FOREST INVENTORY & ANALYSIS

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BIOSUM 5.0 – Bioregional Inventory Originated Simulation Under Management

A dynamic tool for predicting biomass, carbon, and forest restoration outcomes at landscape scale

Issues:

Policy makers, forest managers, wood processors, carbon modelers and bioenergy operators pose varied questions about the health, sustainable production potential, management opportunities and carbon dynamics of managed forest landscapes. By systematically and consistently sampling the entire forested landscape, with remeasurement of trees, down wood and understory vegetation, and by including all ownerships and forest types, the Forest Inventory and Analysis Program constitutes a data utility with the potential for answering some of these questions:

- How much wood & bioenergy can a forested landscape deliver over decades, assuming certain management, sustainability, costs & prices?
- Which fuel treatments will most effectively enhance firefighter safety, protect greenhouse gas mitigation potential, & ensure resilient forests?
- What area can be effectively treated at given cost & set of silvicultural constraints & how does restoration achievement trend with time?
- What are the greenhouse gas mitigation implications of choosing active vs caretaker management of dry forest types in the western U.S.?
- Where are the most efficient places to add capacity for producing bioenergy from wood that is largely derived from harvest residues?

Which change agent is more climate friendly?

BioSum 5.0: A Landscape Management Information Utility

The BioSum modeling framework links a sequence of publicly available, documented models: Forest Vegetation Simulator (FVS) & its fire and fuels extension (FFE), OpCost Simulator for treatment cost estimation, and a Travel Times Calculator (TTC), with the FIA database and analyst-supplied assumptions and parameters to address these pressing questions. BioSum provides statistically representative estimates of treatment costs, volumes and values of merchantable and energy wood produced, treatment effectiveness and longevity, sustainability of productivity, habitat, and any other forest attribute that can be calculated or derived from inventory data.
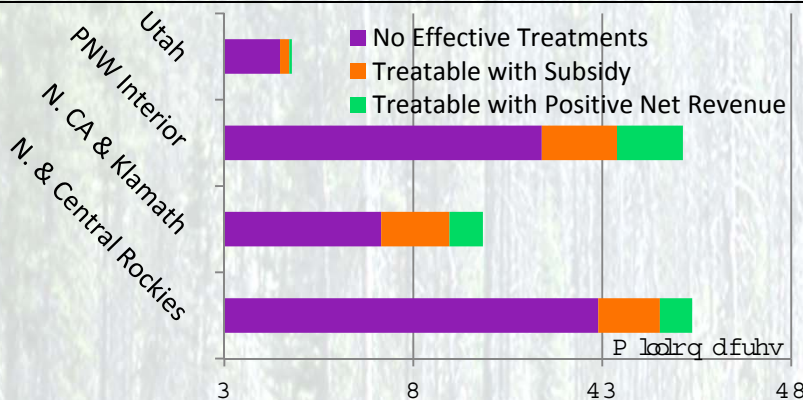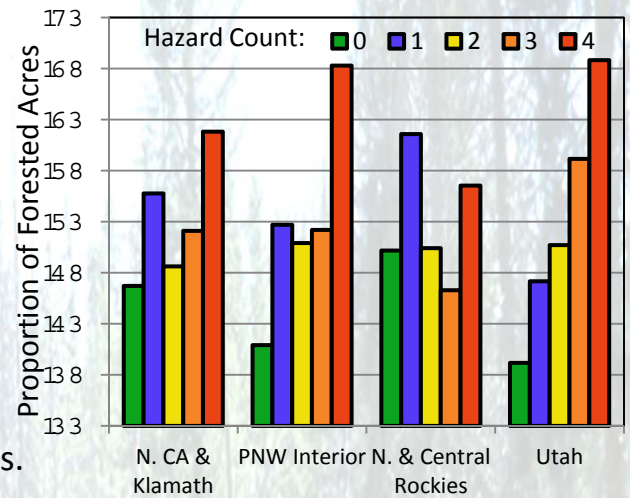
Available Spring 2015!

Hazards that matter

BioSum allows customized hazard definition, for example, if:

- Surface flame length > 4 ft. (safe suppression),
- Torching probability > 20 percent (crown fire),
- Torching index < 20 mph (crown fire), or
- Mortality volume > 30% (resilience, value, carbon)

Most dry mixed conifer forests have multiple hazards.

Effective fuel treatments eliminate one or more hazards.

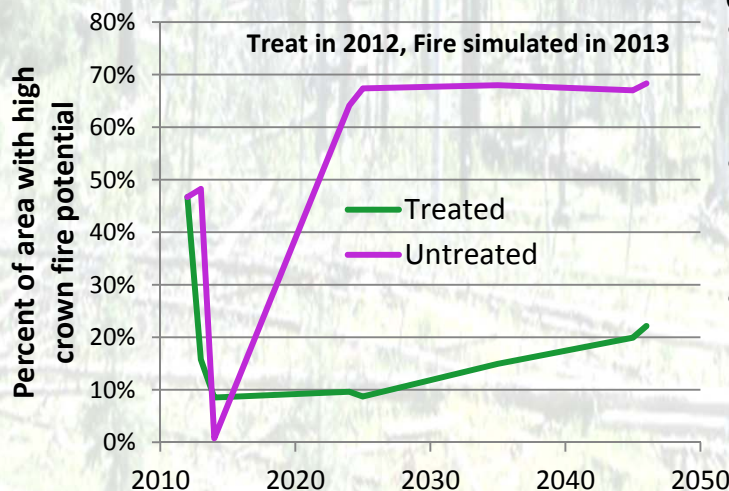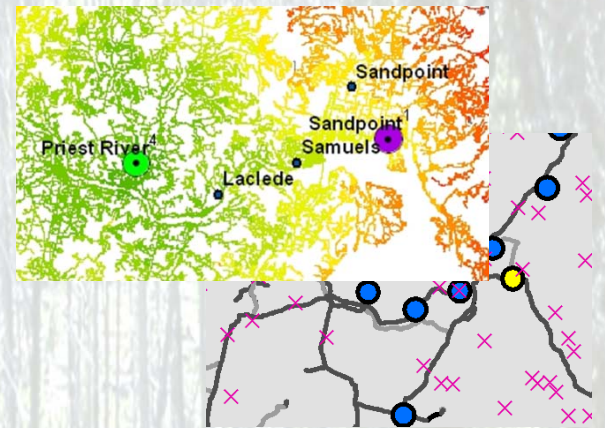## Landscape-scale treatment potential

Treatment accomplishment can:

- Be evaluated over entire forested landscapes
- Be targeted by ownership, forest type or initial hazard
- Depend on effectiveness criteria
- Relate to fire hazard or any other stand attribute
- Consider economic factors

Realistic treatment cost computation

Treatment economic components reflect:

- Harvest system specificity
- Machine, labor, move-in, & restoration costs
- Product mix extracted, by silvicultural prescription
- Haul costs to merchantable and bioenergy processing facilities given actual road networks & speeds
- Potential for divergent factor cost and product price trends

Treat in 2012, Fire simulated in 2013

Current analyses based on BioSum

- Life Cycle Pathways and Impact Analysis of Wildfire Fuel Reduction Treatments (CA, statewide; CA energy commission)
- Modeling Forest Resilience, Biomass and Carbon Management Potential (OR, statewide; Oregon Dept. of Forestry)
- Evaluating cost-effectiveness of multi-purpose fuel treatments in western mixed-conifer forests considering hazard, risk, longevity and co-benefits (6 western states; Joint Fire Sciences Program, with Terrie Jain/Rob Keefe)