Rocky Mountain Research Station and Missoula Fire Sciences Lab

2017-2018 Seminar Series

2017-18	Title/Presenter Click on the Title to view abstract	
Oct 5	An overview of the USFS National Technology and Development Program / Mark Vosburgh	No Recording
Oct 12	High-Resolution Modeling of Environmental Transport Processes in Cities and Complex Terrain / Eric Pardyjak	View Recording
Oct 19	Enterprise research computing at the Firelab / Bryce Nordgren ***Cancelled***	
Oct 26	Fire behavior on slopes: flame and plume attachment / Torben Grumstrup	No Recording
Nov 2	How Cattle, Logging, Fire, and Climate Shaped the Mississippi Piney Woods Since ca. 1700 CE / Grant Harley	View Recording
Nov 9	Evaluating the Swiss SNOWPACK modeling system across the Northern Rocky Mountains / Chris Gibson	View Recording
Nov 16	Complex patterns of the Lolo Peak Fire from Carlton Ridge to Bass Creek / Steve Arno	View Recording
Dec 7	The Human Physiological effects of Wildland Fire Management / Joe Domitrovich	No Recording
Dec 14	Vulnerability and resilience of forest landscapes to changing fire regimes and altered post-fire recovery dynamics. / Alan Tepley	View Recording
Dec 21 - Jan 4	No Seminars, Winter Break	View Recording
Jan 11, 2018	Whitebark Pine / Molly Retzlaff and Sarah Flanary	View Recording

11:00 AM-12:00 PM

The Fire Science Lab , 5775 West U.S. HWY 10, Missoula, MT 59808.

2017-18	Title/Presenter
Jan 18	Integrating Fire and Forest Planning: A Review of National Forest Plan Revisions / Hailey Graf — View Recording
Jan 25	Changing cryosphere and alpine landscapes in Glacier National Park, MT / Erich Peitzsch
Feb 1	Climatic controls on post-fire conifer regeneration in low-elevation forests of the western U.S. / Kim Taylor
Feb 8	Scott Copeland
Feb 15	The Nature Conservancy: Two decades of forest land conservation in western Montana: lessons learned and exciting opportunities for science of applied forest restoration, fire and adaptive management.
Feb 22	Fire Center research / Lloyd Queen
Mar 1	Alan Ager
Mar 8	Methane emissions from the United States natural gas infrastructure: Field measurements and national emissions modeling results / Anthony Marchese
Mar 15	The Forest Inventory and Analysis tree-ring data base: applications and opportunities/ Justin DeRose
Mar 22	Rangeland Fuelcasting: A Predictive Service for Improving Suppression Readiness/ Matt Reeves
Mar 29	Justin S. Crotteau
Apr 5	2017 Fire Season from the Missoula District Perspective / Jen Hensiek and Dave Williams
Apr 12	Global fire induced tree loss and its biophysical effects on surface temperature / Zhihua Liu
Apr 19	Serra J. Hoagland

11:00 AM-12:00 PM

The Fire Science Lab , 5775 West U.S. HWY 10, Missoula, MT 59808.

2016-17	Title/Presenter
Apr 26	
May 3	
May 10	Disturbance dynamics of severe and widespread bark beetle outbreaks in pine systems at various spatial scales over the past century / Joel Egan
May 17	Emily Heyerdahl
May 24	No Seminar, Fire Continuum Conference
May 31	
June 7	
June14	

11:00 AM-12:00 PM

The Fire Science Lab , 5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us or visit www.firelab.org

FireLab

Seminar Series

Mark Vosburgh, USFS

National Technology and Development Program

Host: Thomas Dzomba

Date: October 5, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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An overview of the USFS National Technology and Development Program

In May of 2017 the Missoula, Montana and San Dimas, California Technology and Development Centers emerged from a multi year re-organization effort to form the National Technology and Development Program. Our new organization is guided by the following principles. **NTDP Mission:** The Forest Service National Technology and Development Program provides Forest Service employees and partners with practical, science-based solutions to resource management challenges. We evaluate, design, and develop new technologies, products, and systems to solve problems and deliver solutions. **NTDP Vision:** The Forest Service National Technology and Development program is recognized nationally for providing quality products and outstanding customer service. This presentation will provide an introductory overview for those unfamiliar with our organization. This discussion will include a high level overview of current program of work. For who have worked with us in the past, a summary of what is new and what has stayed the same in the reorganization will be provided.

FireLab

Seminar Series

Eric Pardyjak,
University of Utah

Host: Natalie Wagenbrenner

Date: October 12, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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High-Resolution Modeling of Environmental Transport Processes in Cities and Complex Terrain

Cities are diverse places with heterogeneous landscapes and are home to complex processes occurring over a wide range of length and time scales. Understanding and modeling these process is critical to improved sustainability related to goals of improving urban microclimate, reducing energy and water usage, increasing clean energy production and mitigating pollution emissions. Due to difficulty in simulating the large disparity in length scales covering these processes, little is known about their impact. In this resentation, a description of our approach, which is designed to bridge these scales and improve our understanding of different processes occurring in urban environments at local (neighborhood), city, and meso-scales will be discussed. In particular, an overview of the fast-response QUIC EnvSim model will be presented along with recent model additions designed to resolved vegetation and mountainous terrain. QUIC EnvSim predicts winds, dispersion, radiation components, air temperatures and humidity at scales of 1-5 meters. A discussion will be presented on how this modeling system can be extended to other applications related to winds and microclimate in complex (e.g., mountainous) terrain such as fires at the wildland urban interface.

Seminar Series

Enterprise Research Computing at the Firelab

Fire Lab scientists press their computers into service in a variety of ways that government CIO professionals either strive to forbid or scramble to avoid supporting. The practice which causes the most discomfort is R&D's agile collaboration with external cooperators. Official mechanisms for coping with R&D's needs focus on documenting individual exceptions to the "office computer/office software" standard, explicitly treating each request as unrelated from all others. This talk focuses on common requirements which support multiple scientific inquiries, as embodied in our computing environment here at the Firelab. We will cover all three sides of the computing triangle: processing power, bandwidth, and storage. The goal of this talk is to show that although substantive professional IT support for these common R&D needs is not forthcoming, it is not necessary for each end user to separately re-invent all of their infrastructure from scratch, or self-support it indefinitely.

Bryce Nordgren,
Missoula Fire Lab

Host: Thomas Dzomba

Date: October 19, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Fire behavior on slopes: flame and plume attachment

Torben Grumstrup,
Missoula Fire Lab

Host: Natalie Wagenbrenner

Date: October 26, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Grant Harley,
University of Idaho

Host: Alina Cansler

Date: Nov. 2, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

How Cattle, Logging, Fire, and Climate Shaped the Mississippi Piney Woods Since ca. 1700 CE

Fire is a common occurrence in the longleaf pine (*Pinus palustris*) forests of the Southeast United States. Prescribed fire is used to manage these threatened ecosystems, but information regarding historical fire activity is unknown. My goals were to determine the historical fire regimes in De Soto National Forest (DSNF), southern Mississippi, and determine the influence of climate and land use history on fire activity at two study sites: Fern Gulley Ridge (FGR) and Death Scar Valley (DSV). The composite mean fire interval during the prescribed burning period (1980–2013) was 3.4 years. During settlements periods, fire intervals at FGR and DSV were as frequent as 1.7 years and 1.9 years, respectively. Hence, the historical fire regime was more frequent than the current schedule of prescribed fire designed to emulate past fire activity. Evidence of biannual burning was found at both sites, indicating up to three fires burned in a 12–15 month period likely caused by land use practices (i.e. logging, cattle herding). A significant ($p < 0.05$) albeit weak association between broad-scale Pacific and Atlantic Ocean oscillations were found, which suggests fire-climate interactions were masked by heavy anthropogenic land use over the past several centuries. Based on fire regime information gleaned in this study, burning the forest at a 2–3 year interval would be the first step towards simulating historical landscape conditions and fire activity.

FireLab

Seminar Series

Chris Gibson,
NOAA

Host: Natalie Wagenbrenner

Date: Nov. 9, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

Evaluating the Swiss SNOWPACK modeling system across the Northern Rocky Mountains

Since late 2015, a one dimensional model of snow pack structure, know as SNOWPACK, has been evaluated by the National Weather Service at Missoula, in collaboration with Montana State University. The model is driven by point-based output from a high-resolution numerical model (WRF-ARW). Hourly forecasts of incoming radiation, temperature, precipitation, etc., drive the SNOWPACK model, which simulates snow accumulation, structure of the snow pack and melting processes. Designed to assist with avalanche hazard evaluation and forecasting, the SNOWPACK model allows the meteorologists within the NWS to evaluate the impact of storm cycles, cold and clear periods, rainfall, etc., on snow pack structure. By simulating the snow pack near remote SNOTEL gauges, accuracy can be somewhat verified with observed snow depth readings, as well as occasional snow pits and avalanche center evaluations. WRF and SNOWPACK simulations and verification will be presented, for points across western Montana, for two winter seasons.

FireLab

Seminar Series

Complex Patterns of the Lolo Peak Fire from Carlton Ridge to Bass Creek

The recent Lolo Peak Fire and associated burnouts and backburns resulted in both expected and unexpected burn patterns related to differences in forest structure, topography, and weather. It also illustrates the "perfect storm" of stifling constraints the Forest Service faces in attempting to implement ecologically-based management of the West's fire-dependent forests.

Steve Arno (Retired),
Missoula Fire Lab

Host: Bob Keane

Date: Nov. 16, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

The Human Physiological effects of Wildland Fire Management

Wildland firefighters expend large quantities of energy, are exposed to extreme environmental conditions, and often alter their dietary patterns while managing fires. Our work at the National Technology and Development Program (NTDP) has been to quantify the physiological demand placed on these wildland firefighters. Our work includes fitness, nutrition, exposure assessment, and PPE. This presentation will give an overview of our findings from our latest studies and direction for the future.

Joe Domitrovich
National Technology & Development Center
Host: Thomas Dzomba

Date: Dec. 7, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Seminar Series

Alan Tepley

University of Montana

Host: Alina Cansler

Date: Dec. 14, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

Vulnerability and resilience of forest landscapes to changing fire regimes and altered post-fire recovery dynamics

As the climate continues to warm, forest landscapes face increasing risk of conversion to non-forest vegetation through alteration of their fire regimes and their post-fire environments. Despite the intuitive relationship between warmer, drier weather and larger, more severe fires, the degree to which climatic warming and other global change pressures transform landscapes may depend on more complex interactions and feedbacks between fire and vegetation. To better understand the factors conferring vulnerability and resilience of forest landscapes to changing fire regimes and altered-post-fire environments, I studied vegetation dynamics following high-severity fire in one landscape that has undergone extensive transformation in response to alterations of its fire regime in the recent past (the loss of *Nothofagus* forests of New Zealand soon after initial human colonization in the 13th century) and another landscape that may face increasing risk of transformation from forest to shrub-dominated ecosystems in the near future as the warming trend continues (mixed-conifer and mixed-evergreen forests of the Klamath Mountains of northern California and southwestern Oregon). Insight from the empirical studies was incorporated into a mathematical model to help generalize understanding of how fire–vegetation feedbacks and the time to forest recovery following high-severity fire interact to affect the extent and stability of forest cover across landscapes facing altered fire regimes and post-fire environments. The model provides testable predictions regarding trajectories and rates of future landscape change, which can help prioritize future empirical work, and the interpretations can be further tested by comparison to more complex simulation models.

Seminar Series

Molly Retzlaff and Sarah Flanary,

Missoula Fire Lab

Host:

Date: Jan. 11, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Hailey Graf

Host: Alina Cansler

Date: Jan. 18, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Integrating Fire and Forest Planning: A Review of National Forest Plan Revisions

Wildland fire is a disturbance process integral to system functioning across many National Forests. Historically, however, fire management in the U.S. focused on suppression efforts that over time lead to changes in the vegetation and fuel characteristics. Only recently have planning regulations in the U.S. Forests Service (USFS) begun to recognize the importance of wildland fire and its relationship to sustaining ecosystems. It is also now recognized that landscape-scale land management efforts must include fire planning and management. Successfully integrating wildland fire management and forest plan revisions could aid managers in landscape-scale planning, project prioritization, and even restoration of fire-adapted ecosystems. However, it is not yet clear how the USFS will approach integrating wildland fire and forest plan revisions, pursuant to recent changes in the planning regulations. To determine how fire and forest planning are being integrated, a policy review, forest plan evaluations, and supplemental interviews were conducted. This research shows that the planning regulations provide the necessary flexibility for all National Forests, despite unique ecological characterizes, to integrate fire and forest planning. However, several challenges revealed by this research include developing adaptable plan components, specific desired conditions, monitoring strategies, and fire-specific area designations. Understanding the approaches used by National Forests can provide learning opportunities for future forest plan revision efforts. Recommendations for overcoming these challenges include the increased use of objectives, the inclusion of option plan content such as goals and management approaches, and a more explicate incorporation of the Cohesive Strategy into plan components.

FireLab

Seminar Series

Erich Peitzsch,

USGS, West Glacier, MT

Host: Alina Cansler

Date: Jan. 25, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

Changing cryosphere and alpine landscapes in Glacier National Park, MT

Mountain ecosystems in the western U.S. and the Northern Rockies in particular are highly sensitive to climate change. These same ecosystems provide up to 75% of the water humans depend on as well as a host of other ecosystem services such as snow-based recreation, timber, unique flora and fauna, and critical habitat for rare and endangered species such as bull trout and grizzly bear. The USGS Northern Rocky Mountain Science Center has been monitoring, conducting research, and modeling ecosystem responses to climatic variability since 1991, first at Glacier National Park, but eventually throughout the western U.S. and worldwide in collaboration with other scientists. Erich will present a broad overview of their research group's projects, and then provide an in-depth look at two of their current projects: glacier mass balance and avalanche/snowpack mapping using remote sensing capabilities. CCME staff are monitoring many of the park's glaciers to determine the causes of change, assess their ecological and hydrological effects, and predict future changes and effects. Intensive research to determine the mass balance of Sperry Glacier will determine whether small cirque glaciers like Sperry can serve as reliable indicators of current climate variability. Analysis of aerial photography, repeat photography, and glacier margin surveys document the rapid retreat of these mid-latitude glaciers as increasing temperatures influence mountain ecosystems world wide. These data have contributed to regional climate change and hydrologic models. Snowpack characteristics have also been evaluated in relation to avalanche forecasting and plowing of GNP's Going to the Sun Road efforts. Studies of natural snow avalanches reveal connections with large-scale climate patterns as well as the influence on the creation of characteristic habitat vulnerable to climate change.

FireLab

Seminar Series

Climatic controls on post-fire conifer regeneration in low-elevation forests of the western U.S.

Kim Taylor,
University of Montana

Host: Alina Cansler

Date: Feb. 1, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

An increase in the frequency of large, high-severity wildfires is raising concerns over the possibility of post-fire conifer regeneration failure and subsequent shifts to non-forest states. Conifer seedlings are especially sensitive to climate conditions, and thus climate may play an important role in limiting post-fire conifer regeneration. Here we ask: 1) how do high severity fires alter the microclimate at the ground level where seedlings are recruiting; and 2) how do annual climate conditions affect post-fire conifer recruitment?

We found that forest canopies can dramatically buffer extremes of maximum temperature and vapor pressure deficit (VPD) during the growing season, with biologically meaningful effect sizes. For example, the buffering effect near the ground surface was as high as 16 °C and 5.0 kPa at daily time scales, and, where canopy cover was at least 50%, maximum temperature and VPD were on average 5.3°C and 1.1 kPa lower, respectively, compared to areas without canopy. Therefore, high severity fires that dramatically reduce canopy cover have the potential to significantly alter the microclimate experienced by tree seedlings. Furthermore, we found that annual recruitment density of ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) in forests across the western US depended on these same climate variables: maximum temperature at the ground surface and/or average VPD during the growing season were consistently important in explaining recruitment density after accounting for time since fire. Other climate variables related to annual moisture conditions such as climatic water deficit, growing season precipitation, and/or soil moisture were also important in explaining annual recruitment density. The relative importance of different climate variables in explaining recruitment success varied by species and across the Southwest, Colorado, Northern Rockies, and Northern California regions.

FireLab

Seminar Series

Scott Copeland,

Colorado State University

Host: Thomas Dzomba

Date: Feb. 8, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

The Nature Conservancy: Two decades of forest land conservation in western Montana: lessons learned and exciting opportunities for science of applied forest restoration, fire and adaptive management.

Join The Nature Conservancy (TNC) in discussing new and exciting research and forest restoration opportunities across the Blackfoot watershed. Over the last two decades TNC has been involved in conserving over 525,000 acres of former industrial timberlands across western Montana. A majority of these lands have been transferred into public ownership, much of it now managed by the US Forest Service. In the process of finding permanent conservation outcomes we have built a strong network of partners to protect these important landscapes. While we search for permanent conservation ownership outcomes on our current ownership—located primarily in the lower Blackfoot Watershed—we have an opportunity to engage in restoration now and initiate projects that could continue beyond our ownership. With a history of extensive timber harvest and recent large wildfires, this landscape is dominated by dense young forests in need of restoration to invest in their future resilience. We see an opportunity for the scientific community and management practitioners to partner with us and help identify opportunities to set up landscape-scale applied experiments to inform our collective understanding of the interactions of forest dynamics, climate adaptation, fire, and wildlife across the region.

Speakers: Chris Bryant & Mike Schaedel, Western Montana Nature Conversancy

Host: Alina Cansler

Date: Feb. 15, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Lloyd Queen,
University of Montana

Host: Natalie Wagenbrenner

Date: Feb. 22, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Seminar Series

Alan Ager,
Missoula Fire Lab

Host: Alina Cansler

Date: March 1, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

FireLab

Seminar Series

Anthony Marchese

Host: Torben Gumstrup

Date: March 8, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Methane Emissions from the United States Natural Gas Infrastructure: Field Measurements and National Emissions Modeling Results

To realize immediate net climate benefits from the substitution of coal, diesel or gasoline with natural gas, the rate of methane loss from the entire natural gas supply chain must be less than a few percent. Since the natural gas supply chain consists of a vast network of infrastructure with countless emission sources, quantifying the total methane emissions from the U.S. natural gas supply chain represents a major challenge. In this study, facility-level methane emissions measurements were conducted using a new dual tracer gas technique at 130 natural gas gathering facilities and processing plants in 13 U.S. states. The results from the field campaign were combined with state and national facility databases in a Monte Carlo simulation to estimate methane emissions from U.S. natural gas gathering and processing operations. Total annual methane emissions of 2,421 (+245/-237) Gg were estimated for all U.S. gathering and processing operations, representing a methane loss rate of 0.47% (±0.05%) when normalized by annual methane production. The largest source of methane emissions from gathering and processing operations were attributed to normal operation of gathering facilities (1,697 +189/-185 Gg) and these emissions were eight times that of previous EPA Greenhouse Gas Inventory (GHGI) estimates. The methane emissions from processing plants (506 +55/-52 Gg) were 40% lower than previous GHGI estimates but a factor of three higher than that reported under the EPA Greenhouse Gas Reporting Program (GHGRP). In April 2016, the EPA GHGI was updated based directly on the results of this study, which effectively added over 1500 Gg of annual methane emissions to the inventory. With these updates to the EPA GHGI, gathering operations are now estimated to account for 27% of all methane emissions from natural gas supply chain.

FireLab

Seminar Series

The Forest Inventory and Analysis tree-ring data base: applications and opportunities

Justin DeRose
Forest Inventory and Analysis, RMRS, USFS, Ogden, UT
Host: Alina Cansler

Date: March 15, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Speaker: Matt Reeves

Host: Thomas Dzomba

Date: March 22, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Rangeland Fuelcasting: A Predictive Service for Improving Suppression Readiness

Nationally available maps describing fuel conditions, such as those produced by LANDFIRE, often struggle to remain up-to-date because rangeland vegetation and fuels exhibit high inter-annual variability. In addition, while the predictive services offered by the various GACCs provide copious information and maps regarding fuel moisture, they lack quantitative, objective, spatially explicit information describing fuel quantity. This is a conundrum since, especially in arid and semi-arid rangelands, fire spread is often limited by lack of fuel but can become very significant during years exhibiting relatively high vegetation production. To help this situation, we have developed a system for projecting peak fuel loads, bi-weekly, throughout the growing season, to describe the timing and peak of vegetation (and therefore fuel) production. The machine learning approach processes up to 9 indicators of rangeland production including lag times specific for each vegetation type. The resulting data indicate the estimated date of peak fuel production, estimated total annual production of fuel, and a confidence interval that assists in determining reliability of using the projections to estimate future conditions.

FireLab

Seminar Series

Justin S. Crotteau, University of Montana

Host: Alina Cansler

Date: March 29, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

2017 Fire Season from the Missoula District Perspective

Jen Hensiek and Dave Williams

Host: Natalie Wagenbrenner

Date: April 5, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Global fire induced tree loss and its biophysical effects on surface temperature

Zhihua Liu

Host:

Date: April 12, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Seminar Series

Serra J. Hoagland,
Missoula Fire Lab

Host: Alina Cansler

Date: April 19, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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Seminar Series

Speaker TBA

Host:

Date: April 26, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

Seminar Series

Speaker TBA

Host:

Date: May 3, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

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FireLab

Seminar Series

Joel Egan

Host:

Date: May 10, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
5775 West U.S. HWY 10, Missoula, MT 59808.

For more information, please contact missoula_firelab_seminars@fs.fed.us **or visit** www.firelab.org

Disturbance dynamics of severe and widespread bark beetle outbreaks in pine systems at various spatial scales over the past century

Presentation includes discussion on:

1) reconstructions of Northern Region mountain pine beetle outbreaks from 1915-2015;
2) relative comparisons of pine host resistance;
3) meta-analysis of yellow pine resistance to *Dendroctonus* spp.-attack across western U.S.

Seminar Series

Emily Heyerdahl

Host:

Date: May 17, 2017
Time: 11:00 AM-12:00 PM
Where: The Fire Science Lab
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