Appendix B
Vegetation Module: Report of Activities during 2004

Project Staff

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Objectives

The vegetation module of the Plumas-Lassen Administrative study is focused on studying how changes in the forest canopy affect ecosystem functioning. Aspects of ecosystem function studied include understory microclimate and growth and competition of shrubs and juvenile trees, and understory diversity. The module objectives are the following:

1) determine the effects of reduction in tree canopy cover on microclimate, fuels dryness, and other factors contributing to flammability of the forest understory, and

2) determine effects of reduction in tree canopy cover on composition and growth of the understory plant community.

Research approaches include stand-level experimental manipulations, measurement of plant growth and survival along existing environmental gradients, and assessment of impacts of routine (i.e., non-experimental) forest management activities.

Research activities 2004

Field work in the 2004 season was aimed at gathering stand descriptive data prior to the experimental cuttings planned for the 2005 season. The experiment design was augmented with a group selection treatment (Fig. 1). A 1-hectare inventory plot, consistent with Forest Inventory and Analysis (FIA) protocol, was established in each of the 12 experimental management plots. These plots reveal basic elements of stand structure (e.g., stems per unit area, Fig. 2) and will provide for monitoring thinning effects on canopy structure over time. Dead fuels were measured in all plots with the

protocol established by fuels researchers Scott Stephens and Kurt Menning, and a cross-walk was established to the FIA fuels measurement protocol.

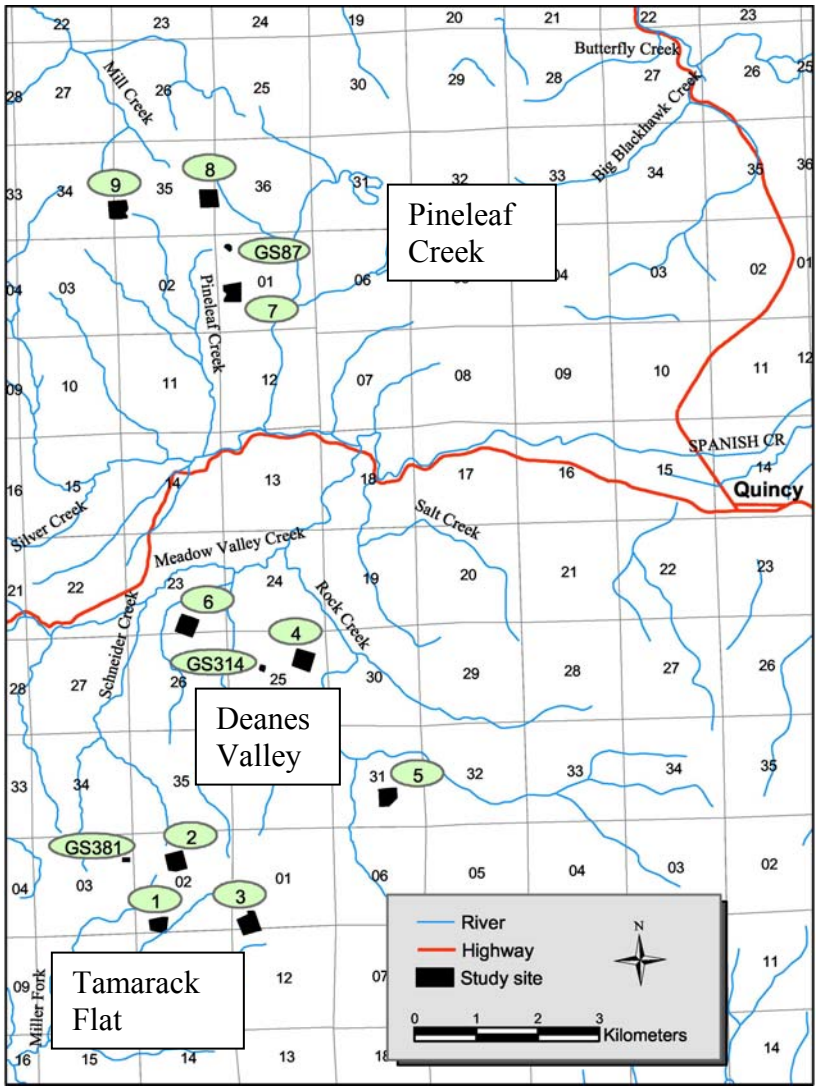

Fig. 1. Map of locations of experimental thinning and group selection plots in Meadow Valley area. Larger black squares are 22-acre thinning stands, and small black dots are planned groups.

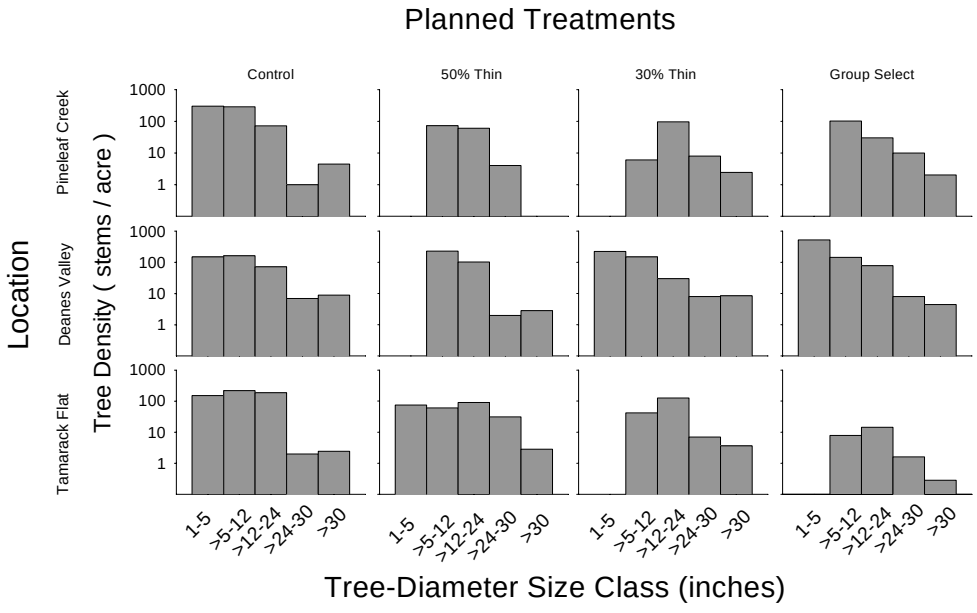

Fig. 2. Breast-height tree diameter distributions in plots slated for experimental silvicultural treatments. Note log scale for tree density.

Plant understory composition was assessed at 100 2-m radius circular plots within each experimental plot. Circular plots were centered on small-mammal trapping locations to enhance compatibility with data collected by small mammal researchers. Cover of six plant growth-forms was estimated visually (Fig. 3). The growth forms were graminoids (grass and grass-like plants), forbs (non-grass herbs), shrubs, shade-tolerant conifers, shade-intolerant conifers, and broad-leaved trees. The plant making the largest contribution to cover in each life-form was identified to species (Table 1). Only one non-native invasive species, *Silene noctiflora* or night-flowering catchfly, was detected.

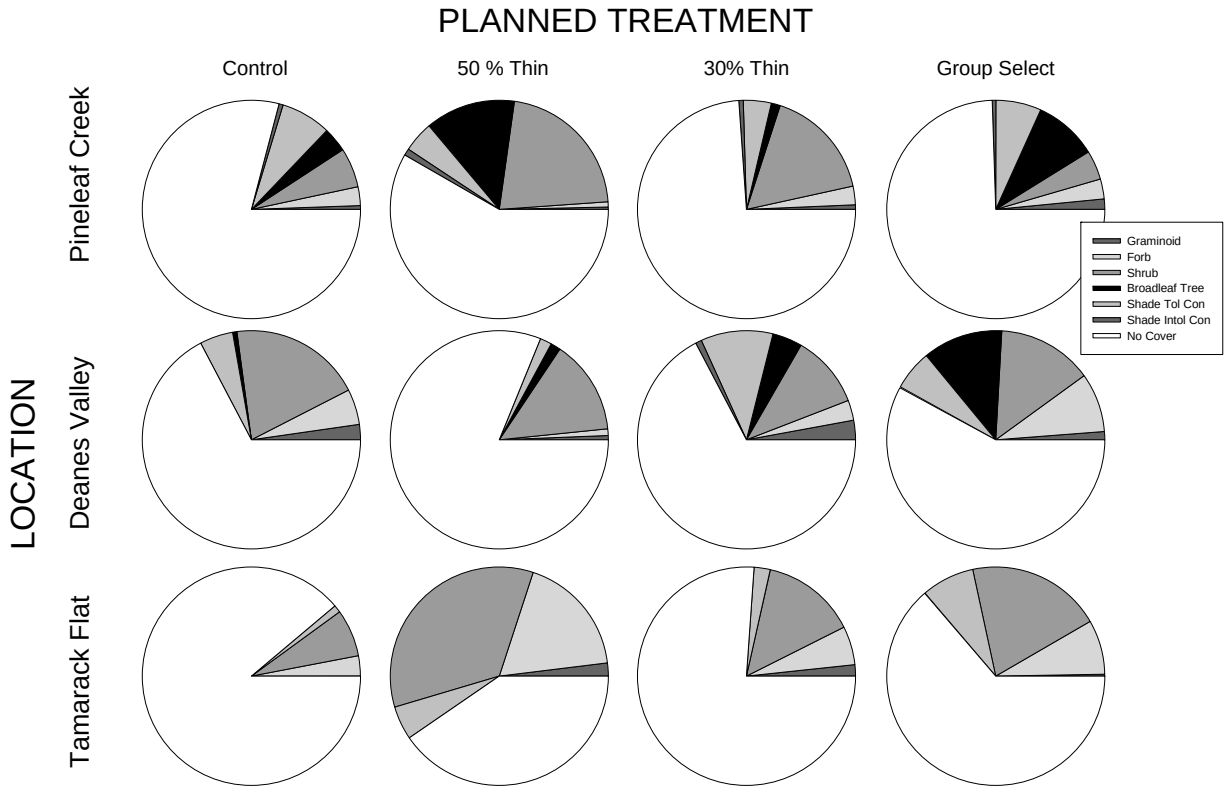

Fig. 3. Understory cover, by plant growth form, in plots planned for experimental thinning and group selection. Each pie chart presents averages from 100 2-m radius circular plots.

Table 1. Most common vascular plant species in understory vegetation composition plots.

Plant Species	Common Name	Plant Species	Common Name
Graminoids		**Forbs**	
Acnatherum lemmonii	Lemmon's Needlegrass	*Adenocaulon bicolor*	Trail Plant
Carex brainerdii	Brainerd's Sedge	*Allium sp.*	Wild Garlic
Carex multicaulis	Many-stemmed Sedge	*Apocynum canabanum*	Indian Hemp
Carex sp.	Sedge	*Arenaria sp.*	Sandwort
Festuca occidentalis	Western Fescue	*Aster radulinus*	Broadleaf Aster
		Calystegia malacophylla	Morning-glory
Shrubs		*Campanula prenanthoides*	Harebell
Amelanchier alnafolia	Serviceberry	*Castillea sp.*	Indian Paintbrush
Arctostaphylos patula	Greenleaf Manzanita	*Claytonia perfolata*	Miner's Lettuce
Arctostaphylos viscida	Whiteleaf Manzanita	*Claytonia rubra*	Spring Beauty
Ceanothus cordulatus	Whitethorn	*Clarkia sp.*	Clarkia
Ceanothus integerrimus	Deerbrush	*Corallorhiza maculate*	Spotted Coralroot
Ceanothus prostratus	Mahala Mat	*Corallorhiza striata*	Striped Coralroot
Chimaphila menziesii	Little Prince's Pine	*Corallorhiza sp.*	Coralroot
Chimaphila umbelata	Prince's Pine	*Cryptantha affinis*	Common Cryptantha
Chrysolepis sempervirens	Bush Chinquapin	*Cryptantha torreyana*	Torrey's Cryptantha
Garrya fremontii	Silk Tassel Bush	*Cynoglossum occidentale*	Hound's Tongue
Penstemon gracilentus	Slender Penstemon	*Disporum hookerii*	Hooker's Fairybells
Prunus emarginata	Bitter Cherry	*Gallium sp.*	Bedstraw
Quercus vaccinifolia	Huckleberry Oak	*Gayophytum sp.*	Groundsmoke
Rhamnus rubra	Sierra Coffeeberry	*Goodyearea oblongifolia*	Rattlesnake Plantain
Ribes roezlii	Sierra Gooseberry	*Hiracium albiflorum*	Hawkweed
Rosa sp.	Rose	*Iris hartwegii*	Iris
Rubus parvifolia	Thimbleberry	*Kelloggia galioides*	Kelloggia
Symphoricarpos sp.	Snowberry	*Chamaesaracha nana*	Dwarf Chamaesaracha
		Lilium sp.	Lily
Broadeaf Trees		*Lupinus latifolia*	Broadleaved Lupine
Cornus nuttallii	Pacific Dogwood	*Monardella odoratissima*	Pallid Mountain Wild Mint
Quercus kelloggii	California Black Oak	*Osmorhiza chilensis*	Mountain Sweet-cicely
Salix scouleriana	Scouler's Willow	*Penstemon personatus*	Close-throated Beardtongue
Sambucus sp.	Elderberry	*Phacelia sp.*	Phacelia
Sorbus californica	California Mountain Ash	*Piperia sp.*	Piperia
		Potentilla sp.	Cinquefoil
Shade Intolerant Conifers		*Pteridium aqualinum*	Bracken Fern
Pinus lambertiana	Sugar Pine	*Pyrola picta*	White-veined Wintergreen
Pinus ponderosa	Ponderosa Pine	*Sanicula graveolens*	Sierra Sanicle
		Silene noctiflora	Night-flowering Catchfly
Shade Tolerant Conifers		*Smilacina sp.*	False Solomon's Seal
Abies concolor	White Fir	*Stephanomeria lactucina*	Large-flowered Stephanomeria
Calocedrus decurrens	Incense Cedar	*Trifolium brewerii*	Forest Clover
Pseudotsuga menzeisii	Douglas-fir	*Trientalis latifolia*	Pacific Starflower
		Vicia americana	America Vetch
		Viola lobata	Pine Violet
		Viola sheltonii	Shelton's Violet
		Viola sp.	Violet
		Whitneya dealbata	Whitneya

Air temperature and humidity within the experimental plots were measured using a network of 36 stations, and measurements of moisture in soil, duff, and 10-, 100-, and 1000-hour fuels were made monthly at 108 sampling points (Fig. 4). Instrumentation for continuous monitoring of soil wetness, soil temperature, and wind velocity was installed at one location in each experimental plot; instrumentation for photosynthetically active radiation (PAR) measurement was installed in four plots.

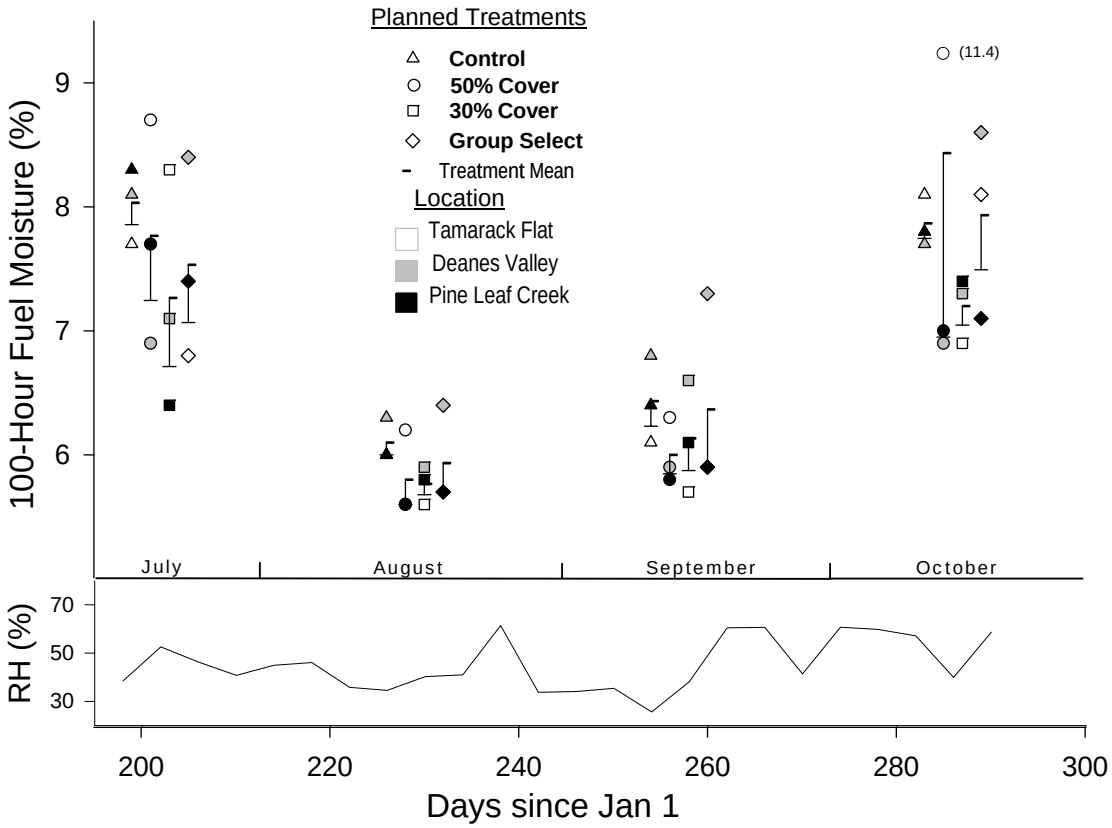

Fig. 4. Moisture in 100-hr fuels over the 2004 growing season. Each data point is a mean of nine samples per plot. Planned treatments are identified by symbol shape, and location is coded by shading. Short horizontal lines show means and standard deviation by planned treatment. Lower panel shows four-day running average of relative humidity of air.

During the 2004 season a long-term conifer seedling study was continued, and lab work was completed for the 2003 study of conifer sapling growth along soil moisture and nutrient gradients.

Outreach, Collaboration, Training, and Safety

Outreach

Vegetation module staff made presentations to the Quincy Library Group (April 2004), and the USFS Herger-Feinstein Quincy Library Group Steering Committee (July 2004). An all-day tour of the experimental plots was provided to the Quincy Library Group and other members of the interested public (Sept. 2004), and individual tours of the experimental plots were given to two members of the QLG. A presentation on the sapling growth study was made at the annual meeting of the Ecological Society of America (see reference).

Collaboration
The vegetation module staff collaborated closely with the Ecosystem Management staff of the Mount Hough Ranger District to plan the experimental silviculture treatments, and took a leadership role in preparing NEPA-process documents for the experiment. The field crew of the vegetation module devoted two months in Fall 2004 to assessing stand structure at owl activity sites. Dr. W. R. Horwath of the U. C. Davis Department of Land, Air, and Water Resources cooperated on the study of sapling performance along water and nutrient gradients.

Training and Personnel Development
Seth Bigelow completed a mandatory 40-hour course, Introduction to Supervision. Two members of the field crew participated in a two-week training course in FIA protocols in Oregon. Carl Salk attended the Ecological Society of America Annual Conference as part of his professional development, and completed a one-day course in snowmobile safety. The entire field crew attended a one-day orientation to the Mount Hough Ranger District.

The two seasonally employed GS-5 field technicians both made significant advances in professional development subsequent to their employment with the vegetation module. One enrolled in a Master's degree program in Natural Resource Management at Humboldt State University, and the other was hired for a permanent position with the Forest Service.

Safety
There were no serious accidents: a bee sting resulted in one lost day of work. The leased field vehicle was maintained in excellent condition and required no body work after the field season.

References

Bigelow, S. W., M. P. North, and W. R. Horwath. 2004. Shade and drought tolerance in conifers of the Sierra Nevada, USA. Poster presentation at the 89th Annual Meeting of the Ecological Society of America, Portland OR.