

POSTER SESSION | DAY 1 & 2 (only) | 12PM-1PM | OPTIONAL



WILDFIRE

WEATHER | WATER | WEEDS | WILDLIFE

DAY 1 - Thurs. Sept. 16, 9am-12pm

DAY 2 - Thurs. Sept. 30, 9am-12pm

DAY 3 - Thurs. Oct. 14, 2pm-5pm



Supported by **UNIVERSITY OF CALIFORNIA**
Agriculture and Natural Resources

DAY 1 | SEPTEMBER 16TH | POSTER ABSTRACTS & PRESENTERS

Modeling the Under-Protection of Human Development From Post-Fire Floods and Debris Flows

Ariane Jong-Levinger, Ph.D. Student in Civil & Environmental Engineering, University of California, Irvine

Cycles of fire, rainfall, and flood are increasingly common within Mediterranean and semi-arid climates; precipitation over a burned, steep watershed can generate flash floods with high concentrations of sediment and unpredictable flow paths. In southern California, communities have defended themselves from these hazards with flood management infrastructure that includes debris basins located at the outlet of mountain canyons to capture sediment and debris, and flood channels that rapidly convey floodwater past urban development. Such infrastructure has proven effective at protecting communities from flood events equal to or less than what they were designed for. However, two major trends in California point to the increased

likelihood that post-fire floods will exceed the capacity of flood management infrastructure: first, large wildfires are becoming more frequent and more severe, and second, precipitation extremes are intensifying. Moreover, development is expanding below and into mountain wildlands where these compound hazards are concentrated, exposing more lives and property to dangerous flooding and debris flows. Extensive work has addressed the development of predictive models for the hydrologic effects of wildfires. However, previous work has yet to characterize the compound hazard from successive events that may fill and overtop debris basins, leading to the clogging of flood channels. We present an original model that captures the interrelatedness of wildfires, storms, and infrastructure with the aim of characterizing the compound hazard facing human development. Preliminary results show that the compound hazards associated with successive events may far exceed what is expected based on regional infrastructure design standards.

Potential of Green Infrastructure to Mitigate Water Quality Impact of Wildfire

Onja Davidson Raelison, University of California, Los Angeles

Surface runoff from wildfire-affected areas carries ash and sediments containing high concentrations of heavy metals, trace elements, and toxic organic pollutants and deposits them downstream affecting surface waters and aquatic ecosystems. However, the runoff from wildfire areas can be intercepted by green infrastructure and natural stormwater management systems designed to route and treat stormwater runoff. Thus, these treatment systems could provide a mitigation measure to limit the spread of wildfire residues downstream. Yet the potential of stormwater treatment systems to absorb or remove wildfire-derived pollutants from runoff has never been studied. Deposited wildfire residues could increase the concentration of heavy metals and dissolved organics in the influent and effluent of stormwater biofilters based on filter media properties and their release would depend on ash types, pH, and concentration of dissolved organic carbon in stormwater or biofilter pore waters. To test the hypothesis, batch experiments have been conducted to better understand the leaching of heavy metals from wildfire residues surrounding the stormwater biofilter environment while column experiments have been conducted to analyze the wildfire-derived pollutants removal capacity of model biofilters. The results could inform management efforts to implement green infrastructure to protect downstream wildfire-affected areas and their ecosystem functions from future wildfire threats.

Resilient Watersheds and Fire Management

Diana (dee-ah-nah) Voss-Gonzalez, Local Government Commission

LGC's recent Pandemic Recovery work highlights the need for watershed-scale fire management preparedness. Climate change is intensifying California's natural drought-fire-flood cycle, leading to more devastating wildfires with greater financial

impact. Three of the past four fire seasons have cost the state \$10 billion each in damage, compared to the average \$1 billion costs annually over the previous 50 years. As these costs accumulate, and compound with other climate impacts, the state's resilience to withstand wildfire is hindered.

LGC proposes a paradigm shift away from reactionary approaches, to forward-looking management techniques that minimizes the need for emergency response. The state is beginning some course-correction through the Wildfire and Forest Resilience Action Plan and associated funding, but institutional barriers to implementation still remain. LGC supports collaboration at the watershed scale and coordination with local, regional, and state entities. Intentional, measured, and preemptive action is necessary, especially fuel-load reduction and multi-scale coordination. LGC identifies several case studies that elevate community-driven efforts to thin trees, remove biomass, and promote cultural burning.

Learning to Live with Fire

Jeremy Klemic, SWA Group (Landscape Architecture)

Fire knows no borders, threatened communities are crafting both broader and localized plans for mitigating megafires. This reevaluation of life in the WUI is about shifting mindsets, creating new models and relearning strategies for wildfire resilience.

Planting a Legacy: Preventing the Next Woolsey Fire

Sarah Kevorkian, Santa Monica Mountains Conservancy Regional Forest and Fire Capacity Project Manager, Mountains Recreation and Conservation Authority

High intensity wildfires are regular events in the Santa Monica Mountains. Decades of wildfire history show large Santa Ana wind driven fires moving southward in the Simi Hills and then jumping the 101 freeway into the Santa Monica Mountains in a well-defined, historic fire corridor. Many of those large fires then spread out widely in the Santa Monica Mountains and reach the ocean as they did in the 2018 Woolsey Fire which burned 96,949 acres, destroyed 1,643 structures, killed three, and prompted the evacuation of more than 295,000 residents. Given the predictability of fire travel through this fire corridor, the Mountains Recreation and Conservation Authority (MRCA) is implementing an innovative ember barrier zone on public lands along a four-mile-long section of the 101 freeway. Within this fire corridor zone, the MRCA is employing a combination of intensive-species-specific fuels management and planting of ember catching groves of coast live oaks interspersed with valley oaks. All work is occurring on open space managed by the MRCA within the Santa Monica Mountains Zone. The three-year pilot project will employ and train youth in various local conservation corps.

The Edge of Paradise: Landscape Strategies for Living with Wildfire

Alison Ecker, Planner & Designer, SWA Group

This project identifies strategies for mitigating risk within and around the Town of Paradise, California, which was destroyed by the 2018 Camp Fire. With Guidance from community leaders, the project envisions a series of wildfire buffering schemes designed to leverage the co-benefits of wildland fuels reduction, high-value agricultural production, renewable energy, and expanded recreational

programming. Drawing heavily from landscape ecology and indigenous principles of prescribed fire management, the project identifies a regional network of patches and corridors that can be leveraged as effective spatial drivers for implementing context-specific burn strategies. This project, which builds on recent studies by the Conservation Biology Institute and the Nature Conservancy, continues SWA's research and design engagement with wildfire-prone landscapes in California.

Using GIS, Machine Learning, High-Resolution Aerial Imagery, and Non-governmental Organization (NGO) and Open Natural Resources Data to Map Invasive Species and Develop Climate-Adapted Ecological Plant Palettes for Los Angeles, CA

Peggy H Nguyen, M.S., Environmental Science, Policy and Management; M.Ed.; Cert. Restoration Ecology; D.Env. Candidate, UCLA Institute of the Environment and Sustainability; Environmental Supervisor, City of Los Angeles, L.A. Sanitation and Environment

Predictive models suggest that climate change will create disturbances, such as severe wildfires, that may both harm and enhance the survival and spread of invasive plant species. Pampas grass (*Cortaderia selloana*) is one invasive species that is predicted to become less common in Southern California and to expand north by 2050. Using these predictions Land Managers can plan for the replacement of invasive vegetation in urban-wildland interface (UWI) areas with climate-adapted locally-native vegetation alliances cover and seed bank. Doing so can help to facilitate wildlife migration and climate resilience, and prevent biodiversity loss following severely damaging wildfires. GIS and machine learning have been used successfully to map vegetative cover from satellite and aerial imagery. This proof-of-of concept study sought to determine the most effective workflow for 1) rapidly mapping invasive plant species, and 2) using climate change research findings, natural and ecological history data, topo-edaphic soil data, and hydrological information to predict and select replacement vegetation alliances for habitat restoration efforts in Los

Angeles, California. This poster describes 1) a geospatial and machine learning-based method for rapidly mapping Pampas grass in the Ballona Wetlands using field data and high-resolution aerial photographs; and 2) the method used to develop an ecological landscaping resource and plant selection tool (from NGO and open data) that can increase user awareness of local ecology and ecological landscaping and conservation efforts and resources. Sample maps and plant palettes for different climate scenarios for the Ballona Wetlands and a nearby UWI are included.

Abbreviations Used:

UWI - urban-wildland interface

GIS - geographic information system

NGO - non-governmental organizations

Built to Burn: California's Wildlands Developments Are Playing With Fire

Tiffany Yap, Senior Scientist, Urban Wildlands, Center for Biological Diversity

Wildfires have occurred on California's landscapes for millennia. They are a natural, necessary process for many of California's ecosystems. But poor land-use practices since European colonization have disrupted historical fire regimes, which has led to an increase in fire frequency in native shrublands and more harm to human communities. Almost all contemporary wildfires are caused by human sources like power lines and electrical equipment. Building new developments in fire-prone wildlands increases unintentional ignitions. Hotter, drier, and windier conditions due to climate change make the landscape more conducive to wildfire ignitions and spread. This is causing a dangerous feedback loop as native shrublands are converted to highly flammable non-native grasses. In addition, people are suffering. Since 2015 almost 200 people in the state have been killed in wildfires, more than 50,000 structures have burned down, hundreds of thousands have had to evacuate their homes and endure power outages, and millions have been exposed to unhealthy levels of smoke and air pollution. Meanwhile, the costs of fire suppression and damages have skyrocketed. Policymakers need to acknowledge that reckless land-use policies are increasing wildfire risk, destroying habitat, and putting more people in harm's way. To address this

crisis, local officials must stop approving new development in highly fire-prone wildlands and instead, invest in critical retrofits, like irrigated defensible space immediately adjacent to structures, exterior sprinkler systems, and distributed solar, for existing communities. Every dollar spent on new development in these hazard areas is a dollar invested in the problem rather than the solution.