Blue Ribbon Committee for the Rehabilitation of Clear Lake

2019 Report to the Governor and California State Legislature

Annotated Draft Outline for Committee Revision

July 22, 2019

Commented [SM1]: Primary question for August 15: Is this a generally accurate representation of your work (including subcommittee) to date? Do we have your approval to continue refinement of these items (particularly Section 3 and 4 below)?

Section 1: Background

Clear Lake is one of the top two contributors to the local Lake County economy, according to the 2016 Lake County Comprehensive Economic Development Strategy, which cites the lake as "the cornerstone of the local visitor and recreation markets," mainly through boating and bass fishing tourism.[1] It is essential to the traditional cultural resources and economies of the seven federally recognized tribes of the area; the condition of the lake affects the safety of traditional ceremonies, as well as fishing and consumption of fish in accordance with tribal customs.

Clear Lake is the oldest species-rich, warm water, natural lake in North America. It supports the surrounding ecosystems of native plants and animals, as well as species introduced by the Department of Fish and Wildlife. Clear Lake and the surrounding environment are also a home to endangered and rare animal species. However, the lake also experiences environmental challenges such as harmful algal blooms and mercury contamination from legacy mining issues.

In light of the environmental challenges facing Clear Lake and Lake County, Assembly Bill (AB) 707 (Aguiar-Curry, 2017) was passed by the California Legislature (Legislature) and signed by Governor Jerry Brown to create a Blue Ribbon Committee (Committee) to develop strategies to clean up Clear Lake and revitalize local economies dependent on the health of the Lake. AB 707 places the Committee under the management of the California Natural Resources Agency (Resources), with the Resource Secretary or designee serving as Committee Chair. Additionally, the Legislature appropriated $5 million in Proposition 68 funding for Clear Lake-specific capital improvement projects to improve conditions in the lake. The Committee will play a significant role in determining appropriate projects for funding.

This report represents the first annual report to Governor Gavin Newsom and appropriate committees within the Legislature as required by AB 707. AB 707 specifically requires annual reports to identify barriers to improved water quality in Clear Lake, the contributing factors causing poor water quality, and the threats to wildlife. The report must include recommendations on solutions to these issues, estimates of cost,

[1] https://www.lakecountyca.gov/Assets/Departments/Economic+Development/Docs/2016+CEDS+Report.pdf?method=1

and a plan for involving the local, state, and federal governments in funding for and implementation of lake restoration activities.

The Committee is a multi-year process; this report outlines several introductory recommendations designed to address the challenges noted above, beginning with a robust data collection effort to ensure future environmental and socioeconomic recommendations are based on the most up-to-date analysis possible.

Section 2: Committee Process and Progress to Date

Committee Launch

Resources launched the Committee effort in June 2018 by requesting applications from local County and tribal representatives in accordance with AB 707, including:

- A representative from the University of California (appointed by the Chancellor of the University)
- One member of the Board of Supervisors from Lake County or their designee
- Representatives from tribes impacted by Clear Lake, appointed by their respective tribal councils
- The Resources Secretary or their designee
- A represented of the Central Valley Regional Water Quality Control Board (Regional Water Board), appointed by its board
- An expert from each of the follow areas, appointed by the Lake County Board of Supervisors:
    - Local economic development
    - Agriculture
    - Environment
    - A public water supplier drawing its water supply from Clear Lake

A full list of the current membership of the Committee is available in Appendix A.

Resources contracted with the Sacramento State University College of Continuing Education Consensus and Collaboration Program (CCP) in August of 2018 to provide neutral facilitation and process management services for the Committee. CCP works closely with Resources and Committee membership to design agendas, facilitate all Committee meetings, carry out routine negotiations between members over recommendations, and ensure all outreach meets the requirements of the Bagley Keene Open Meetings Act.

Resources formally convened the Committee process at a meeting on October 10, 2018. This meeting was used to provide background on AB 707, explain the charge of the Committee, and discuss parallel research processes intended to develop up-to-date environmental and social science information on Clear Lake and the surrounding area.

Finally, the UC Davis Tahoe Environmental Research Center (TERC) was selected to lead a research effort on the health of the lake, factors contributing to environmental challenges, and develop a 3-D model Clear Lake. UC Davis's Center for Regional Change (CRC) was selected to lead the socioeconomic research effort. These efforts run in parallel to, but are separate from, the Committee effort. Research from both entities will inform the Committee's work in the future. Additional information on both research projects is described below.

TERC Information

Commented [SM2]: Include information on TERC charge. Include initial conclusions from research to date in Appendix B.

CRC Information

Commented [SM3]: Include information on CRC charge. Include initial conclusions from research to date in Appendix C.

Committee Process to Date

Beginning with the project launch meeting, the full Committee met a total of eight times in 2018 and 2019. The table below includes the meeting schedule and a brief summary statement of topics discussed at each session. Complete summaries, as well as video and/or audio recording of each meeting are available online at www.resources.ca.gov/clear-lake.

Meeting Date	Summary
October 10, 2018	
December 20, 2018	
February 12, 2019	
March 13, 2019	
June 5, 2019	
August 15, 2019	
September 26, 2019	
December 10, 2019	

Commented [SM4]: To be updated for final report

Table 1: 2018/19 Committee Schedule and Outcomes

Technical Subcommittee Process to Date

In February 2019, the Committee directed CCP to convene a Technical Subcommittee (Subcommittee) made up of local and regional scientific experts to provide a menu of recommendations for its consideration. The Committee determined focusing on technical, environmental recommendations was an appropriate starting point to meet the charge of AB 707 in 2019. Future subcommittees, including a socioeconomic subcommittee, will be convened to review these environmental recommendations, and

ensure all recommendations have a positive impact on communities dependent on Clear Lake for economic, cultural, or public health purposes.

The Subcommittee met a total of (ENTER FINAL NUMBER OF MEETINGS) in 2019. The table below includes a meeting schedule and brief summary of topics discussed during each session. Complete summaries and audio recordings of each meeting are available online at www.resources.ca.gov/clear-lake.

Meeting Date	Summary
April 19, 2019	
May 17, 2019	
July 9, 2019	

Commented [SM5]: To be updated in final report.

Section 3: Barriers to Improving Water Quality and Threats to Wildlife

Commented [SM6]: From legislation, TERC, and the Technical Subcommittee List in Appendix D. Leave until after August 15 meeting.
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For 2019, the Committee and Technical Subcommittee opted to focus on the causes of harmful algal blooms (HABs) from cyanobacteria, as well as elevated methyl mercury levels.

HABs resulting in elevated levels of cyanotoxins in Clear Lake have been directly linked to documented pet deaths, and human exposure leads to a variety of health problems including gastrointestinal issues, skin issues, and neurological impacts.[2] Additionally, HABs impact lake aesthetics and produce strong odors which may dissuade recreation and other uses.

Current scientific understanding of HABs shows blooms are caused by several key factors such as nutrient availability (particularly phosphorus), duration of sunlight, water temperature, and stability of the water column. Nutrient availability appears to be a primary driver of HABs in Clear Lake, which occur most often in mid/late summer but may be present at other times of the year. In response to nutrient issues, the Regional Water Board issued a Total Maximum Daily Load (TMDL) restriction to address the issue.[3]

[2] https://www.epa.gov/sites/production/files/2014-08/documents/cyanobacteria_factsheet.pdf

[3] https://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/clear_lake_nutrients/2018_0627_tech_memo_final.pdf

Mercury is naturally present throughout California, and may leech into Clear Lake from a variety of sources. However, the Sulphur Bank Mercury Mine, located near the City of Clearlake and adjacent to the Elem Indian Colony Reservation, is a known, significant source of human-caused contamination. Sulphur Bank is an active US Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site, commonly know as "Superfund."[4]

Once mercury becomes biologically available through a process known as methylation, it collects in fish tissue and may be ingested by humans and animals alike, and increases in concentration as it moves up the food chain. In the vast majority of exposure cases, methylmercury is ingested by eating contaminated fish and shellfish. Methylmercury poses a range of significant neurological health impacts, particularly for sensitive groups including young and elderly individuals, and in pregnant women.[5]

Section 4: 2019 Committee Recommendations

Throughout 2019, the Committee and Technical Subcommittee developed a series of recommendations designed to provide the most up-to-date analysis of Clear Lake and its surrounding watersheds available. Beginning in 2020, the Committee will use this information to develop specific actions to address the challenges in Section 3 above. The items below represent consensus from the Committee. A complete list of recommendations developed during brainstorming sessions with the Technical Subcommittee is provided in Appendix D.

General Consensus Items

- New LiDAR flight of *entire* watershed at highest resolution possible
  - Purpose:
  - Cost Estimate:
  - Funding Recommendation:

- Stream gauges and continuous monitoring to provide inputs to the lake, to allow better external loading estimates and ground truth LiDAR-identified hot spots.
  - Purpose:
  - Cost Estimate:
  - Funding Recommendation:

[4] https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0902228
[5] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3514465/

- Upland/"upper watershed" modeling (i.e., model to track nutrient and other inputs from all *external* sources including creeks, streams, and runoff).
    - Purpose: To show the downstream implications of land use activities upstream of Clear Lake. Conceptually, this model would be linked to the UC Davis 3-D hydrodynamic model for internal loading currently under development. The model could include basic building blocks for watershed management such as land use types, soil properties, and nutrient transport mechanisms, but be flexible to integrate more complex elements (i.e., nutrient loads, algal drivers, and climate change projections) as they arise.
    - Cost Estimate:
    - Funding Recommendation:

- Unified database *and* data collection mechanism for Clear Lake.
    - Purpose: To streamline and coordinate data collection, to improve access to relevant data. Data sets are often reported in different ways by many different organizations and sometimes collected, but never analyzed. This recommendation could require a new staff position at an agency or organization TBD.
    - Cost Estimate:
    - Funding Recommendation:

- Assessing the public's perceptions, attitudes, and knowledge gaps towards water quality in order to improve education, outreach, and scientific communication to the Clear Lake community.
    - Purpose: Through strategic questionnaire distribution to the public, assess the public's current perceptions and attitudes towards water quality in Lake County, including Clear Lake. Results from this effort will better inform management efforts and quantify how the public's attitudes and perceptions may be driving behaviors that both negatively and positively impact water quality. With information gathered from this project, managers can better focus educational and outreach efforts towards the public and can better communicate how management or policy practices, like those produced by the Blue Ribbon Committee and other efforts, can be beneficial for the rehabilitation of Clear Lake.
    - Cost Estimate: County of Lake Water Resources Department estimates a total budget of $40,000.
    - Funding Recommendation:

Section 5: Proposed 2020 Workplan

Commented [SM7]: Include short bulleted 2020 workplans for TERC and CRC

Appendix A: Committee Member Roster and Bios

Appendix B: TERC Background and 2019 Research Conclusions

Name	AB 707 Membership Category	Appointing Entity
Brenna Sullivan	Agriculture	Lake County
Harry Lyons	Environmental	Lake County
Jan Coppinger	Public Water Supply	Lake County
Jennifer LaBay	Regional Water Board	Central Valley Regional Water Quality Control Board
Eddie "EJ" Crandall	Lake County Board of Supervisors	Lake County
Alix Tyler	Tribal Representative	Elem Indian Colony
Linda Rosas-Bill	Tribal Representative	Habematolel Pomo of Upper Lake
Mike Shaver	Tribal Representative	Middletown Rancheria of Pomo Indians
Paul Dodd	UC Davis	UC Davis
Sarah Ryan	Tribal Representative	Big Valley Band of Pomo Indians
Terre Logsdon	Tribal Representative	Scotts Valley Band of Pomo Indians
Wilda Shock	Local Economy	Lake County
Karola Kennedy	Tribal Representative	Koi Nation
Jim Steele	Tribal Representative	Robinson Rancheria

Commented [SM8]: Include monitoring plan? Quarterly reports?

Appendix D: Full List of Technical Subcommittee Recommendations

Appendix B: UC Davis TERC Outcomes and Reports

Commented [SM9]: Include quarterly reports? 2019 research highlights?

Appendix C: UC Davis CRC 2019 Research Outcomes

Known Disruptors	Planned or Past Changes	Proposed Changes	NEW Monitoring/Management Tools
• Excess nutrients' e.g. Nitrogen/Phosphorus • Anoxic conditions • Herbicides • Mercury contamination from Sulphur Bank *and* natural sources • Sediment discharge from dirt roads • Municipal Separate Storm Sewage System (MS4) issues • Seawalls • Release schedules from Cache Creek Dam • Griggs Riffle channelization • Keys channelization • Indirect/direct impacts from herbicides • Shoreline and emergent vegetation management (e.g. primrose/noxious plan removal *and* tule replanting) • Waste rock dam mercury discharge • OHV issues • Channelization of streams (generally) • Lack of public education regarding shoreline vegetation management • <u>Potential new issue</u>: new invasives such as quagga or zebra mussels	• Circle pipeline • Grading ordinance (county) • TMDL restrictions (mercury and nutrient) • Farm Nutrient Management Plans • Resurfacing/capping waste rock dam • Sulphur Bank stormwater improvements • County stormwater management plan and ordinance • Local Agency Management Programs (LAMPs) • Mitigation activities associated with fires	• Middle Creek Restoration Project • Update load allocations from nutrient TMDL • UCD Hydrodynamic and water quality/ecological model • Dredging projects (multiple)	• NEW LiDAR flights; compare results to previous results to identify erosion hotspots • Stream gauges and continuous monitoring of perceived hotspots to ground truth LiDAR results. • Pre/post project monitoring to ensure compliance with existing regulations (i.e., SMARTS database) • "Full Circle" pipeline completion • Tule replanting • Single POC for data management and analysis (may involve new hire) • Stormwater buffer ponds (may increase mosquito production/vector control issues) • Ranking streams by flow and relative health • Satellite imagery and ground truthing using autonomous underwater vehicles • Land Trust shoreline acquisition • Climate change projections and modeling (recommendations to include climate scenarios) • Fish recommendations from 2010 UC Davis report • CLERC grant proposals • Analyze load contributions from Tule Lake and Scott Creek • Increased funding for county inspections • Focused management actions for known disruptors such as gravel mining sites • New/improved lake bathymetry to allow better model performance, and to identify in-lake hot spots.