

This WEED REPORT does not constitute a formal recommendation. When using herbicides always read the label, and when in doubt consult your farm advisor or county agent.

This WEED REPORT is an excerpt from the book *Weed Control in Natural Areas in the Western United States* and is available wholesale through the UC Weed Research & Information Center (wric.ucdavis.edu) or retail through the Western Society of Weed Science (wsweedsociety.org) or the California Invasive Species Council (cal-ipc.org).

Hydrocotyle ranunculoides L.f.

Floating pennywort

Family: Apiaceae

Range: Oregon, Washington, Arizona, and California. Also very common in the southern United States.

Habitat: Ponds and lake margins, marshes, low swamps, slow streams, irrigation and drainage ditches.

Origin: Floating pennywort is a widespread native of North America. Plants are sometimes sold as aquatic or pond ornamentals and have escaped cultivation in some regions. In Britain, floating pennywort has become a problematic weed of natural aquatic habitats, and in southern and western Australia, it is a government listed noxious weed.

Impacts: In natural areas, colonies are usually considered a desirable component of aquatic ecosystems. Because of its creeping habit, floating pennywort can be a nuisance in irrigation and drainage ditches. It has become a more prevalent problem in some areas where water hyacinth has been controlled.



Floating pennywort is an aquatic or terrestrial perennial with branched creeping stems that root at the nodes. Plants grow in dense, low-growing mats in shallow water or on wet soil near water. Occasionally small colonies are free-floating. The foliage is glabrous and somewhat fleshy. Stems are easily fragmented. The leaves are alternate and round or kidney-shaped.

The inflorescence is a simple umbel with ~5 to 10 flowers on stalks usually shorter than the leaves. Flowers consist of five greenish- or yellowish-white to purplish petals. Fruits (schizocarps) separate into halves at maturity. Plants reproduce by seed and/or vegetatively from creeping stems and stem fragments. Seeds and stem fragments primarily disperse with water. In Britain, floating pennywort plants rooted in the substrate produce seed, while floating colonies primarily reproduce vegetatively. There are no data to indicate seed longevity in the soil, but it is expected to be around 3 years based on other members of the Apiaceae.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, chopping)	Construction of dams or narrow restrictions in rivers and streams can create still water conditions that are favorable to establishment of pennywort. Even high-flowing river systems are susceptible to infestations in quiescent areas near turns and within riparian vegetation such as cattails and bulrushes. Mechanical harvesting can be effective. Best results are achieved when closed systems are used to transport harvested plants to local landfill or composting sites. Mechanical removal followed by hand picking four times a year during the growing season is now the accepted practice in the UK. Mechanical choppers and shredders leave viable pieces of pennywort rhizomes that can easily reestablish populations, and also provide an opportunity for dispersal by moving water or wind.
Cultural	Although pennywort is a native plant, it can create large mats when there are sufficient nutrients in the water and when roots can access sediment-borne nutrients (e.g. shallow water and shorelines). Some suppression in mat size and density can be achieved if there is adequate shoreline shade from trees. Dewatering (drawdown) small lakes or ponds alone will not control pennywort, but can be done to allow scraping and removal with large equipment. This may also provide the opportunity to use foliar-applied herbicides without overspraying water.
Biological	There is some interest in developing biological control agents in the UK, and a weevil native to South America, <i>Listronotus elongates</i> , has been identified as a candidate. The triploid (sterile) grass carp (white amur) is a relatively nonselective herbivorous fish that will consume pennywort if its more favored submersed plants are absent. This may be an effective method in small ponds or lakes that do not support many plants. Permits are required for use of grass carp in most U.S. states.

CHEMICAL CONTROL

The following specific use information is based on reports by researchers and land managers. Other trade names may be available, and other compounds also are labeled for this weed. Directions for use may vary between brands; see label before use. Herbicides are listed by mode of action and then alphabetically. The order of herbicide listing is not reflective of the order of efficacy or preference.

GROWTH REGULATORS	
2,4-D <i>Weedar 64</i>	<p>Rate: 1 to 4 pt product/acre (0.48 to 1.9 lb a.e./acre) with a non-ionic surfactant</p> <p>Timing: Postemergence in spring to early summer. However, mid-summer to early fall applications can also be effective in suppressing growth.</p> <p>Remarks: 2,4-D is a relatively fast-acting, selective systemic herbicide. Repeated application of 2,4-D amine, at intervals of 3 weeks, delays regrowth of the plant by up to 12 weeks.</p>
Triclopyr <i>Renovate</i>	<p>Rate: 4 to 16 pt product/acre (1.5 to 6 lb a.e./acre) with an approved non-ionic surfactant</p> <p>Timing: Postemergence in early spring to early summer. Applications in mid-summer can also suppress growth, but may give rapid dieback that can result in depressed dissolved oxygen.</p> <p>Remarks: Triclopyr is a selective, systemic herbicide. Lower rates can be used if applied during early spring growth when plants are small.</p>
BRANCHED-CHAIN AMINO ACID INHIBITORS	
Bispyribac-sodium <i>Tradewind</i>	<p>Rate: 1 to 2 oz product/acre (0.8 to 1.6 oz a.i./acre)</p> <p>Timing: Postemergence from early spring to early summer during the period of rapid growth. Treatments may need to be repeated, but allow 30 days between applications and do not exceed four applications per year or 8 oz product/acre/year.</p> <p>Remarks: Bispyribac-sodium is a slow-acting herbicide that may take 4 to 6 weeks to achieve control. It can also be tank mixed with other herbicides.</p>
Imazamox <i>Clearcast</i>	<p>Rate: Broadcast treatment to emergent foliage: 2 to 4 pt product/acre (4 to 8 oz a.e./acre). Spot treatment: 0.25 to 5% v/v solution</p> <p>Timing: Postemergence from early spring to early summer during the period of rapid growth.</p> <p>Remarks: Use an approved surfactant. Aerial application is approved in some states.</p>
Imazapyr <i>Habitat</i>	<p>Rate: Broadcast treatment to emergent foliage: 1 to 2 pt/acre (4 to 8 oz a.e./acre). Spot treatment: 0.5% v/v solution using 100 gal/acre spray solution.</p> <p>Timing: Postemergence in early spring to early summer when new growth is present.</p> <p>Remarks: Imazapyr is a relatively slow-acting systemic herbicide.</p>
CONTACT PHOTOSYNTHETIC INHIBITORS	
Diquat <i>Reward</i>	<p>Rate: Spot treatment to emergent shoots: 0.5% v/v solution or 2 qt per 100 gal water</p> <p>Timing: Postemergence in spring to early summer. Repeat treatments may be needed in mid-summer.</p> <p>Remarks: Diquat is a contact herbicide that is inactivated in turbid water. Use only clean water to mix and spray herbicide. Repeat applications are required to achieve eradication.</p>

RECOMMENDED CITATION: DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544 pp.