Aquatic Pesticide Application Plan (APAP)

For the Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, to meet the aquatic vegetation management requirements.

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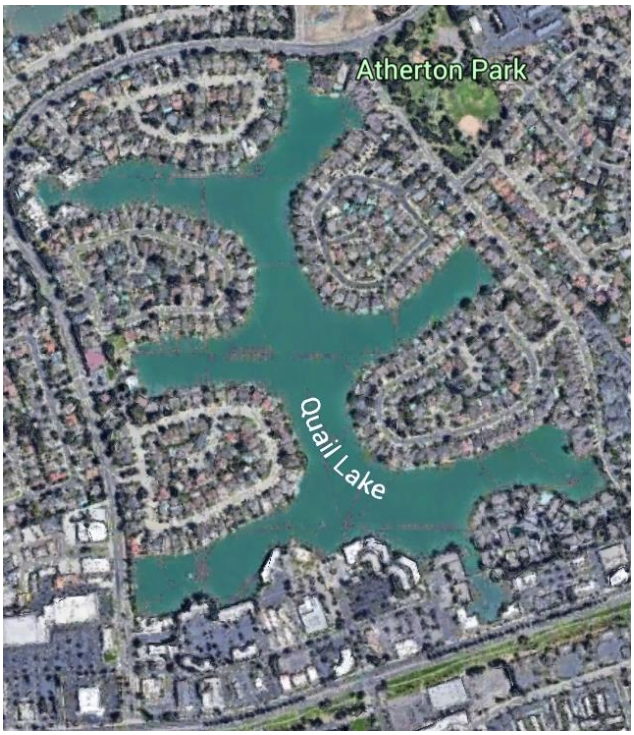


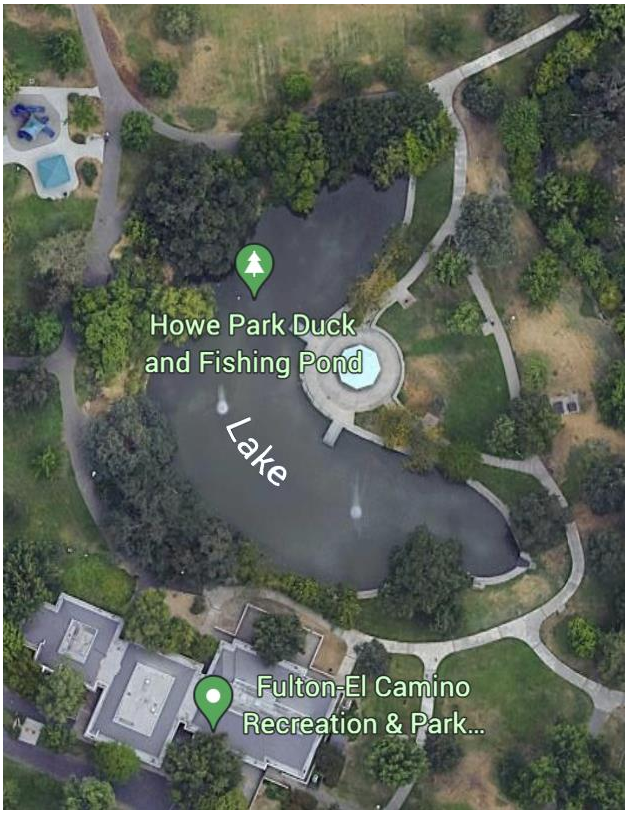
QUAIL LAKE

Region 5

Description of the Quail Lake Home Owners AssociationSystem to Which Algaecide or Aquatic Herbicides areBeing Applied:

QuailLake is a 57 acre lake located east of Interstate 5 in Stockton, CA at the intersection of W. March Lane and Quail Lakes Dr, within a development of residential housing. The beneficial uses of the lake include habitat for fish and waterfowl, recreational activity such as boating and fishing, and aesthetics for the surrounding homes.

Water enters Quail Lake via a well located adjacent to the boat ramp at the south end of the lake and another well located on the east end of the lake. Water also enters the lake via the City of Stockton storm drain system if water levels reach a certain level of capacity. The lake is part of the development's storm water detention system, and is fed by storm water and residential runoff. Water does not leave the lake unless the outflow sluice gate is opened to release water or if the lake completely overflows. During the spring and summer months the lake level is maintained at a level that does not release water into the storm drain system. Quail Lake is operated as closed/static system and not a flow through system.



Howe Community Park Pond

Region 5

Description of the Howe Community Park Pond System to Which Algaecide or Aquatic Herbicides are Being Applied:

The Howe Community Park Pond is located in Howe Park within the county of Sacramento and is operated by the Fulton-El Camino Recreation & Park District. The pond was drained and reconstructed in 1994. It was excavated to a depth of 4'3" at the center. The north end of the pond was excavated to a depth of 4'. The depth at the south end was excavated to be 4'6" Maximum. The edges of the pond were tapered at a 2:1 slope from the base of the wall to the bottom of the pond. A 12 inch class C-900 drain pipe was added at the south end of the pond. Overland flow into the pond is limited; however, with the high transmittance rate of natural soils it is probable that true control of the ponds water balance is limited to the dry months.

Water enters Howe Community Park Pond via city water and the level is maintained by a manual on-off valve. Water exits the lake via a six (6) inch drainage culvert at the east end of the pond that acts as an overflow. Water level is kept at the height of the overflow and does not leave the lake unless overfilled or by a rain event. Howe Community Park Pond is not operated as a flow through system. From its outlet the water flows through a culvert adjacent to office buildings, eventually emptying into the American River.

Canyon Lake

Region 5

Description of the Canyon Lake System to Which Algaecide or Aquatic Herbicides are Being Applied:

Canyon Lake is located in the foothills of the Sierra Nevada Mountains off Highway 50 in Orangevale, CA near Orangevale Ave and Canyon Lake Lane, within a development of residential housing. The lake is part of the city's storm water detention system, and is fed by storm water and residential runoff. The beneficial uses of the lake include habitat for fish and waterfowl, recreational activity such as boating and fishing, and aesthetics for the surrounding homes.

Nuisance growths of submersed aquatic vegetation have impacted the beneficial uses of the system that include water storage and aesthetics. Historical methods that have been utilized for the control of aquatic vegetation include the use of United States Environmental Protection Agency (US-EPA) Herbicides and Algaecides, as well as aeration systems. The lake has a surface area of approximately 0.9 acres, and an average depth of approximately 5 feet. Canyon Lake overflows Through three large culverts into the drainage area, which goes to the American River at Negro Bar.

Description of treatment area

Quail Lake Home Owners Association

The lake has a surface area of approximately 58 acres, and an average depth of roughlyeight feet. We understand that Quail Lake overflows into White Slough which then flows into the San Joaquin River, eventually emptying into the ocean.

Howe Community Park Pond

The lake has a surface are of approximately 1.2 acres, and an average depth of four feet. Howe Community Park Pond overflows into a culvert which them flows into the American River, eventually emptying into the ocean.

Canyon Lake

The lake has a surface area of approximately 0.9 acres, and an average depth of approximately 4 feet. Canyon Lake overflows through three large culvert pipes on the South end of the lake. The culvert pipes empty into the creek, which flows down to the American River at Negro Bar , and eventually empties into the ocean.

Aquatics Weeds and Algae That Are Being Controlled

Quail Lake Home Owners Association

Nuisance growths of submersed aquatic vegetation have impacted the beneficial uses of the system that include water storage and aesthetics. Historical methods that have been utilized for the control of aquatic vegetation include the use of Environmental Protection Agency (US-EPA) Herbicides and Algaecides, as well as aeration systems. Nuisance growths of aquatic vegetation within Quail Lake have caused varying levels of negative impacts on the beneficial uses of these water bodies for the general population as well as Quail lake maintenance personnel in recent years. This Aquatic Pesticide Application Plan (APAP) was developed by Indermill Aquatics to ensure that nuisance growths of aquatic vegetation do not impact the beneficial uses of these water bodies in the future years. IA's staff has performed various site inspections of Quail Lake to review the various issues associated with nuisance growths of aquatic vegetation. These site inspections provided the information contained herein.

A review of the Aquatic Vegetation impacts to Quail Lake is presented below. The lake is impacted by nuisance algae growth during the warmer months. Although this lake has specific algae and vegetation that have been identified below, we want to be comprehensive in specifying that there are a number of varieties and species of algae, submersed vegetation, floating, and terrestrial vegetation that can vary from year-to-year.

Problem Identification (Species Present)

- Attached, Planktonic and Filamentous Algae
- Duckweed (Lemnoideae)
- Mosquito Fern (Azolla)
- American Pondweed (PotamogetonnodosusPoir)
- Curly-Leaf Pondweed (Potamogetoncrispus)
- Sego Pondweed (Stuckeniapectinata)
- Water milfoil (Myriophyllum spicatum)

Activities Being Impacted

The main impacts to the beneficial uses associated with nuisance growths of aquatic vegetation within Quail Lake are related primarily to storm water detention, recreational boating and aesthetics. Negative impacts to the aquatic ecosystem will continue or increase if the aquatic weeds and algae are left uncontrolled. Aquatic herbicide applications will be limited to the areas of the lake systems where aquatic vegetation growths impact the beneficial uses of the systems. The planktonic algae can impact aesthetics, and has potential health hazards for human and animal contact with the lake.

Howe Community Park Pond

Nuisance growths of submersed aquatic vegetation have impacted the beneficial uses of the system that include recreation and aesthetics. Historical methods that have been utilized for the control of aquatic vegetation include the use of Environmental Protection Agency (US-EPA) Herbicides and Algaecides, as well as aeration and fountain systems. Nuisance growths of aquatic vegetation within Howe Community Park Pond have caused varying levels of negative impacts on the beneficial uses of these water bodies for the general population as well as Howe Community Park maintenance personnel in recent years. This Aquatic Pesticide Application Plan (APAP) was developed by Indermill Aquatics to ensure that nuisance growths of aquatic vegetation do not impact the beneficial uses of these water bodies in the future years. IA's staff has performed various site inspections of Howe Community Park Pond to review the various issues associated with nuisance growths of aquatic vegetation. These site inspections provided the information contained herein.

A review of the Aquatic Vegetation impacts to Howe Community Park Pond is presented below. The lake is impacted by nuisance algae and aquatic weed growth during the warmer months. Although this lake has specific algae and vegetation that have been identified by staff with the assistance of Stan Adam from Wilber-Ellis of Agribusiness, we want to be comprehensive in specifying that there are a number of varieties and species of algae, submersed vegetation, floating, and terrestrial vegetation that can vary from year-to-year.

Problem Identification (Species Present)

- Attached Planktonic and Filamentous Algae
- American Pondweed (PotamogetonnodosusPoir)
- Eurasian Water milfoil (Myriophyllum spicatum)

Activities Being Impacted

The main impacts to the beneficial uses associated with nuisance growths of aquatic vegetation within Howe Community Park Pond are related primarily to recreational fishing, aesthetics and maintenance of the aeration and fountain systems. Negative impacts to the aquatic ecosystem will continue or increase if the aquatic weeds and algae are left uncontrolled. Aquatic herbicide applications will be limited to the areas of the lake systems where aquatic vegetation growths impact the beneficial uses of the systems. The planktonic algae can impact aesthetics, and has potential health hazards for human and animal contact with the pond.

Canyon Lake

Nuisance growths of submersed aquatic vegetation have impacted the beneficial uses of the system that include water storage and aesthetics. Historical methods that have been utilized for the control of aquatic vegetation include the use of Environmental Protection Agency (US-EPA) Herbicides and Algaecides, as well as aeration systems. Nuisance growths of aquatic vegetation within Canyon Lake have caused varying levels of negative impacts on the beneficial uses of these water bodies for the general population as well as Canyon lake maintenance personnel in recent years. This Aquatic Pesticide Application Plan (APAP) was developed by Indermill Aquatics to ensure that nuisance growths of aquatic vegetation do not impact the beneficial uses of these water bodies in the future years. IA's staff has performed various site inspections of Canyon Lake to review the various issues associated with nuisance growths of aquatic vegetation. These site inspections provided the information contained herein.

A review of the Aquatic Vegetation impacts to Canyon Lake is presented below. Canyon Lake has been highly impacted due to the presence of the aquatic plants listed below. The lake is impacted by nuisance algae growth during the warmer months. Although this lake has specific algae and vegetation that have been identified below, we want to be comprehensive in specifying that there are a number of varieties and species of algae, submersed vegetation, floating, and terrestrial vegetation that can vary from year-to-year.

Problem Identification (Species Present)

- Planktonic and Filamentous Algae
- Duckweed (Lemna spp.)
- Mosquito Fern (Azolla spp.)

Activities Being Impacted

The main impacts to the beneficial uses associated with nuisance growths of aquatic vegetation within the Canyon Lake are related primarily to storm water detention, aesthetics and maintenance of the aeration system. Negative impacts to the aquatic ecosystem will continue or increase if the aquatic weeds and algae are left uncontrolled. The planktonic algae can impact aesthetics and has potential health hazards for human and animal contact with the lagoon.

Algaecides and Aquatic Herbicides to be used, Their Degradation Byproducts, Application Methods, and the Adjuvants and Surfactants Used

Herbicide/Algaecide Active Ingredient.	Degradation Byproducts	Application Method
Fluridone	n-methyl formamide (NMF) 3-trifluoromthyl benzoic acid	Hand gun
Endothall	Glutamic acid	Hand gun, backpack sprayer
Diquat Dibromide	Diquat binds with organic matter in the sediment indefinitely. It does not degrade and will accumulate in sediments	Hand gun, backpack sprayer
Glyphosate	Aminomethylphosphonic acid, carbon dioxide	Hand gun, backpack sprayer
Tryclopyr	TCP (3,5,6- trichloro-2-pyridinol) and TMP (3,5,6-trichloro-2- methoxypridine)	Hand gun, backpack sprayer
Imazamox	nicotinic acid and di- and tricarboxylic acids	Hand gun, backpack sprayer
Flumioxazin	APF (6-amino7fluoro-4-(2-propynyl)-1,4,-benzoxazin3(2H)one) and THPA (3,4,5,6-tetrahydrophthalic acid	Hand gun, backpack sprayer
Copper Formulations	Does not break down.	Hand gun, backpack sprayer
Sodium Carbonate Peroxyhydrate	Sodium carbonate and hydrogen peroxide in water. Hydrogen Peroxide breaks down into water and oxygen.	Hand gun, backpack sprayer
Peroxyacetic Acid	Water, oxygen, and carbon dioxide	Hand gun, backpack sprayer

Factors influencing the decision to select aquatic herbicide applications

Communication with Quail Lake, Howe Community Park and Canyon Lake as well as past experience on this job reveals that these vegetation problems have been fairly consistent over the last few years.

Over time these aquatic weeds can drastically change the physical and chemical characteristics of any waterway. Failure to implement control measures will allow the infestations of these plants to decrease water quality, provide habitat for mosquito larvae, clog the waterways, shade out of important organisms, reduce biodiversity, and increase the threat of flooding and drainage problems, all of which decrease the recreational and aesthetic value of the system. Generally speaking, the association's primary goal is to maintain their system to provide adequate flood control protection, as well as aesthetic and recreational value. Treatments for the control of aquatic vegetation using contact herbicides will be implemented each year when plant densities begin to reach nuisance levels. Treatments for the control of aquatic vegetation using a systemic aquatic herbicide will be implemented each year when the plants begin to grow. Treatments for the control of algae will be implemented when, or just prior to densities reaching nuisance levels based on visual observations.

Description of Gates and Control Structures

Quail Lake Home Owners Association

Water flow leaving the Quail Lake system is controlled by a sluice gate located at the north end of the lake. Water level is maintained by Indermill Aquatics, who lowers the lake level each fall, and re-establishes it in the spring every year. In addition to the weekly inspections, the sluice gate will be inspected preceding any herbicide or algaecide application. There is also a well located near the boat ramp at the southern end of the lake and one on the east end of the lake near the club house these are manually operated or set on a timer for adding water to the system to keep it at a satisfactory level.

Howe Community Park Pond

Water flow leaving the Howe Community Park Pond system is controlled by a spillway located on the east end of the pond. The only manner water leaves the pond is if it fills to a level above the spillway.

Canyon Lake

Water flow leaving the Canyon Lake system is controlled by water elevation and natural input. The only manner in which water can leave the pond is if it fills to a level above the culvert drain pipes.

Short-Term or Seasonal State Implementation Policy Exemption

If the Discharger has been granted a short-term or seasonal exception under State Water Board Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays,* and Estuaries of California (Policy) section 5.3 from meeting acrolein and copper receiving water limitations, provide the beginning and ending dates of the exception period, and justification for the needed time for the exception. If algaecide and aquatic herbicide applications occur outside of the exception period, describe plans to ensure that receiving water criteria are not exceeded because the Dischargers must comply with the acrolein and copper receiving water limitations for all applications that occur outside of the exception period:

No short-term or season exception has been applied for or granted.

Description of Monitoring and Reporting Program

Monitoring and sampling shall be performed in accordance with the guidelines set forth in Attachment C of Water Quality Order 2004-00090DWQ and as outlined below.

Each monitoring event will follow the parameters in Table 1.

TABLE 1
MONITORING PARAMETERS

Sample Type	Constituent/Parameter	Units	Sample Method	Minimum Sampling Frequency	Sample Type Requirement	Required Analytical Test Method
Visual	1. Monitoring area description (pond, lake, open waterway, channel, etc.) 2. Appearance of waterway (sheen, color, clarity, etc.) 3. Weather conditions (fog, rain, wind, etc.)	Not applicable	Visual Observation	[1]	Background, Event and Post-event Monitoring	Not applicable
Physical	1. Temperature[2]	°F	Grab[4]	[5]	Background, Event and Post-event Monitoring	[6]
	2. pH[3]	Number				
	3. Turbidity[3]	NTU				
	4. Electric Conductivity[3] @ 25°C	µmhos/cm				
Chemical	1. Active Ingredient[7]	µg/L	Grab[4]	[5]	Background, Event and Post-event Monitoring	[6]
	2. Nonylphenol[8]	µg/L				
	3. Hardness (if copper is monitored)	mg/L				
	4. Dissolved Oxygen[2]	mg/L				

[1] All applications at all sites.
[2] Field testing.
[3] Field or laboratory testing.
[4] Samples shall be collected at three feet below the surface of the water body or at mid water column depth if the depth is less than three feet.
[5] Collect samples from a minimum of six application events for each active ingredient in each environmental setting (flowing water and non-flowing water) per year, except for glyphosate. If there are less than six application events in a year, collect samples during each application event for each active ingredient in each environmental setting (flowing water and non-flowing water). If the results from six consecutive sampling events show concentrations that are less than the receiving water limitation/trigger for an active ingredient in an environmental setting, sampling shall be reduced to one application event per year for that active ingredient in that environmental setting. If the yearly sampling event shows exceedance of the receiving water limitation/trigger for an active ingredient in an environmental setting, then sampling shall return to six application events for that active ingredient in each environmental setting. For glyphosate, collect samples from one application event from each environmental setting (flowing water and non-flowing water) per year.
[6] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136.
[7] 2,4-D, acrolein, dissolved copper, diquat, endothall, fluridone, glyphosate, imazamox, imazapyr, penoxsulam, and triclopyr.
[8] It is required only when a surfactant is used.

Sampling Procedures and Contamination Prevention

When taking the sample, the cap will be left on the bottle until it is at the depth appropriate for the type of pesticide and water body. A grab sampler extension will be used if necessary. If sampling depth is beyond reach of the grab sampler, the sample will be taken as deep as possible. Clean disposable nitrile gloves will be worn during collection. After filling laboratory supplied containers they will be returned to secondary containment (i.e. cooler or re-sealable bags). Samples will be delivered directly to the laboratory where appropriate Chain of Custody (COC) forms will be filled out.

Quail Lake Home Owners Association

Sampling per the above requirements will be performed at two sites within the Lake. Since Quail Lake isoperated in a static condition,the monitoring locations will be selected to represent the two types of treatments performed. The monitoring locations for entire lake or lagoon treatments will be selected from a location close to the lake outlet on the north end of the lake. The background and post event monitoring locations for spot lake treatments will be within the treatment areas. The event monitoring locations for spot lake treatments will be collected immediately outside of the treatment areas. Sampling will be performed immediately prior to, during, and post application as described in Attachment C. Reporting will occur annually (by March 1) and include field and lab data as required by Attachment C. Indermill Aquatics uses industry standard sampling procedures. Only trained technicians will retrieve samples from this project. Sample bottles will be pre-labeled to ensure accuracy and location. Samples will be transported and stored in a cooled environment until analysis is performed. Chain of custody forms will accompany all samples. All data will be reviewed on an ongoing basis during the performance of the project.

Howe Community Park Pond

Sampling per the above requirements will be performed at two sites within the Pond. Since Howe Community Park Pond is operated in a static condition, the monitoring locations will be selected to represent the two types of treatments performed. The monitoring locations for entire pond treatments will be selected from a location close to the lake outlet on the east end of the pond. The background and post event monitoring locations for spot pond treatments will be within the treatment areas. The event monitoring locations for spot pond treatments will be collected immediately outside of the treatment areas. Sampling will be performed immediately prior to, during, and post application as described in Attachment C. Reporting will occur annually (by March 1) and include field and lab data as required by Attachment C. Indermill Aquatics uses industry standard sampling procedures. Only trained technicians will retrieve samples from this project. Sample bottles will be pre-labeled to ensure accuracy and location.

Samples will be transported and stored in a cooled environment until analysis is performed. Chain of custody forms will accompany all samples. All data will be reviewed on an ongoing basis during the performance of the project.

Canyon Lake

Sampling per the above requirements will be performed at two sites within Canyon Lake. Since Canyon Lake is operated in a static condition, the monitoring locations will be selected to represent the two types of treatments performed. The monitoring locations for entire pond treatments will be selected from a location close to the lake outlet on the east end of the pond. The background and post event monitoring locations for spot pond treatments will be within the treatment areas. The event monitoring locations for spot pond treatments will be collected immediately outside of the treatment areas. Sampling will be performed immediately prior to, during, and post application as described in Attachment C. Reporting will occur annually (by March 1) and include field and lab data as required by Attachment C. Indermill Aquatics uses industry standard sampling procedures. Only trained technicians will retrieve samples from this project. Sample bottles will be pre-labeled to ensure accuracy and location. Samples will be transported and stored in a cooled environment until analysis is performed. Chain of custody forms will accompany all samples. All data will be reviewed on an ongoing basis during the performance of the project.

Best Management Practices (BMP)

The subsequent application procedures and BMPs shall be followed:

- The herbicide solutions shall not be allowed to mist, drip, drift, or splash onto non-targets.
- When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) that are likely to drift.
- Avoid applying at excessive speed or pressure.
- Monitor droplet sizes especially in extremely dry, somewhat windy, or humid conditions.
- Application should take place with wind speeds between 2 and 10 miles per hour (mph). With winds below 2 mph, application should be avoided due to variable wind direction and high inversion potential. Winds above 10 mph increase the chances for wind drifts, gusts, and application of herbicides to non-targets.
- Any water use restrictions will be addressed with the Quail Lake Lakefront association.
- Fish are commonly seen throughout the lake. Fish can be harmed during the application of aquatic herbicides/algaecides, which can reduce the amount of oxygen in the water. Only the minimum amount of aquatic herbicides and algaecides will be applied and only to the impacted area.
- Staff will have regular safety meetings prior to working with chemicals. During the meeting safety precautions will be reviewed as per the manufactures product label and SDS.Education on possible adverse effects from algaecide and aquatic herbicide applications will be covered during chemical safety training. Licensed applicators receive yearly and project specific training on all potential herbicides in use. The training consists ofevaluation of the current labels and material safety data sheets which delineate the possible adverse effects that can occur from applications with each specific herbicide or algaecide. In addition PCA's, QAL's, and QAC's are required to complete continued education hours every two years to be licensed with the DPR. The approved continued education courses and seminars educate PCA's, QAL's, and QAC's in a wide variety of topics including pesticide laws, regulations, and pest control methods.

Examination of Possible Alternatives to Algaecides and Aquatic Herbicides

Other BMPs to consider:

Weekly Lake Inspections – Observing overall site conditions within Quail Lake, such as changes in water color or clarity, odors, unusual aquatic life activity, excessive floating debris or algae, and noting weather changes and the impacts of these on lake conditions helps in determining overall lake health. These observations when compared side by side with water quality testing results can help determine patterns or cycles that the lake experiences, thus allowing further evaluation of current practices and future practices.

Ongoing Lake Maintenance – Regular debris removal program. The removal of trash, algae, and organic materials from the lake helps reduce nutrient loads that must be processed by the lake, ultimately reducing the amount of pesticides necessary to combat algae.

Aeration - Introducing oxygen to the water column is beneficial to lakes. Dissolved oxygen increases nitrogen removal rates. Additionally it encourages aerobic decomposition of organic materials, which leads to less sediment accumulation than anaerobic decomposition. This in turn reduces the release of gases and objectionable odors. Aeration can be achieved through diffusers or fountains placed throughout the lake to agitate surface water, eliminate stratification and increase water movement in otherwise static coves.

Applying a decision matrix concept to the choice of the most appropriate pest management formulation from the evaluated alternatives to algaecide and aquatic herbicide application

A combination of non-chemical alternatives for algae and aquatic weed treatment will be evaluated and implemented before the decision to use chemical treatments. At Quail Lake we have four fountains in place both on the south and north ends of the lake. There are also five vane compressor aerators in use in each of the coves where water movement might be slowed and the water could become stagnant. Each compressor has at least four diffuser heads equidistant around the cove to promote oxygenation and destratification throughout the cove. These tools all provide water movement, agitation, destratification and oxygenation to promote a healthy body of water. This is the first line of defense .These measures incorporated into the weekly inspections and ongoing lake maintenance reduce the need for chemical treatments. During the lake maintenance inspections if it is found that the nutrient load in increasing in the water body, non chemical treatments can them be performed. Treatments such as Phoslock can be broadcast throughout the system to control phosphorus in the water, thus reducing one of the main food sources for algae. If the evaluated alternatives fail to produce desired resultsThe decision to implement aquatic vegetation control treatments is basedon the plants growth stage and its potential to negatively impact the positive uses of a determined area. When it comes to deciding what the most appropriate formulation is, Indermill Aquatics will rely on a PCA to determine the formulation and write a recommendation after evaluating the specific species of pest, water quality, which formulation has the least impact on the surrounding environment, non-

target organisms, and human health and assessment of product labels and material safety data sheets.