Appendix 2

Guidelines for Mowing Harding Grass Within and Adjacent to Coastal Terrace Prairie Habitat at the University of California, Berkeley Richmond Field Station

Introduction

Mowing is one of many tools that can be employed for habitat restoration. In the University of California, Berkeley Richmond Field Station (RFS) grassland, it is a promising means to control the dominant non-native invasive species, Harding grass (*Phalaris aquatica*), and to promote the health of native grassland species. There are two specific goals for mowing Harding grass: 1) with proper timing, this tool can be used to weaken and reduce the spread of established stands of Harding grass, and, 2) to prevent the development of viable seed and continued spread of this invasive plant. Mowing can also be an effective tool for controlling other invasive non-native species, such as European annual grasses, teasel and fennel. These Guidelines apply to mowing the RFS coastal terrace prairie with lawn mowers, brush cutters, and other hand held equipment (as a follow-up to mowing along edges or in areas with small patches of weeds that cannot be reached by mowers).

History

Anecdotal history suggests that RFS grassland had been mowed for both fire suppression as well as aesthetics since the 1950's when UC Berkeley acquired the property. In the early 1990s, mowing in areas of the grassland was halted due to concerns about potential damage to native California coastal terrace prairie species. In hindsight, this cessation of mowing has proven to be in part misguided. Although there is no proven causal link, it has been observed that after mowing in the grassland ceased, the Harding grass population has expanded in range. Today, Harding grass covers over 40% of the grassland, confirming the belief that mowing is a means to control the rapid spread of Harding grass. In the summer of 2006, mowing of Harding grass was resumed as a desired management strategy to control the spread into unaffected areas.

Mowing Procedures

1) <u>Delineation of no-mow zones:</u>

Before mowing, delineation of no-mow zones will be completed under the direction of the Office of Environment, Health & Safety (EH&S). The use of tall (4-5') wooden or metal stakes tied with brightly colored flagging tape has proven to be the best method for delineating these zones.

No-mow zones contain native plants that may be negatively impacted by mowing. These species include shrubs and subshrubs, which are not adapted to grazing, and grasses that are present in the RFS prairie in very small amounts.

The following should be included in no-mow zones (see figure 1):

a.) Native plants in restoration plots.

b.) Seasonally wet areas.

c.) Populations of slender wheatgrass (*Elymus trachycaulus*), asters (*Aster chilensis*), *Elymus multisetus*, mules ears (*Wyethia angustifolia*), lupines, gumplant (*Grindelia hirsutula*) and *Juncus patens*. If resources are limited, these areas can be delineated every 2 years.

d.) Other native plants, such as toyon and coyote bush, should be avoided unless their removal and control is specified by grassland management plans. Note: due to the size of these shrubs, it is not necessary to mark them as no-mow zones.

2) <u>Delineation of mow zones:</u>

Areas to be mowed in the Big Meadow, Northwest Meadow, West Meadow, and EPA Meadow N are to be delineated by the OEH&S. Figure 2 represents the current mow zones. Mowers will also be directed in the field, at the time of mowing, by a representative of EH&S when resources permit. The general strategy is to mow from the leading edge of Harding grass outward, preserving the native coastal terrace prairie within.

3) <u>Mowing and brush cutting priorities:</u>

If resources are limited, or if the entire area can't be mowed, the following list of priorities should be used under the direction of EH&S, so that the most important areas are mowed or brush cut first. Brush cutting is used strategically to target smaller, isolated infestations and edges of the larger Harding grass patch when the edge abuts sensitive grassland areas. See figure 3 for areas to be brushcut or given alternative treatments.

1. Brush cut the Harding grass in restoration plots that has not already been removed by hand. Ideally, all Harding grass in restoration plots should be hand removed or treated with the appropriate herbicide;

2. Brush cut or mow a six foot buffer around all restoration plots that have Harding grass infestations abutting them - see figure 2;

3. Brush cut isolated Harding grass pioneers, a well as larger "islands" of Harding grass in the coastal terrace prairie;

4. Mow or brush cut Harding grass along edges of coastal terrace prairie habitat to establish a buffer and reduce expansion of the Harding grass - see figure 4;

5. Mow all remaining Harding grass within the larger grassland area, highest priority given to areas closest to restoration plots and intact coastal terrace prairie areas.

4) <u>Timing of mowing</u>

Mowing should occur 3 times throughout the Harding grass growing season: May 1st, June 1st, and July 15th. Harding grass has usually bolted and flowers are beginning to form by May 1st. This schedule is designed to gradually reduce plant vigor by cutting the grass when energy reserves are being transported from the rootball to the inflorescence. Dispersal will also be prevented since mowing will occur before seed set. Subsequent mowings are necessary because Harding grass will likely re-bolt due to the large amount of energy stored underground.

Summary

Mowing is the primary control method for preventing the spread of Harding Grass where it is established over large areas. Other methods such as manual removal, herbicide, or brushcutting should be applied strategically as needed in order to eliminate outlier populations within areas rich in native species diversity. See Figure 4 for a map of all management strategies.

Figure 1. Harding Grass Management - No Mow Areas

Figure 2. Harding Grass Management - Mowing Areas

Figure 3. Harding Grass Management - Brushcutting, Herbiciding, or Manual Treatment

Figure 4. Harding Grass Management Strategies