Science Impacts on Forest Health in the Lake Tahoe Basin

Forests are integral to the aesthetics, fish, recreation, urban values, water, wilderness, wildlife, and other ecosystem services in the Lake Tahoe Basin. Restoring and maintaining forest health is paramount to ecosystem resiliency to fire, insects and disease, and other disturbances and is critically important to local communities.

Key Management Questions

Forest management requires understanding the processes that contribute to forest health and understanding the impacts that treatment or protection measures have on valuable forest resources. Management actions typically aim to restore forest ecosystems to healthier and more fire-resilient conditions, while reducing the risk of catastrophic fire to the surrounding communities. Key management questions include:

➢ How can forest health be restored while minimizing the effects of treatment measures on water quality, air quality, soils, habitats (plants and wildlife), aesthetics, and recreational experience?
➢ What is the effect of prescribed burning (pile or broadcast) on soils and how will this affect their ability to infiltrate water and nutrients?
➢ How effective are current treatments for improving forest resiliency to fire, insect attack, and mitigating the impacts of a changing climate?
➢ What regulatory and economic factors impact the effectiveness of treatment measures for reducing hazardous fuels, and restoring and sustaining healthy forests?

Science Investments to Address Key Management Questions

Science continues to improve our understanding of what constitutes a healthy forest, historically and today. These investments are informing management by:

➢ Reconstructing historic forest structure and fire return intervals
➢ Demonstrating the use of operating mechanized equipment in stream zones
➢ Developing restoration options for forest components impacted by exotics
➢ Measuring impacts of restoration treatments on watershed and lake values

Slaughterhouse Canyon near Glenbrook, NV
Photo by C.E. Watkins: 1873

Key Science Findings

Research has examined the effects of using mechanized equipment and controlled burns for fuels reduction on air quality, fire history in riparian areas, aspen restoration, sugar pine and other five-needle pine restoration, soil nutrient cycling, runoff water quality, and erosion risks. Preliminary results, ensuing symposia and presentations resulting from this research have provided forest managers and policymakers the opportunity to discuss and generate feedback to the researchers, identify new questions, and refine policy. Based on the preliminary findings a common theme is emerging that many of the treatments typically employed within the Lake Tahoe Basin pose little to no risk of adverse impacts

on lake clarity especially when coupled with appropriate Best Management Practices (BMPs). Some key findings include:

➢ The use of low ground pressure equipment in stream zones has been demonstrated to be an acceptable practice.
➢ Current fire frequencies are at their lowest over the past 12,000 years.
➢ Lack of fire has had a major influence on forest composition and structure, drought-induced mortality, disease and insect infestation, nutrient cycling, runoff water quality, and erosion.

Before Hand Thin Treatment	After Hand Thin Treatment

Management Actions Taken

Information generated from the science community has and will continue to add to project-level planning. Management actions taken include:

➢ Using mechanized equipment in stream zones to conduct tree thinning, reduce hazardous fuels, remove encroaching conifers, and restore aspen stands
➢ Providing education and outreach to the communities through events, media and collaboration on emerging science related to management actions

Next Steps

Syntheses of the scientific literature with a focus on key management questions need to be compiled in order to better understand the social and economic interactions between forest ecosystems and the impacts of restoration treatments.

Where to go for more information

Forest Health and Fuels Management Research:
http://www.fs.fed.us/psw/partnerships/tahoescience/fuel_management.shtml

Proceedings of the February 2010 conference held at McClellan, CA, "Pre- and Post-Wildfire Forest Management for Ecological Restoration and Fire Resiliency":
http://ucanr.org/sites/Prepostwildfire/