

## Eurasian Watermilfoil

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Eurasian watermilfoil (*Myriophyllum spicatum*), an aquatic weed growing in Lake Tahoe, especially the Tahoe Keys and most protected dock areas, has boaters seething. This water weed grows rapidly and forms a dense canopy at the water's surface, interfering with recreation, inhibiting water flow, and tangling boat propellers. It is also found in the first few miles of the Truckee River beyond the dam. If ignored, it has the potential to travel all the way to the Stillwater Wildlife Refuge, fouling the river by crowding out native plant species, destroying wildlife habitat, and interfering with recreational activities.

### Where did it come from?

No one is certain how Eurasian watermilfoil reached North America. It is widespread in its countries of origin: Europe, Asia, and North Africa. Reports suggest that it was introduced to the United States in the late 1800s, but it may have been confused with look-alike native species.

Eurasian watermilfoil was probably introduced intentionally as a water plant or unintentionally as a contaminant of shipping ballast. It soon spread across America. It is established in 44 states and continues to expand its presence in new locations. In Nevada, it is found in Lake Tahoe, the upper Truckee River, and probably in other lakes and ponds.

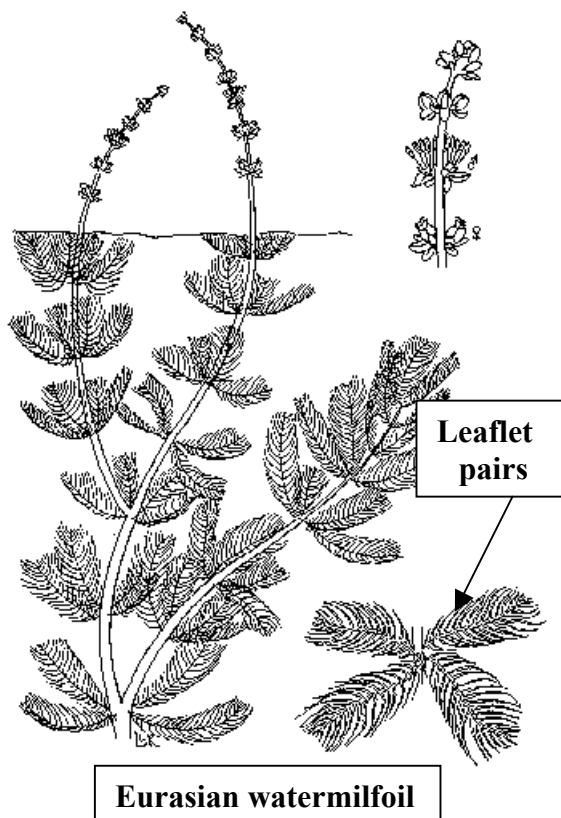
### What does it look like?

A submersed, rooted, aquatic perennial, Eurasian watermilfoil has smooth stems that branch near the water's surface. It grows from six to nine feet long with long, vine-like stems. The featherlike leaves are up to 1½ inches long, and are whorled about the stem in groups of four. The

leaflets grow in pairs of more than 12 on each leaf. This helps distinguish Eurasian watermilfoil from native species, but is not a consistent characteristic. Fragments of the stem that have nodes are capable of growing roots and starting new plants.

**Nodes:** growing points for leaves, stems, branches, and roots.

The plant flowers during the summer months. The flower stem is a rigid pink-flowering spike up to eight inches long that is held erect above the water during flowering. The fruit contains four seeds. The seeds have a fairly low germination rate, but seem to be long-lived.



## How to tell Eurasian watermilfoil from other milfoil species:

- Count the pairs of leaflets. Eurasian watermilfoil generally has twelve or more pairs.
- The leaves of Eurasian watermilfoil collapse around the stem when it is removed from the water. Native species are more sturdy and maintain their spread-leaf shape.
- Eurasian watermilfoil leaves occur in whorls of four around the stem.

## Where does it grow?

This aquatic weed is found in ponds, lakes, irrigation canals, and rivers. It prefers quiet waters, but can be found in flowing and backwater areas of rivers. It tends to grow in waters up to 20 feet deep, depending on light penetration. Most plants are found in waters to 10 feet deep. In Lake Tahoe, due to exceptional clarity, Eurasian watermilfoil could grow at much greater depths.

The key factor for the establishment of this weed is a protected area with still water. Often, the first outbreaks are seen in marinas and near breakwaters. Populations of Eurasian watermilfoil have been reported in the Tahoe Keys marina at the south end of Lake Tahoe since the 1960s, and 160 acres are infested today. Aerial and boat surveys in 1995 found the weed in numerous other locations around the lake, including Emerald Bay, Crystal Bay, Elk Point Marina, and Ski Run Marina. Populations increased in size dramatically from 1995 to 1996 due to the wet, stormy winter. The flood of January 1997 which resulted in record high levels of water in Lake Tahoe was probably instrumental in spreading the weed into the Truckee River.

The plant is quite tolerant of various sediment types, and will thrive in brackish waters with a salinity of up to 10 parts per thousand (10,000 ppm).

## How is it spread?

Eurasian watermilfoil spreads primarily by plant fragments, although seeds also contribute to its spread. These fragments grow roots, stems, and leaves as they float along in water. Eventually they attach and take root

in the bottom sediments of ponds, lakes, or slow waters of streams and ditches. Rooted plants also spread by sending out stolons to produce new plants. The stored seeds in lake sediments also start new plants.

As the plant is easily spread by fragments, transport on boating equipment plays the largest role in contaminating new water bodies. A single stem fragment hitching a ride on a boat or trailer can spread the plant from lake to lake.

## Why should we be concerned?

Like most invasive non-native weeds, Eurasian watermilfoil competes aggressively with native aquatic plants. It begins spring growth earlier by elongating from shoots grown the previous fall. Because it tolerates low water temperatures, it quickly grows to the water's surface early in the year and forms dense canopies that shade surrounding vegetation and keep the water significantly cooler. Low light and cooler temperatures give this weed a competitive advantage.

This weed's rapid growth and eventual decay degrades water quality and uses up oxygen needed to support fish populations. This decreases the numbers and diversity of native plants. In Lake George, New York, it reduced native plants from 5.5 to 2.2 species per square meter in just two years.

Eurasian watermilfoil accelerates nutrient cycling by moving nutrients out of lake sediments and leaking them into the water. The plant concentrates large quantities of sediment phosphorus in its tissues. As the vegetation dies and decays, the phosphorus is released into the water. This could increase the availability of nutrients for algal growth in Lake Tahoe, which in turn would reduce the lake's water clarity.

This weed creates problems for boaters, recreationists, managers, and individual landowners. The dense, matted growth restricts boating, water skiing, swimming, and fishing. The vine-like stems wrap around propellers and may be sucked into water intakes. When the tangled mats of weeds die, they result in fouling of lakeside beaches and may contribute to problems of "swimmer's



itch” by providing habitat for the snail that harbors this parasite. It may also clog water intakes to cooling towers, farm ponds, canals, ditches, and irrigation equipment. The cost of control can become a serious burden for communities, businesses, and property owners.

## **What can we do to control this weed?**

It is important to establish goals to manage Eurasian watermilfoil, including:

- Eradicating populations whenever possible.
- Reducing the mass of plant growth during the summer.
- Supporting native and beneficial plant populations to help reestablish high quality habitat and help compete with the weed after eradication.
- Implementing prevention programs to stop the spread of the plant into waterbodies that are currently weed-free.

There are a number of techniques currently used to decrease populations of Eurasian watermilfoil. In most cases, it may not be possible to completely eradicate the weed. For this reason, a comprehensive prevention program is essential.

The top growth of Eurasian watermilfoil can be killed by emptying and drying the lake or pond for several weeks. Unfortunately, this often is not a realistic option. This does not kill the root system easily, and if the plants are re-wetted too soon, growth may resume. Drying will also have an undesirable effect on other plant and animal species. Other methods, including harvesting, dredging, or chemical applications, may be more practical.

### Mechanical Harvesting

Mechanical harvesting is used to reduce the plant mass to allow boat traffic and recreational uses. Harvesting rigs on boats cut through and gather plant material to about the six foot depth. The plants quickly regrow, and the process must be continually repeated, much like mowing a lawn. In the Tahoe Keys, three harvesters are at work from May through September to keep the marina accessible to boats. By removing the biomass, some of the accumulated nutrients can also be removed. Unfortunately, because a lot of cut plant material is moved, the potential for spreading the weed is high, especially to downstream locations.

For this reason, it is wise to apply systemic herbicides prior to harvest so plant fragments do not grow new plants.

### Diver-Assisted Dredging

Diver-assisted dredging is used to physically remove Eurasian watermilfoil from small infestations in marinas, generally under one acre in size. Dredging and hand-pulling are not too difficult, and can result in the removal of the entire plant, including the roots and shoots. Dredging disturbs the sediments and produces turbid water. Dredging operations should be contained and isolated from the surrounding water using suitable management measures such as silt containment curtains. Dredging may be regulated by public agencies such as the California Regional Water Quality Control Board, Lahontan Region (in California); the Nevada Division of Environmental Protection (in Nevada); and the Tahoe Regional Planning Agency at Lake Tahoe. Contact these agencies to determine the permitting requirements and conditions that may apply to dredging.

### Chemical Control

Herbicides (chemicals that kill plants) have been used to control Eurasian watermilfoil. Systemic herbicides, those taken up and distributed throughout the plant, kill the entire plant. These are preferable to contact herbicides that only kill the above ground plant, but do not affect the roots and prevent regrowth. Aquatic herbicides labeled for use with Eurasian watermilfoil include copper compounds, fluridone (Sonar®) and 2,4-D. Because copper compounds may be toxic to fish and may accumulate in sediments, it is unlikely they will ever be used in Lake Tahoe, but may be effective in closed ponds.

Fluridone is a systemic herbicide that affects the ability of plants to photosynthesize. It is used at extremely low rates (10 to 20 parts per billion), but requires a long contact time of four to six weeks. Triclopyr currently has an experimental use permit only for aquatic applications. This chemical is selective for broadleaves like Eurasian watermilfoil, has no effect on native pond weeds, and has little effect on aquatic invertebrates. It requires a short contact time, 48 hours, and is used in higher concentrations of 1.5 to 2.5 parts per million.



**Milfoil weevil  
(*Euhrychiopsis  
lecontei*) on  
Eurasian  
watermilfoil**

### Biological Control

In the long term, probably the best chances for effective, non-toxic control of Eurasian watermilfoil involve the use of insects that specialize in eating only this weed. To be successful, the insects must become established, reproduce, and cause damage only to this weed. A disease specific to Eurasian watermilfoil would have to have the same specific action.

Efforts are underway to identify insects which are native to Nevada or California that prey on the plant and help control it. A North American native milfoil weevil, *Euhrychiopsis lecontei*, has been identified in several studies in other states and Canada. The weevil completes all life stages fully submersed, and the larvae are stem miners. The eggs are laid on milfoil meristems, and the larvae eat and bore down through the stem, suppressing plant growth. So far, it has been successful only at certain sites, and is in use only in the eastern part of the United States, although it has been found in Washington state.

### **How can we stop the spread of Eurasian watermilfoil?**

Prevention is the key to controlling the spread of this invasive weed. You can help by:

- Inspecting your boating/fishing equipment and cleaning **all aquatic vegetation** from your boat and trailer before leaving any boat ramp.
- Removing **all plants and other debris** from boats, motors, trailers, and other equipment before launching--especially if you have been in an infested area.

- Draining livewells and bilge water before leaving infested areas.
- Disposing of any plant debris away from the lake.
- Emptying your bait bucket on land, never into the water. Never dip your bait/minnow bucket into one lake if it has water in it from another. And never dump live fish from one water body into other waters.
- Reporting any aquatic vegetation you suspect is Eurasian watermilfoil to the Nevada Division of Agriculture at (775) 688-1180 or University of Nevada Cooperative Extension at (775) 784-4848.
- Passing the word about Eurasian watermilfoil to your friends and neighbors so they'll help identify and control this problem weed.

### **Bibliography**

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### **For more information, write or call:**

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