Our Burning Challenge:

Innovative Implementation On Walker Hill Demo

The Nature Conservancy's Forest Restoration Project at Walker Hill Demo in the Coconino National Forest west of Flagstaff, Arizona. ©TNC

Modernizing Processes to Increase Pace and Lower Costs of Forest Restoration

Across the Southwest U.S., millions of forested acres are ecologically degraded and vulnerable to uncharacteristic wildfire. It is imperative to accelerate the pace and scale of implementing ecologically focused restoration treatments. New innovative practices have focused on streamlining project layout, a critical bottleneck in the restoration treatment pipeline. Walker Hill Demonstration Project provides data driven information on shifting workflows from manual, paint based tree designation to more scalable and cost effective approaches.

Project Description

The Walker Hill Demonstration Project compared alternative tree designation methods against conventional paint-based tree marking in restoration treatments. The project was conducted at an operational-scale study site on the Coconino National Forest in northern Arizona and was the first rigorous scientific study of its kind to assess these designation methods. The intent was to understand:

- **How much faster and less expensive is layout with alternative designation methods?**
- **Can a harvest operator follow a digital prescription, and will it slow them down?**
- **Can alternative designation methods achieve the same desired (silvicultural) outcomes?**

Five designation methods were used to implement identical restoration prescriptions across randomized treatment blocks.

1. **Leave Tree Marking (LTM)**
   Conventional, paint-based, on-the-ground designation
2. **Designation by Prescription (DxP)**
   "Cutter select" implementation based on the written prescription
3. **Imagery-Based Tablet Marking**
   Digital Prescription Guide (DPG) drawn in the field over satellite imagery
4. **LiDAR-Based Tablet Marking**
   Field-drawn DPG with LiDAR-derived canopy height model
5. **Desktop Marking**
   Office-based DPG drawn from LiDAR and satellite imagery

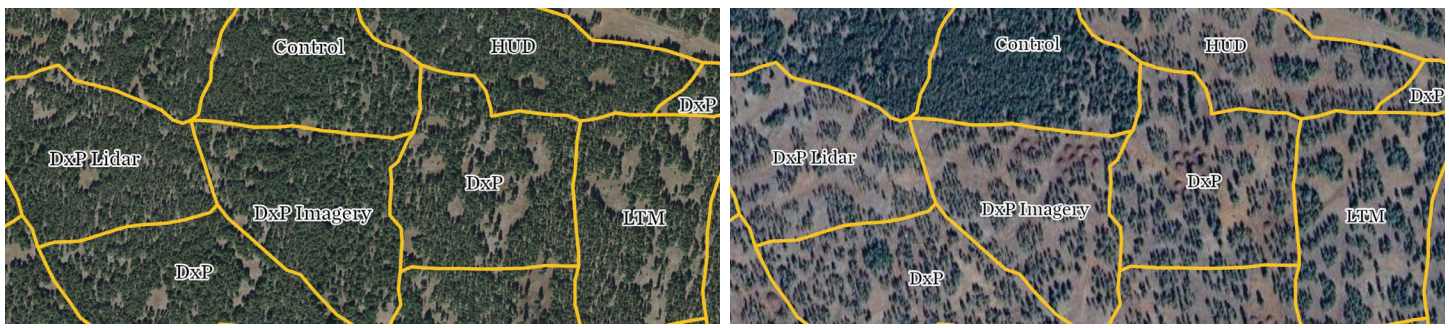


Figure 2: Representative pre- and post-treatment satellite imagery of Walker Hill Demo Project. © Kevin Dickinson/TNC

Figure 3: Pre- and Post-treatment satellite imagery with DPG overlay (blue lines). © Kevin Dickinson/TNC

Key Findings

Preferred **silviculture outcomes** largely achieved through all layout and designation methodologies, with no statistically significant differences detected between methods.

- ✓ tree density
- ✓ large & old tree retention
- ✓ size & structure
- ✓ residual tree quality
- ✓ canopy cover

Harvest Operators followed digital prescriptions and were not slowed down by alternative methods.

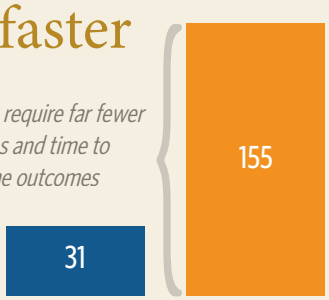
Results

Digital based layout methods verses Leave Tree Mark (LTM)

Digital LTM Per 1000 Prepared Acres

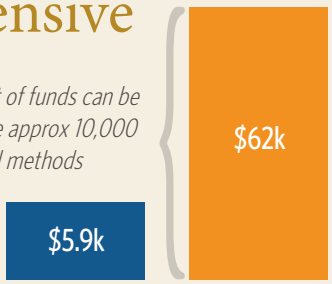
5x faster

Digital methods require far fewer human resources and time to achieve the same outcomes



10x less expensive

The same amount of funds can be applied to prepare approx 10,000 acres using digital methods



10x more acres prepped

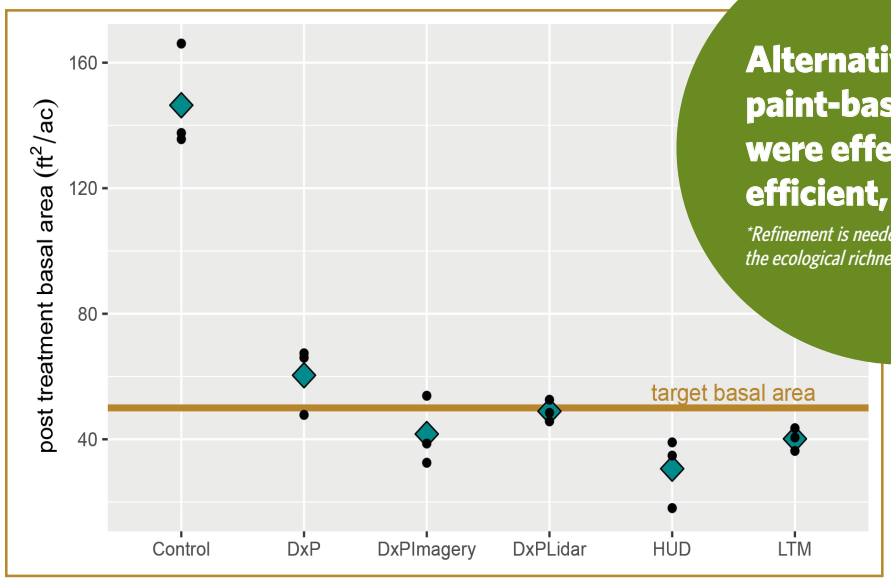


Figure 4: Measured residual basal area by treatment type and prescribed target (brown). ©USFS

Alternatives to paint-based marking were effective, efficient, and feasible*

**Refinement is needed to further enhance the ecological richness of outcomes*

Considerations

Successful implementation of DxP/DPG methods requires trained and skilled harvest operators.

Sale administration costs were not assessed but may add to overall costs.

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