VIA U.S. MAIL and EMAIL

April 14, 2022

Lahontan Regional Water Quality Control Board
Attn: John Yu
15095 Amargosa Rd., Bldg. 2, Ste 210
Victorville, CA 92394
john.yu@waterboards.ca.gov

Re: **Proposed Study of Laurel Pond and Groundwater to Inform New Waste Discharge Requirements and Proposed Basin Plan Amendment**

Dear John,

We agree that studying new information from the new monitoring wells and Laurel Pond system should occur before moving forward with a waste discharge requirement (WDR) revision, as we discussed on December 3, 2021. Also, we hope that our comment letter on the 2022 Basin Plan Triennial Review project priorities helped raise awareness for the need of a Basin Plan Amendment that pertains specifically to Laurel Pond and its designated beneficial uses.

Please see the proposal below for studies of Laurel Pond and the shallow aquifer. We look forward to working out the details, continuing the portions of this proposal we are already working on, and getting started on the new components. We also look forward to working on a cooperative agreement to memorialize this process.

Should you have any questions regarding this matter, please feel free to contact me at (760) 934-2596, extension 248 or ghigerd@mcwd.dst.ca.us .

Sincerely,

Garrett Higerd, PE
District Engineer

1. Purpose and Goals of Study

The goal of the proposed work is to inform a future WDR revision and a Basin Plan Amendment by:

- Characterizing groundwater in the vicinity of Laurel Pond through collection of regular quarterly groundwater quality samples at the four monitoring wells installed around Laurel Pond in 2021 (**Figure 1**)
- Studying whether Laurel Pond water entering the shallow groundwater system is connected to the springs at Hot Creek Hatchery (**Figure 1**)
    - The Lahontan Regional Water Quality Board (LRWQB) has identified Laurel Pond as a potential source of high nitrate levels observed at the springs that feed the Hot Creek Fish Hatchery. This theory is documented in the Time Schedule Order for Hot Creek Fish Hatchery (TSO No. R6V-2021-0015). Mammoth Community Water District (MCWD) proposes to conduct a groundwater study using existing data from nearby wells, existing data from the four Laurel Pond Monitoring wells, and to be collected data from the Laurel Pond wells and existing (non-MCWD) wells, potentially including those planned to be installed by the Hot Creek Fish Hatchery in response to the TSO discussed above.
- Studying the fate of nitrogen in Laurel Pond
    - Organic and inorganic nitrogen present in the wastewater treatment plant (WWTP) effluent entering Laurel Pond is not detected in significant concentrations in the four Laurel Pond Monitoring wells installed in July of 2021. The purpose of this study is to determine if mechanisms within Laurel Pond itself are sequestering or removing the nitrogen prior to leaching into groundwater.
- Studying the applicability of beneficial uses for Laurel Pond (REC-1, MUN, COLD, etc.) and produce documentation to support a proposed Basin Plan Amendment that would specifically identify Laurel Pond as a named water body in Table 2-1 of the Basin Plan with specifically identified beneficial uses.
    - As a "minor surface water", beneficial uses are generically assigned to Laurel Pond and do not actually reflect the current or planned public uses of the pond, or what wildlife do or could inhabit the pond. This study would define beneficial uses based on actual existing and potential uses of the water body.

A summary table of the proposed study, including tentative start and end dates, is included as **Attachment 1**.

2. Laurel Pond Groundwater Compliance Sampling

Four monitoring wells were installed in July 2021 around Laurel Pond to replace the four existing monitoring wells that were too shallow to provide consistent or representative groundwater data (See **Table 1** for well information). MCWD began collecting water quality data from the four monitoring wells in August 2021, and will continue collecting groundwater quality samples per the existing wastewater discharge requirements (WDRs) until a new WDR is adopted. The data from these sampling events will be used to characterize the groundwater upgradient (LP MW-1) and downgradient (LP MW-2, 3, & 4). Groundwater quality data and depth-to-water (DTW) data from these compliance sampling events will also be utilized where appropriate in the studies described below.

Table 1 – Laurel Pond Monitoring Well Information

Well ID	Ground Elevation (ft amsl)	Well Diameter (inch)	Total Depth (ft bgs)	Screen Interval (ft bgs)
LP MW-1	7132.45	4	125	80-120
LP MW-2	7130.09	4	65	40-60
LP MW-3	7132.57	4	65	40-60
LP MW-4	7129.35	4	90	45-85

3. Groundwater Flow Study

The purpose of the groundwater flow study is to use empirical data to determine if groundwater flows from the Laurel Pond area towards the springs feeding Hot Creek Fish Hatchery. The purpose of this investigation is not to determine the source of high nitrate levels at the springs supplying Hot Creek Fish Hatchery. The remainder of Section 3 presents the proposed groundwater flow study.

- a literature review of existing relevant research on the area (Laurel Pond and Hot Creek),
- construction of groundwater contour maps of the Laurel Pond/Hot Creek area utilizing existing historical data and,
- A multi-year DTW measurement program at a proposed list of wells,

The proposed investigation will better define the fate of groundwater influenced by Laurel Pond, specifically whether it is likely to be traveling to the Hot Creek Fish Hatchery.

3.1. Literature Review

An MCWD engineer will review, summarize, and compile all available existing research and studies performed in the Laurel Pond/Hot Creek area relevant to the potential Laurel Pond-Hot Creek connection. A draft report will be compiled and submitted to the LRWQB for review, and any changes agreed upon by both parties will be incorporated into the final report.

3.2. Existing Data Compilation and Groundwater Contour/Flow Map Creation

The USGS publishes DTW data from wells in the Long Valley area, including upgradient and downgradient of Laurel Pond, to the National Water Information System (NWIS). An MCWD professional engineer with hydrogeology experience will review and compile historical data from the NWIS, as well as historical data from MCWD wells, to construct groundwater contour maps of the Laurel Pond/Hot Creek area. MCWD will produce a draft report describing the data used, methods utilized during the construction of the groundwater contour maps, groundwater contour maps, and a proposed list of wells to be sampled during the bi-annual DTW measurement events described in Section 3.3. This draft will be submitted to the LRWQB for review, and any agreed upon changes to the report, including proposed well list, will be incorporated into the final version.

3.3. Depth-to-Water Measurement Events

MCWD proposes to complete a focused DTW measurement study in the Laurel Pond area, including the four new Laurel Pond monitoring wells installed in July 2021 (LP MW-1 through LP MW-4). The purpose

of this investigation is to better define groundwater flow near Laurel Pond by incorporating data from the new Laurel Pond monitoring wells into a larger sampling event. Prior to beginning this study, MCWD will reach out to the land-owners to secure access to the wells on the reviewed list (See Section 3.2). The goal is to obtain a complete data set, however the completeness will be dependent on well condition and landowners granting access.

MCWD will also reach out to Hot Creek Fish Hatchery to determine if any monitoring wells included in TSO No. R6V-2021-0015 have been constructed and are able to be sampled as part of this study.

3.3.1. Groundwater Investigation Frequency and Methods

MCWD proposes to measure DTW at all wells in the reviewed list twice a year for a 5-year period, targeting sampling to occur when groundwater levels are at their lowest and highest (Fall and Early summer respectively).

DTW will be measured using an electronic sounding tape, with measurements being recorded in feet and tenths-of-feet. During the first water level measurement event, the following will occur at each well in order to establish a common reference and datum:

- A common reference point (i.e. well casing) will be determined, marked with a permanent marker, and photographed for reference during future events,
- A tape measure will be used to measure the distance from the ground surface to the reference point,
- A Trimble R2 GNSS receiver will be used to measure the elevation of the ground at the well.

This information, along with the measured DTW, will then be utilized to calculate the groundwater elevation at each well.

3.4. Groundwater Study Analysis and Subsequent Work

An MCWD professional engineer with hydrogeology experience will use the data to produce groundwater elevation contour maps and inferred flow direction. Computer driven spatial interpolation methods (i.e. kriging, IDW, etc) will be used to generate groundwater elevation contours, which will then be modified based on known topography, geology and hydrogeology. MCWD will present these maps to the LRWQB within one month following completion of sampling events for review and discussion, and will incorporate any agreed-upon changes.

Following the last groundwater measurement event a report will be compiled that will summarize the findings of the groundwater level investigation, including inferred direction of groundwater flow, analysis of seasonality of groundwater levels and their effects on flow direction, and a comparison to the historical groundwater analysis described in **Section 2.1**.

4. Fate of Nitrogen at Laurel Pond

WWTP effluent entering Laurel Pond contains both inorganic nitrogen (nitrate-nitrite, ammonium-ammonia) and organic nitrogen. Nitrate (as N) concentrations in WWTP effluent since 2016 have ranged from non-detect to 5.8 mg/L, with 11 of the 20 samples being non-detects (**Table 2**). Since 2016 Ammonia (as N) concentrations in the WWTP effluent has ranged from 12 to 38 mg/L with an average of

25 mg/L (**Table 2**), and Total Kjeldahl Nitrogen (TKN) during this period has ranged from 14 to 41 mg/L, with an average of 28 mg/L (**Table 2**).

Four monitoring wells were installed in July 2021 around Laurel Pond to replace the four existing monitoring wells that were too shallow to provide consistent or representative groundwater data (See **Table 2** for well information). Since installation, three groundwater sampling events have occurred and were analyzed for a suite of constituents including ammonia (as N), Total Kjeldahl Nitrogen, and nitrate (as N) (**Table 3**). Nitrate levels at the four new wells have ranged from non-detect (ND) to 0.27 mg/L, well below the MCL of 10 mg/L, and ammonia has only been detected in well LP MW-4 at 0.7 mg/L (**Table 3**). TKN has only been detected at MW LP-4 at 1.2 and 1.4 mg/L (**Table 3**). While preliminary groundwater water quality results indicate that elevated levels of nitrate/ammonium are not being transferred off-site in groundwater, the fate of nitrogen entering Laurel Pond is not understood.

Potential processes of nitrogen removal at Laurel Pond include, but are not limited to, biological assimilation (uptake by plants, bacteria, and algae), denitrification and volatilization to atmosphere, and adsorption to the soil matrix. MCWD proposes to complete a year-long nitrate-nitrogen balance study, with the goal of understanding the fate of nitrogen in Laurel Pond during cool and warm periods. This analysis will be performed by a third-party consultant with relevant experience, and will include analysis of existing data, biological surveys, and water samples taken from Laurel Pond (in addition to regular compliance sampling of WWTP effluent and Laurel Pond monitoring wells). MCWD will submit the chosen consultant's resume and proposal for review by the LRWQB prior to starting the study.

Table 2 – Wastewater Plant Effluent Statistics from January 2016 through December 2021

Metric	Ammonia (as N)	Total Kjeldahl Nitrogen	Nitrate (as N)
Minimum	12 mg/L	14 mg/L	0.23 mg/L
Maximum	38 mg/L	41 mg/L	5.80 mg/L
Average[1]	25 mg/L	28 mg/L	1.03 mg/L
Standard Deviation	6 mg/L	6.90 mg/L	1.81 mg/L

1- For calculation of averages non-detect values assumed to be zero since more than half of the results were non-detect.

Table 3 – Laurel Pond Monitoring Well Nitrogen Data

Date	Ammonia (as N) mg/L				Total Kjeldahl Nitrogen mg/L				Nitrate (as N) mg/L			
	LP MW-1	LP MW-2	LP MW-3	LP MW-4	LP MW-1	LP MW-2	LP MW-3	LP MW-4	LP MW-1	LP MW-2	LP MW-3	LP MW-4
August 2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND	ND	ND
September 2021	ND	ND	ND	0.7	ND	ND	ND	1.2	ND	0.27	0.24	ND
November 2021	ND	ND	ND	0.7	ND	ND	ND	1.4	ND	0.26	ND	ND
March 2022	ND	ND	ND	0.8	ND	ND	ND	1.1	ND	0.49	0.68	ND

N/A – Sample not analyzed for listed constituent.

5. Beneficial Use Study

MCWD proposes to study the current and potential future beneficial uses at Laurel Pond to provide data and context to support a Basin Plan Amendment and new WDRs. As stated in the comment letter sent by MCWD to the LRWQB on January 17, 2022, the beneficial uses generically assigned to a 'minor surface water' that MCWD would like to review for a site-specific listing are: REC-1, MUN, and COLD. MCWD does not propose any changes to the beneficial uses defined for groundwater in the Basin Plan. MCWD proposes to submit a single report that will document the applicability of beneficial uses at Laurel Pond. The specific beneficial uses MCWD plans to study are described in detail in the following sub-sections.

5.1. REC-1

Laurel Pond operates on USFS land under a 1983 MOA that is currently being updated. As the landowner, the USFS has its own recreation and commercial goals for Laurel Pond and the surrounding land. As documented in the 1998 Reclaimed Water EIR/EA, USFS contacted MCWD regarding long-term disposal of excess effluent at Laurel Pond (then an ephemeral pond), with the goal of providing a perennial source of water to enhance waterfowl nesting habitat (Bauer, 1998). The USFS also manages the land around Laurel Pond as range for cattle and has constructed and maintains a series of fences around Laurel Pond to allow controlled movement of cattle in the area, as well as to notify the public that the water in the pond is wastewater effluent and not suitable for human consumption.

As the landowner, the USFS is the primary entity responsible for managing recreational uses at Laurel Pond, and therefore MCWD proposes discussions between the LRWQB, MCWD, and the USFS should be the basis for the determination of applicable recreational uses.

5.2. MUN

As documented in the 1998 Reclaimed Water EIR/EA, prior to discharge of wastewater effluent, Laurel Pond was an ephemeral pond with inputs derived from direct precipitation and runoff. Laurel Pond in its present state is a result of a joint USFS/MCWD project to create a perennial pond using effluent wastewater. Laurel Pond in its present state is a result of a series of modifications including:

- Effluent outfall, including a water line conveying wastewater effluent from the WWTP to Laurel Pond (Constructed by MCWD)
- A series of mounds to enhance waterfowl nesting at the pond (constructed by USFS and Ducks Unlimited)
- Fencing installed to manage cattle and recreational use (i.e. posted signs indicating the pond is comprised of wastewater effluent)

As described above, Laurel Pond is characterized as an effluent-dominated water body which has been designed and modified to collect municipal wastewater, and as such State Water Resource Control Board (SWRCB) Resolution 88-63 "Sources of Drinking Water" states that it should not be considered potentially suitable for municipal or domestic water supply. Accordingly, MCWD believes the beneficial use of MUN is inappropriately assigned to Laurel Pond and should be removed without additional study.

5.3. COLD

As part of the 1998 Reclaimed Water EIR/EA, Tetratech performed a comprehensive biological resources investigation of Laurel Pond, including an analysis of 'Aquatic Invertebrates, Amphibians, and Fish' (Bauer, 1998). The site investigations found that 'no fish species are known to inhabit Laurel Pond, and only two amphibian species are known to occur at the site', although Laurel Pond does support a broad variety of aquatic invertebrates including daphnia, midges, water beetles and a broad representation of other aquatic insects (Bauer, 1998).

While this report indicates that Laurel Pond is not currently a habitat for any fish species, analysis of potential uses is required. MCWD proposes to conduct a study to characterize the physical and chemical characteristics of Laurel Pond, and what aquatic life could be sustained. MCWD proposes to utilize a third party consultant for the study, with a focus on documenting the following pond characteristics:

- Observational assessment of aquatic life,
- Nutrients,
- pH,
- Dissolved Oxygen levels,
- Seasonal temperature profile (duration, frequency, and extent of freezing).

MCWD will submit the chosen consultants resume and proposal for review by the LRWQB prior to starting the study.

The purpose of this study is to determine if the COLD designation is appropriate for Laurel Pond, or if a site-specific objective is appropriate.

6. References

Bauer, 1998. *Reclaimed Water Project: Compendium of Final Environmental Impact Report/Environmental Assessment.* Bauer Environmental Services, Tustin, CA. October 1998.