

## FISHPOND CHECKLIST

We have checked your pond and:

- found mosquitoes.
- did not find mosquitoes.

- Your pond was treated for mosquitoes.
- Mosquitofish were added to your pond.

**Below are conditions found in your pond which may require attention to prevent mosquito problems:**

- Too much shallow area
- Plant growth too thick
- Too much organic material
- Not enough sunlight
- Plants hanging into water
- Leaves in pond are toxic to fish
- Runoff contamination possible
- Fish need protection from predators
- Waterfall pools hold water
- Other (see below)

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Checked by:

Date:

# Mosquito Prevention for Fishponds



## SAN MATEO COUNTY MOSQUITO ABATEMENT DISTRICT

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[www.smcmad.org](http://www.smcmad.org)

## MOSQUITOFISH

Keeping a healthy population of fish in your pond is a great line of defense against mosquitoes. Goldfish and koi will feed on mosquito larvae, but are not as effective as mosquitofish or other top-feeding minnows.

### The mosquitofish

Western mosquitofish (*Gambusia affinis*) are voracious predators of mosquito larvae. The adults can eat up to 500 mosquito larvae a day! They require no special feeding or care other than to protect them from garden sprays, chemicals, tannins leached from fallen leaves, and predators such as egrets and raccoons. Mosquitofish generally coexist peacefully with other pond fish.

Mosquitofish do not lay eggs but give birth to well-developed and very active young. They breed throughout the summer, producing new broods at monthly intervals. The newborn are approximately one-half inch in length and are immediately ready to begin the work of eating mosquito larvae. *Gambusia* grow rapidly, reaching a maximum size of about three inches. The fish become sexually mature when 4-5 months old; the earliest broods of the season are in April to May. Mosquitofish can live two to three years.

### How to obtain mosquitofish

The District provides mosquitofish free to the public. Residents living within the District's service area may call our offices to schedule a delivery. Residents living outside of the District's service area are welcome to pick up fish at our office at 1351 Rollins Road in Burlingame. Mosquitofish are normally available from April through October.

## REMOVING FISH PONDS

Unwanted, neglected fishponds are a problem for you and your neighbors. If you have a fishpond you no longer use or want, it can be altered or permanently removed to prevent mosquito problems:

### Completely remove the pond

To completely remove a fishpond, break up and remove the bottom and edge material. Fill the hole with soil.

### Provide for complete drainage

A pond may be prevented from causing a problem by breaking large holes in the bottom or removing the bottom. Drainage is successful if water does not stand for more than a few days. Check after rain to be sure drainage is sufficient to remove all the rainwater.

### Fill the pond with soil

Provide drainage as above, then fill the pond with good soil and landscape it. Allow for shrinkage of the soil and fill above the edges of the pond so that water will not stand on the surface. Mosquitoes can develop in water as shallow as 1/2" deep.

### District Services for Pond Owners

The San Mateo County Mosquito Abatement District provides a number of services to fishpond owners:

- ➔ Pre-construction, mosquito prevention and pond removal advice.
- ➔ Free mosquitofish. You may pick them up at our office or call the District to have them delivered to your pond.

Emergency treatment of mosquito larvae in your pond. We use materials that are very specific for control of mosquitoes and are safe for animals and aquatic plants.

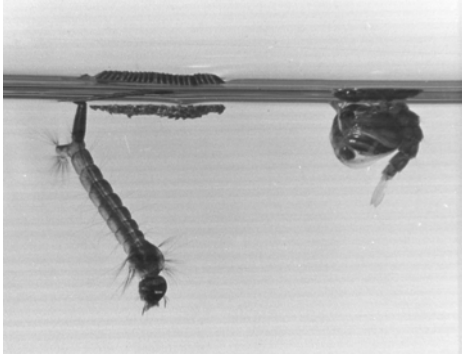


### WHAT'S THIS DOING IN MY POND?

Mosquito briquettes (left) provide long-lasting control for mosquitoes in fishponds. The active ingredient is a synthetic hormone that is specific to mosquitoes. Methoprene is non-toxic to other organisms, including people and pets.

## MOSQUITO LIFE CYCLE

Mosquitoes must have standing water to develop:



Mosquito egg raft, larva and pupa.

**Eggs:** Female fishpond mosquitoes deposit eggs in rafts (of up to 200 eggs) on the water surface. The eggs will then hatch into larvae.

**Larvae:** Because of their distinct movement through the water, larvae are commonly called “wrigglers”. They are very active, feeding on microorganisms and detritus and may be readily seen at the water surface. There are four larval stages followed by the pupal stage.

**Pupae:** These are also active, but non-feeding, and can be seen resting at the water surface. Because of their method of swimming, they are often called “tumblers”. During this stage, the transformation to the adult occurs. Upon completion of this change, the pupal case splits open to allow emergence of the adult.

**Adults:** Only adult mosquitoes live out of water. After biting to obtain a blood meal and mating, the females return to a water source to deposit eggs. Adult males do not take blood and feed only on plant juices and nectar.

## MOSQUITOFISH CARE

### When you first get your fish...

Make sure your pond water is properly treated to remove harmful chemicals (see page 4). You will also need to acclimate them to their new home. Float the closed bag of fish directly in the water for at least 20 minutes or until the water temperature inside the bag is equal to the temperature of the pond water. Then release the fish.

### Feeding your mosquitofish

There is no need to feed your fish. They will eat just about anything in the pond, including mosquitoes and insects that fall in the water. In the winter, the cold temperature slows them down, so they need even less food. An overfed fish will stop eating mosquitoes, and excess food can cause a bacterial bloom that is harmful to fish.

### QUICK FISH FACTS

Mature females are about 2½ inches long, and the males are about 1½ inches long.

Mosquitofish are live-bearing and produce 3 or 4 broods of 12-100 young per season.

Fish may not survive extremely cold winters in shallow ponds.

Mosquitofish will not thrive in densely shaded areas, but mosquitoes will! Locate the ponds so that it will receive some sunlight.

## CHLORAMINES

Tap water in San Mateo County is treated with chloramines (and not chlorine). Although these chemicals are toxic to fish, shellfish, reptiles and amphibians, they do not affect mosquitoes.

Chloramines are chemicals which contain chlorine and ammonia. Chloramines are considered safer for drinking water than chlorine because they reduce the formation of hazardous by-products and keep the bacteria-killing disinfectant in the pipelines for a longer period of time. Unlike chlorine, chloramines do not dissipate from water left standing overnight.

### What can you do to protect your fish?

Water used for fish must be treated in a way that remove both chlorine and ammonia components of the chloramines.



#### Treatments that work:

- putting the water through a properly sized activated charcoal filter or biological filter
- using conditioning chemicals designed to remove chloramines (available at pet stores, fish supply stores, and some variety stores)

#### Treatments that don't work:

- letting the untreated water stand outside for a day or two
- boiling the water first
- using chemicals that remove only chlorine



To be completely safe, always pre-treat your water before adding it to your pond, no matter how little you add. Treatment and test kits are available at most pet and fish supply stores. Chloramine residuals in treated water should be below 0.1 mg per liter.

For additional information, visit [www.sfwater.org](http://www.sfwater.org) or contact:

San Mateo County Water Quality—(650) 363-4305  
State Water Resources Control Board—(916) 341-5250  
Environmental Protection Agency, Region 9—(415) 941-8000  
San Francisco Public Utilities Commission—(877) 737-829

## MOSQUITOES AND FISHPONDS

Once the pond is built, there are some things that can be done to ensure that you do not create habitat for mosquitoes. Most mosquito problems can be prevented by taking the following steps:

- Stock your pond with goldfish, koi, and/or mosquitofish.
- Keep landscape plants trimmed away from the pond edge.
- Fallen leaves are toxic to fish. Remove dead vegetation frequently.
- Thin or remove excess aquatic plants.
- Avoid having shallow edges (see diagram).
- Circulating water, such as pumps and fountains, will prevent mosquitoes from breeding.
- Fill gaps between rocks with gravel.
- Keep water depth greater than 6 inches. The deeper the water, the better.

### Potential mosquito producing areas in a typical pond

