



# L.W. Schatz Demonstration Tree Farm

## 2014 Annual Report

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### Research at the L.W. Schatz Demonstration Tree Farm

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#### Water for Streams

In 2014 Dr. Andrew Stubblefield and graduate student Kirsten Reddy began work on the project “Water for Streams: Investigating the Potential for Forest Thinning to Augment Summer Flows in Northern California Watersheds”. The project seeks to determine reasons for the observed declines in dry season flows in small streams and creeks in Humboldt County. The project will use sapflow measurements to quantify forest stand water use in thinned and unthinned forests on the L.W. Schatz Demonstration Tree Farm and a site on private land in the Mattole River watershed near Petrolia. This project is a component of the collaborative “Carbon, Water-use, and Regeneration after Variable-density Retention in Evergreen Mixed-conifers” (see page 5) research project.

Research has suggested that current high forest stand densities in Northern California forests may be depleting rivers and streams of critical dry season water inputs. Over the past century fire suppression has led to higher density redwood forests along with dense regrowth and reseeding after

clearcut logging. Warmer, more arid regions that were once grasslands and oak woodlands have been overgrown by dense thickets of Douglas fir. In addition to their impact on water flow, high density stands can also impact the health of forests, making stands more susceptible to disease and high severity wildfire. Both of these impacts diminish the ability of California forests to securely sequester carbon and play a role in abating climate change.

The project began in June of 2014 with the researchers making trips to Petrolia and the Schatz Demonstration Tree Farm to locate study sites for the experiment and identify suitable trees. The weather station was overhauled at the Tree Farm to begin collecting weather data. During the fall the study



Study site at the Tree Farm

## Research projects in 2014 (continued from page 1)



Graduate student Kirsten Reddy with the solar panel system designed to power the equipment.

design was refined and the team worked with engineers at Dynamax to create sapflow monitoring systems that most efficiently expanded the existing equipment. A solar panel system was also designed and purchased from Six Rivers Solar to power the equipment. The research will continue in 2015 with field measurements and installation of equipment. Soil moisture systems will also be prepared for field installation at each of the study plots.

### Douglas-fir Branching Study

Graduate student Christopher Kirk completed his work with Dr. Pascal Berrill studying branching in Douglas-fir and coast redwoods. His thesis “Second log branch analysis of redwood and Douglas-fir” was completed in the summer of 2014.

### Root:Shoot Biomass

Dr. Pascal Berrill and students continued work on this multi-year project to identify factors affecting root mass and root:shoot ratio in planted seedlings of different ages and species.

## Research Projects Anticipated for 2015

### Root:Shoot Biomass

Dr. Pascal Berrill and his students will complete work on his root:shoot biomass project in 2015.

### Investigating the Potential for Forest Thinning to Augment Summer Flows in Northern California Watersheds

Dr. Andrew Stubblefield and graduate student Kirsten Reddy will continue their work investigating the impact of forest thinning on dry season flows in small streams and creeks in Humboldt County.

### Carbon, Water-use, and Regeneration after Variable-density Retention in Evergreen Mixed-conifers

Forestry and Wildland Resources Faculty will commence a multi-year, collaborative project examining the impact of variable-density Retention in Evergreen Mixed-conifers on carbon storage, water use and regeneration.



Student in FOR 431 measuring species richness and composition as part of their forest restoration project.

## Summer Operations and Maintenance in 2014

As in past summers, significant maintenance and improvement projects were done over the Summer in 2014. Walter Kast and Jeffrey Ortiz comprised the 2014 summer maintenance crew, along with Gordon Schatz, Tree Farm Manage. Projects completed include:

### Tree Farm building

- Mowed lawns and outer areas to reduce fire hazard.
- Cleaned shop, bath-

rooms and interior of the building.

- General landscaping, including weeding, cleanup and mulching.
- Saws and other power equipment brought into town for annual maintenance.
- Resupplied gas and oil for machines.
- Weather station overhauled

### Tree Farm acreage

- Cleared storm debris and downed trees from roads, trails and culverts.
- Mowed roads, and turnouts as well as brush cut trails.
- Removed brush and pruned trees along roadsides to improve visibility.
- Shaded fuel break enhancement and pruning along roads and trails.

## Summer Operations and Maintenance Planned for 2015

- The Schatz Tree Farm building is scheduled to be repainted during the summer.
- The summer maintenance crew will assist with current research projects.



Students in FOR 432: Silviculture helping implement the variable density retention experiment

## Tree Farm as Educational Tool



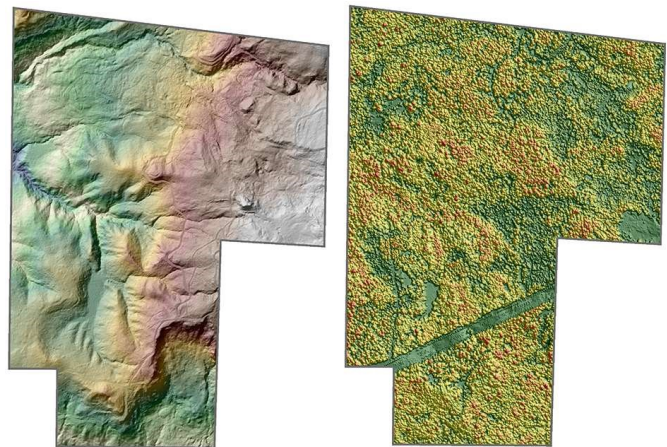
Students in FOR 431 work on their restoration project at the Tree Farm.

### FOR 431: Forest Restoration

Dr. Pascal Berrill's Forest Restoration class made multiple trips to the Tree Farm in the spring 2014 to work on their term project. The project involved restoring forest cover and associated habitat and biodiversity values to degraded areas at the Tree Farm. This included survey and mapping, site preparation and planting, and follow-up monitoring.

### GSP 216: Introduction to Remote Sensing

Students in Sara Hanna's fall 2014 Introduction to Remote Sensing class didn't physically visit the Tree Farm but they were able to analyze the topography and tree canopy using LiDAR data. Students learned how to create high-resolution bare terrain models and canopy height models from LiDAR point data. From these data students were able to locate the tallest trees and other areas of interest on the tree farm property.



High resolution bare earth terrain model (left) and canopy height model (right) of the Tree Farm

### FOR 432: Silviculture

In the fall students in FOR 432 helped implement the new variable density retention experiment (see page 5). Students surveyed the area and completed a forest inventory. They also assisted in the design of treatments, and in selecting trees for retention/cutting. Qualified students performed the cutting which helped set up the long-term experiment for other classes and researchers to study.

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## Carbon, Water-use, and Regeneration after Variable-density Retention in Evergreen Mixed-conifers

In the latter part of 2014 several Forestry and Wildland Resources faculty collaborated to develop a multi-disciplinary project at the L.W. Schatz Demonstration Tree Farm. The project entitled “Carbon, Water-use, and Regeneration after Variable-density Retention in Evergreen Mixed-conifers” will take place over the next two years and will involve six faculty members and multiple graduate and undergraduate students. The goal of this research is to conduct pilot-scale variable-density retention experiments at the Tree Farm.

Many evergreen mixed-conifer stands in northern California are currently in poor condition and variable-density thinning has great potential to improve forest conditions. After implementing variable-density retention, the project will study regeneration, understory light, tree growth and carbon storage, soil carbon content, soil moisture, and tree water use. This project will allow the research team to (i) quantify ecosystem,

climate and economic benefits of variable-density retention and (ii) determine management methods that best optimize the results.

The project will foster strong collaborative relationships amongst the faculty of the Department of Forestry and Wildland Resources, leading to continued research and outreach efforts of societal importance. The research and training provided by this project will also benefit the graduate and undergraduate students working on the project. Two graduate students in the Forest Watershed and Wildland Science option of the Masters of Natural Resources at Humboldt will also receive training and research experience, basing their theses on parts of this project. In addition to receiving funding support from the Tree Farm funds this project is also being supported by funding through the McIntire-Stennis (M-S) Cooperative Forestry Research Program grant.



Students in FOR 432: Silviculture help implement the variable density retention experiment

### Project Team

- Pascal Berrill
- David Greene
- Aaron Hohl
- Lucy Kerhoulas
- Susan Marshall
- Andrew Stubblefield

### Undergraduate Courses Involved

Forest & Range Soils, Soil Fertility, Soil Microbiology, Silviculture, Silvics, Forest Mensuration, Forest Measurements, Hydrology & Watershed Management, Watershed Hydrology

## **Contact Information**

### **L.W. Schatz Demonstration Tree Farm**

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## **L.W. Schatz Demonstration Tree Farm**

The L.W. Schatz Demonstration Tree Farm's mission is to provide a demonstration tree farm operation for the benefit of the students and faculty of Humboldt State University and as an example for owners of small timberland parcels. The Tree Farm enables experimentation and research regarding the growing, harvesting, and replacement of trees on timberland. The Tree Farm aims to utilize as many square feet as practical for production of commercial wood crops. The Tree Farm serves as an outdoor classroom for educational purposes and also enables public educational assistance to landowners through publications, photos, lectures, symposia, and tours.



## **Department of Forestry & Wildland Resources**

### **Tree Farm Advisory Committee**

David Greene, Chair, Department of  
Forestry and Wildland Resources

Steve Smith, Dean, College of Natural  
Resources and Sciences

Pascal Berrill, Assistant Professor, De-  
partment of Forestry and Wildland  
Resources

### **Tree Farm Staff**

Gordon Schatz, Tree Farm Manager  
George Pease, Technician  
Sara Hanna, Research Associate and  
Coordinator

Walter Kast, summer crew  
Jeffrey Ortiz, summer crew

### **Department of Forestry & Wildland Resources Faculty**

Pascal Berrill  
David Greene  
Han-Sup Han  
Jeff Kane  
Erin Kelly  
Susan Marshall  
Stephen Sillett  
Andy Stubblefield