California Regional Water Quality Control Board
Santa Ana Region

January 22, 2004

ITEM: 7

SUBJECT:

Waste Discharge Requirements, Big Bear Municipal Water District, application of aquatic herbicide and Aluminum Sulfate – Order No. R8-2004-0007, NPDES No. CA8000396

DISCUSSION:

See Attached Fact Sheet

RECOMMENDATION:

Adopt Order No. R8-2004-0007, NPDES No. CA8000396, as presented.

Comments were solicited from the following agencies:

U.S. Environmental Protection Agency, Permits Issuance Section (WTR-5) – Doug Eberhardt
U.S. Army District, Los Angeles, Corps of Engineers, Regulatory Branch
U.S. Fish and Wildlife Service - Carlsbad
State Water Resources Control Board, Office of the Chief Counsel – Jorge Leon
State Water Resources Control Board, Division of Water Quality- James Maughan
State Water Resources Control Board, Division of Financial Assistance – Diana Robles
State Department of Health Services, San Bernardino – Richard L. Haberman
State Department of Water Resources - Glendale
State Department of Fish and Game - Long Beach
San Bernardino County Department of Public Works, Envr. Mngmt. Div. – Naresh Varma
San Bernardino County Environmental Health Department – Daniel Avera
Santa Ana Watershed Project Authority – Joseph Grindstaff
Santa Ana River Dischargers Association
Orange County Coastkeeper – Garry Brown
Lawyers for Clean Water C/c San Francisco Baykeeper
Big Bear Municipal Water District - Sheila Hamilton, General Manager
Stakeholder list (see attached)

California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

January 22, 2004

FACT SHEET

The attached pages contain information concerning the issuance of waste discharge requirements and a National Pollutant Discharge Elimination System (NPDES) permit to Big Bear Municipal Water District (hereinafter BBMWD or discharger) for the targeted application of Sonar (an aquatic herbicide) in selected areas of Big Bear Lake and application of aluminum sulfate to areas of Big Bear Lake where the depth of water is greater than 2 meters (6 feet). The objective of applying Sonar is to control the growth of noxious, invasive aquatic weeds (Eurasian Water Milfoil and common coontail) that impair the Lake's beneficial uses. The application of alum is intended to control and reduce the release of Phosphorous from the sediments and, thereby, to reduce the percentage of bio-available phosphorous, in macronutrient for algae. Algae blooms are expected to be reduced[1]. Targeted application of Sonar in Big Bear Lake is currently regulated under Order No. R8-2002-0028, which will be rescinded upon adoption of this Order. Aluminum sulfate has been applied in limited areas of Big Bear Lake in pilot scale studies of its efficacy in reducing phosphorus concentrations.

I. INTRODUCTION

IA. Description of the Receiving Water Body

Big Bear Lake is located in the San Bernardino Mountains, San Bernardino County, California. The Lake was originally constructed in 1885 as a water supply reservoir, via a dam at its western side. It was enlarged to a size of approximately 3,000 acres in 1911. The Lake is also a significant recreational, fish and wildlife resource. The Lake is tributary to the Santa Ana River and controlled releases from the Lake provide downstream fish habitat and irrigation water.

The Lake is subject to major aquatic weed problems, due to having shallow bays and shorelines and little outflow to disperse incoming nutrients. In the 1970s, the invasive aquatic species Eurasian Water Milfoil (*Myriophyllum spicata*) was introduced to the Lake. It has subsequently expanded and overtaken the natural plant communities within the Lake, disrupting the Lake's biological integrity. This plant is classified as a noxious weed by most states, and is a "harmful non-indigenous species" according to the federal government. The thick mats that form on the Lake surface impact recreational activities by entanglement of swimmers and boat propellers and by plugging the intakes of jet skis. Additionally, in dense milfoil beds, water temperatures become elevated and dissolved oxygen levels become reduced such that fish and aquatic organisms cannot survive. The other major nuisance plant species in the lake is Coontail

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[1] *Since Eurasian water milfoil is a rooted plant that obtains its nutrients directly from the sediments, alum application is not expected to affect its growth. Common coontail is a free-floating aquatic plant that derives nutrients from the water column. Accordingly, alum application may affect the growth of this species. The most significant effect of algae control will be to improve water clarity, which is expected to enhance growth opportunities for beneficial macrophytes.*

(*Ceratophyllum demersum*). Milfoil and other invasive aquatic plants impair approximately 800 acres (more than 25% of the surface area of the Lake).

IB. Beneficial Uses and Water Quality Objectives

The beneficial uses of Big Bear Lake designated in the 1995 Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), are: MUN, AGR, GWR, REC1, REC2, WARM COLD, WILD, and RARE. The first three uses relate to potable and agricultural water supply and groundwater recharge. Recreational uses include swimming, fishing, boating and water-skiing. The WARM, COLD and WILD designations refer to the Lake's support of habitat for a variety of fish, invertebrates, vegetation, and wildlife. The RARE designation reflects the Lake's use by rare, threatened or endangered species, including the bald eagle.

The Basin Plan specifies narrative objectives that pertain to toxic substances. These are: (1) "Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health"; (2) "The concentrations of contaminants in waters which are existing or potential sources of drinking water shall not occur at levels that are harmful to human health"; and (3) "The concentrations of toxic pollutants in the water column, sediments or biota shall not adversely affect beneficial uses".

Sonar is not a "priority pollutant", as defined in federal statute and regulation. No numeric water quality criteria or objectives for Sonar have been developed by either the U. S. EPA or California.

As described in the Basin Plan and the Board's Watershed Management Initiative Chapter, the beneficial uses of the Lake are impaired by excessive growth of nuisance aquatic plants, and by nutrient enrichment (eutrophication). Big Bear Lake is included on the Board's Clean Water Act Section 303(d) list of impaired waters, in part because of these problems. Nutrient enrichment stimulates excessive growth of aquatic plants, which impair the fishing, boating and swimming uses of the Lake. To address the nutrient problem, Board staff is working with local stakeholders to develop a nutrient Total Maximum Daily Load (TMDL) for the Lake. The removal/control of noxious weeds is an important aspect of the watershed management plans currently being developed by stakeholder groups and agencies such as BBMWD under EPA and SWRCB funding. An appropriate program for aquatic plant removal/control, which is likely to include the application of Sonar and aluminum sulfate, is also expected to be an important part of the TMDL implementation plan.

As discussed below, Big Bear Municipal Water District has been implementing an Aquatic Vegetation Management Plan. The emphasis of this plan is mechanical removal. In addition, the herbicide "Sonar" was applied in certain locations in the Lake in 1996, 1998, 2002 and 2003. Given the increasing eutrophic condition of the Lake and the magnitude of the growth of the invasive plants, mechanical removal alone is no longer a practicable, effective method of control. Therefore, BBMWD proposes to apply the herbicide "Sonar" in selected locations of the lake and to apply aluminum sulfate to areas of the lake where depth of water is greater than 2 meters (6 feet). The US EPA and the State Water Resources Control Board have both awarded grants to support this project.

IC. Description of Aquatic Herbicide "Sonar"

Sonar is a selective systemic aquatic herbicide used in management of aquatic vegetation in fresh water ponds, lakes, reservoirs, drainage canals, irrigation canals and rivers. Sonar is approved for this use by the U.S. Environmental Protection Agency (EPA) and by the State of California (Department of Pesticide Regulation).

Sonar Precision Release is a pelleted formulation containing 5 percent fluridone. Sonar AS is a liquid formulation. Fluridone is the common name for the compound 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone. Sonar is absorbed from water plant shoots and from hydrosoil by the roots of aquatic vascular plants. Plants must be exposed to the targeted concentrations of Sonar for a minimum of 45 days to achieve optimum plant control. Sonar acts by inhibiting the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight. When this occurs, food production stops. The plants take on a bleached appearance and die of starvation. The herbicidal symptoms of Sonar appear in seven to ten days and under optimum conditions desired aquatic plant management is achieved in 30 to 90 days.

The maximum recommended application rate is 150 parts per billion (ppb) per annual growth cycle. At this concentration, no detrimental effects are expected for drinking, fishing, swimming, or livestock/pet consumption water uses. With respect to irrigation, it is recommended that irrigation of tree crops, row crops, turf or other plants with Sonar treated water not occur for 7-30 days, in order to reduce any potential for injury to vegetation. Where FasTEST[2] has determined that concentrations are less than 10 ppb, there are no irrigation precautions for irrigating established tree crops, row crops or turf. Where FasTEST has determined the concentrations are less than 5 ppb, there are no water use restrictions for irrigation of any type. Application rates and timing to various environments are described in product labels.

BBMWD sought direction from staff of the Regional Board and the California Department of Fish and Game (CDFG) when the application of Sonar was first contemplated in 1996. In a July 30, 1996 response letter, CDFG stated that the impact of an invasive, introduced plant species like Eurasian milfoil (also known as "water milfoil") could be much more significant than the impacts from the use of Sonar. CDFG listed the detrimental impacts of milfoil on fisheries, including displacement of native aquatic vegetation, reduction of the populations of native invertebrate species that are important forage for fish, and alteration of sunlight penetration and dissolved oxygen concentrations. Additionally, milfoil was seen to restrict public use of waterways by impeding boating and other recreational activities. Based on the review of the scientific literature, CDFG concluded that the use of Sonar at labeled rates should have no short-term or long-term impacts on aquatic organisms. Similarly, in a July 25, 1996 letter to BBMWD, Regional Board staff indicated that the targeted application of Sonar would not pose a threat to the water quality of Grout Bay (the targeted area) or Big Bear Lake itself.

The use of Sonar to control the excessive growth of invasive, noxious aquatic plants is proposed in order to allow the natural aquatic plant communities to recover and, thereby, to restore the biological integrity of the Lake. Control of dense mats of plant growth will reduce adverse

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2 *FasTEST is an Enzyme Linked Immunosorbent Assay (ELISA) that measures concentrations of Sonar in the water. FasTEST is highly quantitative and specific, measuring Sonar concentrations ranging from 0.5 parts per billion (ppb) to 150 ppb.*

impacts to swimming and boating activities in the Lake. This action is therefore considered a means to restore and protect the beneficial uses of Big Bear Lake, particularly REC1 and REC 2, WARM, COLD, WILD, and RARE.

The proposed application of Sonar also conforms to the Basin Plan narrative objectives for toxic substances cited above. Sonar does not bioaccumulate and therefore does not pose a threat to human health. If applied at approved rates, as required by this Order in accordance with an approved application plan, the resultant levels of Sonar in the Lake, a potential source of drinking water, would not pose a threat to human health. Finally, the application of Sonar will not adversely affect beneficial uses but, rather, restore and protect the uses.

ID. Description of Aluminum Sulfate

On contact with water, aluminum sulfate (Al_2 $(SO_4)_3$*$18H_2O$; a form of alum[3]) forms an aluminum hydroxide precipitate. The aluminum hydroxide molecules bind with phosphorus molecules in the water column to form an aluminum phosphate compound. Under most conditions, this aluminum phosphate compound is essentially insoluble in water so that phosphorus is no longer available for biological processes. Soon after the water column is treated, the aluminum phosphate material settles on the bottom of the lake and forms a layer that acts as a phosphorus barrier by combining with phosphorus that is released from the sediments.

Alum is a non-toxic material commonly used in water treatment plants to clarify drinking water. In lakes, alum is used to reduce the level of the nutrient phosphorus in the water column as well as the amount of phosphorus released by the lake sediments. Previous studies of sediment flux rates in Big Bear Lake have clearly shown that a significant percentage of the total phosphorus loading to the lake comes from the lake sediments. Core-flux studies performed in 2002 and 2003 indicate that internal nutrient loading to Big Bear Lake from the lake sediments is quite significant.

The National Recommended Water Quality Criteria for non-priority pollutants lists aluminum with Freshwater Criteria Maximum Concentration at 750 micrograms per liter (ug/l) and Freshwater Criteria Continuous Concentration at 87 ug/l, expressed as total recoverable metal in the water column. These values were based on the 304(a) aquatic life criterion that was derived using the 1985 Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses (PB85-227049, January 1985). Cooke et al. (1982) indicated that based on the solubility of aluminum sulfate, dissolved aluminum concentrations, regardless of dose, would remain below 50 ug/L in lakes with a pH range of 5.5 to 9. Alum application temporarily lowers the water pH. A dose producing a post-treatment pH in the range of 5.5 – 9 is considered environmentally safe with respect to aluminum toxicity. The pH of water in Big Bear Lake consistently ranges between 7.5 and 8.5. The pilot scale alum treatment in Papoose Bay demonstrated that water pH remained well above 5.5 at an aluminum dose of 47 g Al/m^2. The water volume subjected to alum treatment in Big Bear Lake will be much greater than the water volume treated under the Papoose Bay experiment (due to lake depth). Therefore, the impact of alum treatment on water column pH, alkalinity, and total aluminum concentration should not be significant. The discharger proposes to apply alum at a rate not to exceed 100 grams per square meter area of the lake. The exact dosage will be determined through appropriate pre-treatment analysis, and the alum would be applied in

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[3] *Aluminum sulfate is one form of alum. Pretreatment evaluation will determine the appropriate form of alum to be applied. This will be reflected in the proposed application plan required by this Order.*

accordance with an approved application plan, including dosage, application methods and monitoring. It is hoped that the alum would be applied sometime in April or May 2004 before the algae bloom starts. The discharger expects that this alum application would remain effective for five years. The estimated cost for a one a time application of alum to the entire lake (where water depth exceeds 6 feet) is $400,000.

The large-scale alum application is expected to employ the use of alum application equipment that consists of a barge fitted with surface application spray bars that will apply the alum evenly over a set path width. The alum treatment will take approximately one to two weeks to complete.

II. BEST MANAGEMENT PRACTICES

IIA. Aquatic Vegetation Management Program

BBMWD has had an Aquatic Vegetation Management Program in place for several years. The most important aspects of this plan are: (1) its objective to protect both the fishery/wildlife habitat and recreational beneficial uses of the Lake; (2) the use of mechanical weed harvesting as the preferred option over the use of chemical weed treatment, based on cost analyses, plus consideration of other measures such as drawdown; and (3) ongoing comprehensive field monitoring and modeling activities upon which to base the most effective annual management decisions.

The target plants in the program are milfoil and coontail, which have been particularly detrimental to boating, jet-skiing and fishing recreational uses of the lake, as well as causing degradation in water quality and habitat for aquatic organisms. BBMWD has weed harvesting equipment for use both in open water areas and around docks, including two Aquamarine H-650 weed harvesters, an Aquamarine H-400 harvester, an Aquatics Unlimited AUTC-200 trailer and conveyor, an Aquamarine shore conveyor, one tractor/trailer, and an Aquamog. BBMWD controls approximately 240 acres of the annual 800 acres coverage of aquatic plants around the perimeter of Big Bear Lake, harvesting 1,000 tons of weeds per year. When water temperatures reach 65 degrees in the lake, aquatic plant growth begins. BBMWD staff monitors weed growth, and around the 15th of June, the weed harvesting program begins, with the most heavily weeded areas treated first. In a full cutting season, the harvesting program completes between two and four laps around the Lake each summer. The cutting season ends around September 15th. Weed removal around residential docks begins around April 1 and continues until the lake water temperatures reach an average of 55 degrees. The Aquamog is used for these areas.

Chemical treatment using Sonar was tested in 1996 and in 1998 in Grout Bay of the lake, a 35-acre area on the north side that is not suitable to mechanical weed harvesting operations. The first treatment did not yield conclusive results, but the second series of applications did show a successful reduction in noxious aquatic plant growth. In 2002 and 2003, BBMWD conducted Sonar applications (using Sonar Precision Release pellets) at additional sites within the lake. These treatments were coupled with intensive data-collection activities, in order to assess pre-treatment and post-treatment conditions. These activities are described below.

The first component of the 2002/2003 Sonar treatment plan was the completion of a study by ReMetrix LLC in 2000[4]. This study mapped the extent of the aquatic plant communities and the Eurasian Milfoil present in Big Bear Lake. It was discovered that there were over 800 acres of the littoral zone (the area close to shore) of the Lake heavily infested with this non-indigenous species.

A review of management options was then performed. The only known technology to selectively remove Eurasian Milfoil from large lake systems allowing native aquatic plants to recover involves the use of Sonar aquatic herbicide. This herbicide is very effective in controlling Eurasian Milfoil, but has minimal impact on native aquatic plants present in Big Bear Lake. (Coontail is an invasive, non-rooted aquatic plant that floats into areas where milfoil has been treated. It then becomes subject to Sonar control).

A number of pre-treatment assessments were made to document the control of Eurasian Milfoil/coontail and the recovery of native plant communities. These are:

a. A plant assay using SePRO's PlanTEST[5] technology. This assay was used to determine the susceptibility of the Eurasian Milfoil from Big Bear Lake to Sonar and to help in treatment rate planning.

b. A pre-treatment mapping effort to document the levels of infestation present in the treatment areas prior to application.

c. A pre-treatment aquatic plant biomass collection and measurement effort in the treatment areas and in reference areas of the Lake. These biomass collections are sorted by species, dried, and processed. This allows for comparative analysis to post treatment conditions and characterization of the recovery of native plant communities.

d. Pre-treatment monitoring of water quality parameters such as temperature, dissolved oxygen and pH within the treatment areas and in reference plots.

In order for Sonar to target the Eurasian Milfoil in the lake effectively, it has to be physically present in the target area for from six to eight weeks. Sonar herbicide does not kill the plants by itself. Rather, it prevents the plants from manufacturing a pigment that protects the chlorophyll from being degraded by sunlight. Absent the ability to produce this pigment, the sun will break down the chlorophyll and the plant can't produce food, effectively "starving" itself. If Sonar is not present in the 5-10 parts per billion range for this six week period, the plants can recover. As such, a sequential treatment protocol has been developed that includes an initial application of Sonar, monitoring of the levels in the treatment area using SePRO's FasTEST[6] analysis, and adjustment of the levels through additional applications, if necessary.

A post-treatment assessment of the plant communities was conducted as well. It included the following components

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4 *"Vegetation Assessment and Management Plan for Big Bear Lake (San Bernardino County, California, January 10, 2001)*

5 *Mention of trade names does not imply Regional Board endorsement.*

6 *Mention of trade names does not imply Regional Board endorsement.*

a. A post-treatment plant assay using EffecTEST technology to monitor the effectiveness of Sonar treatments. Plant samples from a treated waterbody are gathered, processed and analyzed in a laboratory to determine the level of Sonar injury of those plants.

b. A post-treatment mapping effort to document the levels of infestation present in the treatment areas after application.

c. A post-treatment aquatic plant biomass collection and measurement effort in the treatment areas and in reference areas of the lake. These biomass collections are sorted by species, dried, and processed. This allows for comparative analysis to pre-treatment conditions and characterization of the recovery of native plant communities.

Sonar applications in 2002 and 2003 were successful in reducing water milfoil and coontail. Since these macrophytes dominated the plant biomass, few macrophytes remained in the Lake. No specific plans for further Sonar treatment have been proposed. BBMWD will monitor plant growth in the Lake (species composition, biomass, location, etc.) to determine whether, when and where further applications are necessary, and whether replanting or other steps to promote the growth of more beneficial plant species are necessary. The use of Sonar formulations (liquid or pellet) may be incorporated into future management actions under this aquatic plant management program for Big Bear Lake in order to provide the most effective management tools available.

BBMWD has demonstrated its commitment to an integrated program, through use of a variety of means to control aquatic vegetation growth, as well as having a thorough data collection and analytical system from which management decisions can be made.

IIB. Agency-Prescribed BMPs

To ensure negligible impacts on fish and wildlife resources, the CDFG required that certain measures be implemented by BBMWD as part of its approval for Sonar application activities in 1996 (CDFG Section 1601 Stream/Lake Alteration Agreement, Notification No. 5-256-96, July 25, 1996). The CDFG specifications were as follows:

Measures to Protect Fish and Wildlife Resources:

a. The Operator shall apply Sonar in accordance with local, state and federal regulations.

b. The Operator shall monitor the area for a month after each treatment to see if there are any fish kills. If dead fish are found, they shall be collected, frozen and taken to Martin Chan at the Mojave River Hatchery. Fish kills shall be reported immediately to the DF&G Warden Diane Hermans.

c. The water in the treatment area shall be tested 3-4 days prior to first application for dissolved oxygen content. During the application period, the water shall be monitored daily for dissolved oxygen content. Sampling shall be conducted within several hours of sunrise or just prior to sunset. Samples shall be taken at three sites from within the center of the treatment area. At each site, monitoring shall be conducted at one-meter intervals from the bottom of the lakebed to the top of the water. Three control sites outside of the treatment area shall be set up in

the manner mentioned above, so comparisons can be made. After the treatment is completed, monitoring shall continue for one month with sampling every three days.

d. Monitoring reports shall be submitted by FAX no later than Friday afternoon of each week to Mike Guisti.

e. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, oil or petroleum products or other organic or earthen material from any logging, construction, or associated activity of whatever nature shall be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

f. The Operator shall comply with all litter and pollution laws, as well as contractors, subcontractors and employees.

The CDFG worked with BBMWD to evaluate the treatment program and make changes in it, through 1998, in order to improve the success of the application activities in eradicating the nuisance submerged aquatic plants. This experience facilitated the 2002 and 2003 applications and will assist any future treatments. The discharger will obtain requisite approvals from the Department to conduct the proposed alum application and future Sonar treatments, should they prove necessary.

IIC. General Lake Monitoring and Management

Big Bear Lake has had a general Lake monitoring program in place for several years. Much of the data to be obtained for herbicide and alum application activities under the proposed Order relates to general physical and chemical parameters of the Lake, dependent upon both field instruments and human observations, as well as assessments of overall coverage of aquatic vegetation. The following parameters are measured in the Lake at various stations for regular limnological monitoring. The methods and reporting limits are indicated where applicable.

a. Visual Observations—Water color, Sky conditions, Wind speed and direction

b. Dissolved Oxygen, Temperature, pH and Secchi Disk Transparency—These measurements are taken based on lake temperatures: Twice a month when 50-60° F, Once a week when 61-70°F, and Twice a week when 71°F

c. Nutrients—Monthly ammonia, nitrogen and phosphorus at stations 1 and 5, and in all tributaries when flowing; Nitrate-nitrogen (EPA300, RL 0.05 mg/l), Total phosphorus (SM4500-PB4E, RL 0.05 mg/l), Nitrite-nitrogen (SM4500-NO2B, RL 0.01 mg/l, Kjeldahl nitrogen (EPA351.2, RL 0.1 mg/l), Total nitrogen (Calculation, RL 0.2 mg/l)

d. Minerals and Other Substances—Once every five years; Organics and inorganics, pesticides, and fecal coliform at tributaries and sites A through E

Given this monitoring, BBMWD has a substantial database from which to determine general trends, as well as an existing means of determining localized or event-specific changes within the lake system.

Additionally, for the large-scale alum application, sediment samples are currently being analyzed to determine the optimal large-scale alum dosage for the lake. These sediment analyses will identify phosphorus forms in the sediment by the application of a phosphorus fractionation procedure. Phosphorus forms examined will include: 1) loosely-sorbed forms (e.g., porewater phosphorus); 2) iron-bound phosphorus; 3) aluminum-bound phosphorus; 4) calcium mineral phosphorus (e.g., apatite); and 5) total phosphorus. The results of the sediment analyses will be utilized to determine the dose of alum needed to substantially reduce the mobile inorganic sediment phosphorus and transform it to aluminum phosphate in Big Bear Lake. Alum treatment will be applied only to lake waters with a depth greater than 2 meters (6 feet). Prior to, during, and after treatment with alum, monitoring will be conducted to measure nutrient (total phosphorus, total dissolved phosphorus, orthophosphate, total nitrogen, total dissolved nitrogen, nitrate-nitrogen, nitrite-nitrogen, ammonia-nitrogen) and other relevant water quality parameters, (Chlorophyll a, hardness, pH, alkalinity, total suspended solids, and volatile suspended solids), and to determine lake sediment flux characteristics. Sediment flux characteristics at two main monitoring stations will be evaluated prior to and after alum treatment. Sediment characteristics will not be monitored during alum application to permit the even settling of the alum floc.

III. REGULATORY BASIS FOR WASTE DISCHARGE REQUIREMENTS

Section 301(a) of the federal Clean Water Act, 33 U.S.C. §1311(a), makes it illegal to discharge any pollutant from any point source into the waters of the United States, except in compliance with a permit issued by the United States Environmental Protection Agency (EPA), or by a state with an EPA-approved permit program, under the National Pollutant Discharge Elimination System (NPDES). The Clean Water Act defines "pollutant" generally to include any "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water." 33 U.S.C. §1362(6)

On March 12, 2001, the Ninth Circuit Court of Appeals decided that discharges of pollutants from the use of aquatic pesticides in waters of the United States require coverage under an NPDES permit (*Headwaters, Inc. v. Talent Irrigation District*, 243 F.3d526,533). The Ninth Circuit Court held that the residue of an aquatic pesticide that remained in the water after the pesticide's application was a "pollutant" within the meaning of the Clean Water Act, and that the discharge of an aquatic pesticide to waters of the United States therefore required an NPDES permit.

"Aquatic pesticides" are considered to include those (1) substances or mixtures of substances used to eradicate or defoliate plants, regulate an organism's growth, or for preventing, destroying, repelling, or mitigating any pest that may infest or be detrimental to vegetation, man, animals, or household, or that may be present in any agricultural or nonagricultural environment, or (2) any spray adjuvant, or (3) breakdown products of these materials. Thus, those substances more appropriately referred to as herbicides are subject to the above decision. The terms herbicide and pesticide may be used interchangeably in this Order.

IV. DISCHARGE LIMITATIONS

The Discharger intends to discharge an aquatic herbicide, Sonar, which is registered by the California Department of Pesticide Regulation (DPR), to waters of the United States. Neither the herbicide's active ingredient, fluridone, nor its other ingredients are priority pollutants, as defined by federal law and regulation. Neither the US Environmental Protection Agency nor the State of California have developed or adopted water quality objectives/criteria for this substance. Therefore, there is no reasonable potential for the discharge to cause or contribute to a violation of numeric water quality objectives. Therefore, no numeric discharge limitations are specified in this Order. This Order requires the discharger to ensure that the application of Sonar is conducted in accordance with approved specifications included on the product label, and in accordance with the terms of any use permits issued by the Agricultural Commissioner. This Order also requires the discharger to implement a program of Best Management Practices to assure the efficacy of the application and to prevent adverse impacts on beneficial uses.

The discharger also intends to apply aluminum sulfate (or another form of alum) to areas of the lake where depth of water is greater than 2 meters (6 feet). Neither aluminum sulfate nor the element aluminum is a priority pollutant, however there are recommended water quality criteria for aluminum. For freshwater[7], the criteria maximum concentration is 750 micrograms per liter (ug/L) and the criteria continuous concentration is 87 ug/L. This Order includes a receiving water limitation for alum application based on these recommended criteria. This limitation is based on best professional judgement of the levels that needed to assure that the Basin Plan narrative objectives pertaining to toxic substances are implemented.

V. ANTIDEGRADATION ANALYSIS

The application of Sonar and alum must be consistent with both federal and state antidegradation policies, pursuant to 40 CFR 131.12 and State Board Resolution No. 68-16. These policies allow the lowering of water quality only under specified circumstances. First, there must be no adverse impacts on beneficial uses. Second, water quality consistent with maximum benefit to the people of the state must be maintained.

The application of Sonar may result in the limited-term lowering of water quality, localized in the area of application. If conducted in conformance with the terms and conditions of this Order, this effect would be limited. The intent of the application is to protect and restore beneficial uses that have been adversely impacted by the growth of excessive amounts of noxious aquatic plants. Therefore, beneficial uses would not be adversely affected by this lowering of water quality. Big Bear Lake is a significant recreational and aesthetic resource, attracting visitors from around the state. Tourism is a substantial contributor to the local economy. The Lake also supports state- and federally listed rare, threatened or endangered species. As such, it is in the maximum benefit to the people of the state to allow the limited-term lowering of water quality contemplated by this Order to protect and restore the Lake's beneficial uses.

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[7] *See National Recommended Water Quality Criteria - Federal Register/Vol. 63, No. 237/Thursday, December 10, 1998/Notices.*

The application of alum will result in the addition of a substance not currently found in the Lake and, in that sense, could be considered a lowering of water quality. However, the expected effects of the alum application are improvement of nutrient water quality, reduction of nuisance and noxious plant growth, and restoration of impaired beneficial uses. Any lowering of water quality associated with alum application will not adversely affect beneficial uses and is of maximum benefit to the people of the state.

VI. COMMENTS AND REVIEW

Interested persons are invited to submit written comments on the proposed Order and Monitoring and Reporting Program. Although all comments that are provided up to and during the public hearing on this matter will be considered, receipt of comments by January 5, 2004, would be appreciated so that they can be used in the formulation of the final draft Order which will be transmitted to the Board prior to the hearing. Comments should be submitted either in person or by mail to:

Jun Martirez
California Regional Water Quality Control Board
3737 Main St., Suite 500
Riverside, CA 92501-3348

The Board's proposed Order, related documents, and all comments and petitions received may be inspected and copied at the Regional Board office by appointment (909-782--4130) scheduled between the hours of 9 AM and 3 PM, Monday through Friday. Copies of the proposed Order will be mailed to interested persons upon request to Jun Martirez (909-782-3258).

VII. PUBLIC HEARING

The Board will hold a public hearing to consider adoption of the proposed waste discharge requirements as follows:

DATE:	January 22, 2004
TIME:	9 AM
PLACE:	City Council Chambers of Loma Linda 25541 Barton Road Loma Linda, CA

California Regional Water Quality Control Board
Santa Ana Region

ORDER NO. R8-2004-0007
NPDES NO. CA8000396

Waste Discharge Requirements
for
Big Bear Municipal Water District
Application of Aquatic Herbicide and Aluminum Sulfate (Alum)
San Bernardino County

The California Regional Water Quality Control Board, Santa Ana Region (hereinafter, Regional Board), finds that:

1. Section 301(a) of the federal Clean Water Act, 33 U.S.C. §1311(a), makes it illegal to discharge any pollutant from any point source into the waters of the United States, except in compliance with a permit issued by the United States Environmental Protection Agency (EPA), or by a state with an EPA-approved permit program, under the National Pollutant Discharge Elimination System (NPDES).

2. The Clean Water Act defines "pollutant" generally to include any "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water." 33 U.S.C. §1362(6)

3. On March 12, 2001, the Ninth Circuit Court of Appeals decided that discharges of pollutants from the use of aquatic pesticides in waters of the United States require coverage under an NPDES permit (Headwaters, Inc. v. Talent Irrigation District, 243 F.3d526,533). The Ninth Circuit Court held that the residue of an aquatic pesticide that remained in the water after the pesticide's application was a "pollutant" within the meaning of the Clean Water Act, and that the discharge of an aquatic pesticide to waters of the United States therefore required an NPDES permit.

4. "Aquatic pesticides" are considered to include those (1) substances or mixtures of substances used to eradicate or defoliate plants, regulate an organism's growth, or for preventing, destroying, repelling, or mitigating any pest which may infest or be detrimental to vegetation, man, animals, or household, or that may be present in any agricultural or nonagricultural environment, or (2) any spray adjuvant, or (3) breakdown products of these materials. Thus, those substances more appropriately referred to as herbicides are subject to the above decision. The terms herbicide and pesticide may be used interchangeably in this Order.

5. A revised Water Quality Control Plan (Basin Plan) became effective on January 24, 1995. The Basin Plan identifies beneficial uses and water quality objectives for waters in the Santa Ana Region.

6. The requirements contained in this Order are necessary to implement the Basin Plan.

TENTATIVE

7. The beneficial uses of Big Bear Lake include:

   a. Municipal and domestic supply,
   b. Agricultural supply,
   c. Groundwater recharge,
   d. Water contact recreation,
   e. Non-contact water recreation,
   f. Warm freshwater habitat,
   g. Cold freshwater habitat,
   h. Wildlife habitat, and
   i. Rare, threatened or endangered species habitat.

8. The beneficial uses of Big Bear Lake, especially water contact and non-contact recreation, warm and cold freshwater habitat, wildlife habitat and rare, threatened or endangered species habitat, are impaired by excessive growth of invasive aquatic plants (macrophytes)(particularly Eurasian Water Milfoil (*Myriophyllum spicatum*) and, to a lesser degree, Coontail (*Ceratophyllum demersum*)). The Lake is included on the Clean Water Act Section 303(d) list of impaired waters, in part because of these noxious plants. The Lake is also included on the 303(d) list because of nutrients, which stimulate excessive plant growth.

9. Pursuant to the Clean Water Act and implementing regulations, Total Maximum Daily Loads (TMDLs) must be developed to address pollutants identified on the 303(d) list of impaired waters. The Board is working with local stakeholders to develop a nutrient TMDL for the Big Bear Lake that would address the growth of nuisance/noxious plants. Direct efforts have been and are underway to control the growth of the invasive aquatic plants. The discharger is implementing an aquatic vegetation management program that focuses principally on mechanical removal. An aquatic herbicide, Sonar, has also been applied in limited areas of the Lake, beginning in 1996 and 1998. Sonar is registered by the California Department of Pesticide Regulation (DPR). Given the magnitude of the invasive aquatic plant growth in the Lake, stimulated by increasing nutrient over-enrichment (eutrophication), mechanical removal alone will not suffice to control the problem. Managed application of herbicides and/or the application of aluminum sulfate (or another form of alum) to control phosphorus (a nutrient that stimulates plant growth) is expected to be an integral part of the TMDL implementation plan to address the impairment resulting from noxious aquatic plant growth. Control of noxious aquatic plant growth will also contribute to the control of nutrients.

10. On February 13, 2002, Big Bear Municipal Water District (hereinafter, the discharger) submitted a report of waste discharge for the proposed use of Sonar in selected areas of Big Bear Lake. The purpose of the herbicide applications is to prevent the growth and spread of noxious, nuisance aquatic plants, and to restore the biological integrity of the Lake. Control of these plants will also address adverse impacts to recreational uses, including swimming and boating.

11. On March 15, 2002, the Regional Board adopted Order No. R8-2002-0028 for the application of Sonar in selected areas of Big Bear Lake. The discharger conducted Sonar treatments in 2002 and 2003. These treatments were successful in reducing the biomass of nuisance aquatic plants. Future Sonar treatments may be necessary as part of the integrated aquatic vegetation management program for the Lake to be conducted by the discharger.

12. During September and October of 2003, the discharger conducted a pilot-scale study on various phosphorus mitigation techniques in Big Bear Lake. One of the phosphorus mitigation activities involved the use of aluminum sulfate (a form of alum) to treat Papoose Bay, a small bay located on the southern shore of Big Bear Lake. Alum is a non-toxic material commonly used in water treatment plants to clarify drinking water. In lakes, alum is used to reduce the level of phosphorus in the water column, as well as the amount of phosphorus released by the lake sediments. Previous studies of sediment flux rates in Big Bear Lake have clearly shown that a significant percentage of the total phosphorus loading to the lake comes from the lake sediments. Preliminary results of the 2003 study indicate the efficacy of alum in phosphorus reductions. Phosphorus reductions are expected to result in decreased phytoplankton (algae) biomass. Such phytoplankton reduction would, in turn, enhance water clarity and thereby, the growth of more beneficial species of aquatic macrophytes. Phosphorus reductions may reduce the growth of Coontail, a free-floating aquatic plant that derives nutrients from the water column.

13. On December 3, 2003, the discharger submitted an application for waste discharge requirements for the large-scale application of aluminum sulfate in Big Bear Lake. The discharger proposes to apply aluminum sulfate to areas in the lake where the depth of water is greater than 2 meters (6 feet). Pre-treatment evaluation may lead to recommendations for the application of an alternative form of alum. The application will be in accordance with an approved, specific plan that identifies the form of alum, dosage, application methods, timing and schedule, monitoring, and the best management practices that will be employed to assure that beneficial uses are not adversely affected.

14. This Order rescinds Order No. R8-2002-0028. Future Sonar treatments, as well as the large-scale application of aluminum sulfate (or another appropriate form of alum) in Big Bear Lake, will be regulated pursuant to the terms and conditions of this Order.

15. Neither Sonar's active ingredient, fluridone, nor its other ingredients are "priority pollutants" as defined in federal statute and regulation. No water quality criteria or objectives for this constituent have been developed or approved by the U.S. Environmental Protection Agency (EPA) or the State of California. Accordingly, no criteria or objectives for this constituent are included in EPA's California Toxics Rule. No numeric effluent limitations for fluridone or other ingredients of Sonar are specified in this Order. The discharger will be required to conduct future Sonar treatments in accordance with an approved comprehensive aquatic vegetation management plan or approved project-specific plan to assure that water quality and beneficial uses are not adversely affected.

16. There is reasonable potential for the discharge to cause or contribute to an excursion of numeric water quality criteria for aluminum recommended by the US EPA[1], and therefore, to cause or contribute to violation of the narrative objectives for toxic substances specified in the Basin Plan. This Order specifies numeric effluent limitations for aluminum that are based on best professional judgement of the levels necessary to assure compliance with the Basin Plan narrative objectives for toxic substances.. Prior application of Sonar in Big Bear Lake was conducted in accordance with conditions of use and monitoring specified by the California Department of Fish and Game (CDFG) pursuant to a Section 1601 Streambed Alteration Agreement. Prior to the issuance of this Agreement, the CDFG assessed the scientific literature and concluded that the use of Sonar at labeled rates should have no short-term or long-term impacts on aquatic organisms. This Order requires the discharger to coordinate with the Department of Fish and Game and to obtain requisite approvals from the Department for any proposed future use of Sonar and the application of aluminum sulfate (or other form of alum). This Order also requires the discharger to implement best management practices or other measures identified by the Department to assure that non-target biota are not adversely affected.

17. To assure coordinated, effective and appropriate control of nuisance aquatic vegetation in an environmentally and economically sound manner, it is appropriate to require the discharger to develop a comprehensive integrated aquatic vegetation management plan. The purpose of this plan will be to identify specific needs for aquatic vegetation control, on a lake-wide basis, taking lake topography, water depth, aquatic habitat and biota, costs, etc. into account. The plan would include the methods proposed to be employed to exert this control (including nutrient source controls, mechanical removal of vegetation, and chemical treatments), and the monitoring that will be done before, during and after the control measures are implemented to evaluate the efficacy of the measures and to prevent adverse impacts on non-target biota. It is expected that the development of this plan will be required as part of the implementation plan of the nutrient TMDL. It is anticipated that this TMDL will be completed within the next two years. The discharger is encouraged to begin early development of the integrated aquatic vegetation management plan. For each type of control (mechanical removal, Sonar, alum), detailed project specific plans would be required to be submitted. These plans would become appendices to the comprehensive, integrated aquatic vegetation management plan and would be updated from year to year as necessary to reflect the current conditions of the lake. These project specific plans could be implemented once approved by the Executive officer.

18. Discharges must be consistent with both federal and state antidegradation policies, pursuant to 40 CFR 131.12 and State Water Resources Control Board Resolution No. 68-16. These policies allow degradation of water quality only under specified circumstances. First, there must be no adverse impacts on beneficial uses. Second, water quality consistent with maximum benefit to the people of the state must be maintained.

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[1] *See National Recommended Water Quality Criteria - Federal Register/Vol. 63, No. 237/Thursday, December 10, 1998/Notices.*

19. The application of Sonar as proposed may result in the limited-term lowering of water quality, localized in the area of application. If conducted in conformance with the terms and conditions of this Order, this effect would be limited. The intent of the application is to protect and restore beneficial uses that have been adversely impacted by the growth of excessive amounts of noxious aquatic plants. Therefore, beneficial uses would not be adversely affected by this lowering of water quality. Big Bear Lake is a significant recreational and aesthetic resource, attracting visitors from around the state. Tourism is a substantial contributor to the local economy. The Lake also supports state and federally listed rare, threatened or endangered species. As such, it is in the maximum benefit to the people of the state to allow the limited-term lowering of water quality contemplated by this Order to protect and restore the Lake's beneficial uses.

20. The application of aluminum sulfate will result in the addition of a substance not currently found in the Lake and, in that sense, could be considered a lowering of water quality. However, the expected effects of the alum application are improvement of nutrient water quality, reduction of nuisance and noxious plant growth, and restoration of impaired beneficial uses. Any lowering of water quality associated with alum application will not adversely affect beneficial uses and is of maximum benefit to the people of the state.

21. In accordance with California Water Code Section 13389, the issuance of waste discharge requirements for this discharge is exempt from those provisions of the California Environmental Quality Act contained in Chapter 3 (commencing with section 21100) Division 13 of the Public Resources Code.

22. The Regional Board has notified the Discharger and other interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written views and recommendations.

23. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. DISCHARGE SPECIFICATIONS:

1. Discharges of aluminum sulfate (or other form of alum) into the lake shall not cause the aluminum concentration in the water column of the lake to exceed the following:

Constituent	Maximum Daily Concentration (ug/L)	Average Monthly Concentration (ug/L)
Total Recoverable Aluminum	750	87

B. PROVISIONS:

1. Prior to the application of Sonar or aluminum sulfate (or other form of alum), the discharger shall submit a proposed plan for approval by the Executive Officer for the application that identifies, at a minimum, the following:

   a. Proposed timing, schedule, methods of application;

   b. Proposed monitoring before, during and after treatment. The monitoring proposed shall be sufficient to document the efficacy of the applications and the effect of the applications on water quality (including pH, dissolved oxygen, nutrients and other relevant parameters) and beneficial uses both within and outside treatment areas. Minimum monitoring requirements are described in Monitoring and Reporting Program (M&RP) NO. R8-2004-0007; and

   c. The best management practices that will be employed to assure effective and efficient application, with minimal impacts on non-target biota, and compliance with the terms and conditions of this Order. (see also Provisions 10 and 12, below)

2. No application of Sonar or aluminum sulfate (or other form of alum) shall commence until the proposed application plan is approved by the Executive Officer.

3. Monitoring shall be conducted in accordance with approved project specific application plans and M&RP R8-2004-007.

4. Prior to the application of Sonar or aluminum sulfate (or other form of alum), the discharger shall coordinate with the Department of Fish and Game regarding any proposed application(s). The results of this coordination, including any requisite approvals and a description of the best management practices/mitigation measures required or recommended by the Department, shall be included in the proposed application plan (Provision 1). The discharger shall comply with the conditions of approval for the chemical application(s) identified by the Department.

5. The use of Sonar must be consistent with the label instructions and any Use Permits issued by the Agricultural Commissioner. Parties applying products must be licensed by the Department of Pesticide Regulation and all use must be reported to the Agricultural Commissioner.

6. The discharge of chemicals to surface waters, other than Sonar, aluminum sulfate (or other form of alum) and buffering agents identified in the approved application plan (Provision 1) that may be needed to control alkalinity as the result of alum application, is prohibited.

7. The discharge shall not create, or threaten to create, a nuisance or pollution as defined by Section 13050 of the California Water Code.

8. The mortality of aquatic vertebrates or the long-term suppression of aquatic invertebrate populations due to the direct action of Sonar or alum is prohibited.

9. Applications of Sonar or alum that cause oxygen depletion to the point of stress or lethality to aquatic biota as the result of plant die-off are prohibited.

10. The discharge shall not cause or contribute to long-term adverse impacts on beneficial uses of waters of the United States.

11. The discharge shall not cause exceedance of any applicable water quality objective or water quality standard for the receiving waters.

12. The discharge shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws.

13. The discharger shall implement Best Management Practices (BMPs) that are designed to maximize the efficacy of control efforts and minimize adverse impacts to the environment. The BMPs that shall be implemented include, but are not necessarily limited to, the following:

    a. *Preliminary site evaluations.* The discharger shall conduct a site inspection to verify the need for herbicide and/or alum treatment and suitability of the site for treatment. The discharger shall evaluate options to chemical treatment and demonstrate that chemical treatment is the optimal alternative.,

    b. *Secondary site evaluations and pre-treatment monitoring.* The discharger shall determine the type and intensity of treatment needed. This evaluation shall include measurement and analysis of indicators to provide information on potential efficacy and water quality impacts.

    c. *Alternative Control Measures.* The discharger shall evaluate other available BMPs and alternative control measures to determine if there are feasible alternatives to the selected aquatic herbicide application project.

    d. *Treatment.* Immediately prior to treatment, the discharger shall examine a series of indicators and modify treatment plans accordingly. These indicators may include day length, precipitation, recreational activity, sunlight, water exchange, water depth, water flows, water turbidity and wind. If this examination indicates a potential for reduced control efficacy and/or heightened water quality impacts, the treatment shall be rescheduled.

    e. *Post-treatment.* The discharger shall assess control efficacy and water quality impacts. The results of this assessment shall be evaluated by the discharger to refine project operations through an adaptive management process.

14. The discharger shall take steps to notify potential water users of the expected extent of the area of impact in an effort to avoid temporary adverse impacts to recreation and any other uses of the water.

15. The discharger shall implement the following restrictions on the application of alum for the reduction of phosphorus:

    a. The discharger shall provide results of jar tests to determine appropriate application rates for whole lake treatment. This jar tests will be conducted to evaluate the effect alum dosage will have on lake pH. Lake pH will be measured prior to and during alum application and after alum treatment is complete. At least one datalogger will be deployed to monitor lake water pH immediately before, during, and after alum treatment to assure that pH requirements of this Order, B.15.g. below are met. Monitoring for lake water alkalinity shall also be done during alum application to assure that alkalinity is not exceeded.
    b. Powdered alum must be mixed with water to form a slurry prior to application. Lake water may be used to make the slurry and for spray application.
    c. Alum application shall begin as early as possible each morning to avoid complications due to natural decrease in pH after nightfall.
    d. Buffering material such as sodium carbonate or sodium aluminate shall be available to use with alum if a decrease in pH is observed.
    e. Alum application shall be stopped if wind velocity exceed 5 miles per hour.
    f. The discharger shall cease treatment and immediately notify the Regional Board and the Department of Fish and Game if any fish are killed or distressed during application.
    g. The pH of the lake water must remain between 6.5 and 8.5.
    h. Only aluminum compounds suitable for water treatment (low concentration of heavy metals) shall be used.

16. The discharger shall comply with Monitoring and Reporting Program No. R8-2004-0007, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.

17. The discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as specified in the above Monitoring and Reporting Program.

18. The discharger is required to retain records, including all monitoring information and copies of all reports required by this Order, for five years unless otherwise directed by the Executive Officer.

19. The discharger shall comply with applicable items of the Standard Provisions and Reporting for Waste Discharge Requirements (Standard Provisions), which are attached to this Order.

20. This Order shall become effective on the adoption date and shall also serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the CWA, or amendments thereto, that shall become effective 10 days after the date of adoption, provided the Regional Administrator of the EPA has no objection. If the Regional Administrator objects to its issuance, this Order shall not serve as an NPDES permit until such objection is withdrawn.

21. This Order expires on March 1, 2009 and the discharger must file a Report of Waste Discharge in accordance with Title 23, Division 3, Chapter 9 of the California Code of Regulations not later than 180 days in advance of this expiration date. The Report of Waste Discharge shall serve as the application for issuance of new waste discharge requirements.

22. Order No. R8-2002-0028 is hereby rescinded.

C. PERMIT REOPENING, REVISION, REVOCATION, AND REISSUANCE

1. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal CWA, or amendments thereto, the Board will revise and modify this Order in accordance with such standards.

2. This Order may be reopened to address any changes in State or federal plans, policies or regulations that would affect the quality requirements for the discharges.

3. Any permit noncompliance constitutes a violation of the CWA and the California Water Code and is grounds for enforcement action; for permit or authorization letter termination, revocation and reissuance, or modification; the issuance of an individual permit; or for denial of a renewal application.

4. This Order may be modified by the Regional Board prior to the expiration date to include effluent or receiving water limitations for toxic constituents determined to be present in significant amounts in the discharge through the comprehensive monitoring program included as part of this Order.

5. This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by a discharger for modification, revocation and reissuance, or termination of this Order or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on January 22, 2004.

_____

Gerard J. Thibeault
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR
ORDER NO. R8-2004-0007, NPDES NO. CA8000396

A. General Provisions

1. Duty to Comply [40 CFR 122.41(a)][CWC 133811]

   a) The discharger must comply with all of the conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action, for permit termination, revocation and reissuance or modification, or for denial of a permit renewal application.

   b) The discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act within the time provided in the regulations that establish these standards or prohibitions, even if this permit has not been modified to incorporate the requirement.

2. Duty to Mitigate [40 CFR 122.41(d)]

   The discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment.

3. Proper Operation and Maintenance [40 CFR 122.41(e)]

   The discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the discharger to achieve compliance with this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of, backup or auxiliary facilities or similar systems, which are installed by a discharger only when necessary to achieve compliance with the conditions of this permit.

4. Permit Actions [40 CFR 122.41(f)][CWC 13263(e)1[40 CFR 122.44(b)(1)]

   a) This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

b) If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge, and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the discharger so notified.

5. Property Rights [40 CFR 122.41(g)][CWC 13263(g)]

a) This permit does not convey any property rights of any sort, or any exclusive privileges.

b) All discharges of waste into water of the state are privileges, not rights.

6. Duty to Provide Information [40 CFR 122.41(h)]

The discharger shall furnish the Regional Water Quality Control Board (RWQCB), the State Water Resources Control Board (SWRCB), or the U.S. Environmental Protection Agency (U.S. EPA), within a reasonable time, any information which the RWQCB, SWRCB, or U.S. EPA may request to determine compliance with this general permit. Upon request, the discharger shall also furnish to the RWQCB, SWRCB, or U.S. EPA, copies of records required by this permit to be kept.

7. Inspection and Entry [40 CFR 122.41(h)]

The discharger shall allow the RWQCB, SWRCB, U.S. EPA, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this permit; and

(2) Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(3) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit; and

(4) Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act or the Porter-Cologne Water Quality Control Act, any substances or parameters at any location.

9. Bypass and Upset [40 CFR 122.41(m)] [40 CFR 122.41(n)]

a) Definitions.

(1) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

(3) "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond, the reasonable control of the discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b) Prohibition of Bypass.

Bypass is prohibited, and the RWQCB may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(3) The permittee submitted notices as required under 40 CFR 122.41 (m) (3)

c) Conditions necessary for a demonstration of upset.

A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required in 24 Hour Reporting; and

(4) The permittee complied with any remedial measures required under 40 CFR 122.41 (d).

d) Burden of proof

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

10. Transfers [40 CFR 122.41(L)(3)] [CWC 133771] [40 CFR 122.61 (a)(b)]

This permit is not transferable to any person except after notice to the RWQCB. The RWQCB may require modification or reissuance of the permit conditions to change the name of the discharger and incorporate such other requirements as may be necessary under the Clean Water Act and the Porter-Cologne Water Quality Control Act.

11. Severability

The provisions of this Order are severable and, if any provision of this order or the application of any provisions of this Order to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected thereby.

12. Twenty-four Hour Reporting [40 CFR 122.41(l) (6)]

a) The discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times and, if the noncompliance has not been corrected, the anticipated time it is expected to continue, and, steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

b) The following shall be included as-information that must be reported within 24 hours under this paragraph:

(1) Any bypass which exceeds any effluent limitation in the permit.

(2) Any upset which exceeds any effluent limitation in the permit.

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed in this permit is to be reported within 24 hours. The RWQCB may waive the above required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours.

13. Other Information [40 CFR 122.41(l) (8)]

When the discharger becomes aware that it failed to submit any relevant facts or incorrect information in a permit application, or in any report to the RWQCB, SWRCB, or U.S. EPA, the discharger shall promptly submit such facts or information.

14. Planned Changes [40 CFR 122 41(l)(1)]

The discharger shall give notice to the RWQCB as soon as possible of any planned physical alterations or additions to the permitted activity. Notice is required under this provision only when:

a) The alteration or addition to the permitted activity may meet one of the criteria for determining whether a facility is a new source in 40- CFR Part 122.29(b); or

b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit nor to notification requirements under 40 CFR Part 122.42 (a) (1); or

c) The alteration or addition results in a significant change in the discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application/NOI process or not reported pursuant to an approved land application plan.

15. Anticipated Noncompliance [40 CFR 122.41(l)(2)]

The discharger shall give advance notice to the RWQCB or SWRCB of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.

16. Discharge Monitoring Quality Assurance (DMQA) Program [SWRCB/EPA 106 MOA]

The discharger shall conduct appropriate analyses on any sample provided by U.S. EPA as part of the DMQA program. The results of such analyses shall be submitted to U.S. EPA's DMQA manager.

17. Enforcement Provisions

a) The Clean Water Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed $25,000 per day of violation. Any person who negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a fine of not less than $2,500 nor more than $25,000 per day for each violation, or by imprisonment of not more than one year, or both. Higher penalties may be imposed for knowing violations and for repeat offenders. The Porter-Cologne Water Quality Control Act provides for civil and criminal penalties comparable to and in some cases greater than those provided under the Clean Water Act. [40 CFR 122.41(a)(2)][CWC Sections 13385 and 13387]

b) The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both. [40 CFR 122-41(k) (2)]

c) The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or both. Higher penalties may be imposed for repeat offenders. [40 CFR 122.41(j)(5)]

California Regional Water Quality Control Board
Santa Ana Region

Monitoring and Reporting Program No. R8-2004-0007
NPDES No. CA8000396
for
Big Bear Municipal Water District
Application of Aquatic Herbicide and Aluminum Sulfate (Alum)
San Bernardino County

I. GENERAL MONITORING AND REPORTING REQUIREMENTS:

1. All sampling and sampling preservation shall be in accordance with the current edition[1] of *"Standard Methods for the Examination of Water and Wastewater"* (American Public Health Association) and other procedures approved by the United States Environmental Protection Agency (EPA), where applicable.

2. All laboratory analyses for water or wastewater shall be performed in accordance with test procedures under 40 CFR 136 (latest edition)[2] *"Guidelines Establishing Test Procedures for the Analysis of Pollutants,"* promulgated by EPA, where applicable and unless otherwise specified in this Monitoring and Reporting Program (M&RP). In addition, the Regional Water Quality Control Board (Regional Board) and/or EPA, at their discretion, may specify test methods which are more sensitive than those specified in 40 CFR 136.

3. This Order is being issued for one herbicide, Sonar (fluridone) and alum. As Sonar is a non-priority pollutant with no procedures found in 40 CFR 136, all sampling, sample preservation and laboratory analyses shall be determined by the FasTest assay, an immunoassay which is widely used and the currently recognized method of determining concentrations of Sonar in water. All analytical data obtained from monitoring activities for Sonar shall be reported with identification of practical quantitation levels and with method detection limits, as determined by the FasTest Assay procedures.

4. Chemical, bacteriological and immunoassay analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services or EPA or at laboratories approved by the Regional Board's Executive Officer.

5. Monitoring shall be in accordance with the approved Project specific plans.

TENTATIVE

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1 *Current or latest edition refers to those editions in effect when this Order is adopted.*

2 *Ibid.*

6. For all methods of control, the following, at a minimum, should be sampled: depth-integrated samples that measure dissolved and total nutrients, dissolved organic carbon, and chlorophyll a at lake monitoring stations MWDL1, MWDL2, MWDL6, and MWDL9 (See Attachment "A" of this monitoring and reporting program for locations of these monitoring stations) and at least two control areas; data loggers that monitor dissolved oxygen (DO), pH, temperature, Electrical conductivity (EC), chlorophyll a and turbidity in at least one treatment area; nutrient flux rates from the sediment at stations MWDL1, MWDL2, MWDL6, and MWDL9.

II. IMPACTED AREA MONITORING:

At a minimum, the discharger shall conduct the following monitoring. The discharger shall also assure that monitoring is conducted in accordance with approved project specific application plans.

A. Application of Aquatic Herbicide:

1. The discharger shall collect water samples quarterly for analysis of the active ingredients of the herbicide applied. Water samples are to be taken once during the application period in each quarter: for flowing water bodies, samples to be taken downstream of the treatment area within one hour following application; for canals and other man-made conveyance facilities, samples to be taken at point where water is discharged to a natural water body; for lakes, samples to be taken within 10 ft. of any spot treatment within four hours of the application, at frequencies and locations that will provide representative data on herbicide concentrations within the targeted impact area and the receiving waters during each quarter of the season.

2. For each sample location, the discharger shall provide a sketch showing the treatment area, the location of the monitoring site(s) relative to the treatment area, the shore, and direction of water movement. The depth of sample shall be recorded.

3. The discharger shall include a visual assessment of existing or potential adverse impacts on beneficial uses caused by application of herbicides.

4. The discharger shall perform water quality analyses (using test procedures specified in 40 CFR Part 136 where applicable or procedures approved by the Regional Board) for selected constituents and parameters to demonstrate full restoration of water quality and protection of beneficial uses of the receiving waters following project completion. Analyses shall include the active ingredients in the herbicide applied and the following:

    a. Other constituents that have been identified that may adversely impact;
    b. Beneficial uses of the receiving waters as a result of the project;
    c. Dissolved Oxygen;
    d. Temperature;

e. pH;
f. Turbidity;
g. Hardness and other water quality parameters that may influence herbicide;
h. Persistence or toxicity; and
i. Electrical Conductivity.

5. The discharger may expand its ongoing Big Bear Lake limnological monitoring program to satisfy the above. This program includes regularly scheduled visual observations, and sampling for dissolved oxygen, temperature, pH, secchi disk transparency, nutrients, mineral, organics, inorganics, pesticides, and fecal coliform at several locations within the lake as well as in tributaries.

B. Application of Aluminum Sulfate (Alum):

1. One week before, during and after aluminum sulfate (or any other form of alum) is applied, the discharger shall collect water samples bi-weekly for analysis of the following constituents. Representative samples shall be taken at lake monitoring stations MWDL1, MWDL2, MWDL6, and MWDL9 (See Attachment "A" of this monitoring and reporting program for locations of these monitoring stations):

Constituent	Units	Type of Sample	Minimum Frequency of Sampling and Analysis
Alkalinity	mg/l	Grab	Bi- Weekly
Hardness	"	"	"
Dissolved Oxygen	"	"	"
Total Dissolved Solids	"	"	"
Total Suspended Solids	"	"	"
Volatile Suspended Solids	"	"	"
Turbidity	"	"	"
pH	pH Units	"	"
Specific Conductance	µmhos/cm	"	"
Temperature	^{o}C	"	"
Chlorophyll a	mg/m^3 or µg/L	"	"
Ammonia-Nitrogen	µg/L	"	"
Total Dissolved Nitrogen	"	"	"
Total Inorganic Nitrogen	"	"	"
Nitrate + Nitrite	"	"	"

Constituent	Units	Type of Sample	Minimum Frequency of Sampling and Analysis
Total Nitrogen	µg/L	Grab	Bi- Weekly
Total Phosphorus	"	"	"
Total Dissolved Phosphorus	"	"	"
Orthophosphate	"	"	"
Total Recoverable Aluminum	µg/l	Grab	Bi- Weekly

2. The time, date and depth where samples were taken shall be recorded.

3. The discharger shall include a visual assessment of existing or potential adverse impacts on beneficial uses caused by application of alum. This observation shall be recorded on a permanent log with the date and time of observation.

4. Daily when alum is applied, the discharger shall provide a sketch showing the treatment area, the location of the monitoring site(s) relative to the treatment area, the shore, and direction of water movement.

III. QUALITY ASSURANCE/QUALITY CONTROL:

1. The Discharger shall develop and submit a Quality Assurance Plan (QAP) to provide references, standardized procedures and quality specifications for the sampling, analysis, and data review procedures for the monitoring program.

2. Chain of custody forms are required and are to include: (1) name of parties collecting and transporting sample, (2) time of sample collection and delivery to lab, (d) type and volume of sample bottle, and (4) method of sample preservation.

IV. AQUATIC HERBICIDE AND ALUM USE DOCUMENTATION:

1. The discharger shall maintain records of the following information for each treatment site:

   a. The location of the treatment area (address, cross roads, coordinates);
   b. For herbicide application, the names of the water bodies treated (canal, creek, lake);
   c. For alum application, the daily location of treatment area in the lake;
   d. Project size (the water surface area, volume of water treated, flow rate);
   e. Name, formulation, concentration, and amount of herbicide/alum used; and
   f. Documentation of activities in conformance with Best Management Practices

g. (BMPs)

2. Records of monitoring information shall also include:

   a. The date, exact place, and time of sampling or measurements;
   b. The individual(s) who performed the sampling or measurements;
   c. The duration of daily application;
   d. The estimated volume of discharge (application dosage rate);
   e. The date(s) analyses were performed;
   f. The individual(s) who performed the analysis;
   g. The analytical techniques or methods used; and
   h. The results of such analyses.

3. Copies of these documentation records shall be submitted to the Regional Board in monthly Pesticide Use Reports and/or monthly Alum Application Reports due the 15th of the following month. . Operational samples (FasTEST) collected outside of the NPDES requirements will be submitted in monthly reports on the 15th of the following month. Dischargers may use Pesticide Use Report forms (from the Department of Pesticide Regulation) as part of the documentation.

V. REPORTING:

1. All reports shall be submitted to: Gerard J. Thibeault, Executive Officer, California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348.

2. The discharger shall tabulate the monitoring data to clearly illustrate compliance and/or noncompliance with the requirements of the Order.

3. For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time and submit a timetable for correction.

4. If no application of herbicide or alum is conducted within a month, a letter to that effect shall be submitted in lieu of a monitoring report.

5. In addition to the monthly submittal of the Pesticide Use Reports/Monthly Alum Application Reports, the discharger shall submit a calendar year Annual Report to the Regional Board by January 31 of the following year (beginning January 2003). The Annual Report shall contain tabular summaries of the herbicide monitoring data obtained during the previous year in a format that satisfies the requirements for inclusion in the Department of Pesticide Regulation's surface water database. The Annual Report shall include a summary including but not limited to (1) objectives of the monitoring program(s); (2) results; and (3) interpretation of data in relation to frequency, duration and magnitude of impacts to beneficial uses.

6. The Annual Report shall include an evaluation of any non-toxic or less-toxic weed control methods or algal control methods that may provide a practicable substitute for herbicide oralum application. This evaluation shall include an estimate of each alternative's costs, a review of any known barriers to implementing the alternative and any solutions to overcoming those barriers.

7. The Annual Report shall include an evaluation of the effectiveness of representative BMPs to eliminate or reduce the discharge of herbicides/alum and minimize the extent and duration of any impacts caused by the discharge of herbicides/alum.

8. Sketches of sample locations, chain of custody forms and other information developed as part of these monitoring requirements shall be maintained by the Discharger and submitted to the Regional Board upon request.

9. All reports shall be signed by either a principal executive officer or ranking elected or appointed official or a duly authorized representative of a principal executive officer or ranking elected or appointed official. A duly authorized representative of a principal executive officer or ranking elected or appointed official may sign the reports only if;

    a. The authorization is made in writing by a principal executive officer or ranking elected or appointed official,

    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position), and

c. The written authorization is submitted to the Regional Board.

Each person signing a report required by this Order or other information requested by the Regional Board shall make the following certification:

" I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate[3], and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Ordered by: _____

Gerard J. Thibeault
Executive Officer

Date: January 22, 2004

[3] *For the purposes of this certification the term "accurate" refers to the veracity of the information submittal and not to the performance characteristics of the measurement system.*
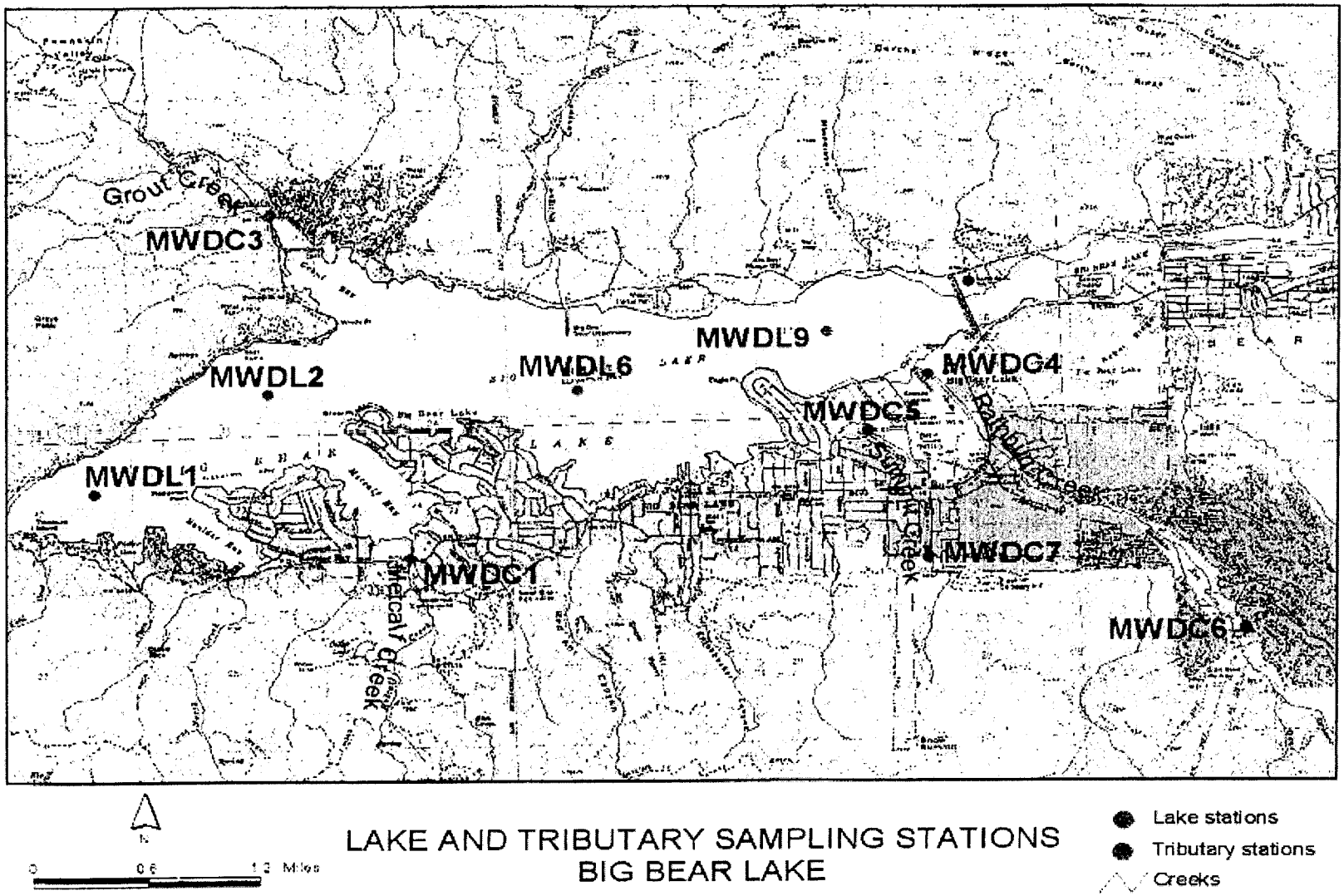
FIGURE 1-1. MAP OF BIG BEAR LAKE AND SELECT TMDL NUTRIENT MONITORING STATIONS