Phalaris aquatica Control at a Remnant Coastal Terrace Prairie in Richmond, CA


The Watershed Project restoration stewardship program University of California, Berkeley’s Richmond Field Station in Richmond, California

Abstract

The Richmond Field Station supports one of the last remnants of coastal terrace prairie within the surrounding San Francisco Bay Area. This prairie contains remarkable diversity and over 80% native plant cover in the grassland’s core. Surrounding the intact prairie, however, invasive Phalaris aquatica dominates, and pioneer populations have begun to gain foothold in the core section. In order to preserve this biodiversity, and to inform restoration efforts on similar sites, plots were established to test different control and eradication techniques. If aquatic patches are prioritized for removal based on their proximity to areas that support the species richness nadir. Control methods include hand-removal, herbicide application, mowing, hand-cutting, and recycled carpet cover. Preliminary monitoring indicates that the treatment results vary widely. This experiment aims to develop an effective and adaptive approach for restoration in an environment of limited resources.

The Problem

Phalaris aquatica (bulrush) is native to the Mediterranean and has become a widespread invasive plant throughout most of California. Formerly, no native-competitive species coexisted with P. aquatica as it colonized the region. This species has become well-established in the remnant coastal terrace prairie within the Richmond Field Station, with patches of greater than 80% coverage. P. aquatica is not only found in, but is most often found in, wetland and floodplain areas of the prairie. Because Phalaris can severely impact other species, one of the key restoration strategies is the control of P. aquatica.

Mapping & Prioritizing Treatment Areas

Semi-automated digitizing of Phalaris patches within the Richmond Field Station was performed to establish prioritization patches of P. aquatica based on their proximity to regions of the prairie containing the highest diversity and abundance of native plant species. A total of three treatment plots were established with each plot consisting of two sub-areas. Each sub-area contained points of interest (b) and non-interest (a) native plant species. Additionally, points of interest were selected to minimize the number of repeat point locations. The total area of these plots is 1100 square feet (0.30 acres).

The scientific team will prioritize the plots for further hand-removal treatment based on the species richness and impact of Phalaris patches on native plant species. The team will be working to develop effective and adaptive treatment methods that can be implemented in other coastal terrace prairies threatened by Phalaris aquatica.

Preliminary Results

Hand-removal more effective than herbicide

Herbicides and soil disturbance plots, which widely had greater than 70% cover of P. aquatica, have 40% or greater native plant cover. In April 2006, 1 - 16 months after initial treatment, as of this date, the remaining herbicide plot has over 60% native plant cover. The presence of pioneer species and P. aquatica indicate the importance of maintaining high native cover and reducing the amount of bare soil in the prairie. Additional research is needed to determine the effectiveness of herbicides in this environment.

Thick applications of raised redwood needles and sandbags

Sandbags and redwood needles were used to cover areas near P. aquatica plots to determine whether there was suppression of the plants. After 4 - 6 months of treatment, the sandbags and needles have been found to be effective in reducing the growth of P. aquatica. The presence of redwood needles and sandbags will improve the overall success of the restoration efforts.

Future Actions

Hand-removal will continue to be an effective treatment to manage Phalaris populations. The team will be working to develop an effective and adaptive approach for restoration in an environment of limited resources. Preliminary results indicate that hand-removal treatment is more effective than herbicide treatment. Additional research is needed to determine whether hand-removal is more effective than herbicide treatment. Additional research is needed to determine whether hand-removal is more effective than herbicide treatment.