Assessing multiple treatment methods to control Festuca arundinacea using prescribed burning, herbicide, brush-cutting and hydro-mechanical obliteration (H_M_O).

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Abstract: On September 27th 2011, a controlled burn was conducted by NPS staff on eight acres of tall fescue in the Garbade Valley, Martin Headlands, San Francisco CA. The goal of the burn was to significantly reduce tall fescue in order to apply additional control treatments and begin the habitat restoration of a coastal swale plant community. The burn was a success and reduced the absolute cover of tall fescue from 99% to 22%, compared to pre-treatment data from 2006. Plots were subsequently installed on 2 acres of the site to determine the results of three follow-up control treatments: brushcutting, herbicide, and hydro-mechanical obliteration (H_M_O). Currently, data shows that brushcutting treatment was the most effective at reducing the re-growth of F. arundinacea. Following these treatments, one of two re-treatment techniques were implemented: broadcast seeding or native nurseries. A total of 14 pounds of seed was broadcast and 4,882 native plants were planted across the larger site as well within selected plots.

Methods and Materials: Prescribed Burn: The area proposed for the burn on September 27th, 2011 was split into two units: Unit A to the south, a 12 acre parcel, and Unit B to the north, an 8 acre parcel. The first Unit was not treated in 2011 and will hopefully be subject to fire management in the future. On September 29th, a test burn occurred in the northern most corner of Unit B to assess how well the accumulated thatch would ignite and continue to burn. On the 28th, ignition began at 12:15 p.m. where the test burn left off. Fire management staff manually lit the west and east edges of the burn unit. Ignition continued slowly with pauses to allow for smoke dispersion and was completed by 3:00 PM. Fire behavior was good with little backfiring, 2-3 flame lengths and good consumption. Equipment on site included several fire engines, on site water and a large number of fire management personnel.

Results: The prescribed burn in Garbade Valley was successful in reducing tall fescue thatch cover from 99% in 2006, to 22%, recorded two months following the burn in November, 2011. Compared to the 92.7% average cover in the fire control plots, the subplots treated with 3.5% glyphosate solution had the least amount of live, re-sprouting tall fescue at 50.25% cover - indicated on the graphs by a light green code FEAR. The mechanical brush-cutting treatment proved to be the least effective, with 44.42% average live fescue cover in corresponding subplots. The 79.35% average fescue cover in the H_M_O treatment subplots was actually slightly less than the average of chemically treated subplots. Because this graph is only representative of two subplots, the data is not as informative of that collected in the glyphosate application plots.

Discussion/Management Implications: As the pre and post-burn data shows, fire is effective at decreasing tall fescue biomass in the Martin Headlands, San Francisco CA. Follow up treatment with glyphosate on re-sprouting bunches was the most effective fescue control follow-up method. While other studies have demonstrated that mowing can be effective at controlling tall fescue, we were unable to obtain the equipment post burn to test our suggestion. Therefore we have documented that limited fire reapplication to similar bunches was not effective for several reasons. The tall fescue and helmstorffia fescue bunches make the areas narrow and it was difficult to cut them out at the base of the plant. Another challenge we encountered was that fire in the Martin Headlands was split among 20-20 under very wet weather and muddy conditions on the burn site. It was almost impossible to get the H.M.O equipment out to the subplots for the first round of treatments due to the size of the burn and also the amount of water needed. This resulted in a delay of one year for the first treatment methods and a skewed picture of the method’s effectiveness at controlling tall fescue. Another challenge was the short time frame which we used to acquire seed bunches from the remaining tall fescue before they dropped seed into the study plots and the removal of equally large amounts of bull thistle, Crepis acutiloba, a prevalent post burn species. Both of these tasks required large amounts of labor and determination on the part of staff and volunteers to accomplish which we did not plan for. So, as usual, adaptive management and ingenuity (at its best) became an important part of the process and we used a very effective new tool the scythe as a result.

Future Plants: Future plans in the remaining 6 acres of Unit B are mapping vegetation trends within and outside the plots to inform our replanting strategies, ongoing treatment of tall fescue and bull thistle and re-sampling of the plots in Spring 2013.

Management Timeline:• September 27th 2011 – Prescribed burn conducted• October 2011 – Study plots set up and point intercept data collection• November 1 – Glyphosate application begun• August 2012 – Brushcutting, native nurseries,1) Ave of Fire Management 2) Ave of Fire Management 3) Ave of Fire Management 4) Ave of Fire Management 5) Ave of Fire Management• January 2012 – broadcast seeding• March 2012 – broadcast seeding• August & July – Seed head removal of non-re-sprouted tall fescue• And H.M.O. treatment in remaining study plots• August – bull thistle removal using scythe• September – Monitoring of July H.M.O. treatment plots

Challenges: One of the biggest challenges we faced with this project was the persistence of vast weather and similar conditions on the way out to the burn site. It was almost impossible to get the H.M.O equipment out to the subplots for the first round of treatments due to the size of the burn and also the amount of water needed. This resulted in a delay of one year for the first treatment methods and a skewed picture of the method’s effectiveness at controlling tall fescue.

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