

**Exemption to the Aquatic Pesticide Discharge
Prohibition for the Control Methods Test Of
Herbicides and Other Techniques to Reduce Aquatic
Invasive Plants In The Tahoe Keys Lagoons**

Staff Report

Report to the Lahontan Regional Water Quality Control Board
XXXX, 2022 Board Meeting, Agenda Item No. **XX**

Executive Summary

The Tahoe Keys Lagoons are heavily impacted by aquatic invasive species including aquatic invasive plants (AIP). During 2014 - 2016, 85 to 95 percent of the wetted surface in the Tahoe Keys Lagoons were infested with AIP. AIP support other invasive species, such as warm water fish, degrade water quality, and adversely impact water contact and non-water contact recreation among other beneficial uses. Additionally, the heavy boating traffic in and out of the Tahoe Keys Lagoons presents a pathway to further spreading AIP into the main body of Lake Tahoe, increasing the risk of additional AIP infestations within Lake Tahoe. A 2015 report prepared by the University of Reno Biology Department for the Lake Tahoe Aquatic Invasive Species Coordination Committee identifies the Tahoe Keys Lagoons as the highest priority area requiring an integrated treatment program for aquatic invasive species, including AIP species. The report recommends using a combination of non-chemical and chemical (herbicides) treatment methodologies given the extent of the AIP infestation within the Tahoe Keys Lagoons and the increasing risk the AIP infestation presents to the main body of Lake Tahoe.

Tahoe Keys Property Owners Association (TKPOA) has requested to implement a Control Methods Test (CMT) project to evaluate the effectiveness of multiple AIP treatment methodologies, including chemical and non-chemical methodologies and combinations of both, to identify methodologies that will: 1) quickly reduce the AIP biomass 2) bring infestation to a level that can be managed by non-chemical treatment methodologies, 3) improve water quality, 4) improve recreational benefits, and 5) reduce re-infestation. Concurrent evaluation of the chemical and non-chemical treatment methodologies is necessary in order to produce comparative results that will assist TKPOA, regulatory agencies, and others in making decisions regarding the combination of future treatment methodologies TKPOA will use to control AIP species. Future treatment methodologies may or may not include chemical treatments, and decisions made regarding the proposed CMT project do not obligate the regulatory agencies to approve chemical treatment methodologies in the future.

The proposed application of herbicides requires TKPOA to request an exemption from the Lahontan Water Board to the waste discharge prohibition for pesticides in the Water Quality Control Plan for the Lahontan Region (Basin Plan). The Basin Plan also includes exemption criteria that must be satisfied in order to apply pesticides, which include herbicides, to surface waters within the Lahontan Region, including Lake Tahoe.

Information and line of reasoning supporting a position that TKPOA's CMT project meets the Basin Plan's exemption criteria for pesticide use is provided below.

Section 1: Introduction

The Tahoe Key Lagoons are presently known to be infested with two different aquatic invasive plant (AIP) species. Eurasian watermilfoil became established within the lagoons during the 1980s. In 2003, curlyleaf pondweed was identified in the lagoons. As noted, above, nearly the entire wetted surface of the Tahoe Keys Lagoons was infested with AIP during 2014 -2016, and conditions have not improved.

In 2015, the University of Nevada Reno Biology Department in collaboration with the Lake Tahoe Aquatic Invasive Species Coordination Committee, produced an Implementation Plan for Control of Aquatic Invasive Species within Lake Tahoe (AIS Plan). The AIS Plan discusses how both AIP species, Eurasian watermilfoil and curlyleaf pondweed, create habitat for other aquatic invasive species including warm fish species, adversely alter water quality (e.g., dissolved oxygen concentrations, nutrient cycling), and present boating navigational challenges.

The Lake Tahoe Aquatic Invasive Species Coordination Committee members provided input to the AIS Plan. The AIS Plan ranked the Tahoe Keys Lagoons as the highest priority to treat for aquatic invasive species in the Lake Tahoe Basin. The AIS Plan made the following recommendation

“However, due to the notable abundance of invasive and nuisance native aquatic plants in this system, an integrated program for removal which not only includes the use of non-chemical removal efforts such as bottom barriers and diver assisted suction removal, but other actions such as the reduction of nutrient loads, plant fragment collection, and herbicide application is recommended to reduce unwanted plant biomass.”

In 2017, the Tahoe Keys Property Owner Association (TKPOA) submitted an application for an exemption to the Basin Plan’s waste discharge prohibition on the use of pesticides in surface waters. TKPOA provided supplemental information for its 2017 application in July 2018, and substantially revised request in December 2020, with supplement in April 2021 and June 2021 proposing use of pesticides (herbicides) in the Tahoe Keys West Lagoons in an integrated Control Methods Test (CMT).

In 2018, a collaborative effort began between the Lahontan Water Board and Tahoe Regional Planning Agency (TRPA) to produce a draft environmental document to comply with California Environmental Quality Act (CEQA) requirements for a Basin Plan prohibition exemption and for compliance with TRPA requirements. The collaborative effort altered the proposed CMT project and its goals to include Ultraviolet C light (UV-C) and Laminar Flow Aeration (LFA) treatment methodologies. Additionally, the use of herbicides was modified from a multi-year application to a single-year application with multiple test sites of both herbicides and non-chemical treatment methodologies. The CMT project, as now described in the draft environmental document, applies herbicides during Year 1 of the CMT project, and will apply non-pesticide treatment methodologies during Years 1 - 3 of the CMT project.

The CMT project also proposes the use of three non-herbicide chemicals/products, two with treatment and one to mitigate potential water quality impacts associated with AIP biomass die-off. Rhodamine is a dye to be used with the herbicides, but only for monitoring purposes. Acetic acid with hot water may be injected below installed bottom barriers to increase the effectiveness of the bottom barriers. Lastly, a lanthanum modified clay may be used to reduce phosphorus in the water column. The measure will be used if there is a suspected correlation between AIP decay from treatment, elevated phosphorus in the water column, and an increase in cyanobacteria. The lanthanum modified clay has the ability to bind phosphorus in the water column.

The Water Quality Control Plan for the Lahontan Region (Basin Plan) contains prohibitions that apply to all surface waters of the Lahontan Region. Chapter 4, section 4.1 of the Basin Plan specifies the following waste discharge prohibition: "The discharge of pesticides to surface or ground waters is prohibited." Exemptions to this prohibition may be allowed subject to the criteria detailed in the section entitled "Exemption Criteria for Aquatic Pesticide Use" in Chapter 4, section 4.1 of the Basin Plan.

Section 2: TKPOA CMT Project Goals

The primary purpose and goal of the CMT project is to evaluate the effectiveness of multiple AIP treatment methodologies, including chemical and non-chemical methodologies and combinations of both, to identify methodologies that will: 1) quickly reduce the AIP biomass 2) bring infestation to a level that can be managed by non-chemical treatment methodologies, 3) improve water quality, 4) improve recreational benefits, and 5) reduce re-infestation.

The CMT project divides the treatment methodologies into two groups. Group A includes herbicides, Ultraviolet light C (UV-C), Laminar Flow Aeration (LFA), with some herbicides test sites also including the use of UV-C in the year following herbicide treatment. Group A treatment sites may also be followed up with the use of Group B treatments. Group B treatments include bottom barriers, bottom barriers with injection of hot water, diver-assisted suction/hand pulling and possibly additional UV-C treatments. The Group B treatments will be follow-up treatments employed at multiple locations during Years 2 and 3.

The CMT currently includes 21 test sites and three control sites covering 41.4 acres, which accounts for 24 percent of the total surface area of the Tahoe Keys Lagoons. 16.9 acres will be treated with herbicides. The following is a breakdown of the different sites.

- Six herbicide-only sites in the West Lagoon (three replicate sites each for two herbicide products)
- Three herbicide-only sites in Lake Tallac (three replicate sites for one herbicide product)
- Three UV-C light-only sites
- Six combination sites (herbicides and UV-C light treatment)
- Three LFA-only sites
- Three control sites

The herbicides proposed for use are Endothall and Triclopyr. TKPOA also applied for a pesticide prohibition exemption for the use of Florpyrauxifen-benzyl (ProcellaCOR). ProcellaCOR is not yet approved for use in California by the California Department of Pesticide Regulation and, therefore, will not be considered by the Lahontan Water Board as part of this exemption.

Section 3: Exemption Request

TKPOA submitted an exemption request to apply Endothall, Triclopyr and ProcellaCOR in the Tahoe Keys Lagoons and Lake Tallac. At the time of writing of this resolution, ProcellaCOR has not been approved for use in California by the California Department of Pesticide Regulation. The maximum label rate has not been established for California, and the use of ProcellaCOR in California is not yet allowed. Therefore, the exemption request for ProcellaCOR is not considered.

The exemption request and additional information submitted by TKPOA for Endothall and Triclopyr is consistent with the Basin Plan for consideration of an exemption to the prohibition on the discharge of pesticides to surface water, as further described below.

- (1) TKPOA submitted project information including a description of the project, purpose and need for the Project, and the chemical composition of the pesticide to be used. A communication and notification plan was also submitted, and will be required as part of the Draft NPDES to be considered by the board. The spill contingency plan will be finalized within 60 days after adoption of the NPDES permit.
- (2) The Applicant submitted a report of waste discharge and an application for an individual National Pollutant Discharge Elimination System (NPDES) permit for the Project. The Project's last updated Aquatic Pesticide Application Plan was submitted on April 30, 2021 with a final amendment dated June 14, 2021.
- (3) The decision to grant an exemption to the prohibition is a discretionary action subject to California Environmental Quality Act (CEQA). The Tahoe Regional Planning Agency (TRPA) is the Lead Agency for the Environmental Impact Statement (EIS) required by the Tahoe Regional Planning Compact and the Water Board is the CEQA Lead Agency for the Environmental Impact Report (EIR). Impacts and mitigation measures are set forth in the Draft Environmental Impact Report/Final Impact Statement (FEIR/FEIS).
- (4) The exemption process described in section 5.3 of the State Implementation Policy (SIP) is for pesticides that are associated with priority pollutants. The Applicant is not seeking authorization to discharge any pesticides with priority pollutant ingredients.
- (5) Information was also submitted related to how the project will benefit the people of California and to determine if the project complies with antidegradation policies. The Tahoe Keys Lagoons ranked as the highest priority for addressing Aquatic Invasive Species (AIS) in the 2015 Implementation Plan for the Control of Aquatic Invasive Species within Lake Tahoe. The priority is due to the

extensive recreational use and the density of AIS both of which represent threats of AIS spreading from Tahoe Keys Lagoons to Lake Tahoe. The information submitted by TKPOA and presented in the FEIR/FEIS provide information to determine whether the use of the proposed discharges are consistent with Antidegradation Policies.

- (6) Information was submitted to be able to determine whether the project satisfies the exemption criteria.

The information submitted by TKPOA is consistent with the Basin Plan for consideration of an exemption to the prohibition on the discharge of pesticides to surface water for the use of for endothall and triclopyr.

Section 4: Basin Plan Exemption Process

The Basin Plan prohibition and the exemption criteria were adopted by the Lahontan Water Board in December 2011, approved by the State Water Board in 2012, and approved by Office of Administrative Law in 2012. An exemption to the waste discharge prohibition for aquatic pesticide use may be granted by the Regional Board if all the following findings are made:

- (a) The project is an eligible circumstance as described in the Basin Plan.
- (b) The project satisfies all the applicable exemption criteria.

Section 4.1: Project Eligibility

The Basin Plan indicates that prohibition exemptions for “Controlling AIS or Other Harmful Species” will be considered “if the use of aquatic pesticides is to protect public health and safety, the environment, or for other situations described [in the Basin Plan].” (Basin Plan, p. 4.1 – 6). For non-Emergency and non-Time Sensitive projects proposed for purposes “of protecting drinking water supplies, water distribution systems, navigation, agricultural irrigation, flood control channels, control of AIS, or for purposes that otherwise serve the public interest, the project proponent must be (1) a state, federal, or public agency (local or regional) with legal authority to manage the affected resources or protect such facilities, or (2) private entity (e.g., a homeowners association, private water utility) that has control over the financing for, of the decision to perform, aquatic pesticide applications. For projects proposed for purposes of AIS control, the project proponent must demonstrate that the decision to apply aquatic pesticides is consistent with an adopted Aquatic Invasive Species Control Management Plan.” (Basin Plan, p. 4.1 – 6).

TKPOA is a homeowners association that has control over the financing and decision to perform, aquatic pesticide applications. The Project would test a range of large-scale and localized aquatic weed control methods suitable for management of target aquatic weeds, to determine what combination of methods within the test areas will: (1) Reduce target aquatic weed infestations as much and as soon as feasible; (2) Bring target aquatic weed infestations to a level that can be managed over the long term with

localized non-herbicidal treatment methods; (3) Improve the water quality of the Tahoe Keys lagoons and reestablish native aquatic habitat; (4) Improve navigation and enhance recreational benefits and aesthetic values; and (5) Reduce the potential for target aquatic weed re-infestation after initial treatment.

The project proponent has demonstrated that the decision to apply aquatic pesticides is consistent with an adopted Aquatic Invasive Species Control Management Plan. AIS Implementation Plan produced by University of Nevada Reno, Under Knowledge Gaps section, recommended that further exploration on the safe and effective use of pesticide as an integrated AIS management tool in Lake Tahoe be considered. Further the implementation plan noted the Tahoe Keys Lagoons as the highest priority site in Tahoe, as having an abundance of invasive plants recommended an integrated program including herbicide application to reduce the unwanted biomass.

Continued dense growth of aquatic weeds in the Tahoe Keys lagoons would increase the buildup of fine organic sediments from plant decay that can lead to increased turbidity and decreased water clarity. To the extent that aquatic weed infestations spread to other areas of Lake Tahoe, long-term potential impacts include a similar buildup of fine organic sediments and potentially a measurable contribution to increased turbidity and decreased water clarity in nearshore areas when those sediments are disturbed by wave action, currents, boats, swimmers, or bottom-dwelling organisms. Internal cycling of nutrients from decomposing macrophytes and organic sediments could also lead to increased phytoplankton productivity and also negatively impact water clarity. The herbicide application is for the purposes of controlling AIS by evaluating the effectiveness of multiple AIP treatment methodologies and thereby addressing and controlling AIS in an effective manner. The project test will protect public health and safety and the environment.

Therefore, the project is an eligible circumstance as described in the Basin Plan.

Section 4.2: Basin Plan Exemption Criteria

The Basin Plan identifies seven exemption criteria for the Basin Plan's waste discharge prohibition for pesticide use in surface waters for projects that are neither emergencies nor time sensitive. Four criteria are located in the Basin Plan under the heading "Time Sensitive Projects" and the other three criteria are located in the Basin Plan under the heading "Projects that are Neither Emergencies nor Time Sensitive." The following is an evaluation of the exemption criteria in the order as they appear in the Basin Plan. The quoted text below is the exemption criteria language from the Basin Plan.

Criterion 1

"Demonstration that non-chemical measures were evaluated and found inappropriate/ineffective to achieve the project goals. (Alternatives to pesticide use must be thoroughly evaluated and implemented when feasible (as defined in CEQA Guideline 15364: "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.)"

The project goal for TKPOA's CMT project is to:

Evaluate the effectiveness of multiple AIP treatment methodologies, including chemical and non-chemical methodologies and combinations of both, to identify methodologies that will: 1) quickly reduce the AIP biomass 2) bring infestation to a level that can be managed by non-chemical treatment methodologies, 3) improve water quality, 4) improve recreational benefits, and 5) reduce re-infestation.

The information generated by the CMT test will be used by TKPOA to update or to develop a new Integrated Management Plan for Aquatic Invasive Weeds (IMP)¹. As recommended by the Lake Tahoe Aquatic Invasive Species Coordination Committee's 2015 AIS Plan, TKPOA is considering multiple AIP treatment methodologies, including chemical and non-chemical, in updating/developing its IMP. In order to compare the effectiveness of the different AIP treatment methodologies with minimal variability in testing conditions, it is important that all AIP treatment methodologies being considered for future use be evaluated at the same time in the same or very similar environment. That is why both chemical and non-chemical treatment methodologies identified in the CMT project need to be evaluated concurrently. Failing to do so, will fail to meet the project's goals, as outlined, above.

If following the CMT project, TKPOA develops an IMP that includes pesticide use, such a plan will require a Basin Plan prohibition exemption, separate from that being considered for the TKPOA CMT project. The results from the CMT project will be available for the project review and evaluation process related to the proposed IMP. As noted in the Basin Plan, the Lahontan Water Board has significant discretion in and how it approves pesticide use in surface waters of the Lahontan Region. Additionally, the Lahontan Water Board is under no obligation to grant a prohibition exemption for the proposed IMP simply because it may have granted such an exemption for the TKPOA CMT project.

Criterion 2

“A plan detailing mitigation and management measures must be submitted and implemented. The Plan must incorporate control measures to limit adverse impacts to the shortest time necessary for project success. The Plan should include measures to remove and dispose of dead biomass which are adequate to protect water quality and beneficial uses. (Removal of biomass may not be necessary in situations where recovering the dead biomass creates a greater potential to impact water quality.)”

TKPOA submitted a plan detailing mitigation and management measures and those measures will be implemented by TKPOA. TKPOA submitted a report of waste discharge and an application for an individual National Pollutant Discharge Elimination

¹ Lahontan Water Board Waste Discharge Requirements Order No. R6T-2014-0059 requires TKPOA to develop and implement an Integrated Management Plan for Aquatic Invasive Weeds (IMP). The IMP is to address control and monitoring of AIP species in Tahoe Keys Lagoons, Lake Tallac, and the Marina Lagoon. TKPOA submitted its IMP in May 2016, and Water Board staff conditionally accepted the IMP in August 2016.

System (NPDES) permit for the Project. The Project's last updated Aquatic Pesticide Application Plan was submitted on April 30, 2021 with an amendment dated June 14, 2021. In addition, the implementation of best management practices are a required component of the NPDES permit.

The control measures to be implemented by TKPOA limit adverse impacts to the shortest time necessary for project success. Pre-project macrophyte surveys to select final treatment locations/test sites to optimize aquatic herbicide selection for each test site would minimize non-target species impacts and optimize treatment of target aquatic plant species. Other control measures that would limit adverse impacts to the shortest time necessary for project success include the application of herbicides in Lake Tahoe when water flow direction would be from the Lake into the Keys, thereby minimizing the potential migration of herbicide to Lake Tahoe. Installation of turbidity curtains in key locations likewise prevents the migration of herbicides to Lake Tahoe. Control measures also include the application of Rhodamine WT aquatic dye tracing at time of aquatic herbicide application to trace herbicide residue migration and dissipation. Boating traffic would also be limited in the Tahoe Keys during application.

To ensure appropriate use of the pesticides, TKPOA would utilize qualified pesticide applicators licensed by the California Department of Pesticide Regulation (DPR), and is required to follow pesticide label requirements, project permit requirements, and approved project plans. Other control measures include transporting only the quantity of herbicide on the water needed for the site being treated and implementing spill and contingency mitigation measures to reduce impacts.

Adverse conditions that could result from plant die off include the lowering of dissolved oxygen and the possibility of stimulating a cyano-bacteria growth or harmful algae blooms (HABs). The dissolved oxygen and HABs will be monitored in the field and supported by laboratory analysis of the CMT treatment and the control sites. Two different mitigation efforts would be implemented when applicable conditions exist, the use of mechanical aeration to mitigate low dissolved oxygen, and the use of lanthanum modified clay to mitigate HAB outbreaks. Testing will be done to determine if the phosphorus levels are elevated before lanthanum modified clay is used.

TKPOA may remove some dead biomass as part of its existing practice to harvest AIP, however the project does not include measures to remove and dispose of dead biomass. Conducting aquatic herbicide treatment events in spring period before plant growth has reached peak biomass would minimize levels of dead biomass post-treatment and associated impacts of biomass decomposition to water quality. Biomass decomposition in the water places a biochemical oxygen demand on the dissolved oxygen (DO) in water that may cause short-term DO impacts. The low biomass and high water column DO concentration conditions in the spring provide conditions that will minimize the potential for DO depletion.

With early spring treatment the levels of dead biomass post-treatment will be a fraction of that occurring when the plants are full growth. Removal of dead biomass at these minimized levels is difficult and has the potential to disturb sediment. Sediment disturbance could release nutrients into the water column and become available to

algae. Aluminum persistent in sediments of the lagoons could also be mobilized into the water column. Therefore, removal of biomass creates a greater potential to impact water quality than biomass decomposition, and therefore is not necessary. Therefore, a plan detailing mitigation and management measures has been submitted and will be implemented by TKPOA.

The mitigation measures and the monitoring for adverse conditions appears acceptable and adequate to mitigate for the identified conditions.

Criterion 3

“The planned treatment protocol will result in the minimum discharge of chemical substances that can reasonably be expected for an effective treatment.”

There are two herbicides proposed for use, Endothall and Triclopyr. ProcellaCOR had been previously proposed, but it has not been approved for use in California by the Department of Pesticide Regulation; and therefore, it will not be used as part of the CMT project. TKPOA is proposing application rates less than the maximum allowable rates indicated on the label. Based on the results of mesocosm studies, TKPOA plans to use the following application rates.

Table 1: Allowable and Proposed Herbicide Application Rates and Application Methods

Herbicide	Max. Allowable Application Rate	Proposed Application Rate	Application Method
Endothall	5 ppm	2 ppm	Drop hoses
Triclopyr	2.5 ppm	1 ppm	Drop hoses or granular

Based on the mesocosm studies, TKPOA is minimizing the chemical application rates to the minimum application of chemical substances that can reasonably be expected for an effective treatment to meet project goals.

Criterion 4

“Monitoring and reporting program must be submitted and implemented to evaluate impacts and verify restoration of water quality in the treatment area. The program must be sufficient to determine compliance with criterion No. 3.

The project monitoring program must include pre- and post-project sampling of water, sediment, and biota to determine if toxicity persists as a result of project implementation. At the discretion of the Regional Board, due to the urgency of Time Sensitive projects, the collection and analysis of sediment and biological samples may be waived and/or a reference site may be used to represent pre-project conditions.

Unless waived by the Regional Board, the project proponent shall develop a biological monitoring program to evaluate (a) the magnitude and extent of potential impacts to, and (b) the post-project recovery of non-target organisms and rare/threatened or endangered species. The biological monitoring program must be based on an appropriate study design, metrics, and performance criteria to evaluate restoration of aquatic life as specified below in criterion no. 7. This requirement may be waived at the discretion of the Regional Board where the Regional Board finds that there is no significant threat to non-target aquatic organisms.”

The Aquatic Pesticide Application Plan (APAP) for the CMT provides a description of the monitoring that aligns with the EIR/EIS and Basin plan requirements. A Mitigation Monitoring Reporting Program (MMRP) will be required pursuant to Water Code Section 13267. In addition, a monitoring and reporting program is a required component of the (NPDES Permit. The monitoring and reporting that will be implemented includes: (1) pre-project monitoring to determine pre-project conditions, (2) monitoring during project implementation including visual observation of dye tracer, contingency monitoring, and water quality monitoring to determine aquatic herbicide migration and if applicable mitigation measures must be implemented; (3) post-project monitoring to determine the effects from the CMT treatments and post-project recovery.

The monitoring and reporting that will be implemented is sufficient to determine compliance with Criterion No. 3, showing that the planned treatment protocol will result in minimum discharge of chemical substances that can reasonably be expected for an effective treatment. Baseline data on all treatment sites will be collected prior to any herbicide application, including hydroacoustic scans. Surveys since 2015 have included point-intercept sampling to determine percent composition by species and hydroacoustic sampling to determine presence of plant species, plant height, and biovolume (TKPOA 2019c and TKPOA 2020d). Hydroacoustic and aquatic macrophyte surveys would be completed in the test sites prior to initiating the testing program. These survey results would provide information on the species mix and biovolumes of macrophytes, and would be used to decide (1) final test site locations and boundaries to minimize effects on non-target species, and (2) which of the proposed herbicides to apply at each herbicide test site to best match the target species present. Any adjustments to site locations and boundaries would not expand the total area of herbicide testing. In the year following Group A testing at each site, hydroacoustic and macroinvertebrate surveys would be performed to determine the size of the remaining infestation. The hydro-acoustic scans will be used to determine the bio volume of the plants, plant growth or a lack of growth. The plant point sampling will evaluate the health and variety of the plants after treatment.

The project monitoring program also includes pre- and post-project sampling of water, sediment, and biota to determine if toxicity persists as a result of project implementation. Pre-project and post-project monitoring will include testing for the presence of aquatic pesticides, and monitoring for the water quality parameters of pH, dissolved oxygen, temperature, and turbidity. Rhodamine WT dye detections will be used to determine the possible migration of aquatic pesticides. Water quality monitoring and visual observation could trigger additional water quality monitoring and will be used to determine whether to implement applicable mitigation measures. The dissolved oxygen water quality parameter

will be the lead indicator in determining when and if aeration should be implemented. For cyano-bacteria, visual indications of a potential HAB occurrence and subsequent water samples will be collected and analyzed for the three HAB indicators (Microcystins ≥ 0.8 $\mu\text{g/L}$, Anatoxin-a is detected and cylindrospermopsin ≥ 1.0 $\mu\text{g/L}$) and total phosphorus in the water at the target treatment area(s) and the control sites to determine whether lanthanum modified clay should be applied.

Pre-project and annual monitoring of the biological conditions will also be implemented. The target indicator will be the Benthic Macro-Invertebrates (BMI) (i.e., aquatic bugs). The measurement/analyses will be done at all treatment locations and will be used to determine the magnitude and potential impact to, and the post-project recovery of, non-target organisms and rare/threatened or endangered species in comparison to pre-treatment conditions. This biological monitoring is based on an appropriate study design, metrics and performance criteria to evaluate restoration of aquatic life as specified criterion no. 7 of the Basin Plan exemption criterion, and further explained below in the discussion of Criterion 7.

Criterion 5

“Purpose and Goals statement that (a) demonstrates that the target organism is a primary cause of the problem being addressed, and (b) provides evidence that the proposed application of pesticides will accomplish the project goals.”

The purpose of the CMT is to test methods to control the spread of target AIP species that have compromised water quality in the Tahoe Keys Lagoons and threaten Lake Tahoe. The Lake Tahoe Aquatic Invasive Species Coordination Committee’s 2015 AIS Plan produced by University Nevada Reno, ranks the Tahoe Keys Lagoons as the top priority area to be treated due to the magnitude of the invasive plant and fish infestations and the high recreational use of the area. Targeted AIP species are eurasian watermilfoil and curlyleaf pondweed. The purpose and goals of the project demonstrate that the target organism is a primary cause of the AIS infestation being addressed.

The proposal is to test different treatment methodologies to determine what treatment methodology or combination of methodologies will best control the target AIP species. Recent studies in Lake Tahoe and TKPOA’s mesocosm studies indicate that the multiple treatment methodologies to be evaluated by the CMT project have potential to treat the target AIP species to some extent. Evaluating the effectiveness of chemical and non-chemical treatment methodologies concurrently in the same or very similar environment will accomplish the project goals of identifying effective treatment methodologies or combination of methodologies for controlling the target AIP species in Tahoe Keys Lagoons.

Criterion 6

“A description of the failure of non-chemical measures to effectively address the target organisms. The description will include either (1) evidence that non-chemical efforts failed to address target organisms or (2) justification, accepted by Regional

Board, of why non-chemical measures were not employed or are not feasible (CEQA Guideline 15364) to achieve the treatment goals.”

In response to the growing infestation of target aquatic weeds in the Tahoe Keys and to limit non-point sources of pollution, TKPOA was tasked with developing a Non-Point Source Water Quality Management Plan (NPS Plan), and an Integrated Management Plan (IMP) to address target aquatic plant species management. Both plans are being implemented and a variety of non-herbicidal control methods have been utilized. However, due to the size, density and dominance of the infestation in the Tahoe Keys Lagoons, these control methods have produced limited results. In addition, these current control methods also produce large quantities of weed fragments, which risk the further spread of aquatic weed infestations throughout the shallow nearshore waters of Lake Tahoe. Non-chemical efforts to date have failed to address target organisms. Other non-chemical control methods (LFA and UVC-C light) are experimental methodologies that are unproven in controlling AIS on scale and density found in the Tahoe Keys.

The proposed CMT project will be evaluating both non-chemical and chemical treatment methodologies concurrently to compare the effectiveness of each treatment methodology and combinations of treatment methodologies. The following reasons provide a justification of why the CMT project may proceed, concurrently evaluating both non-chemical measures and chemical measures.

1. Non-chemical treatment methodologies will be employed in the Project.
2. TKPOA has been utilizing mechanical measures to control AIP, which has failed to control growth and spread of AIP in the Tahoe Keys Lagoons.
3. The Lake Tahoe Aquatic Invasive Species Coordination Committee’s 2015 AIP Plan prepared by the University Nevada Reno identifies the Tahoe Key Lagoons as highest priority location within Lake Tahoe to be treated for Aquatic Invasive Species, including AIP.
4. The CMT project will be testing two experimental non-chemical treatment methodologies (LFA and UVC-C light) to compare their effectiveness to that of two chemical treatment methodologies in the Tahoe Keys Lagoons.
5. The original CMT project has been modified through a collaborative approach with assistance from the League to Save Lake Tahoe, Tahoe Regional Planning Agency, and substantial work by other stakeholder groups. The collaborative approach has increased the project’s scope regarding non-chemical treatment methodology evaluation and reduced the scope of herbicide use to a one-treatment event test application at multiple locations involving significantly less area than originally proposed. Further limiting the CMT project to evaluating only non-chemical treatment methodologies will reduce the knowledge to be gained and will not accomplish the goals of the project.

The information obtained through the proposed CMT project will be used to assist TKPOA, regulatory agencies, and others in making informed decisions regarding the future treatment methodologies TKPOA will use to control AIP. Including chemical use

as part of a future IMP will require a separate project evaluation and Basin Plan prohibition exemption prior to the IMP being accepted by the Lahontan Water Board.

Criterion 7

“A monitoring and reporting program accepted by the Regional Board, will be followed to assess the effects of treatment on surface and ground waters, and on bottom sediments if specified by the Regional Board. The monitoring and reporting program must include, but not be limited to, monitoring sites, analytes, methods, frequencies, schedule, quality assurance, and measurable objectives to determine if the project goals were achieved (e.g., acreage treated, reduction in biomass of target species, improved water quality). The monitoring plan must identify a dedicated budget and specify the entity/person(s) responsible for the monitoring....”

The quote, above, is only a portion of the criterion, as it is quite lengthy (Basin Plan pages 4.1-9 and 4.1-10).

A monitoring and report program is a required component of the NPDES permit. **Mitigation Monitoring** is also required. In addition, a description of monitoring to be implemented was included in the APAP submitted by TKPOA. The monitoring to be implemented will assess the effects of treatment on surface and ground waters, and on bottom sediments.

In June 2021, TKPOA provided an update to their APAP which included changes to their proposed monitoring program in June of 2021. The monitoring program includes information on monitoring sites, analytes, methods, frequencies, and schedules, quality assurance, and measurable objectives to determine if the project goals will be achieved. The updated monitoring program included additional pre and post biological monitoring of the non-target community. The pre and post biological monitoring will target plant monitoring and macroinvertebrates. The plant monitoring will provide biovolume estimates from hydroacoustic scans and point plants sampling to determine health and diversity. The macroinvertebrates will be the key indicator in evaluating the recovery of the non-target community.

The pre-project biological monitoring program and the monitoring, reporting, and mitigation program for non-target communities (section 4 of the APAP monitoring program submitted by TKPOA) was peer reviewed by independent expert, Dr. Michael Marchetti Ph.D. with Saint Mary's College of California, through the Tahoe Science Advisory Council. The review found “the proposed monitoring plan will provide ample evidence to assess whether non-target communities have fully restored/recovered after the aquatic weed treatments.”

The biological monitoring program is based on an appropriate study design, metrics, and performance criteria to evaluate restoration of non-target biological life potentially affected by the pesticide application. Pre-project and post-project monitoring of biological conditions will include monitoring using a Benthic Macro-Invertebrates (BMI) indicator. This is an indicator that is commonly accepted by the scientific community and is accepted by the Regional Board. The measurement/analyses will be done at all

treatment locations and will be used to determine the magnitude and potential impact to, and the post-project recovery of, non-target organisms and rare/threatened or endangered species to pre-treatment conditions. As required by the NPDES permit, within two years of the last treatment for a specific project, a qualified biologist(s) will assess the restoration of non-target aquatic life and benthic communities within the treated waters, and if, based on the monitoring data, the evidence demonstrates, certify in writing that all affected non-target biological communities have been fully restored. If non-target biological communities are not fully restored after two years, the project proponent must conduct continued annual monitoring and implement the proposed mitigation measures until the Regional Board accepts the certification.

Therefore, the monitoring program meets the conditions stated in criterion no. 7.

Section 5: Summary

The proposed CMT project will evaluate the initial “knock down” effectiveness of four treatment methodologies involving two non-chemical methodologies (LFA and UV-C light) and two chemicals (herbicides Endothall and Triclopyr). Some of the herbicide treatments may receive follow-up treatments by non-chemical treatment methodologies and some treatments are planned to be operated for the entire length of the project, such as LFA. Data will be collected for three years or longer and is intended to provide information to assist in deciding which treatment methodologies are to be included in TKPOA’s future IMP.

The purpose or goal of the CMT project is to evaluate chemical and non-chemical treatment methodologies. The project is not proposing to use and evaluate chemical treatment methodologies at the exclusion of non-chemical treatment methodologies. The information obtained through the proposed CMT project will be used to make informed decisions in developing, reviewing, and approving TKPOA’s future IMP. Evaluating the effectiveness of different treatment methodologies and combination of treatment methodologies needs to be done concurrently under the same or very similar environmental conditions in order to produce comparative results.

The Basin Plan recognizes that certain activities involving the application of herbicides may be in the public interest and includes controls of aquatic invasive species as a circumstance eligible for a prohibition exemption, including project located in or near Lake Tahoe. As described above, TKPOA’s CMT project is an eligible project that meets the Basin Plan’s exemption criteria for pesticide use.

References

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2019 Aquatic Invasive Plant Control Pilot Project Final Monitoring Report, Tahoe Resource Conservation District

2020, Draft Environmental Impact Report/Environmental Impact Statement Tahoe Key Lagoons Aquatic Weed Control Methods Test

Andy Kopania, 2020 E-mail communication on estimated cost to implement herbicide and first-year monitoring cost.

Greg Hover, 2020 E- mail communication on the estimated cost to install six acres of laminar flow aeration.

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Witmann, M.E. and Chandra, S., 2015 Implementation Plan for the Control of Aquatic Invasive Species within Lake Tahoe. Lake Tahoe AIS Coordination Committee, July 31, 2015. University Nevada Reno