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Subject:	Sites Project EIS/EIR comments
Date:	Friday, January 28, 2022 8:12:16 AM
Attachments:	SitesProjectEIR_OEHHACommentsLetterhead_final_encrypted_.pdf

Please see attached comments on the Sites Project EIS/EIR.
Thanks
Beckye

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https://oehha.ca.gov/risk-assessment/harmful-algal-blooms-habs

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

Gavin Newsom, Governor
Jared Blumenfeld, Secretary for Environmental Protection
Lauren Zeise, Ph.D., Director

January 28, 2022

Sites Project Authority
P.O. Box 517
Maxwell, CA 95955

Dear Alicia Forsythe:

Please see below comments submitted by Office of Environmental Health Hazard Assessment's (OEHHA) Fish, Ecotoxicology, and Water Section on the Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) for the Sites Reservoir project.

Scope of review

- OEHHA's review focused on potential freshwater (cyanobacterial) harmful algal blooms (HABs). OEHHA's Fish, Ecotoxicology, and Water Section staff contribute time and expertise to HABs statewide through the California Cyanobacterial and HAB (CCHAB) Network and the Interagency HAB-related Illness Workgroup as well as other regional and interstate technical efforts.

Comments:

Chapter 2: Project Description and Alternatives

- *Section 2.5.2.4. Operations and Management Plans*
    - We recommend that Recreation and Reservoir Management Plans explicitly include the following:
        - Monitoring for both planktonic and benthic HABs including: (1) frequent visual assessments (such as weekly year-round) and (2) sampling for cyanobacteria and cyanotoxins (such as every two weeks during recreational season and monthly during winter) as well as any time year-round when visual indicators of HABs are present, with samples collected from shore at shoreline recreational sites and in open water areas likely used for boating or fishing.
        - Actions necessary to address potential HAB-related human and animal impacts such as through posting general awareness or potential advisory signage for HABs at recreational areas,

education on Healthy Water Habits, and the use of personal protective equipment (as needed) for Reservoir personnel.

Chapter 6: Surface Water Quality

- *Section 6.2.2.3. Nutrients, Organic Carbon, and Dissolved Oxygen*
  - The text states, "*The initial filling of a new reservoir results in the release of nutrients from newly flooded soil and decomposing flooded vegetation. This release declines somewhat as the reservoir ages (Gunnison et al., 1984; Maavara et al., 2020:108).*"
    - This influx of nutrients into water that is being held in a reservoir, where increased light availability, reduced flow, and increased temperatures are likely, may overall enhance opportunities for HABs to occur.
- *Section 6.2.2.6. Harmful Algal Blooms*
  - The description of environmental factors that influence HABs does not account for the wide variety of planktonic and benthic cyanobacteria that can occur in California waters. While many planktonic species do favor the temperature, light, and flow conditions noted, there are planktonic (such as *Planktothrix*) and benthic taxa (such as *Microcoleus*, *Phormidium*, and *Anabaena*) that occur in lower water temperatures, lower light, or higher flow than noted (see Section 3.3; ITRC 2021).
  - The description of cyanobacteria focuses on characteristics related to planktonic cyanobacteria, particularly *Microcystis*. As noted above, numerous planktonic and benthic cyanobacteria may occur, including some that grow attached to benthic substrates, aquatic plants, and natural or artificial structures within the water column as well as some that are present in sub-surface layers with lake stratification. This variety should be addressed when considering potential HAB occurrence and necessary monitoring, management, and public heath actions.
  - We recommend noting that OEHHA has developed Notification Level Recommendations for Four Cyanotoxins in Drinking Water as well (https://oehha.ca.gov/water/crnr/notice-availability-notification-level-recommendations-four-cyanotoxins-drinking-water).
- *Section 6.3.2.2. Temporal Shift*
  - The temporal shift between time of diversion and time of release could also contribute to release of water with a higher likelihood of HABs.
- *Section 6.3.2.8. Harmful Algal Blooms*
  - It is unclear how the likelihood of HABs occurring within Sites Reservoir during operations is assessed based on the information presented in this section. Please provide more rationale for what the comparison of intake and water surface elevations is expected to show. As noted above,

cyanobacteria and cyanotoxins can be found in deeper sub-surface waters depending on type, genus, water conditions, etc.

  - See Section 9.1 Optimizing The Location And Depth For The Offtake (Chorus and Welker, 2021; Chapter 9) for context of vertical distribution and consideration of discharge depth. This variability is also shown with real-time profiling to a maximum of 75-90 meters in Detroit Lake, a drinking water source for Salem, Oregon (https://or.water.usgs.gov/projs_dir/habs/lakeprofiler.html?site=444306122144600). Department of Water Resources' Pacheco Pumping Plant monitoring data also provides a useful example of monitoring for HABs at depth for water intake management (http://cdec4gov.water.ca.gov/dynamicapp/QueryF?s=PPP).

- *Section 6.4,* sub-section on *HABs and Invasive Aquatic Vegetation*
  - The discussion about cyanotoxin degradation is primarily applicable for extracellular cyanotoxins, while most cyanotoxins (with the exception of cylindrospermopsin) are primarily intracellular while the cell is intact. As shown with the Klamath River, long-distance transport of cyanobacterial cells and intracellular cyanotoxin can occur following planktonic HABs in reservoirs (Otten et al., 2015). As far as the statement about dilution of discharges, these are living organisms that grow, reproduce, can act as source population, and for some taxa, change their buoyancy, not chemicals that can equally distribute within the water column.
  - As noted above, occurrence of HABs with elevated cyanotoxins (including Danger advisory levels) have occurred in California water bodies during winter (see, https://mywaterquality.ca.gov/habs/where/freshwater_events.html) and cells/toxins may occur in deeper waters.
  - Native and invasive aquatic plants can compete with cyanobacteria for light and nutrients. Actions to address aquatic plants should consider potential to alter conditions for cyanobacterial blooms as well.
  - In addition to HAB advisory signage (when warranted), ongoing outreach efforts about potential HABs through general awareness signage and other communication media (e.g., social media, newsletters) would be helpful in increasing public awareness and potentially reducing HAB exposure.
  - As noted above, some cyanobacteria taxa bloom in sub-surface layers during water body stratification and can then move to the surface with water body turnover.
  - Cyanobacterial cells can senesce and die-off with associated drop in dissolved oxygen at times other than late fall. There can be a seasonal succession as different taxa become dominant (Nwosu et al., 2021).

  - As noted above, some cyanobacteria taxa grow in water at cooler temperatures (including under ice) so, the 66°F minimum noted is not applicable across all water bodies and all cyanobacteria taxa.
  - Potential transport of cyanobacterial cells or cyanotoxins in aerosols and human nasal exposure as shown in Florida (Schaefer et al., 2020) could extend potential HAB impacts beyond the reservoir.
  - As noted above, response of cyanobacteria to water flow increases are specific to type (planktonic or benthic) and taxa of cyanobacteria. In addition, increased flow could flush cyanobacteria cells into downstream areas where potential impacts could occur.
  - The HAB portal incident map only provides voluntarily reported HABs. Absence of reported HABs from Yolo Bypass to that map should not be interpreted as a lack of HAB occurrence. Direct contact with CDFW Wildlife Area or Yolo Basin Foundation staff about observations or monitoring for HABs would be potentially helpful in clarifying this.

Chapter 27, Public Health and Environmental Hazards

- *Sections 27.2.3.2 and 27.3.4, Harmful Algal Blooms*
  - As noted above, the environmental conditions identified for HABs do not address the variety of cyanobacterial types and taxa found in California water bodies that could occur in the future reservoir.
- *Impact HAZ-7: Result in an impact on public health due to an increase in harmful algal blooms*
  - Water depth, dilution, and toxin degradation may not be sufficient to prevent discharge of cyanobacteria and cyanotoxins given changes in buoyancy or presence of benthic cyanobacteria, the potential to act as a seed population, and the presence of more stable intracellular toxin (as well as other factors noted above).
  - We recommend that the recreational HAB monitoring plan include HAB monitoring year-round although the frequency could be reduced (such as changing from bi-weekly to monthly) for the winter period. Monitoring should consider the potential for benthic cyanobacteria, which may not be detected with surface water grab samples. Identification of cyanobacteria taxa present by microscopy can inform what toxins may be produced, and also help understand the overall dynamics in the system, such as cyanobacterial succession over time.
  - Real time monitoring for cyanobacteria at multiple depths from which water may be released has been successfully implemented at other West Coast reservoirs (https://or.water.usgs.gov/projs_dir/habs/lakeprofiler.html?site=444306122144600; http://cdec4gov.water.ca.gov/dynamicapp/QueryF?s=PPP). The assumption that the release of deeper water is sufficient to prevent

discharge of cyanobacteria and cyanotoxins is inconsistent with data from these other locations and published research on potential cyanobacterial occurrence at depth (see Section 9.1 Optimizing The Location And Depth For The Offtake in Chorus and Welker, 2021).

- Given our experience with HABs and HAB-related human and animal illnesses at other California reservoirs, it is unclear that the proposed monitoring and management actions are sufficient to prevent potential human or animal impacts from HABs. We recommend that potential HAB occurrence across a much broader range of environmental conditions and deeper water depths should be considered. A more robust monitoring and outreach program for HABs should be incorporated for any reservoir recreational use. Assessment of cyanobacteria and cyanotoxins at the appropriate water depths prior to discharge (or via ongoing real-time instrumentation data) would allow for more informed evaluation of potential downstream impacts.
- *Impact HAZ-8* mentions potential impacts to Reservoir personnel from mosquitos, but those staff are not identified in the evaluation of potential HAB impacts under HAZ-7. We recommend you consider potential occupational exposure to cyanobacteria/cyanotoxins for Reservoir personnel with direct water contact as well as those working nearby that could be exposed to HAB-related aerosols. HAB outreach and education, appropriate personal protective equipment (when needed), and advisory signage should be provided to Reservoir personnel, in addition to the recreating public.

References Cited:

Chorus, I., & Welker, M. (Eds.). (2021). Toxic Cyanobacteria in Water: A Guide to Their Public Health Consequences, Monitoring and Management (2nd ed.). CRC Press. https://doi.org/10.1201/9781003081449

ITRC (Interstate Technology & Regulatory Council). 2020. Strategies for Preventing and Managing Harmful Cyanobacterial Blooms (HCB-1). Washington, D.C.: Interstate Technology & Regulatory Council, HCB Team. www.itrcweb.org.

Nwosu, E. C., et al. (2021). "Species-Level Spatio-Temporal Dynamics of Cyanobacteria in a Hard-Water Temperate Lake in the Southern Baltics." Front Microbiol **12**(3277). https://doi.org/10.3389/fmicb.2021.761259

Otten, T. G., et al. (2015). "Application of molecular tools for microbial source tracking and public health risk assessment of a Microcystis bloom traversing 300km of the Klamath River." Harmful Algae **46**: 71-81. https://doi.org/10.1016/j.hal.2015.05.007

Schaefer, A. M., et al. (2020). "Exposure to microcystin among coastal residents during a cyanobacteria bloom in Florida." Harmful Algae **92**: 101769. https://doi.org/10.1016/j.hal.2020.101769

Sincerely,

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cc: Marisa Van Dyke and Carly Nilson
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