

KEEP INVASIVE MOLLUSKS OUT OF LAKE TAHOE: CLEAN, DRAIN, AND DRY YOUR BOAT EVERY TIME

Invasive Aquatic Mollusks:



Asian Clam (*Corbicula fluminea*)

Size: 1 to 1 1/2 inches (25 to 40 mm)

Food: These clams filter particles suspended in water, including bacteria, algae, and detritus.

Preferred Habitat: silt, sand, and gravel in near-shore areas from approximately 10 to 30 feet (4 to 10 m)

Primary Means of Introduction: intentional release of aquarium clams, angler bait dumping, microscopic larvae transferred via un-drained boats

Already present in South Lake Tahoe

Photo Credit: U.S. Geological Survey, Florida Integrated Science Center

ZEBRA MUSSEL



QUAGGA MUSSEL



Zebra Mussels (*Dreissena polymorpha*) and Quagga Mussels (*Dreissena bugensis*)

Size: 1/4 to 1 1/2 inches (5 to 40 mm)

Food: These mussels filter particles suspended in water, including bacteria, algae, and detritus.

Preferred Habitat: hard substrate from 10 to 200 feet (4 to 60 m)

Primary Means of Introduction: Adults attach to watercraft and fishing gear, and microscopic larvae are transferred in water of un-drained boats.

Currently **not present in Lake Tahoe**; however, quagga mussels were recently discovered in Lake Mead. Please **clean, drain, and dry** your fishing gear and watercraft. **Both mussels have devastating impacts on aquatic ecosystems.**



New Zealand Mudsnails (*Potamopyrgus antipodarum*)

Size: Small! 1/10 to 1/5 inch (2 to 6 mm)

Food: periphyton (algae)

Preferred Habitat: silt, sand, cobble, and aquatic vegetation at depths from 13 to 130 feet (4 to 40 m)

Primary Means of Introduction: attached to watercraft and fishing gear, larvae in water of un-drained watercraft

Currently **not present in Lake Tahoe**, but have invaded many areas of the West. Please help to keep these invaders out of Lake Tahoe! More information on how to prevent the spread of New Zealand Mudsnails is available from the California Department of Fish and Game:
<http://www.dfg.ca.gov/invasives/mudsnail/>

Photo Credits: R. Draheim, Portland State University Center for Lakes and Reservoirs

Invasive species cause serious economic and ecological damage to aquatic ecosystems.

The Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG) is currently working to prevent invasions in Lake Tahoe. The public is invited to attend meetings and encouraged to volunteer!

For more information, please go to <http://www.tahoercd.org/AquaticInvasives.php>, or contact the Tahoe Resource Conservation District (TRCD) at 530-543-1501, ext. 113

BUT DON'T CONFUSE THEM WITH NATIVE CLAMS, MUSSELS, AND SNAILS!

Lake Tahoe's Native Mollusks:



Fingernail/Pea Clam (*Pisidium*)

Size: Small! 1/25 to 1/5 inch (1 to 5 mm)

Food: These clams filter bacteria, algae, and detritus suspended in water.

Preferred Habitat: silt, sand, and clay at a wide range of depths, ranging from 6 to 600 feet (2 to 180 m)



Dextral Pond Snail (*Lymnaea* or *Fossaria*)

Size: 1/10 to 1/2 inch (3 to 13 mm)

Food: periphyton (algae)

Preferred Habitat: cobble or aquatic vegetation, from 6 to 130 feet (2 to 40 m)

*Note that the snail is right-handed (dextral). When you hold the snail with the opening (aperture) facing you, the opening is on the right-hand side.

Photo credit: National Oceanic and Atmospheric Administration (NOAA)/Great Lakes Environmental Research Laboratory (GLERL)



Sinistral Pond Snail (*Physella*)

Size: 1/5 to 1/2 inch (5 to 13 mm)

Food: detritus and associated bacteria at the bottom of the lake

Preferred Habitat: cobble or aquatic vegetation in shallow water

*Note that the snail is left-handed (sinistral). When you hold the snail with the opening (aperture) facing you, the opening is on the left-hand side.

Photo Credit: Freshwater Gastropods of North America (FGNA) Project



Ramshorn Snail (*Planorbidae*)

Size: Approximately 1/5 to 1/2 inch (5 to 15 mm)

Food: detritus and associated bacteria at the bottom of the lake

Preferred Habitat: silt, cobble, or aquatic vegetation in shallow to deep water, 6 to 400 feet (2 to 120 m)

Photo credit: International Wildlife Museum



Freshwater Limpet (*Ferrisia fragilis*)

Size: 1/25 to 1/5 inch (1 to 4 mm)

Food: periphyton (algae)

Preferred Habitat: cobble or aquatic vegetation in relatively shallow water

Photo credit: Martin Kohl



Western Pearlshell Mussel (*Margaritifera falcata*)

Size: 2 to 3 1/2 inches (50 to 85 mm)

Food: Larvae are parasitic on fish. Adults filter algae, bacteria, and detritus suspended in water.

Preferred Habitat: sand, gravel, cobble, and boulder habitat in streams and rivers (ex. Upper Truckee River)

Photo credit: D.L. Gustafson

Invasive Aquatic Plants of Lake Tahoe



Eurasian Water-milfoil (*Myriophyllum spicatum* L.)

Characteristics: long underwater stems, feathery foliage, tolerant to shallow and deep waters, distinguished from native milfoil by threadlike leaflets usually found in pairs of more than 14

Primary Means of Introduction: native to Europe and Asia, present in much of the United States and Canada, spread from lake to lake by boat trailers and aquarium dumping, has been spreading around Lake Tahoe for 15-20 years

Problems: impedes water flow, disrupts navigation, inhibits recreational activities, decreases water quality, reduces plant diversity

Management: physical (hand pulling, harvesting, cutting) and mechanical control

Prevention: clean all vegetation off boats and equipment

Established communities present in Lake Tahoe. Current management techniques controlling populations; eradication is not achievable.

Photo credit: Robert Johnson, Cornell University. Ruthanna Hawkins, Cayuga Lake Watershed Network



Curly Leaf Pondweed (*Pontamogeton crispus* L.)

Characteristics: submersed aquatic plant with oblong blue-green leaves that have very wavy margin, reproduces by turions (see inset)

Primary Means of Introduction: native to Eurasia, Africa, and Australia; has begun to expand rapidly in Lake Tahoe over the past three years; primarily has spread in warm, shallow waters (such as marinas)

Problems: impedes water flow, disrupts navigation, inhibits recreational activities, decreases water quality, reduces plant diversity

Management: physical (hand pulling, harvesting, cutting) and mechanical control

Prevention: clean all vegetation off boats and equipment

Established communities present in Lake Tahoe. Current management techniques controlling populations; eradication is not achievable.

Photo credit: Three Lakes Council, South Salem, New York
Photo credit (inset): Leslie J. Mehrhoff, University of Connecticut

Eurasian water milfoil and curly leaf pondweed populations are highly concentrated in the South basin, near the Tahoe Keys area, with smaller populations throughout the lake. Both plants currently dominate the submersed aquatic plant community, causing increased nutrient pumping from sediment (a cause of decreased water clarity).

The Lake Tahoe Aquatic Invasive Species Working Group (LTAISWG) is currently working to prevent the spread of invasive species in Lake Tahoe. The public is invited to attend LTAISWG meetings and is encouraged to volunteer!

For more information about aquatic invasive species, please go to <http://www.tahoercd.org/index.php/ISP/aquatic>

Native Aquatic Plants of Lake Tahoe



Andean Milfoil (*Myriophyllum quintense*)

Characteristics: feather-like submersed leaves in whorls of two to four, blue-green emergent leaves, tiny flowers (0.7mm-1.2mm long) with four petals located at base of emergent leaves, may form multiple flower stalks, often flowers in August or September (later than most other milfoils)

Importance: provides habitat of aquatic animals and stabilizes sediment

Photo credit: Jennifer Parsons, Washington State Department of Ecology

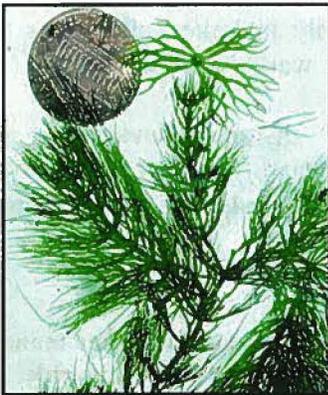


Canadian Waterweed commonly known as Elodea (*Elodea canadensis*)

Characteristics: submersed leaves are bright green, translucent, oblong, 6-17 mm long and 1-4 mm broad; small white or pale purple flowers float at the surface

Importance: provides good habitat for many aquatic invertebrates and cover for young fish and amphibians

Photo credit: Christian Fischer



Coontail (*Ceratophyllum demersum*)

Characteristics: floats freely below the surface, no roots, 0.5-4 cm long leaves are forked into 2 flattened segments, leaves often somewhat stiff, leaves arranged in whorls of 5 to 12, tiny submersed green flowers present from June through September

Importance: provides habitat plant for young fish, small aquatic animals, and aquatic insects

Photo credit: Clayton Antieau, Washington State Department of Ecology



Leafy Pondweed (*Potamogeton foliosus*)

Characteristics: linear leaves that are 2-10 cm long and 1-2.5 mm wide, fibrous roots emerging from threadlike rhizomes, flowers have 2-4 whorls on an initially crowded spike (1 cm)

Importance: seeds and vegetation provide cover and food for aquatic animals

Photo credit: Clayton Antieau, Washington State Department of Ecology