Station Briefing Papers

Science-Based Solutions for the Four Threats to the Health of the Nation's Forests and Grasslands

Pacific Southwest Research Station

USDA Forest Service

Research and Development

PSW Contact: Garland Mason (510) 559-6316
R&D Contact: Dave Cleaves (703) 605-4195
OC Contact: Lennie Eav (202) 205-3818

Website: http://www.fs.fed.us/psw

FIRE AND FUELS

Current Emphasis

- ✓ Developing new remote-sensing technology—the FireMapper to monitor real-time fire behavior.
- ✓ Developing new software (ECOSMART Design) to evaluate tradeoffs between different landscape practices on residential parcels.

Research Results

- ✓ How to remotely sense fire behavior and provide firefighters with information to improve safety and economic effectiveness.
- ✓ How communities and residents can test the feasibility of different firewise techniques and evaluate residential fire risks.
- ✓ Firefighting efficiency can be increased through national adoption of the automated decision support system (Wildland Fire Situation Analysis - WFSA system).
- ✓ Ground penetrating radar can be used to predict impacts of fire on Sonoran desert giant saguaro.
- ✓ How to California to predict savings in economic impacts of fire-induced sedimentation with prescribed fires.
- ✓ Most California recreationists are not concerned about fire except as they affect, air quality, and cause traffic delays.

Further Research

- ✓ Extend the capability of the FireMapper to make direct measurements of fire intensity to further research on large fire behavior and effects.
- ✓ Provide better descriptions of trees as fuel.

- ✓ Understand how fire spreads between trees and structures to guide residents in modifying structures that influence ignition.
- ✓ Evaluate the economics of fuels management practices.
- ✓ A wider range of tools for analyzing fire economics, including large fire cost-analysis tools, non-natural resource valuation, e.g., wildland-urban interface; and fuel treatment costs.
- ✓ Methods for monitoring and evaluating Burned Area Emergency Rehabilitation (BAER).
- ✓ Use remote sensing to determine fuel loads for tactical and strategic response and planning in wildland fire incidents.
- ✓ Improve fire-weather forecasting short range to season-long scales.
- ✓ Improve tools for planning and evaluating performance for the full range of activity in wildland fire protection, including wildland-urban interface areas.
- ✓ Study the impacts of fire and fire management practices on rare, sensitive, threatened or endangered species and their habitats.

INVASIVE SPECIES

Current Emphasis

- ✓ Developing and testing a science-based method of assessing plants for their potential to become invasive in the Hawaiian Islands.
- ✓ Evaluating hundreds of species of plants in the nursery trade for potential invasiveness.
- ✓ Developing simple and inexpensive techniques for controlling invasive, fire-promoting fountain grass (*Pennisetum setaceum*) and for facilitating the establishment of key native dry forest species.
- ✓ Gaining a basic understanding of Sudden Oak Death (*Phytophthora ramorum)* a new pathogen that very devastating to oak species and affects a wide variety of other host plants.

Research Results

- ✓ Models for assessment of invasiveness in Hawaii are 80-85 percent consistent with assessments made by a large group of plant experts with extensive field experience.
- ✓ Once controlled, fountain grass cannot reinvade the same areas it dominated in the short term (5 years).
- ✓ Spread of fountain grass is potentially limited because few seeds germinated in seedbed studies using soil taken from areas where this species is abundant

- ✓ Detect and identify new pathogens, a critical requirement in monitoring, and regulatory actions and policy development.
- ✓ Sudden oak death (SOD) pathogen occurs in at least seven countries, mostly in Europe. Data from Europe, however, cannot be used for management and policy decisions in the U.S. because of genetic and behavioral differences, and different hosts..
- ✓ Preliminary results on chemical control treatments for SOD in individual high-value trees are promising.
- ✓ Safe disposal of SOD pathogen from large volumes of dead materials.

Further Research

- ✓ Make invasive assessments information available to landscaping professionals and the public in Hawaii.
- ✓ Determine what species of landscape plants in Hawaii have lower risk of invasiveness and can be used as substitutes for any important landscaping or forestry purpose.
- ✓ Given the highly fragmented condition of native dry forests in Hawaii, even small–scale successful restoration projects will create urgently needed habitat for the introduction of rare species.
- ✓ Determine the full range of host plants, geographic range at risk, and environmental conditions that favor the SOD pathogen.
- ✓ Study how SOD spreads, how far, and how infects plants.
- ✓ Make an inventory of plants affected by SOD and determine how SOD mortality affect fuels and fire risk, forest and soil instability, erosion, and water quality, forest condition, and diversity of plant species and wildlife habitat.

UNMANAGED RECREATION

Current Work

- ✓ Investigating day use of developed and dispersed recreation sites on National Forests (Angeles, Cleveland, Gifford Pinchot, Inyo, Los Padres, Willamette).
- ✓ Measuring conflict related to off-highway vehicle (OHV) and other uses, and evaluating management perceptions of issues and actions related to OHV use.
- ✓ Studying elements that define a quality visitor experience and visitor preferences for management action.
- ✓ Investigating sociodemographic changes and determining how these translate into differences in recreation interests and needs.

- ✓ Evaluating methods for communication and education that increase environmentally responsible action.

Research Results

- ✓ Many riparian areas are of significant interest to racially/ethnically diverse visitors. Yet these areas are typically the least developed and among the most ecologically sensitive.
- ✓ Many day-use visitors are seeking ways to relieve stress in their everyday lives; some may be engaged in traditional activities (such as hiking) while others pursue high-risk or extreme activities (e.g., , hang gliding).
- ✓ Place importance is a key variable, and day-use visitors often return to the same areas. Areas without similar geographic and attachment features may not be viewed as equivalent choices for redirection of use.
- ✓ Various sites need to be redeveloped to protect resources and serve visitor groups; some day-use visitor groups preferred high levels of site development (Latinos), while others preferred little development (mountain bicycle riders).
- ✓ Mountain bicycle riders tend to be avid enthusiasts looking for difficult trails.
- ✓ OHV enthusiasts tended to recreate in family groups and expressed an interest in safety measures (such as safety flags on their vehicles).

Further Research

- ✓ Determine popularity of recreation sites that have or are near water (e.g., lakes, streams, etc.)
- ✓ Resolve issues related to sense of place and carrying capacity.
- ✓ Study how to manage extreme recreation.
- ✓ Redevelopment options for sites degraded by heavy use.
- ✓ Public perceptions concerning visitor safety.
- ✓ Assist managers in addressing depreciative behavior, and promoting environmental messages and visitor safety information.