U.S. Forest Service Wildland Fire and Fuels R&D Program

USDA Forestry Research Advisory Council
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U.S. Forest Service Research and Development

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Science Serving Society
Frontier Fire
- Forest Research Branch – 1916
- Fire as forestry economics
- Planning

Backcountry Fire
- Fire Research Division – 1948
- Fire behavior
- Fire history
- Meteorology
- Fire ecology
- Fire protection
- Prescribed burning
- Restoration

Mass Fire
- Fire Laboratories Technology Development Centers
- Fire physics
- Fire detection systems
- Suppression technology
- Smoke and emissions

Wilderness Fire
- Incident Command Center
- Fire behavior models
- Fire chemistry
- Fuel management
- Fire economics
- Fire danger rating system
- Prescribed fire
- Remote sensing

Extreme Fire
- National Fire Plan
- Applied modeling
- Fire adapted communities
- Restoration
- Resilient landscapes
- Geospatial
US Forest Service
2016 Proposed

- Land Acquisition: $65.2m
- Payments to Communities: $316.0m
- State and Private Forestry: $236.6m
- Forest and Rangeland Research: $292.0m
- Capital Improvement and Maintenance: $242.0m
- National Forest Systems: $1.65b
- Wildland Fire Management: $2.36b
- Suppression Cap Adjustment: $854.6m

Fire:
- ~ $3.2 billion
- ~ 52%
U.S. Forest Service
2016 Proposed
R&D-$292m

- Forest Inventory & Monitoring
  - $90.8m
- Wildland Fire & Fuels R&D
  - $20.5m
- Invasive Species R&D
  - $32.5m
- Recreation R&D
  - $4.1m
- Resource Management & Use R&D
  - $86.2m
- Wildlife & Fish R&D
  - $25.0m
- Water, Air & Soil R&D
  - $32.7m
U.S. Forest Service 2016 Proposed Fire R&D Budget is 1.5% of Wildland Fire Management and Suppression

Wildland Fire & Fuels R&D $47.3m

Wildland Fire Management and Suppression $2.93b
(Doesn’t include Suppression Cap Adjustment)

Note: Includes Additional Fire R&D Resources from FAM
N.F.P. R&D - $19.8m
JFSP - $6.9m
Research and Development Facilities Locations

- Experimental areas 50
- Station HQ 7
- Laboratory/RWU 58
- TOTAL 145
Wildland Fire and Fuels R&D Strategic Program Area (2006)

Three Goals:
1. Advance basic and applied wildland fire science.
2. Promote application of knowledge and tools.
3. Enhance national and international leadership.

Portfolios:
A. Core Fire Science
B. Ecological and Environmental Fire Science
C. Social Fire Science
D. Integrated Fire and Fuels Management
E. Science delivery
   • Synthesis and tool development
   • Science delivery and application

Science Serving Society
National Fire Plan R&D

• Established by congress in 2001
• 78 research teams across the United States
  – initially funded for 5 years, currently in various stages of re-competition across stations
• Internal peer review process for new projects
• Conducted by FS scientists and university collaborators
• Focus on applied research, deliverables and useful products
National Fire Plan R&D
Four Major Areas of Emphasis

1. Improve Prevention and Suppression
   – Fire weather/behavior prediction
   – Effective/strategic response
   – Fire and smoke monitoring

2. Reduce Hazardous Fuel
   – Fuel treatment effectiveness
   – Biomass and small tree utilization

3. Restore Fire-adapted Ecosystems
   – Rehabilitation effectiveness
   – Invasive management and protection

4. Promote Fire-adapted Communities
   – Structure vulnerability
   – Community policies and attitudes
Joint Fire Science Program

• National, interagency, application focus.
• Managed by 10-person governing board
• Competitively funds 2-3 year projects through external peer-review.
• Focus on fuel treatment effectiveness, landscape restoration, wildlife, emissions, and demonstration projects.
• Budget $13M - $16M, FS and DOI.
National Cohesive Wildland Fire Management Strategy

An effort to collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress towards the three goals:

1. Restore and maintain resilient landscapes
2. Create fire-adapted human communities
3. Respond safely and effectively to wildfires
National Cohesive Wildland Fire Management Strategy

- Four-year process (FLAME Act)
- Regional-to-national approach
- Enormous amount of stakeholder participation and input
- National Risk Assessment and National Action Plan Plan

1. Managing vegetation
2. Protecting homes and communities
3. Managing Human ignitions
4. Safely, efficiently, and effectively responding to wildfire
Prescribed Fire

A - Use prescribed fire to manage fuels where it is already being used
B - Consider expanding use of prescribed fire
C - Consider prescribed fire, but on a limited basis
NSTC Fire Science and Technology Task Force (2014)

• Fire science and technology across the federal government
• Roles and responsibilities
• Progress on 2008 Grand Challenges for Disaster Reduction
• Resource baseline
• Gaps and opportunities
Fire Science Applications
## Fire Science Applications

<table>
<thead>
<tr>
<th>Tool Name</th>
<th>Description</th>
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<tr>
<td>Armillaria Response Tool (ART)</td>
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<td>BehavePlus</td>
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<td>BlueSky Smoke Forecast System (BlueSky)</td>
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<td>Comparative Risk Assessment in Fire and Fuels Planning (CRAFT)</td>
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<td>Consume 3.0</td>
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<tr>
<td>Fire Area Spread Simulator (FARSITE 4.0.4)</td>
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<td>Fire Behavior Assessment Tool (FBAT)</td>
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<td>Fire Ecology Assessment Tool (FEAT)</td>
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<td>Fire Effects Information System (FEIS)</td>
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<td>Fire Effects Planning Framework (FEPF)</td>
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<td>Fire Effects Tradeoff Model (FETM)</td>
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<td>Fire Emission Production Simulator (FEPS)</td>
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<td>FireFamily Plus</td>
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<td>Fire and Fuels Extension–Forest Vegetation Simulator (FFE-FVS)</td>
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<td>Fire Regime Condition Class (FRCC)</td>
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<tr>
<td>Fireshed Assessment: An Integrated Approach to Landscape Planning</td>
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<td>First Order Fire Effects Model 5.2 (FOFEM)</td>
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<td>FlamMap 3.0 Beta 6</td>
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<td>Forest Inventory and Analysis Biomass Summ. System (FIABioSum)</td>
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<td>Fuel Characteristic Classification System (FCCS)</td>
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<td>Fuel Characteristic Classification System (FCCS) Fuelbed Mapping</td>
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<td>Fuels Management Analyst Plus (FMA Plus)</td>
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<td>Gradient Nearest Neighbor (GNN)</td>
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<tr>
<td>Gradient Nearest Neighbor (GNN) Vegetation and Fuel Maps, Including</td>
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<td>Guide to Fuel Treatment in Dry Forests of the Western United States</td>
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<td>Harvest Cost and Revenue Estimator (HCR Estimator)</td>
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<td>Integrated Forest Resource Management System (INFORMS)</td>
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<td>LANDFIRE</td>
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<td>LANDIS and LANDIS-II</td>
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<tr>
<td>Landscape Simulator</td>
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<td>My Fuel Treatment Planner (MyFTP)</td>
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<td>NEXUS</td>
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<td>Optimizing Fuel Solutions and Ecological Values in Landscapes (FUEL)</td>
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<td>Simulating Patterns and Processes at Landscape Scales (SIMPPLLE)</td>
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<td>Smoke Impact Spreadsheet (SIS)</td>
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<td>Stereo Photo Series for Quantifying Natural Fuels</td>
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<td>Tool for Exploratory Landscape Scenario Analysis (TELSA)</td>
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<td>Understory Response Model (URM)</td>
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<td>Valuation of Ecosystem Restoration Strategies (VERSTRA)</td>
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<td>Vegetation Dynamics Development Tool (VDDT)</td>
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<td>Water Erosion Prediction Project (WEPP) Fuel Mgt (FuMe) Tool</td>
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<td>Wildlife Habitat Response Model (WHRM)</td>
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How are we organized and resourced to deliver science?

FS R&D Nationally

R&D Fire SPA:
E. Science Delivery

Knowledge Exchange Consortia:
Connect to Local Experts

Wildland Fire Management Research, Development & Application
Integrating Science, Technology and Fire Management

FS R&D Station(s)