

Sierra Cascade Intensive Forest Management Research Cooperative Proposal 07-01 Glyphosate Control of Evergreen Brush

Principal Investigator: Mark Gray

Title: Investigating the Efficacy of Glyphosate for Control of Evergreen Brush Species

Year Funded: 2007

Executive Summary:

Glyphosate has been used effectively for control of many common weed species that infest conifer plantations. Treatments of evergreen species have historically had mixed results. Recent price reductions, due to the Roundup patent expiration, have renewed interest in developing effective treatment regimes for these harder to control species. Operational experimentation indicates control of manzanita, snowbrush, chinquapin, and tanoak is possible with various glyphosate/surfactant combinations and, conversely some attempts result in poor control. Is the variability in control a function of timing, material applied or a combination of factors? A more controlled investigation of the treatment parameters would provide better guidelines for this promising application.

The stated purpose of this study is to determine the optimal rate of application of various glyphosate formulations for control of manzanita, chinquapin, snowbrush and brush-form tanoak. Additional purposes include determining surfactant superiority and the best application timing for each target pest.

Several sites on industrial timberlands that contain adequate populations of the target species will be selected.

Treatments to be studied will include: 5% glyphosate, 5% oil; 10% glyphosate, 5% oil; 5% glyphosate, 5% sylvac; 10% glyphosate, 5% sylvac; and an untreated

control. All vegetation will be treated with a directed foliar spray. Operational-size test plots will be 1 acre in size. Each study site will require 21 one acre plots. Treatment timing will be once a month starting in May and concluding in September (5 treatment dates). Base line data will be taken in the control plots prior to applying the other treatments. Crown reduction of the target species will be determined at the end of the second growing season after treating.

2008: The first site chosen for the study was located on Sierra Pacific Industries land near McCloud, California. The site was a conifer plantation about ten years old that contained a good compliment of the target brush species. The planted conifers were taller than the adjacent brush. Brush species present included manzanita, rabbit brush, snowbrush, current, bitter cherry, and chinquapin. Plots were laid out in August and base line data from the control plot was collected in September. Shrub data was collected using the line intercept method. The control is very representative of the plantation as far as amount of competing shrubs. This plot had shrub foliar cover of 52%. The August set of treatments were applied August 15th; the September set on September 25th. Weather conditions prevented installation of the May, June, and July treatment sets. These treatments will be applied in 2009.

2009: Final plot layout (Figure 1) and the May, June, and July treatment applications were completed by July, 2009. The primary study objective is to evaluate the effectiveness of the treatments, through the quantification of crown reduction of the target species, two growing seasons after treatment. Therefore all treatments will be evaluated at the end of the 2010 growing season and compared to the control plot.

The study site was one of the featured stops on the 2009 Weed Tour.

In addition to the Ski Park site, plans are to install another replication of the study on Sierra Pacific Industries lands. An area near Indian Springs is a possible location. Additional replications could be installed on lands of other Co-op members if desired.

2010: All plots were measured in September, two growing seasons after treatment. The line intercept method was utilized to determine live crown cover of the shrubs by species. The measurements for the control treatment were collected from the same transects that were measured in 2008. Conifer damage was noted; re-sprouting of the shrubs was recorded when present.

Results: Conifers – eleven of the twenty treatments resulted in conifer damage. All four formulations (see previous page for formulations) damaged conifers when applied in May,

June, and July. Damage was mostly minor and confined to lower branches which had been directly sprayed. August and September applications resulted in very little damage. **Shrubs** – the best treatment timing was June through August, although higher herbicide rates may be needed in August treatments to get satisfactory results. Figures 2 and 3 illustrate these points. The most economical alternative is treating in June or July. Chinquapin needs further investigation as results were more varied for this species than with the others. **Control** – Figure 4 illustrates shrub composition in 2008 and 2010. Total shrub cover increased from 52% in 2008 to 53% in 2010. Manzanita cover was declining while snowbrush cover was increasing. **Re-sprouting** – Six treatments showed signs of re-sprouting but in two of these treatments, the re-sprouts looked very stressed. The most re-sprouting was in the GLY 5/OIL 5 treatment and the shrubs were primarily snowbrush.

Full data sets for this study are available at the Co-op manager's office in Redding.

Another replication of this study is under consideration for Indian Springs. As the primary competing species at this site is chinquapin, this would appear to be a good research opportunity.

Figure Captions

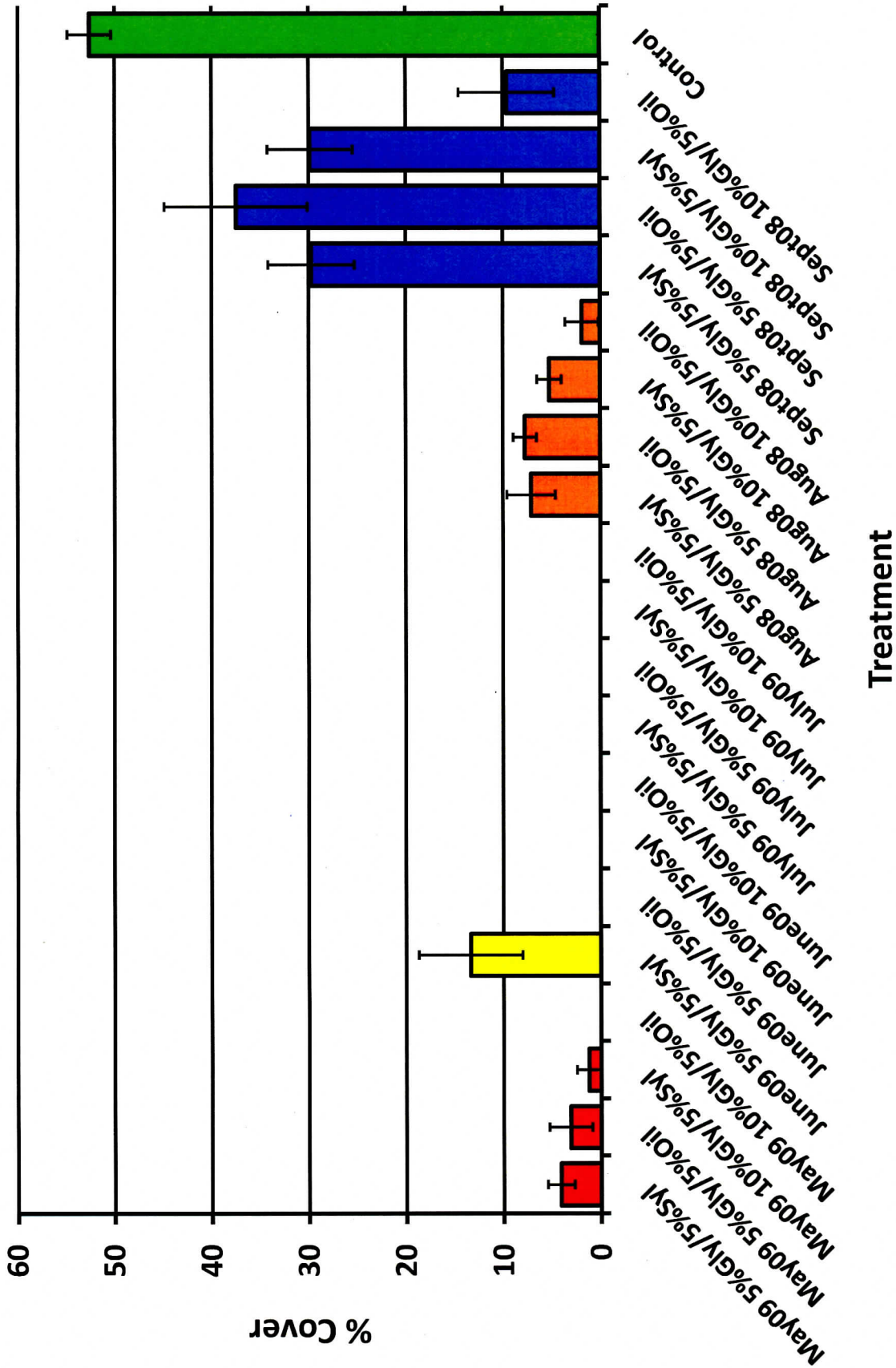
Figure 1 – Ski Park plot layout and treatments.

Figure 2 – Percent live crown cover of shrubs by month of treatment.

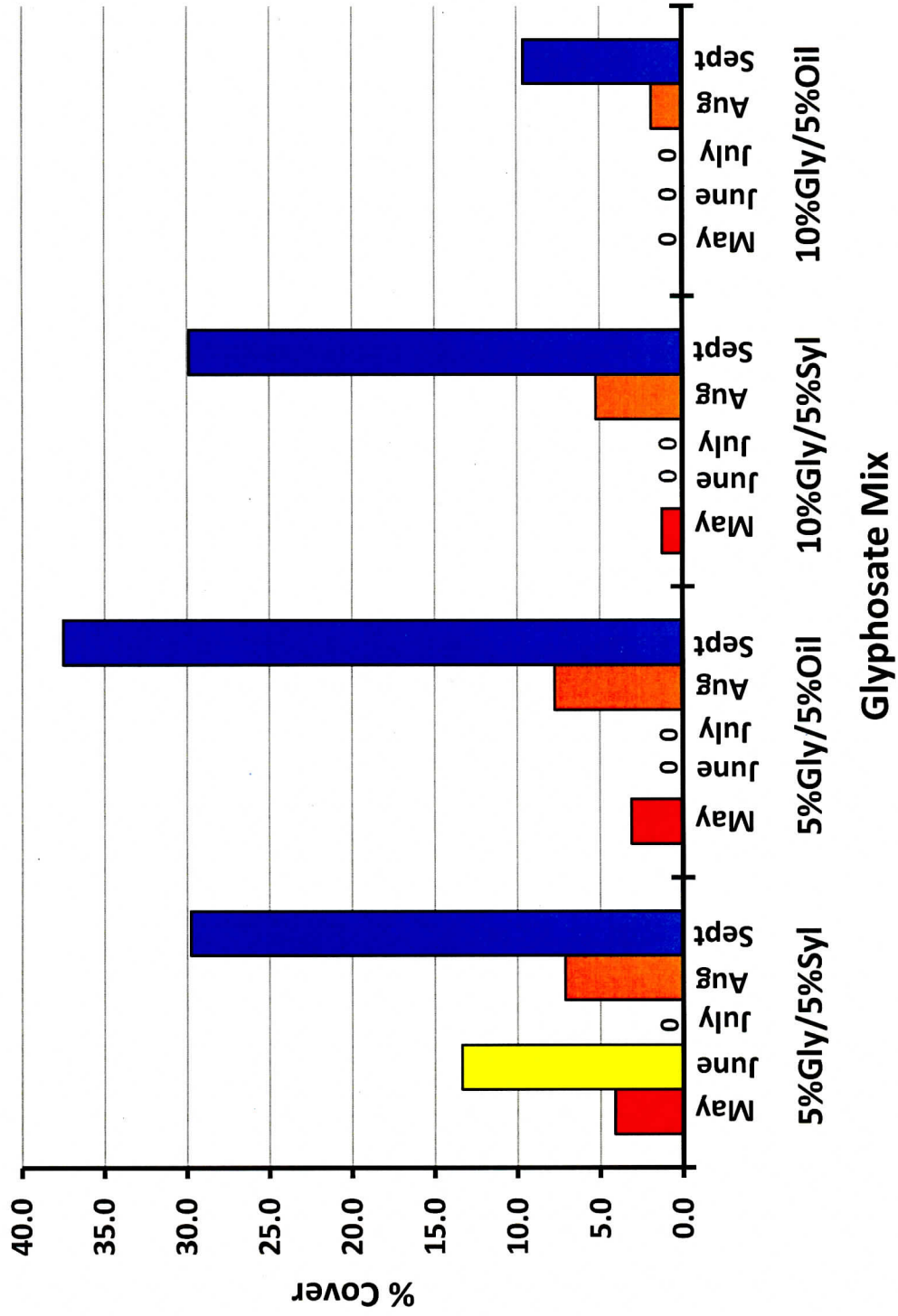
Figure 3 – Percent live crown cover of shrubs by formulation.

Figure 4 – Percent live crown cover of shrubs in control: 2008 vs. 2010.

Ski Park Glyphosate Study



Ski Park Glyphosate Study



Glyphosate Mix

**Ski Park Glyphosate Study
Control Plot Brush Comparison: 2008 vs. 2010**

