September 1990. pp 6-11. http://www.inyowater.org/Water_Resources/1991eir/default.htm

[5] City of Los Angeles and Inyo County. 1990. Green Book for the Long-Term Groundwater Management Plan for the Owens Valley and Inyo County. June 1990. Section I.B.2, pg 2. http://www.inyowater.org/Water_Resources/Greenbookversions.htm

[6] Steinwand, A. and R. Harrington. 2003. Simulation of water table fluctuations at permanent monitoring sites to evaluate groundwater pumping. Inyo County Water Department Report. February 25, 2003. http://www.inyowater.org/ICWD_Reports/Default.htm.) pg. 43.

The fact that water tables didn't recover to the grass rooting zone during valley-wide pumping reductions ordered by Judge Cooper which coincided with two of the wettest years on record (2005 and 2006) provides further support for the implications of Steinwand and Harrington's 2003 modeling, i.e. that the drawdown under BLK094 is effectively permanent under current management practice.

[7] City of Los Angeles Department of Water and Power and County of Inyo 1990. Draft Environmental Impact Report. Water from the Owens Valley to supply the second Los Angeles Aqueduct Vol I SCH #89080705. September 1990 pg 9-73. http://www.inyowater.org/Water_Resources/1991eir/default.htm Regarding the TS wellfield:

> "It can be seen that the continuous pumping to supply the hatcheries, even in above average runoff year, has caused a lowering of water levels. The recovery in wet years that is observed elsewhere in the Valley has not occurred in these areas because of continuous pumping. Only a partial recovery of groundwater levels was seen in these two areas."

[8] City of Los Angeles Department of Water and Power and County of Inyo 1990. Draft Environmental Impact Report. Water from the Owens Valley to supply the second Los Angeles Aqueduct Vol I SCH #89080705. September 1990 Table 9-4, pg. 9-36. http://www.inyowater.org/Water_Resources/1991eir/default.htm

The figure of 8,000 af/yr is an approximation based on the reported average spring flow from 1941 (when Blackrock Hatchery was established) to 1959, when pumping began to diminish the spring flow.

[9] City of Los Angeles Department of Water and Power and County of Inyo 1990. Draft Environmental Impact Report. Water from the Owens Valley to supply the second Los Angeles Aqueduct Vol I SCH #89080705. September 1990. pg. 10-62, Mitigation Measure 10-14. http://www.inyowater.org/Water_Resources/1991eir/default.htm

[10] Valley floor vegetation throughout the Great Basin has been modeled in terms of its relationship to hydrologic and salinity gradients for at least a century. The expectation that permanently drawing down water tables below the graminoid rooting zone will tend to favor shrublands over meadowlands is implicit in this modeling. For some examples, see:

Coville, F. V. 1893. Botany of the Death Valley Expedition. U.S. National Herbarium Contribution, Vol 4. 363 pg. as cited in: Hunt, C.B. 1975. Death Valley: Geology, Ecology and Archaeology. University of California Press, Berkeley. Pp. 200-208.

Lee, C.H. 1912. An intensive study of the water resources of a part of Owens Valley, California. Water Supply Paper 294. Department of the Interior, United States Geological Survey. Government Printing Office, Washington, DC pg. 77.

West, N.E. and J.A. Young. 2000. Intermountain Valleys and Lower Mountain Slopes. *In* Barbour, M.G. and Billings, D.W., Eds. North American Terrestrial Vegetation. Second Edition. Cambridge University Press. pp. 266-284.

Groeneveld, D. 1992. Owens Valley, California, plant ecology: Effects from export groundwater pumping and measures to conserve the local environment. *In* Hall, C.A., Doyle-Jones, V. and Widawski, B. Eds. The

History of Water: Eastern Sierra Nevada, Owens Valley, White-Inyo Mountains. White Mountain Research Station Symposium Volume 4. pp. 141-144.

In Groeneveld's article the expectation that shrubs will be favored over grasses is explicit, even in cases where water tables are recovered and the model of "one-to several year" drawdowns is applied.

Naumberg, E., Mata-Gonzalez, R., Hunter, T.G., McLendon, T., and D.W. Martin. 2005. Phreatophytic vegetation and groundwater fluctuations: a review of current research and application of ecosystem response modeling with an emphasis on Great Basin vegetation. Environmental Management 35:6 pp. 726-740.

Given the great speed and magnitude of the drawdown which occurred under Blackrock 094 in 1987, the model in Figure 2 (pg. 733) predicts a new community type will result. This work was supported by DWP.

[11] Manning, S.J. 2006. Status of re-inventoried vegetation parcels according to the Drought Recovery Policy, 2005. Inyo County Water Department Report. May 9, 2006. Unpublished report. Fig. 27. http://www.inyowater.org/ICWD_Reports/DRP_2005/DRP05.pdf.

[12] Transect data from vegetation monitoring conducted for the Technical Group by Inyo County Water Department can be used to analyze trends in shrub cover relative to grass cover in the top canopy layer. The ratio of grass dominated transects to shrub dominated transects shows a dramatic decline since 1991, while, conversely, the ratio of shrub-dominated transects to grass dominated transects shows a dramatic increase. Repeat photography at permanent monitoring sites TS1 and TS2 also shows this trend clearly.

[13] Manning, S.J. 2006. Vegetation conversion from meadow to scrub. Owens Valley Monitor 2005-2006. http://www.inyowater.org/Annual_Reports/2005-2006/veg_change/veg_conversion.htm

[14] Manning, S.J. 2006. Status of re-inventoried vegetation parcels according to the Drought Recovery Policy, 2005. Inyo County Water Department Report. May 9, 2006. Fig. 28. http://www.inyowater.org/ICWD_Reports/DRP_2005/DRP05.pdf.

Manning, S.J. 2005. Report on vegetation conditions. Owens Valley monitor 2004-2005. http://www.inyowater.org/Annual_Reports/2004-2005/veg.htm

[15] Exhibit A of the Interim Management Plan gives coefficients for multiple regressions relating runoff and wellfield pumping to changes in water table depth at designated indicator wells. These data can be used to model different pumping and runoff scenarios. I calculated four iterations of the formulae for the TS wellfield indicator wells. For the first iteration I used 8000 af of pumping, 2007-2008 forecasted runoff , and current DTW levels; for the second iteration I used 8000 af pumping , average runoff (415725 af), and DTW levels predicted in the previous iteration; I repeated this process two more times and found an average increase in DTW of 5.5 feet after the four iterations. Given that the average DTW under BLK is about 12' this amount of recovery would put water tables within the grass rooting zone. I don't claim this exercise is a definitive hydrologic model, but it does suggest water table recovery is eminently feasible.

[16] City of Los Angeles Department of Water and Power and County of Inyo 1990. Draft Environmental Impact Report. Water from the Owens Valley to supply the second Los Angeles Aqueduct Vol I SCH #89080705. September 1990. Pg 10-62, Mitigation Measure 10-14. http://www.inyowater.org/Water_Resources/1991eir/default.htm

City of Los Angeles and Inyo Count. 1990. Green Book for the Long-Term Groundwater Management Plan for the Owens Valley and Inyo County. June 1990. Section I.B.2.ii. http://www.inyowater.org/Water_Resources/Greenbookversions.htm

[17] According to data supplied by the Inyo County Water Department in most years the volume exceeds 12,000 af. As recently as runoff-year 2004-2005, however, only 9670 af were supplied to the hatchery and, according to DFG data, fish production was not significantly affected.

[18] City of Los Angeles Department of Water and Power and County of Inyo. 1991. Response to comments on September 1990 Draft Environmental Impact Report. Vol. I. SCH #89080705 pg.2-65:

> "A primary goal of the Agreement is to avoid causing significant decreases or changes in vegetation or other significant effect on the environment of Owens Valley. Therefore, mitigation is not considered a primary management tool, but rather a secondary tool to be employed should impacts occur that are inconsistent with the goals of the Agreement."

This language emphasizing the primacy of avoidance over mitigation is repeated in 6 other places in the LTWA EIR itself and associated Responses to Comments

[19] Groeneveld, D. 1992. Owens Valley, California, plant ecology: Effects from export groundwater pumping and measures to conserve the local environment. *In* Hall, C.A., Doyle-Jones, V. and Widawski, B. Eds. The History of Water: Eastern Sierra Nevada, Owens Valley, White-Inyo Mountains. White Mountain Research Station Symposium Volume 4. pg. 144.

[20] LADWP Response to Notice of Dispute. July 2, 2001. Section B. pg. 2.

> "Under the Agreement, the City can be required to undertake vegetation mitigation measures, but only after a careful and thorough determination of the facts."

By misconstruing Inyo's request for operating the McNally Canals as a request for mitigation – as opposed to a request to modify management to avoid creating an impact thereby avoiding the need for mitigation -- DWP refused to acknowledge any obligation to modify management before an impact has occurred.

LADWP Reply to Inyo County Water Department's Comments Dated May 18, 2001 and Transmittal Letter Dated May 22, 2001. pg. 2:

> "In short the Agreement requires the City to *consider* impacts of its groundwater pumping before implementing the annual plan, but does not authorize Inyo to restrict or limit the City's pumping before the fact. The Agreement instead sets forth the method of determining after the fact whether an impact to vegetation has occurred which is measurable, significant, and attributable to groundwater pumping." (italics added)

This statement, in response to Inyo's challenge of DWP's 2001 pumping plan, makes explicit what was implicit in DWP's McNally Canals defense, (previous citation). In DWP's reading, the LTWA cannot be used to require DWP to modify management to avoid impacts. DWP acknowledges only an obligation to mitigate after the fact.