

CLEAN LAKES, INC.

May 2006

**INITIAL INSPECTION AND
MONITORING REPORT**

**For
MALIBOU LAKE (Draft)**



Prepared By

**CLEAN LAKES, INC.
31320 Via Colinas, Suite 114
Westlake Village, CA 91362
www.cleanlake.com**

Prepared For

**Malibou Lake Mountain Club, Ltd.
29033 West Lake Vista Drive
Agoura, California 91301**

**Initial Inspection and Monitoring Report
Malibou Lake Mountain Club, Ltd**

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INITIAL INSPECTION AND MONITORING SCHEDULE: The schedule for Initial Inspection and Monitoring called for carrying out an exercise to document the vegetation control requirements of the lake system so that Malibou Lake Mountain Club (MLMC) has an accurate assessment of the lake system to ensure that all applicable state and federal laws and regulations are being followed with regard to any planned aquatic vegetation control program. The initial inspection and monitoring event monitoring event was carried out on May 18, 2006. Ten (10) sites were monitored during this event for various physical and chemical parameters, aquatic species and abundance, and general observations of lake conditions were noted.

GENERAL OBSERVATIONS:

- Weather conditions mostly sunny with scattered clouds with 5 to 8 mph winds blowing up the canyon. Temperatures were in the high 70's to low 80's.
- The lake was at a level that allowed water to overflow the dam at volumes estimated at less than 3 cubic feet per second (CFS). The dam gate valve was closed.
- The lake held low levels of dissolved oxygen in the deepest part of lake below six (6) foot; generally though lake dissolved oxygen levels were good due to the shallow nature of the lake. (See charts below).
- Secchi disk measurement is used to determine water transparency and can be used to determine the photic zone. The photic zone is generally assumed to be three times the Secchi disk measurement and is the depth to which plant life can grow. Secchi disk measurements were to the bottom in two places (5 foot maximum depth) and 4.5 foot in 15 foot of water at the dam. Therefore, the photic zone on this day was to 13.5 foot. For the purposes of determining area of water greater than 11 foot, a GPS and depth finder were used to delineate an area. The area of water greater than 11 foot equals 0.51 acres, a fraction of the total area of approximately 39.0 acres (less island areas). A high percentage of lake would support submersed aquatic plant and algae growth should transparency remain at this level throughout the year.

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- Submersed aquatic plants were visible at the surface as detached floating leaves and in scanty densities. Other submersed plants were visible at the surface or collected from below the waterline, measured two to three foot in height, and were spotty in distribution. The majority of submersed plants were noted in the east part of the lake, downstream of the mid lake island, and were made up of Sago Pondweed and Southern Naiad. Filamentous algae and benthic algae were observed along shorelines in limited, non-nuisance quantities. Light populations of Chara, an erect attached form algae considered beneficial to waterbodies, were noted in some locations. Duckweed was observed in the far western part of the lake, where Triunfo Creek enters Malibou Lake.
- Numerous schools of largemouth bass fry were noted in various locations of the lake with male bass guarding them from beneath. Bluegill sunfish were also noted. Carp were also observed in several locations of the lake as well as their tell tale feeding that produces bubble trails.

WATER QUALITY MONITORING RESULTS:

May 18, 2006 Water Quality Results – Malibou Lake

| | Sampling Results | MCWBP* Limits | Exceeds Limit |
|---|---------------------------------|---|----------------------|
| Water Clarity | 3.5 foot to 5 foot | N/A | N/A |
| Overall Depth | 3.5 foot to 15 foot | N/A | N/A |
| Dissolved Oxygen (High) | 9.23 mg/l | > 5.0 mg/l | No |
| Dissolved Oxygen (Low) (Lake bottom) | 0.47 mg/l | > 5.0 mg/l | No |
| Temperature (High) (Lake Surface) | 25.06° C | N/A | N/A |
| Temperature (Low) (Lake Bottom) | 17.50 ° C | N/A | N/A |
| pH (High) | 8.37 | N/A | N/A |
| pH (Low) | 7.84 | N/A | N/A |
| Specific Conductance (High) | 2.031 | N/A | N/A |
| Specific Conductance (Low) | 1.217 | N/A | N/A |
| Copper (µg/l) Hardness (mg/l) Copper Exceedance Level Site 1 | 4.2 µg/l 520 mg/l 38 µg/l | No N/A (Per NPDES Aquatic Plant Control Permit Cu Limit) | No |

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| (continued) | Sampling Results | MCWBP* Limits | Exceeds Limit |
|---|----------------------------------|--|---------------|
| Copper (µg/l) Hardness (mg/l) Copper Exceedance Level Site 2 | 3.9 µg/l 726 mg/l 51 µg/l | No N/A (Per NPDES Aquatic Plant Control Permit Cu Limit) | No |
| Total Phosphorus Site 1 Site 2 | 0.08 mg/l 0.11 mg/l | < 0.1 mg/l (Dry Season Limit) | No Yes |
| Total N (Nitrate–Nitrite) Site 1 Site 2 | < 0.10 mg/l < 0.10 mg/l | < 1.0 mg/l (Dry Season Limit) | No No |
| Ammonia (as N) ** Site 1 Site 2 | < 0.01 mg/l < 0.01 mg/l | 1 hr. limit pH dependent** < 8.40 mg N/L < 4.71 mg N/L | No No |
| E. Coli Fecal Coliform Site 1 | 80 MPN/100 ml 80 MPN/100 ml | < 235 MPN/100 ml < 400 MPN/100 ml | No No |
| E. Coli Fecal Coliform Site 2 | 170 MPN/100 ml 170 MPN/100 ml | < 235 MPN/100 ml < 400 MPN/100 ml | No No |
| Chlorophyll - <i>a</i> Site 1 Site 2 | 3 µg/l 9 µg/l | < 10 µg/l (Year Around Limit) | No No |

*Malibu Creek Watershed Basin Plan, proposed limits. **Basin Plan Amendment for Inland Surface Water Ammonia Objectives, April 25, 2002. For Waters Not Designated COLD and/or MIGR – One Hour Average Objective

- Dissolved Oxygen levels did not exceed the Malibu Creek Watershed Basin Plan proposed limits of less than 5 mg/l of dissolved oxygen within the surface waters. Dissolved Oxygen was good in the upper water column, though below about six (6) foot at the deep end of the lake, stratification was evident with low dissolved oxygen levels measured.
- The pH scale measures from 0 to 14. A pH value of 7 indicates a neutral solution. Values above pH 7 indicate basic or alkaline waters; those values below 7 indicate acidity. Results from both monitoring points indicate the lake is slightly basic in a narrow range between pH 7.84 to 8.37, typical for lakes in California.
- Total Dissolved Solids (TDS) are a measure of the amount of material dissolved in water (mostly inorganic salts), typically aggregates of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc. of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts. High TDS concentrations exert

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varying degrees of osmotic pressure and often become lethal to biological inhabitants of an aquatic environment. Water Quality Objectives for urban areas in southern California have established limits not to exceed 2.0 g/L. As measured by the YSI probe the results reveal values in a range between 0.791 to 1.320 g/L.

- Oxidation Reduction Potential (ORP) is a measure of the electrical voltage between hydrogen and material under consideration. The change in the oxidation state of many metal ions and some nutrient compounds is defined by their ORP. Disinfection of water for agricultural use or potable water supplies call for ORP values in the 700 Mv range. Results for Malibou Lake reveal an ORP range from 299 to 322 Mv, a value typical of lakes.
- Ammonia as N, Total Nitrogen, E. coli, Fecal Coliform, and Chlorophyll-a did not exceed the proposed basin plan TMDL limits in May 2006 at either sampling point. Proposed Basin Plan Limits were exceeded for Total Phosphorus at Site 2 by a small margin and was below proposed limits by a small margin at Site 1.
- Total Maximum Daily Load (TMDL) for Ammonia as N is calculated using the One Hour Average Objective for Ammonia – N for Freshwaters (mg/N/L) determined in conjunction with pH values per “Amendments to the Water Quality Control Plan – Los Angeles Region with Respect to Inland Surface Water Ammonia Objectives” dated April 25, 2002. The Malibu Creek Watershed Monitoring group is using this method to evaluate water quality in the watershed and for that reason monitoring of this parameter in Malibou Lake was used for comparison purposes.
- In waters of the US copper levels are not to exceed a level that is considered toxic to aquatic organisms (National Pollutant Discharge Elimination System Aquatic Weed Control Permit – NPDES; California Toxics Rule - CTR). The level is calculated using water hardness according to the following formula:

$$\text{EXP}(0.8545 * ((\text{LN}(\text{hardness (CaCO}_3)) - 1.702))$$

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Due to the moderately hard water found in Malibou Lake (Site 1 - 520 mg/l; Site 2 - 720 mg/l), the background copper concentrations of 4.2 µg/l and 3.9 µg/l on May 18, 2006 was within limits considered protective of aquatic organisms. Given the existing water hardness, the copper levels that would still be considered protective of aquatic organisms are 38 and 51 µg/l, respectively.

- A summary of plant survey results is provided in Appendix A. The location of monitoring points is presented on the map on the following page.

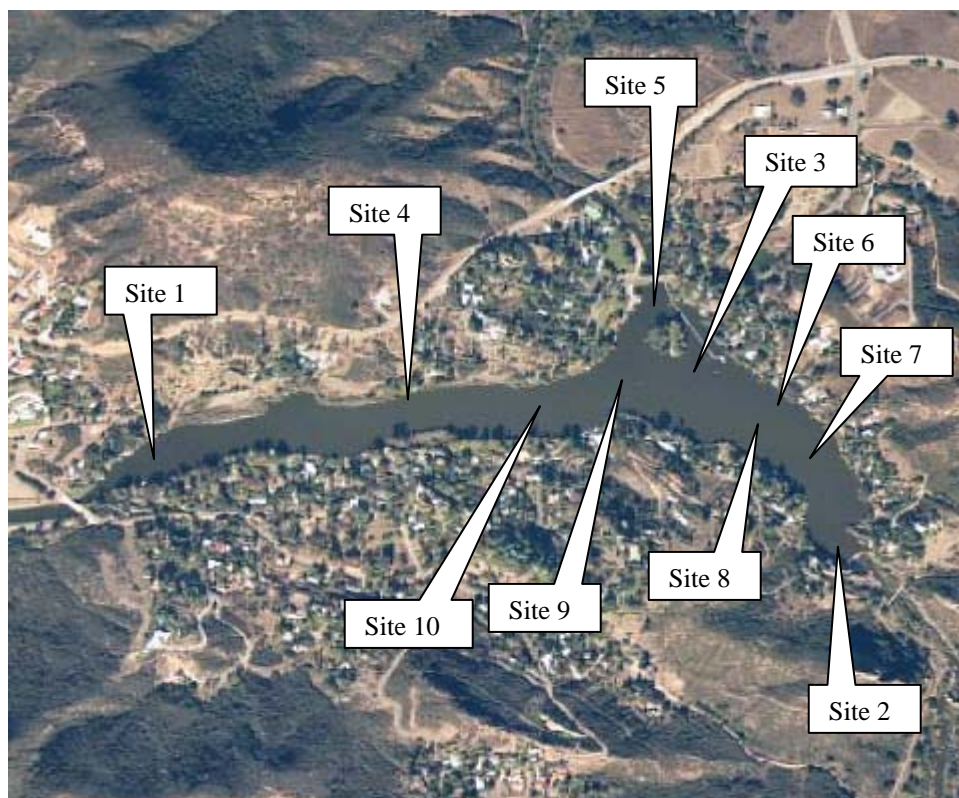
WATER QUALITY MONITORING METHODS

- Chlorophyll *a*: Tested at elbow depth at two (2) locations within the lake system.
- Temperature: Tested at the surface, bottom and at three (3) foot intervals within the water column at two (2) locations within the lake system (results outlined below for each monitoring site).
- Dissolved Oxygen (DO): Tested at the surface, bottom and at three (3) foot intervals within the water column at two (2) locations within the lake system (results outlined below for each monitoring site).
- pH: Tested at the surface, bottom and at three (3) foot intervals within the water column at two (2) locations within the lake system (results outlined below for each monitoring site).
- Total Dissolved Solids (TDS): Tested at the surface, bottom and at three (3) foot intervals within the water column at two (2) locations within the lake system (results outlined below for each monitoring site).
- Clarity (Secchi Disk): Tested at ten (10) locations within the lake system (results outlined below for each monitoring site).
- Nutrients (Total Phosphorus, Ammonia - N and Nitrate-Nitrite as Total N), Chlorophyll-*a*, Bacteriological Coliform, Hardness, and Copper: Tested at elbow depth at two (2) locations within the lake system (results outlined below).

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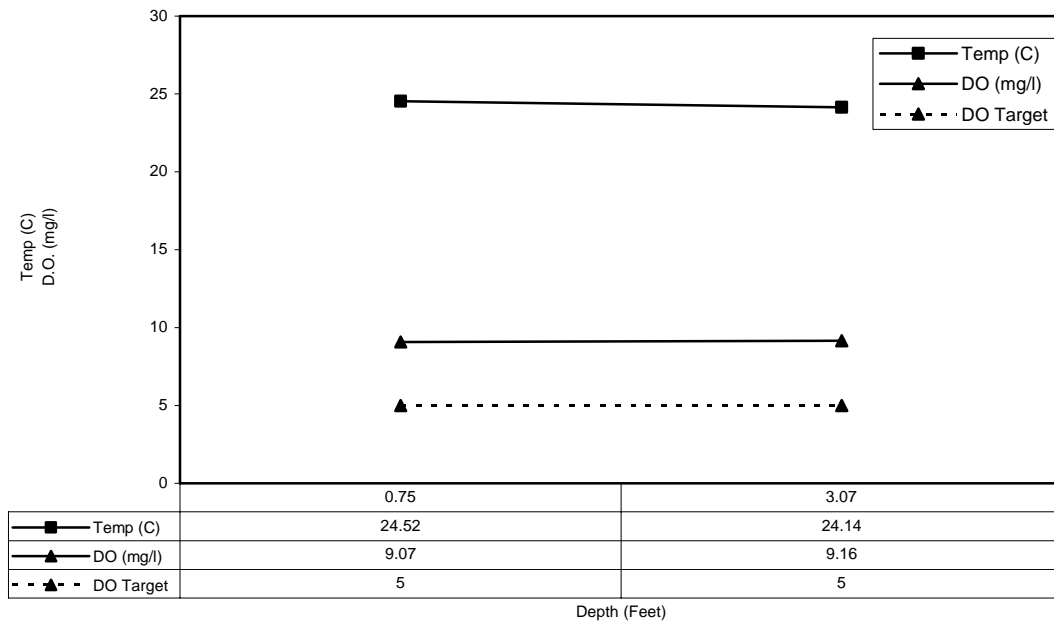
- The water quality results for the parameters monitored on May 18, 2006 are presented in table and graph format (see above and below) as follows for each site:

Sampling Methods: Field analysis for the parameters of Temperature, Dissolved Oxygen (DO), TDS, ORP, and pH were performed using an YSI 6600 EDS Portable Multi-Parameter Meter with a 25-meter probe cable. Nutrient and Chlorophyll *a* samples were collected and sent to the lab for analysis. Water sampling was carried out at the below labeled points, the results were as outlined above, and are charted below as follows:

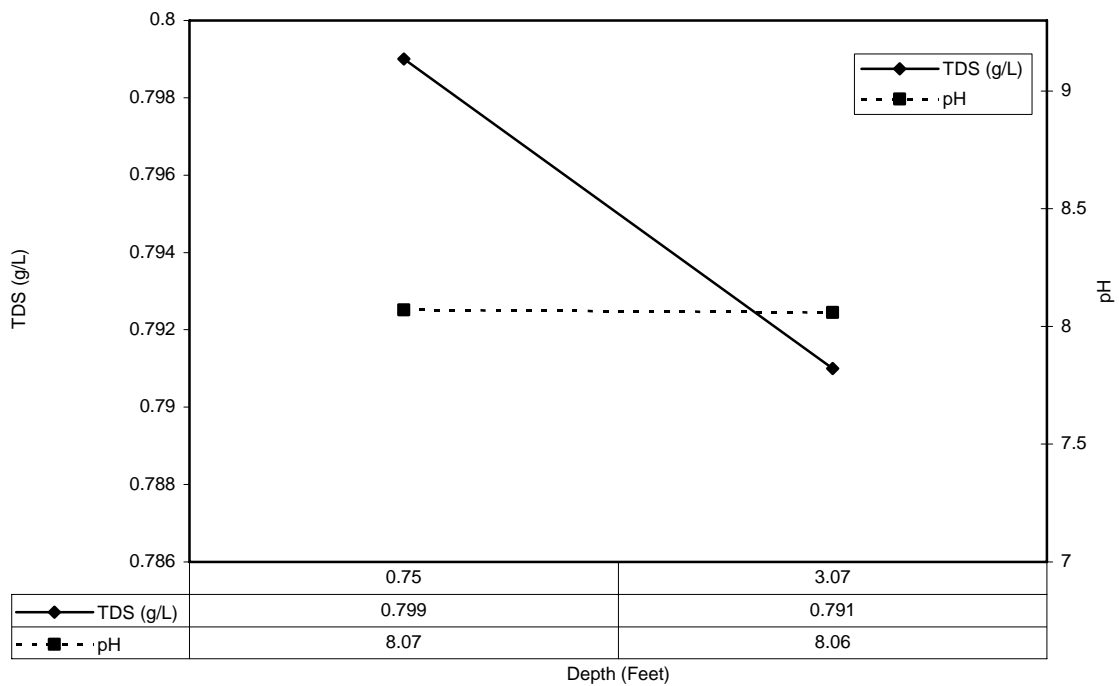


Site 1 (Western Lake)

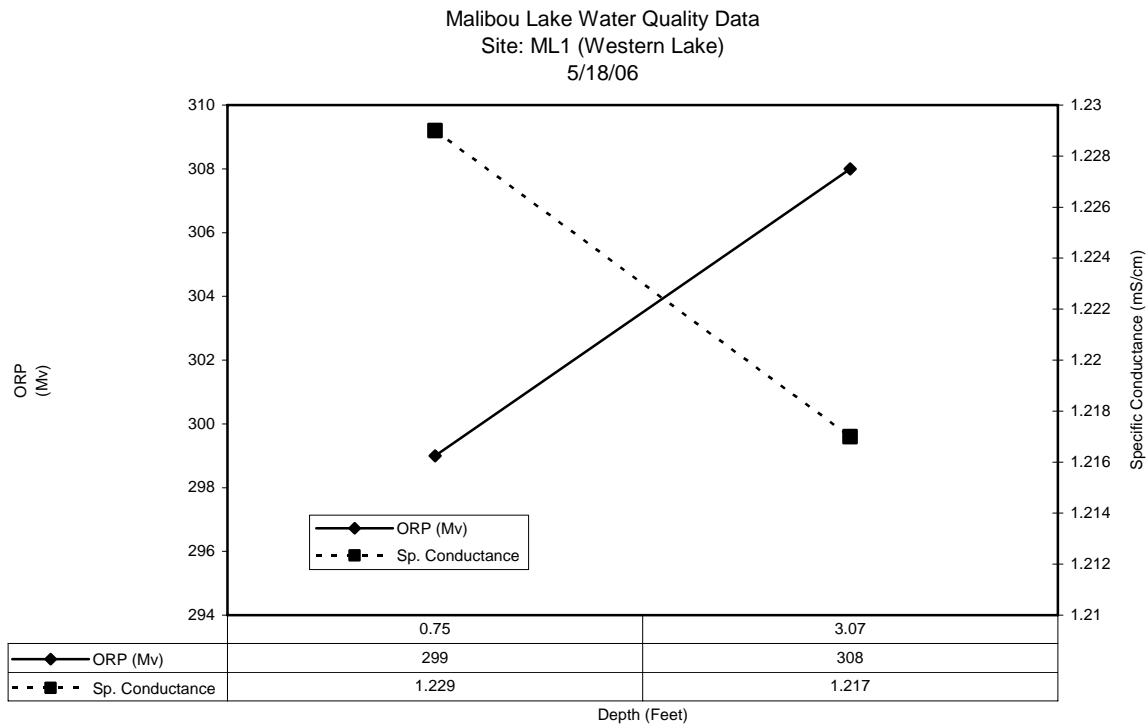
Malibou Lake Water Quality Data
Site: ML1 (Western Lake)
5/18/06



Malibou Lake Water Quality Data
Site: ML1 (Western Lake)
5/18/06



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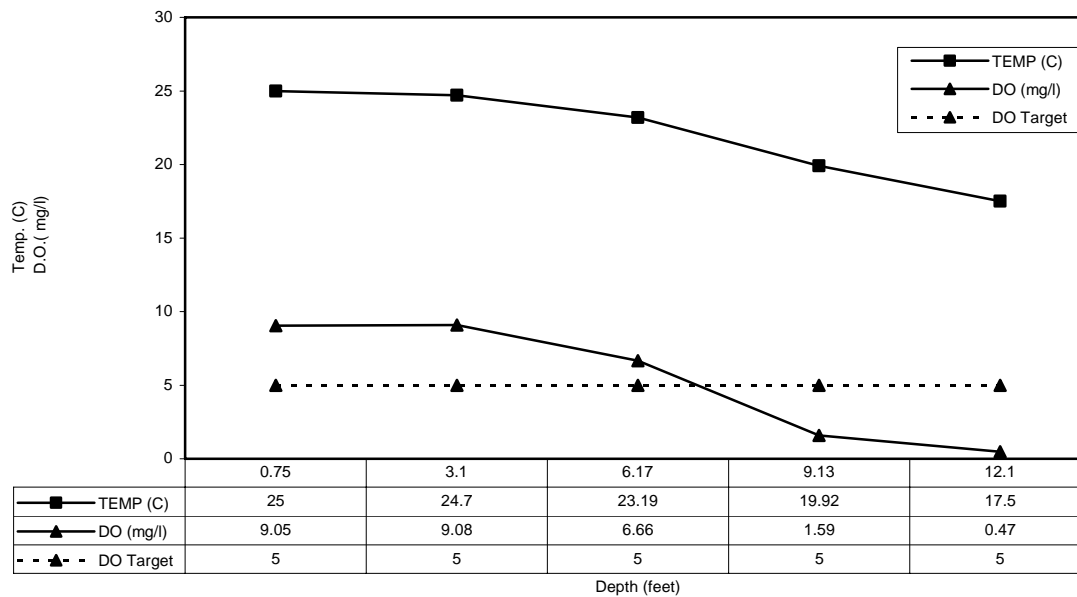


Secchi Disk Reading: 5 foot, bottom 5 foot.

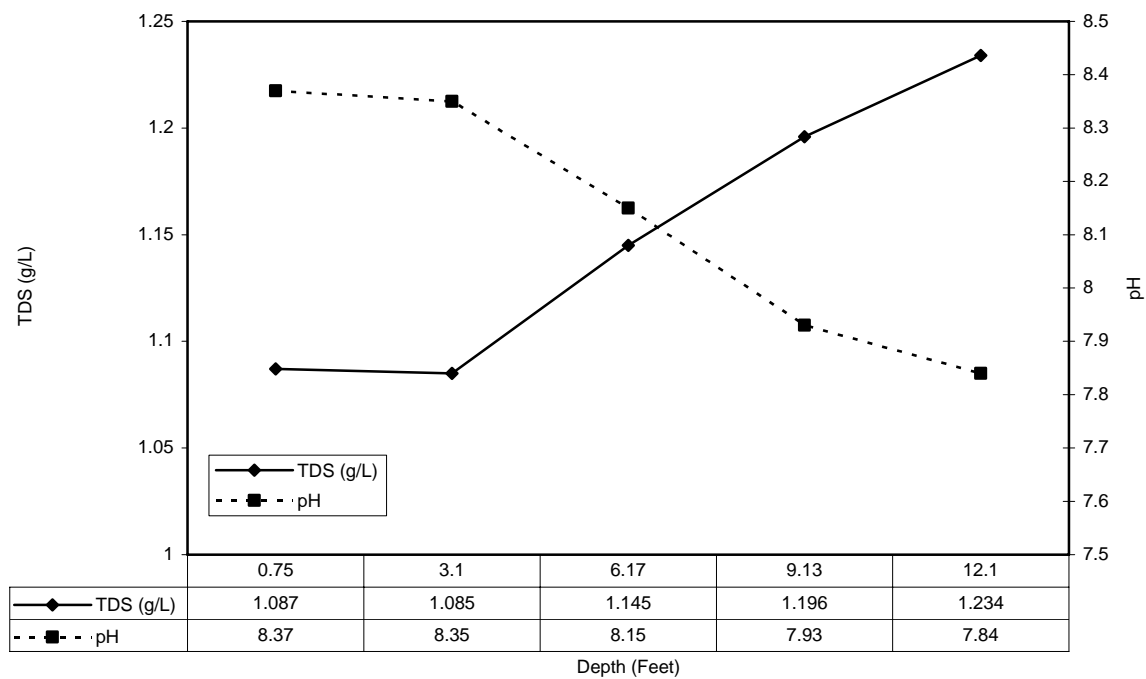
Observations: Water is very clear, light greenish tint. No submersed weeds visible. Light floating detached sago pondweed visible. No surface debris, no odors. Looks good.

Site 2 (Near Dam)

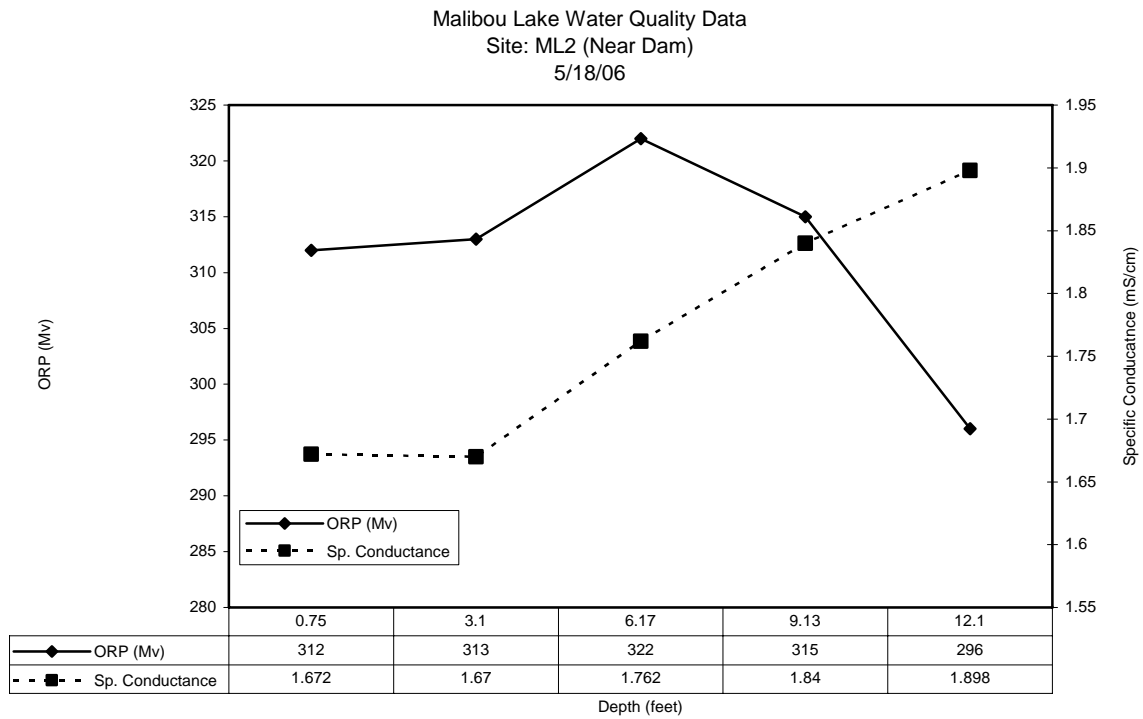
Malibou Lake Water Quality Data
Site: ML2 (Near Dam)
5/18/06



Malibou Lake Water Quality Data
Site: ML2 (Near Dam)
5/18/06



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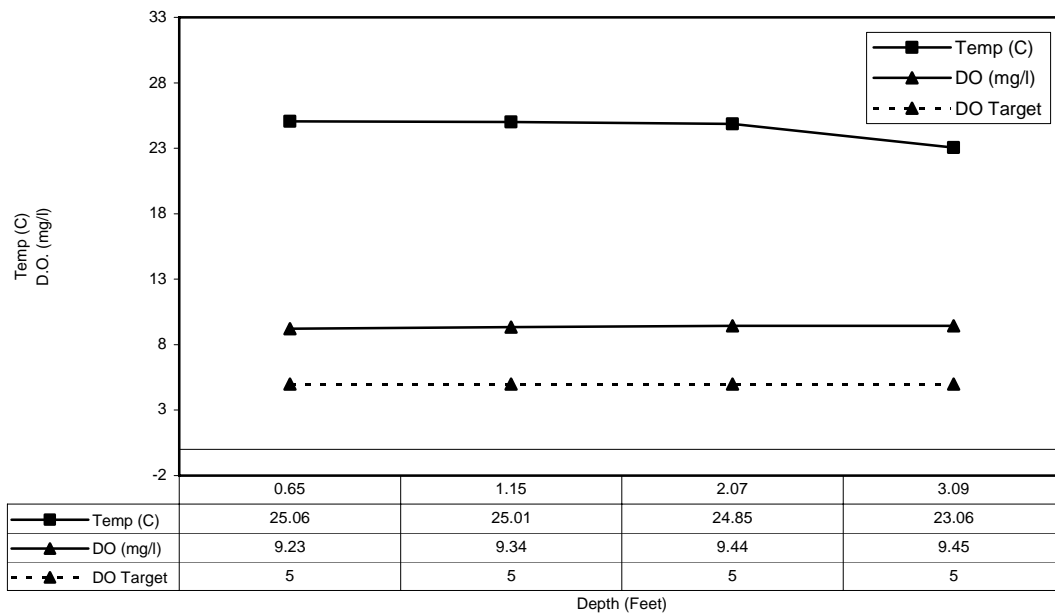
Secchi Disk Reading: 4.5 foot, bottom 15 foot

Observations: Water is very clear, light greenish tint. No submersed weeds visible. Light floating detached sago pondweed visible. No surface debris, no odors. Looks good.

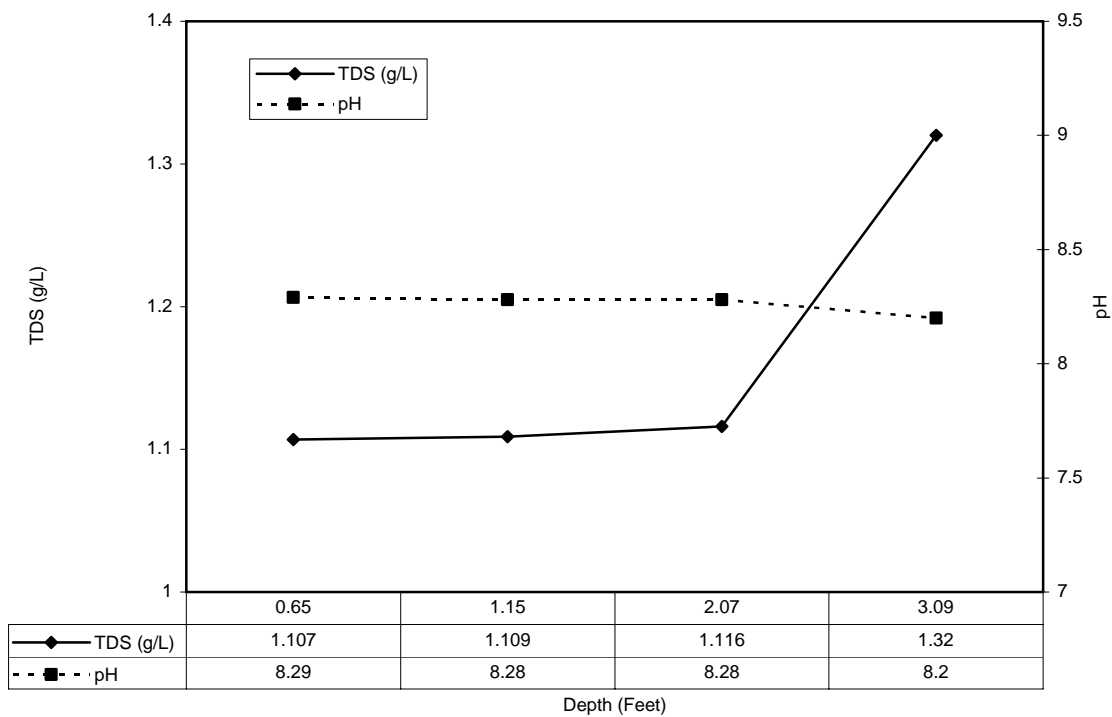
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Site 3 (South of Island)

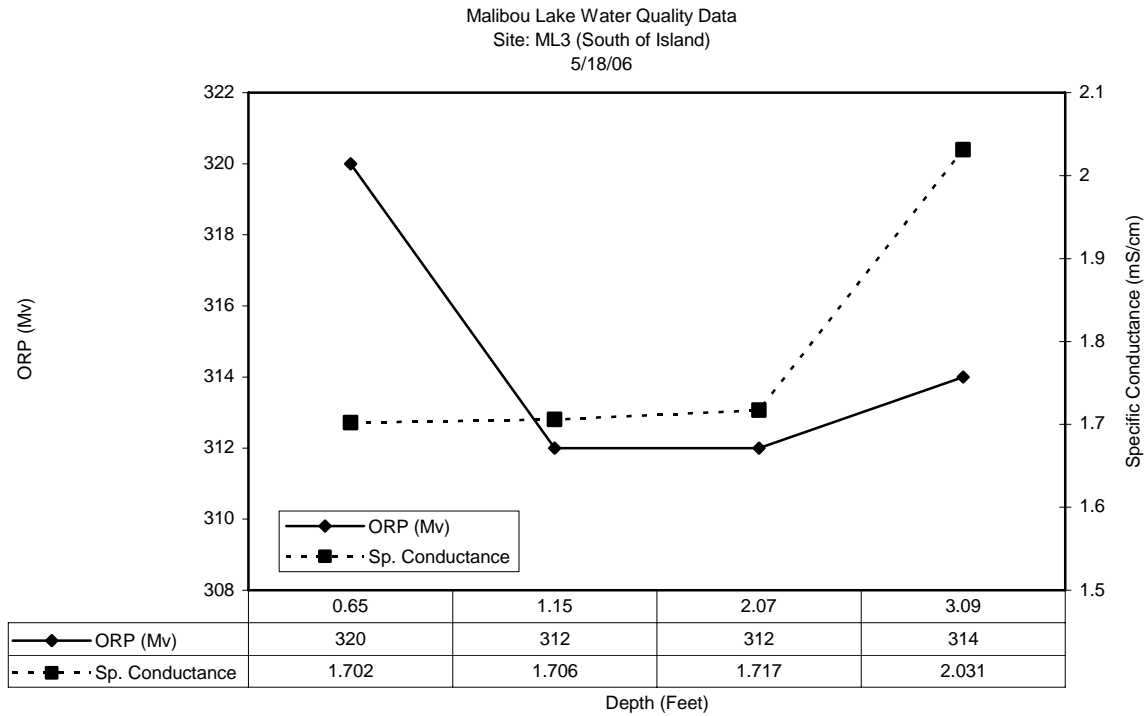
Malibou Lake Water Quality Data
Site: ML3 (South of Island)
5/18/06



Malibou Lake Water Quality Data
Site: ML3 (South of Island)
5/18/06



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Secchi Disk Reading: 3.5 foot, bottom 3.5 foot

Observations: Water is very clear, light greenish tint. No submersed weeds visible. Light floating detached sago pondweed visible. No surface debris, no odors. Looks good. Wind increasing

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Appendix A

Malibou Lake Weed Sampling Worksheet

Date: 5/18/06

By: Moorhouse

Pages: 1 of 2

| No. | GPS Waypoint Name | Coordinates (Map Datum NAD 1983 Garmin E-Trex/Vista GPS) | Photo Number | Secchi Depth/ bottom (feet) | Plant Species | Weed Bed/Notes | Weed Density Rank |
|-----|-------------------------|--|-----------------|--------------------------------------|---|--|----------------------|
| 1 | ML 1 (Site 1) | N34.10631 W118.76318 | 39 | 5.0/5.0 | No plants/tree leaves only | Light filamentous algae | 0 |
| 2 | ML 2 (Site 2) | N34.10504 W118.75150 | None | 4.5/15.0 | No Plants | Light filamentous algae | 0 |
| 3 | ML 3 (Site 3) | N34.10794 W118.75434 | 40 | 3.5/3.5 | Sago Pondweed | 2 + foot long plants | 2 to 3 |
| 4 | ML 4 (Site 4) | N34.10749 W118.75866 | 41 | 4.0/4.0 | Filamentous green alga | Benthic, on the bottom only, sparse | 0 |
| 5 | ML 5 (Site 5) | N34.10889 W118.75455 | None | 4.5/4.5 | Filamentous green alga | Benthic, on the bottom only, sparse | 0 |
| 6 | ML 6 (Site 6) | N34.10743 W118.75248 | 42 | 3.5/3.5 | Sago Pondweed, filamentous green alga | Light plant growth | 2 to 3 |

Malibou Lake Weed Sampling Worksheet

Date: 6/12/06

By: Moorhouse

Pages: 2 of 2

| No. | GPS Waypoint Name | Coordinates (Map Datum NAD 1983 Garmin E-Trex/Vista GPS) | Photo Number | Secchi Depth/ bottom (feet) | Plant Species | Weed Bed/Notes | Weed Density Rank |
|-----|-------------------------|--|-----------------|--------------------------------------|---------------|---|--------------------------------|
| 7 | ML 7 (Site 7) | N34.10619 W118.75182 | N/A | 2.0/6.0 | None | No weeds visible | 0 (post Sonar treatment) |
| 8 | ML 8 (Site 8) | N34.10711 W118.75275 | N/A | 1.5/3.0 | Sago Pondweed | Light weeds visible in area on surface (limp) | 2 (post Sonar treatment) |
| 9 | ML 9 (Site 9) | N34.10758 W118.75539 | N/A | 1.5/3.5 | Sago Pondweed | Light weeds visible in area on surface (limp) | 2 (post Sonar treatment) |
| 10 | ML 10 (Site 10) | N34.10728 W118.75683 | N/A | 1.5/4.0 | Sago Pondweed | Light weeds visible in area on surface (limp) | 2 (post Sonar treatment) |

Site 1



Site 2



Site 3



Site 4

