Sierra Cascade Intensive Forest Management Research Cooperative Proposal 03-01
Agenda 2020

Principal Investigator: Bob Powers

Title: An Experiment to Evaluate the Competitive and Ecological Effects of Understory Vegetation on the Productive Potential of Young Douglas-fir Plantations

Executive Summary:
As a follow-up to the January 13, 2003 Co-op meeting at which the Agenda 2002 proposal was accepted as a Co-op project, the membership was contacted in order to get suggestions on possible sites for the study (originally the first site was going to be located on Boise Cascade lands but the site nominated was not selected). In response to this request, two companies, Roseburg Resources (Ed Fredrickson) and Sierra Pacific Industries (Mark Gray) offered possible sites.

The Roseburg site consisted of two clearcut blocks located east of Redding near Big Bend. The stands had been harvested in the summer of 2003 and the additional site preparation required for implementation could be done in the fall. The stands harvested were high-site mixed conifer and the topography was almost flat. There were no restrictions on either of the blocks that would hinder the installation of the study. After two confirmation visits the Roseburg blocks were selected as the first Agenda 2020 site.

The SPI site was located northeast of Burney near the intersection of Highway 89 and the Dana Cutoff road. This site consisted of a single block that was scheduled for harvest in the fall of 2003. The stand was mixed confier growing on a good site. Topography was flat. As with the Roseburg site, there were no restrictions on this stand that would hinder installation of the Agenda 2020 study. This block was chosen as the second site for the study

As of December, the Roseburg site has been harvested and site preparation has been completed. The SPI site has been harvested with site preparation to follow in 2004. The goal is to install the Agenda 2020 study on both sites during the same time period. Plot layout is scheduled for summer of 2004 with planting to be done in the spring of 2005.

Tom Jopson (Cal Forest Nurseries) has started the collection of manzanita cuttings in order to raise the seedlings (root cuttings) of this species that will be needed for the study. The ceanothus seedlings will be raised from seed that Tom has ordered from the Lawyer Nursery. Both shrubs will be raised by Cal Forest at their Etna, CA. location.

2004: Site preparation was completed on the Sierra Pacific Industries site during the summer of 2004. Plot loayout on both sites was completed by September. Some changes were made to the original proposal prior to plot installation. Conifer spacing was changed from 12x12 to 8x8 feet resulting in 168 trees per plot. Of these

168 trees, 80 are measure trees. There will be a total of 8736 seedlings (4368 pine and 4368 Doug-fir) planted per site. There are thirteen treatments replicated four times per site. This makes a total of 52 plots per site. Contracts for marking the planting spots at both sites were let during November. The conifer seedlings for this study are being raised at Cal Forest Nursery. Ceanothus seedlings are growing at Cal Forest Nursery, also. Nursery crews collected plant material in November from the sites in order to start raising the manzanita plants required by the study. The treatments will be installed in the spring of 2005 as originally planned.

2005: The Dana site was planted on March 31. Weather was clear with a slight breeze. Planting started at 6:30 and was completed by 10:00. All planting was done using hoedads. Fourteen planters and one foreman along with two Sierra Pacific Industries inspectors accomplished the planting. The Douglas-fir were Styro 8 stock from Cal Forest Nurseries, 4500 foot elevation, seed zone 521. The ponderosa pine were Styro 6 stock from K & C Silviculture, Oliver, BC.

The two Roseburg sites were planted on the morning of April 1st. It was partially cloudy with no wind. All planting was done with hoedads. Thirteen planters and one foreman along with two Roseburg Resources inspectors accomplished the planting. The Douglas-fir seedlings were Styro 8 stock from Cal Forest Nurseries, 3000 foot elevation, seed zone 521. The ponderosa pine were also Styro 8 stock from Cal Forest Nurseries, 3200 foot elevation, seed zone 521.

In July, the plots receiving complete vegetation control were treated with a directed spray application using Roundup. Both the SPI and Roseburg sites received this treatment. The ceanothus species being raised at Cal Forest Nurseries for outplanting at the two sites are doing fine.

All attempts to raise manzanita have failed. Another attempt will be made in the spring at the height of the flowering season.

2006: Because of poor survival on the Dana Site, the half of the plot originally planted with Douglas-fir was replanted in the spring of 2006. At this time each planting spot was double planted with a white fir. This replanting was applied to all plots on the site.

In April, the plots receiving complete vegetation control, the fertilization treatment and those plots having some level of either manzanita or ceanothus stocking were treated with 4#/a atrazine applied with a pressurized broom. Both sites were treated at this time. In June these same plots received a directed spray application of 5% Buccaneer mixed with 5% Hasten.

On the Dana site, stocking of manzanita is still a problem. As we are still having no success raising this species, attempts will be made in the spring of 2007 to transplant wild seedlings, taken from the buffer around the plots, into the plots requiring manzanita. Other sources may have to be used to supplement the supply of seedlings if there are not enough seedlings in the buffer.

During 2006, two tours were conducted at the Dana site. A stop on the Weed

Tour of the California Pest Council took place in July; and a tour for faculty from Oregon State University was conducted in the fall.

2007: All release treatments were applied on schedule during the spring on both sites. This consisted of manual release on the Dana site and herbicide release on the Big Bend site. Survival of the fir component is still unsatisfactory despite two replants on the Dana site. The pine component is acceptable. The fir component on the Big Bend site suffered major mortality during 2006 and fir stocking is now marginal. As with the Dana site, the pine component at Big Bend is acceptable.

Another attempt was made in the spring to increase the population of manzanita in the plots at the Dana site. This attempt involved transplanting of freshly lifted wild seedlings harvested within a couple of miles of the study site. Planting weather was ideal with rain occurring before and after the planting. Despite careful lifting, storage, and planting, only about 10% of the seedlings survived the summer. Previous attempts have involved trying to raise seedlings at Cal Forest Nursery from seed purchased from dealers and from cuttings (harvested in the spring and in the fall from areas adjacent to the study site). To date, there has been little success with the attempts to raise manzanita seedlings.

In November a crew from PSW inventoried the amounts of brush on the plots at the Dana site. The Big Bend site will be inventoried in 2008. Plans for 2008 include measuring the amounts of nitrogen being taken up by the two species – manzanita and ceanothus – to determine any differences in nitrogen fixation between the two species.

2008: Funding support was given to Matt Busse (PSW Redding) to measure shrub cover and N fixation rates on all plots on both the Dana and the Big Bend sites. The shrub covering was measured on both sites in summer 2008, the third growing season after tree planting.

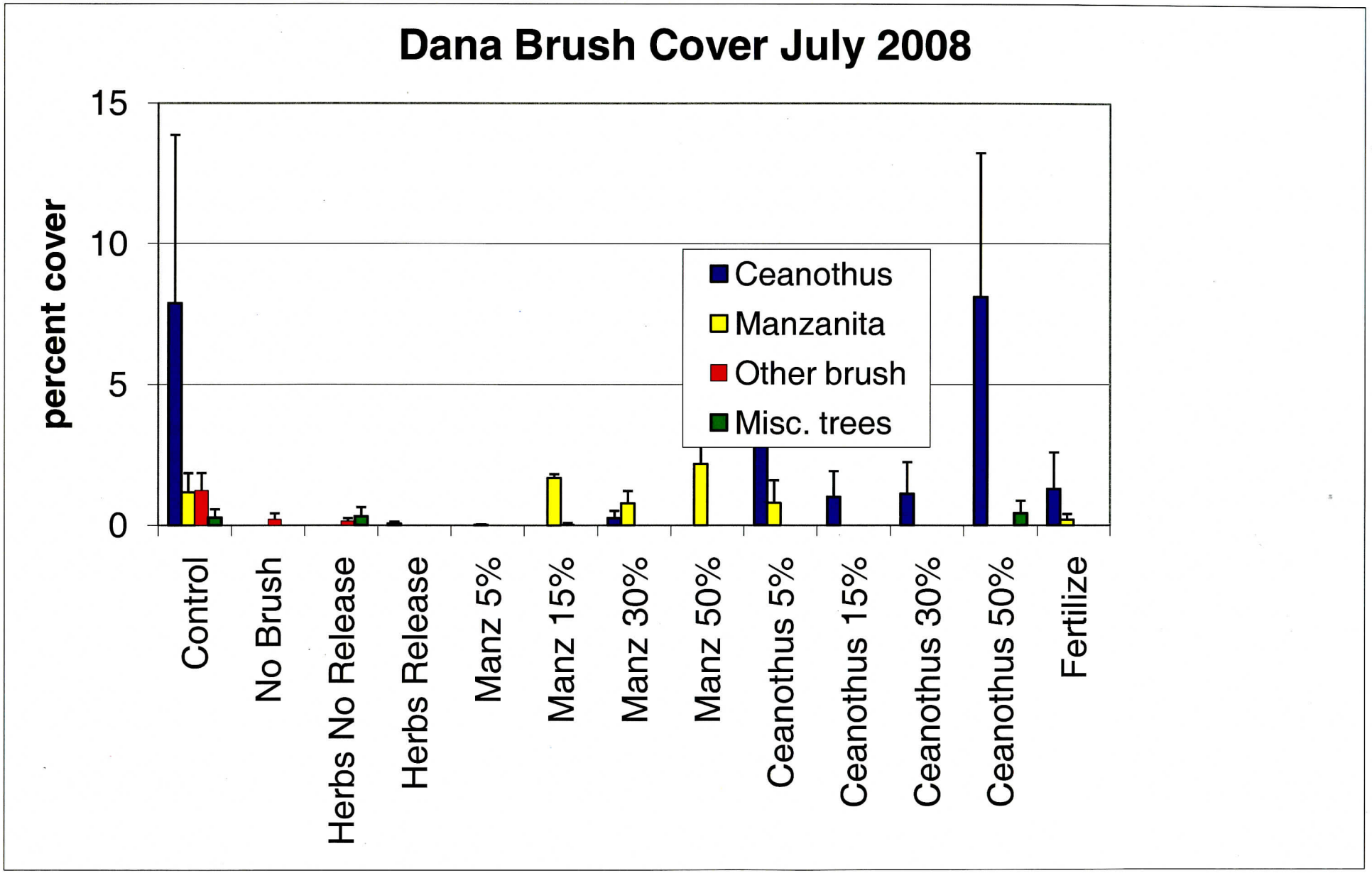
Shrub cover measurements from Dana (Figure 1) confirm the poor performance of shrubs across all treatments. Because of the scarcity of ceanothus at Dana, the decision was made not to measure N fixation rates.

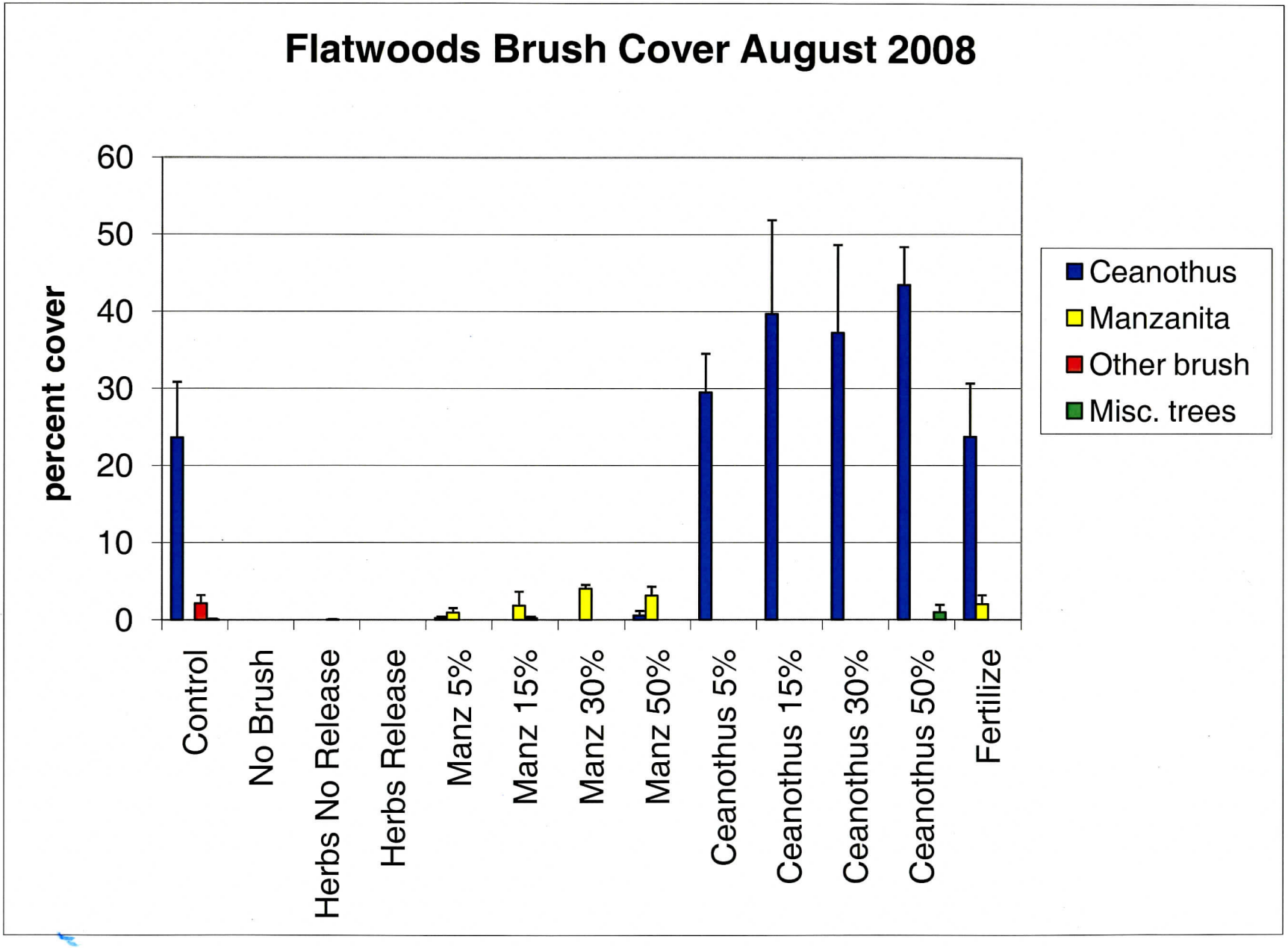
Ceanothus cover at the Big Bend site (primarily whitethorn) ranged from 30 to 50 % on plots designed to retain N-fixing shrubs (Figure 2). However, manzanita cover was conspicuously low, which precludes the ability at present to assess the competitive difference between scrub species.

2009: At the Annual Meeting held Apri1 1, 2009 an update on the status of the Agenda 2020 study was presented to the Co-op membership. A discussion followed as to where to go from here with this study. It was decided that Bob Powers and Jason Warshawer would visit the Big Bend site as soon as possible. Based on the results of this visit, recommendations would be made to the membership as to how to proceed with the study. This site visit was made on April 22nd. Following this visit the decision was made by the Executive Committee to continue with the study with hopes that the manazinta at both sites and the ceanothus at the Dana site would eventually reach the cover percentages needed to meet study

objectives. The "complete vegetation control" plots on both sites were treated in 2009 in order to keep that treatment viable. No other plots were treated at Dana. The manzanita plots were not treated at Big Bend, but the ceanothus plots had sufficient cover to meet the study objectives. Several of these plots had more ceanothus cover than was called for in the study. The decision was made to bring the ceanothus plots to the cover percentages outlined in the study plan. This was done by matching existing plots with desired treatments. After this was done, the remaining plots required removing some of the ceanothus in order to match these plots with desired treatments. The ceanothus to be removed in these latter plots was designated with marking paint by Co-op members in October and November. A contract was let with Forest Protection from White City, Oregon to remove the surplus ceanothus. The work was done on December 2nd and 3rd. Surplus brush was severed at ground line with chainsaws and Garlon 3A or Garlon 4 was applied to the cut surfaces immediately after cutting. This contract was financed from the $3400 originally set aside to do the N fixation rates.

The plan is to re-assess the cover of ceanothus in the treated plots next spring to determine how close these plots are to meeting study targets. Hopefully the original study plans can continue on the Big Bend ceanothus plots at the same time giving the plots at Dana and the manzanita plots at Big Bend time to develop the shrub stocking needed for the study.


Dana Brush Cover July 2008
percent cover
15
10
5
0
Ceanothus
Manzanita
Other brush
Misc. trees
Control
No Brush
Herbs No Release
Herbs Release
Manz 5%
Manz 15%
Manz 30%
Manz 50%
Ceanothus 5%
Ceanothus 15%
Ceanothus 30%
Ceanothus 50%
Fertilize


Flatwoods Brush Cover August 2008
percent cover
60
50
40
30
20
10
0
Control
No Brush
Herbs No Release
Herbs Release
Manz 5%
Manz 15%
Manz 30%
Manz 50%
Ceanothus 5%
Ceanothus 15%
Ceanothus 30%
Ceanothus 50%
Fertilize
Ceanothus
Manzanita
Other brush
Misc. trees