

Comments on the BBL “DRAFT Final Site-Wide Ecological Risk
Assessment, LEHR/SCDS, University of California, Davis”
prepared by Blasland, Bouck & Lee, Inc. (BBL)
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Comments Submitted by

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Presented herein are comments on the draft “final” Site-Wide Ecological Risk Assessment (SWERA) for the UCD LEHR Superfund Site prepared by BBL. With few exceptions these comments have already been made by DSCSOC, in some cases repeatedly, on LEHR site investigation reports. While BBL, in its draft “final” SWERA, corrected some of the errors that it made in its initial draft which were pointed out by DSCSOC in its April 27, 2006, comments, there are still a number of errors in the final draft that have not been corrected. There are also still significant problems with some aspects of how UCD has attempted to evaluate the potential impacts of LEHR site stormwater runoff on Putah Creek beneficial uses. Further, the basis for some of the conclusions reached by BBL in this so-called “final” SWERA for a lack of impact of the LEHR site on Putah Creek water quality is technically invalid and needs to be corrected if this is to be a credible SWERA.

Several of the comments presented below are based on the situation that has developed where inadequate studies on the impacts of LEHR site stormwater runoff to Putah Creek have occurred. As DSCSOC mentioned in its comments on the initial draft ERA, in order for the UCD SWERA to be a credible report on potential ecological impacts, the deficiencies in the studies need to be pointed out, so that a reviewer of the report has the opportunity to understand that there could be ecological impacts on Putah Creek that have not been adequately investigated.

Throughout this “final” draft report and in the previous drafts, the word “bioassay” has been used when the more appropriate term is “toxicity test.” The US EPA methodology for conducting aquatic life toxicity tests does not call these tests “bioassays.” Those working in the field in the Central Valley (such as the Central Valley Regional Water Quality Control Board staff) have correctly concluded that “bioassay” is not a proper term for the kind of toxicity testing that has been and continues to be conducted at the LEHR site, using the US EPA standard toxicity test protocol. The word “bioassay” should be deleted from the SWERA, and “toxicity test” substituted in its place.

Page 4 of the Executive Summary, first paragraph, last sentence states,

“An engineered landfill cap for the three landfills is currently being evaluated as a presumptive remedy. This would remove any potential risks at the landfills and any co-located areas as future exposure would be expected to be de minimus.”

The April 27, 2006, comments by DSCSOC on the BBL initial draft LEHR/SCDS Site-Wide Ecological Risk Assessment (<http://members.aol.com/dscsoc6/2006/LEHR-ERA-comments.pdf>) discussed several issues that need to be addressed in a credible SWERA with reference to the potential for the LEHR site landfills to have an adverse impact on the LEHR area ecosystem. As discussed, there is inadequate characterization of the wastes in the landfills. Further, it is inappropriate to assume that the type of cap that is proposed to be installed on these landfills will be protective of terrestrial and aquatic ecosystems for as long as the wastes in the landfills will be a threat to be released to the environment.

Page 4 of the Executive Summary, last paragraph, the statement,

“Overall SWERA Conclusions

The results of the SWERA indicate that of the 14 on-Site areas, all present acceptable risk to ecological assessment endpoints except the three landfill units. The two off-Site areas, Old Davis Road Ditch and Putah Creek also present acceptable risk to ecological receptors. Additionally, there is no evidence that the LEHR/SCDS Site has significantly impacted Putah Creek.”

needs to be revised if it is to be inclusive of the history of the LEHR site discharges to Putah Creek. There is no information on the magnitude and impacts of the LEHR site discharges to Putah Creek during the time that the site was active. All that can be said now is that, based on the recent limited-scope studies of LEHR site discharges and the very limited monitoring of Putah Creek, there is no evidence of adverse impacts to aquatic biota in Putah Creek near the LEHR site. This statement does not include the discharges of mercury, chlordane and possibly other unmonitored potential pollutants from the LEHR site to Putah Creek in stormwater runoff and into the UCD campus sewerage system that have been and continue to be discharged to Putah Creek. There is no doubt that mercury discharged to Putah Creek from the LEHR site has contributed to the mercury body burden of aquatic life in the creek. This additional body burden can be contributing to the adverse impacts of mercury on higher forms of terrestrial life which use Putah Creek aquatic life as part of their food source.

Page 1-2 in “1.3 SWERA Overview,” first paragraph mentions the use of so-called “sediment quality guidelines” as values upon which to base estimates of potential impacts of chemicals in Putah Creek sediments impacted by LEHR site runoff/discharges. As has been previously discussed in detail (including in the comments on the draft SWERA), the continued use of sediment quality guidelines which are based on co-occurrence (coincidence) between the total concentration of selected chemicals and sediment toxicity is a technically invalid basis for estimating the ecological risk of chemicals in sediments. Please see the discussion of these issues on the DSCSOC website.

The so-called “final” draft of the BBL SWERA continues to fail to mention the unreliability of co-occurrence (coincidence)-based sediment quality guidelines as they are used in this SWERA. There is a substantial literature in refereed journals and other

publications that discuss this issue (see references listed in DSCSOC's comments of April 27, 2006). The UCD SWERA will not be a credible discussion of ecological issues associated with the LEHR site unless it mentions and includes references to this literature.

In DSCSOC's comments on the BBL initial draft LEHR Ecological Risk Assessment, it was mentioned that the California State Water Resources Control Board (SWRCB) has been developing sediment quality objectives (SQOs), where consideration was given to using co-occurrence-based sediment quality guidelines to estimate the impact of chemicals on sediment-associated aquatic life. It was concluded by those conducting this multi-year \$2.5-million study that that approach is not technically valid to determine if a chemical in sediments could be adverse to aquatic life. This past week the SWRCB staff responsible for SQO development held a meeting where the current status of SQO development was discussed. Again it was made clear that co-occurrence-based sediment quality guidelines are not reliable for evaluating the potential impact of a chemical or group of chemicals in the sediments on water quality/beneficial uses of waterbodies.

Page 1-2, last paragraph contains the statement,

“The old Wastewater Treatment Plant (WWTP) was removed from the evaluation based on discussion with and approval by the USEPA.”

DSCSOC has repeatedly pointed out that the potential impacts of the “Old Wastewater Treatment Plant” have not been adequately investigated, with particular reference to the potential for the sludge drying beds to be a source of chemicals that have polluted the soils of the region.

Page 2-8, last paragraph, the statement,

“Those constituents not detected in Putah Creek (using adequately sensitive reporting limits) were not advanced to the Tier 2 assessment based on the premise that they had not been transported off-Site.”

is inappropriate. There is need to include a statement that there have been chronic problems with measuring certain parameters in stormwater runoff from the LEHR site, with inadequate detection limits to determine whether LEHR is contributing the chemical at concentrations that are potentially adverse to aquatic life and public health. As previously discussed, the analytical method detection limits that have been allowed to be used at LEHR, for certain of the bioaccumulatable chemicals such as the organochlorine “legacy” pesticides, are not adequate to assess whether these pesticides in stormwater runoff that are reported as “non-detect” could contribute to excessive bioaccumulation in Putah Creek aquatic life. A credible ecological risk assessment report should mention this situation as one of the deficiencies in the studies that have been conducted at LEHR.

Page 2-26 of the draft “final” SWERA still contains the statement,

“The site-specific value for mercury is considered to be highly conservative since it is independent of oxidation state or chemical species and, under typical conditions, mercury is unlikely to partition from soil to water (Anderson, 1979).”

As mentioned in the April 27, 2006, comments by DSCSOC on the BBL initial draft LEHR/SCDS Site-Wide Ecological Risk Assessment, that statement is incorrect with respect to methylmercury. Methylmercury does partition between soil and water. Further, methylmercury can be formed in ponded water situations.

In this “final” draft SWERA, BBL has failed to correct the error that was mentioned in DSCSOC’s April 27, 2006, comments on the initial draft, with respect to the statement on page 19-3, third paragraph:

“At the UC Davis sites (LF-1 and LF-3), between 1-3 samples from each storm water monitoring location exceeded the CTR for freshwater aquatic life criteria for either hexavalent chromium, copper, mercury or zinc (Geomatrix, 2004). However, some of these samples were not filtered prior to analysis resulting in dissolution of suspended materials and anomalously high concentrations of some metals.”

As mentioned in DSCSOC’s previous comments, that statement reflects a lack of understanding of how the CTR criteria are applied to mercury. The criteria are based on total recoverable mercury, not dissolved mercury. Also, particulate metals and organics can accumulate in sediments and therefore be adverse to aquatic life.

BBL, in this “final” draft SWERA has also failed to correct the error on page 19-4, where it states that *“The study determined that the site does not have a major effect on mercury dynamics in the creek.”* As mentioned in DSCSOC’s April 27, 2006, comments, this paragraph should be expanded to include the fact that the Central Valley Regional Water Quality Control Board has examined the data on mercury bioaccumulation in Putah Creek and the amount of mercury discharged from the LEHR site in stormwater runoff and concluded that UCD must implement best management practices to control the mercury runoff from the LEHR site. This reflects that LEHR is contributing to the excessive mercury bioaccumulation in Putah Creek and downstream. The significance of this contribution is unknown at this time. The final SWERA should mention this situation.

Page 19-17 first paragraph contains the statement,

“Mercury was the only COPEC with an HQ greater than one in the adjacent reach but not in the upstream reach. It is important to note that this seemingly elevated HQ is a result of mercury concentrations from fish collected adjacent to the site being elevated relative to those caught upstream. Because fish move around within the stream and cannot be directly tied to specific sediments, there is uncertainty associated with the risk calculations based on the assumption that fish caught within a reach received their primary exposure in that reach. This is

highlighted by the fact that the sediment concentrations of mercury upstream are actually three times higher than those from the adjacent reach while the fish tissue concentrations from the upstream reach were about three times lower than the adjacent reach.”

Those familiar with the relationship between sediment concentrations of mercury and fish tissue mercury concentrations know that the above statement is likely technically invalid. As discussed in previous comments by DSCSOC on mercury bioaccumulation issues, the key to mercury’s conversion to methylmercury (which can bioaccumulate) is the presence of other constituents in the sediments, such as organic carbon, sulfate, etc. The discharges of the UCD campus wastewater treatment plant have in the past added large amounts of particulate carbon that accumulates in Putah Creek sediments. As discussed in previous DSCSOC comments, the UCD campus wastewater treatment plant impacts the methylation of mercury in Putah Creek. The statement quoted above should be deleted from the final draft.

Page 19-18 states,

“19.4.6 Conclusions

In sediment, the risk characterization for Putah Creek identified benzo(a)pyrene, chrysene, fluoranthene, 4,4’-DDT, chromium, copper, lead, mercury and nickel, vanadium as elevated above NOEC-based effect levels for at least one receptor. In surface water, DDD, DDE and DDT, alpha-chlordane, barium, cadmium, copper, lead, mercury, selenium, silver, thallium and zinc exceeded aquatic benchmarks for at least one receptor. However, while there are a number of COPECs that have HQs that exceed one, HQs are generally of similar magnitude regardless of the reach of the creek evaluated. That is, upstream reaches have similar concentrations as the adjacent and downstream reaches, which supports the conclusion that the LEHR/SCDS Site has not significantly impacted the adjacent reach of Putah Creek.”

As discussed above, the reasoning quoted above is not necessarily valid, since the campus wastewater treatment discharge occurs just upstream of LEHR. This discharge includes a variety of chemicals that can affect the impact of other chemicals in LEHR stormwater runoff to Putah Creek. Further, co-occurrence-based sediment quality guidelines are not a valid basis on which make the evaluation presented above. This approach ignores the aqueous environmental chemistry of chemicals that can impact how chemicals impact aquatic life.

As discussed in previous comments, the only potential valid use of co-occurrence-based so-called “sediment quality guidelines” is that sites with large numbers of exceedances of the guideline values likely show sediment toxicity. It is recognized that this type of situation reflects the fact that sediments with elevated chemicals are receiving a variety of pollutants that accumulate in sediments. These values should never be used as a pass-fail assessment for a specific chemical being the cause or potential cause of sediment toxicity.

Page 20-2 states,

“20.2 Summary of Results of Off-site Areas

Table 20-2 summarizes the risk estimates developed for the off-site areas, Old Davis Road Ditch and the Putah Creek Study area. At the Old Davis Road Ditch, only amphibians were evaluated. While a few compounds exceeded amphibian benchmarks in surface water concentrations modeled from soil, or in storm water collected at LS-1, bioassays conducted in storm water showed no toxicity. Therefore, it is concluded that the Old Davis Road Ditch does not require further evaluation.

Putah Creek had a number of COPECs that exceeded benchmarks for aquatic biota, amphibians, benthic invertebrates, and the belted kingfisher. However, the potential for risk upstream of the site is very similar to the potential for risk in the areas adjacent to the site. There were only two cases where a measurement endpoint indicated a difference between upstream and adjacent areas:

- 1. Concentrations of alpha chlordane and selenium in surface water elevated relative to aquatic biota toxicity benchmarks; and*
- 2. Estimated daily dose of mercury to the belted kingfisher elevated relative to avian NOAEL-based TRV.*

For aquatic biota, because the acute and chronic bioassay measurement endpoint did not indicate toxicity, potential risk from these two compounds is expected to be de minimus. For the belted kingfisher, while the HQ from the adjacent area was slightly elevated relative to the upstream area, the magnitude of the NOAEL-base HQ was low (i.e., 1.8) and the LOAEL HQ was well below one. Therefore, risk to the belted kingfisher from mercury is considered acceptable. When all of the measurement endpoints were evaluated collectively and all of the uncertainties considered, the risk characterization concluded that there is no indication that the LEHR/SCDS Site has significantly impacted the sediment or the benthic community adjacent or downstream of the Site.

20.3 Conclusions

The results of the SWERA indicate that of the 14 on-Site areas, all present acceptable risk to ecological AEs except the three landfill units. The two off-Site areas, Old Davis Road Ditch and Putah Creek also present acceptable risk to ecological receptors. Additionally, there is no evidence that the LEHR/SCDS Site has significantly impacted Putah Creek. Based on this evaluation, it is recommended that Landfill Units No. 1, 2 and 3 be evaluated further in the FS to ensure that potential exposure to ecological receptors will be eliminated in the future.”

As discussed above in the comments on the Executive Summary, the statement about the LEHR site having had no impact on Putah Creek is not technically valid. There is no information on the magnitude and impacts of the LEHR site discharges to Putah Creek during the time that the site was active. All that can be said now is that, based on the

recent limited-scope studies of LEHR site discharges and the very limited monitoring of Putah Creek, there is no evidence of adverse impacts to aquatic biota in Putah Creek near the LEHR site. This statement does not include the discharges of mercury, chlordane and possibly other unmonitored potential pollutants from the LEHR site to Putah Creek in stormwater runoff and into the UCD campus sewerage system that have been and continue to be discharged to Putah Creek. There is no doubt that mercury discharged to Putah Creek from the LEHR site has contributed to the mercury body burden of aquatic life in the creek. This additional body burden can be contributing to the adverse impacts of mercury on higher forms of terrestrial life which use Putah Creek aquatic life as part of their food source.

The use of the term “eliminated” in the above quoted text is inappropriate when discussing capping of the LEHR site landfills. The proposed caps, if properly constructed, monitored and maintained, can minimize adverse ecological impacts. However, the wastes in the LEHR site landfills will be a threat to be released from the site, effectively, forever. If at some time in the future there is inadequate monitoring and maintenance of the cap, then wastes in the landfills could be brought to the surface and have an adverse impact on the LEHR site ecosystem and Putah Creek. This type of issue should be discussed in a credible ecological risk assessment report for the LEHR site.

An issue that is not discussed in this report, which should be mentioned, is that, since the LEHR site and offsite groundwaters are polluted by LEHR site wastes, and since large amounts of groundwater are pumped for agricultural use, there is the potential for offsite ecological impacts to occur due to pollutants in the irrigation waters. This issue should be mentioned in a credible SWERA for the LEHR site as one that has not been evaluated.