

## **Stinkwort**

Brownsey, Kaiser and DiTomaso (2013) provide a good overview of invasion risk, impacts and management of stinkwort in California. Here's the link: <https://wric.ucdavis.edu/PDFs/CalAg6702p110-2013.pdf>

I generally think of stinkwort as an invader of disturbed spaces (roadsides, recent construction areas or other areas of ground disturbance, edges of seasonal ponds, sandy washes, pig wallows). It is noticeable in these areas as dense infestations. It seems to move with human activity such as mowing, and with gravel piles so BMPs for prevention of weed spread are good to do. In its native Mediterranean range, stinkwort inhabits regularly disturbed riparian, marsh, and ruderal habitats such as floodplains, sandbars, marsh transition zones, vernal pools, and alluvial plains. It would appear to not do so well when there is too much shade or thatch. Or it may be competition from other rangeland plants that limit's its ability to impact rangelands.

In areas recently affect by fire, I have noticed an apparent stinkwort expansion due to the increased availability of bare soil and light. These are not dense infestations but they are widespread through areas that burned hot enough to leave bare soil. This is mainly in chaparral areas and forested areas that had little herbaceous competition to begin with. For example, oak savanna woodland that had abundant grasses and forbes pre-fire saw those plants grow back first, before stinkwort could establish. Greg De Nevers noticed a similar pattern for stinkwort at Pepperwood in areas burned by last October's fire.

I expect that many of these plants will not persist as vegetative conditions return to what they were. But the recent fire may help stinkwort spread and establish in new suitable areas. The approach for control we are taking at Annadel State Park is to ensure it doesn't establish in likely habitat or near listed plants or special communities. Preventing it's establishment around Ledson Marsh at Annadel for example.

Stinkwort can be controlled by hand pulling, hoeing, mowing, or herbicide applications when plants are actively growing in July and August. The oils on the plant complicates herbicide treatment without the right surfactant. Once the plant flowers care should be taken in disposing the plants since seeds can still develop on pulled plants. Once it starts producing seed, management activity can make the infestation worse or spread it around to new places. So avoid working around the plant in October once it has started seeding. It appears to have a short seed bank viability (3 years?). Removing the first plants before a seed bank is established can do a world of good.

## **Duckweed**

I don't know much about duckweed control. But in general, plant growth in aquatic systems can be limited by nutrient availability – so controlling organic inputs can help. Otherwise, mechanical removal via skimming or raking is an option. Duckweed doesn't like moving water so aeration that breaks up the surface of the water can help and it tends to keep the duckweed at the stagnant margins. Of course, implementing these options in a natural system is problematic.

William (Bill) Miller, Environmental Scientist  
California State Parks – Bay Area District, [william.miller@parks.ca.gov](mailto:william.miller@parks.ca.gov)

**Mosquitofern** is a native that tends to populate areas similar to duckweed: slow moving, warm, high-nutrient water.

With a small canoe you could collect much of the mosquitofern biomass and move it away from the pond. Then, using some kind of aeration system would work the best to reduce the re-infestation. If water is oxygenated and moving, the conditions won't be as conducive to mosquitofern growth.

There are also herbicides that would work on mosquitofern, but if the conditions in the ponds are good for this plant, then it will come back over time.

I have attached an informational document to this email from UC Davis Weed Research and Information Center.

There is probably duckweed mixed in with the mosquitofern. The same management strategies would apply.

Jon M. O'Brien, PCA, Senior Environmental Scientist-Specialist  
Floating Aquatic Vegetation Unit, Division of Boating and Waterways, CA State Parks and Recreation