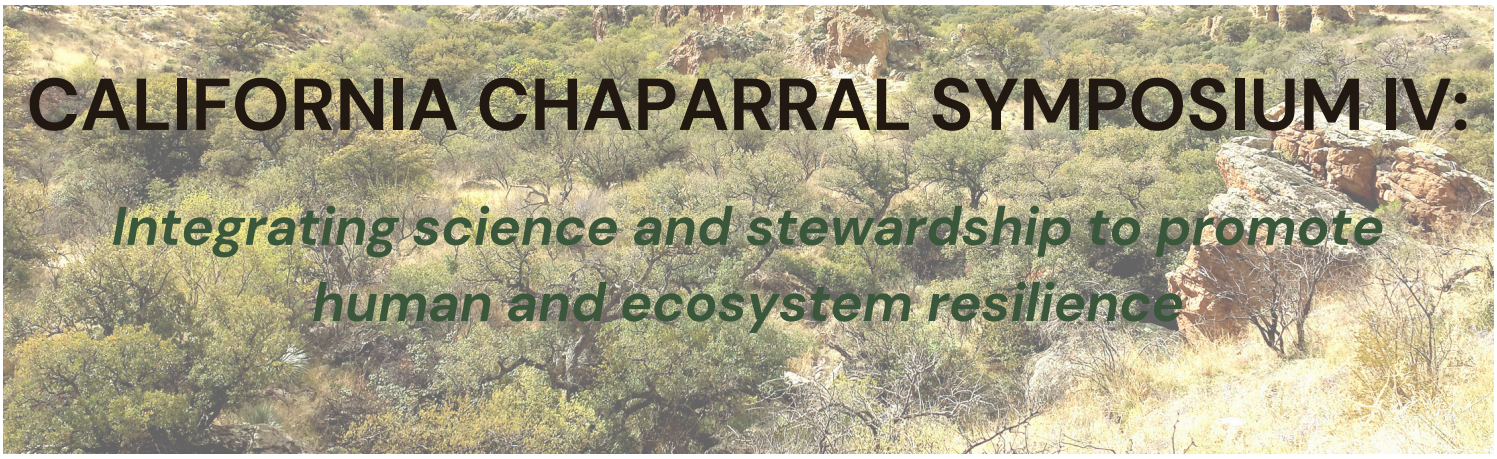

Poster Session Abstracts

Title: Igniting connections for natural and cultural resource protection before and during wildland fires in southern California

Authors: Austin Parker, USGS; Peter Scully, Peter Scully consulting; James Gannon, Bureau land management; Sarah McCutcheon, San Diego Management and Monitoring Program; Emily Perkins, San Diego Management and Monitoring Program; Kristine Preston, San Diego Management and Monitoring Program; Robert Fisher, USGS.

The USGS Western Ecological Research Center, San Diego Field Station, has been creating a partnership with local fire managers, land managers, and conservation scientists. This program creates proactive solutions by connecting local experts with fire managers to identify resource concerns for active wildfire management. This program is a collaboration of local agencies including the BLM, San Diego Management and Monitoring Program, USFWS, NPS, CalFire, the County of San Diego, and NGOs.

This program has two foci: 1. The creation of two databases and interactive maps. One is a database of infrastructure on conservation lands to aid in fire managers' suppression activities. The second is a database of ecological and cultural resource avoidance areas. Together, these two databases aid fire managers during suppression activities as well as suppression repair to avoid ecological and cultural resource damage across a mosaic landscape of landowners and habitat types.

2. A local cohort of wildland fire resource advisors (READs) to provide local expertise and assistance on ecologically sound fire suppression decisions and suppression repair tactics to best protect natural and cultural resources. The cohort of READs will utilize the two databases to make decisions during active incidents.

Title: Using Landsat derived data to map vegetation type conversion in southern California shrublands

Authors: Charlie Schrader-Patton, USDA Forest Service WWETAC / RCR; Emma Underwood, University of California Davis

Southern California is home to over 23 million people and contains the second most populous urban center in the US (Los Angeles). Interspersed with these densely populated urban areas are some of the most biodiverse wildlands in the USA, dominated by chaparral shrublands. Shrublands are experiencing increasing conversion to grasslands dominated by non-native annual species through Vegetation Type Conversion (VTC), which can drastically alter the ecosystem services shrublands provide. The primary driver of VTC is shorter fire return intervals: with shorter intervals shrub regeneration is inhibited as seeder species are unable to accumulate sufficient seed in the seedbank, resulting in non-native annuals occupying the available growing space. Site characteristics such as slope, aspect, and climate play strong supporting roles. Previous studies of VTC in southern California involved change analyses and interpreting historic aerial imagery. In this study, we identified areas of shrub to grassland conversion using a publicly available data stack (1985 to present) generated from Landsat imagery- the MRLC RCMAP Fractional Component Time Series https://www.mrlc.gov/data, Using known areas of conversion, we applied decision rules to determine decline and conversion thresholds of shrub and annual herbaceous cover on a pixel basis (based on Syphard et al. 2022), and applied these rules across the southern California landscape. Temporal analysis of selected areas of interest showed these rules reflected the landscape conditions well. This work demonstrates the utility of long-term fractional cover datasets for tracking VTC in southern California and assisting in identifying areas susceptible to VTC to prioritize sites for restoration.

Title: SoCal EcoServe–Tool for Quantifying Wildfire Impacts on Ecosystem Services

Authors: Emma Underwood, University of California, Davis; Charlie Schrader-Patton, USDA Forest Service WWETAC / RCR

Wildfires in Mediterranean-type shrublands have numerous environmental impacts. We developed an online decision-support tool to help resource managers of shrub-dominated landscapes quantify the impacts of wildfires on ecosystem services. To estimate carbon storage, we created an aboveground live biomass model using over 700 field plots. Based on these estimates, we calculated standing dead, litter, and belowground shrub biomass pools using information in the literature. Results showed mean biomass for the southern California ecoregion and percent uncertainty for each of the pools as: AGLBM (905.4 g/m2, 14.4%); standing dead (644.9 g/m2, 1.3 %); litter (731.2 g/m2, 1.2 %); and belowground (776.2 g/m2, 17.2 %). To estimate the long-term loss of carbon storage post-fire we assessed the potential for the native shrubland to regenerate based on fire history. Sediment erosion data for southern California were calculated using the InVEST sediment erosion module, and water runoff and groundwater recharge data were compiled from the Basin Characterization Model. To estimate the impacts of fire on sediment erosion and hydrological services we integrated burn severity data. Data on recreation and biodiversity services are provided in pre-fire condition. Using the Bobcat Fire (2020) as a case study, we estimated the fire resulted in an immediate post-fire reduction in carbon storage of 16%, of which 2.5% was estimated to be permanently lost. Runoff and recharge increased by 24% and 75% respectively, and sediment erosion increased seven-fold. The SoCal EcoServe tool provides an initial approximation of wildfire impacts in southern California which can support damage assessments post-fire.

Title: Planting a Legacy: Creating an Ember Screen Along a Historic Wildfire Corridor

Author: Sarah Kevorkian, 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 oaks and other native fire resilient trees. All work is occurring on open space managed by the MRCA within the Santa Monica Mountains Zone. The project includes a workforce development component in partnership with local conservation corps including Los Angeles Conservation Corps and San Gabriel Valley Conservation Corps, as well as partnership with Los Angeles County Fire who is helping supply many of the trees.

Title: Action-based framework for building a wildfire resilient community

Authors: Anne-Marie Parkinson, Santa Barbara County Fire Safe Council; Max Moritz, UC Cooperative Extension; Rob Hazard, Santa Barbara County Fire Department; Graham Wesolowski, SIG-NAL; Marc Mayes, SIG-NAL; Kelly Johnston, CWPC; Molly Mowery, CWPC; Kate Furlong, SBCFSC

Recent catastrophic wildfires have caused policy makers to reprioritize and rethink wildfire planning efforts. Large multi-jurisdictional efforts with agencies leading the charge are underway to understand gaps and solutions so communities can move towards wildfire resiliency, e.g. CA Wildfire Resilient Task Force, National Cohesive Wildland Fire Management Strategy. These efforts are needed to address the legislative and policy barriers to wildfire mitigation, but these efforts falter when it comes to implementing change in a region as County's often lack a cohesive and coordinated plan with a strategic vision to create a fire-adapted region.

The Regional Wildfire Mitigation Program (RWMP) provides a much-needed, implementation-based framework for a focal (non-agency) organization to facilitate a holistic and collaborative approach to wildfire resilience through built environment, landscape, and community programming.
Wildfire mitigation efforts often focus on mitigations to the landscape, particularly through thinning and fuel breaks. However, the pathway to wildfire resilience requires a multi-faceted, community centric approach since these domains – landscape, built environment, and communities - are inter-connected.

This framework is designed to be reproducible for other Counties to adapt to their specific socio-political regions. Santa Barbara County, where the highest risk WUI is within chaparral dominated environments, has been the pilot for this novel framework where the Santa Barbara County Fire Safe Council has been leading holistic wildfire mitigation efforts to assist communities to live with wildfire.

Title: 5 Year Chaparral Restoration in Southern

TreePeople broke ground in 2018 on the overarching chaparral restoration of San Francisquito Canyon and has been working hard since to restore just under 25 acres

California

Authors: Alyssa Walker, TreePeople; Stephanie Liu, TreePeople; Thierry Rivard, TreePeople

previously impacted by the 2002 Copper Fire.
Partnering with US Forest Service, California Botanic Garden, Santa Clarita Valley Water Agency, and RECON Environmental TreePeople and more than 5,000 volunteers have planted over 20,000 native trees, grasses and shrubs. This work has been funded by National Fish and Wildlife Foundation and is now funded by CalFire. This work aims to improve watershed health and ecosystem function by removing invasive species and restoring native habitat in areas of the canyon that struggled most to recover from the fire. Healthy chaparral plant communities are one of the most biodiverse habitats in the world and some of our most resilient to climate change which is why the restoration and conservation of these spaces is so critical. Throughout the duration of the project the focus has been a high species diversity with regular care implemented to achieve success through the dry season. With a project species richness of 68, TreePeople has seen incredible success within the first couple years of beginning each new subsite. Areas once overwhelmed with challenging invasives such as: Hirschfeldia incana and Carduus pycnocephalus have been transformed into thickets of shrubland now in full natural regeneration cycles. Through informal, observational studies we have seen insects and fauna utilizing the habitat in ways that were not possible prior to the restoration.

Title: Ecological response of California chaparral to mastication

Authors: Michael Pero, California Polytechnic State University, San Luis Obispo; Jeremy James, California Polytechnic State University, San Luis Obispo; Grey Hayes, California Polytechnic State University, San Luis Obispo

California's chaparral is symbolic of the state's impressive biodiversity and an integral component of the California Floristic Province. Mechanical fuel reduction treatments that have important differences from natural disturbances are commonly used in chaparral ecosystems to manage wildfire risk to human populations. This study aims to build on previous research focusing on the ecological response of southern California chaparral to mastication and how this treatment emulates wildfire disturbances by analyzing masticated chaparral in central and northern California and comparing to nearby sites that burned in a wildfire within the same time frame. Both treatment groups were compared to nearby control sites to determine the response relative to nearby chaparral that is representative of the pre-disturbance plant communities. The results of this study will further inform land managers tasked with weighing multiple management goals that may, at times, conflict with each other.

Title: Restoring and Enhancing Native Perennial Shrublands for Native Insects & Pollinators

Authors: Monica Matthews, Ventura County Resource Conservation District; Heidi Ortloff, Ventura County Resource Conservation District;

Native insects, including our native pollinators, are some of the most imperiled taxa in our ecosystems at this time in our history. As a result of habitat loss and degradation, pesticide use, invasive species and the climate crisis, these populations are bearing the brunt of the environmental crisis affecting all of us. Research shows that loss of or severe reduction in the populations of these organisms contributes to ecosystem collapse. Organisms such as many of larval stage lepidopterans form more than half of the diet of native birds and adult stage native insects of many taxa provide pollination services for fruit production and plant reproduction in all ecosystems. Designing restoration to provide food plants for native insects, that begins to rebuild the food base for these primary consumers rebuilds food webs and thus ecosystems. The work does not end with restoration, as further monitoring and management continue to be necessary to ensure these restored areas meet the intended goals for our projects and

Jamie Whiteford, Ventura County Resource Conservation District	needs of our native insect and pollinator populations, but it is a crucial first step to rebuilding ecosystem health within our communities.
Title: Chaparral shrub restoration: the role of shade and soil inoculum in chamise (Adenostoma fasciculatum) and sagebrush (Artemisia californica) survival ***Authors:*** Antonio Mateiro, California State University, Bakersfield; Brandon Pratt, California State University, Bakersfield	Increased drought conditions and altered fire regimes in chapparal causes a phenomenon called vegetative type conversion, where the evergreen, woody shrubs native to the region are replaced by invasive annual herbs. In these type-converted landscapes, active restoration is required. One method of restoration may be facilitation of chaparral shrubs through shade cast by a nurse plant. Members of the California sage scrub community may fit the role of nurse plant, as their fast growth and drought-deciduous leaves allows them to survive the intense heat and drought conditions. Another method of restoring shrublands may be through the inoculation of native soil. Invasive annuals that populate a type-converted landscape bring their own invasive microbiota, and this hampers establishment of native shrubs. Eighty Adenostoma fasciculatum and Artemisia californica seedlings were transplanted from nurseries into a common garden experiment in February 2023. Seedlings of each species were planted under shade cloth, inoculated with native soil from a chapparal community, and planted without any manipulations as a control (n = 20). Another group consisted of twenty seedlings of each species planted directly next to each other under shade cloth (n = 160 for all seedings). After a year, seedlings planted under shade, regardless of shade treatment, experienced less morality than seedlings inoculated with soil and seedlings with no manipulations and inoculated seedlings did not differ in mortality from the control. This suggests that the facilitation through shade cast by a nurse plant may be feasible in chaparral restoration settings, but not addition of native soil.
Title: Chaparral shrubs as nurse plants for oak plantings ***Authors:*** Stephanie L. Tyler, University of California Riverside; Krista Dugan, UCR, Thierry Rivard, TreePeople, Janet Franklin, SDSU, Marko Spasojevic, UCR, Nicole Molinari, USFS, Loralee Larios, UCR	Oak trees are an integral species of chaparral ecosystems, but they do not readily recover post wildfires. Management efforts are currently being implemented across the Angeles National Forest to establish several oak species. Here we investigated whether a chaparral shrub, Adenostoma fasciculatum, can serve as a nurse plant to enhance oak planting success. We planted oak seedlings of three different species (Quercus berberidifolia, Q. chrysolepis, Q. wislizeni) next to a shrub or in the open, at two different sites. Q. berbedifolia was planted at both sites while the other species were planted at one. We measured survivorship of each oak seedling at three times during the summer - end of June, end of July, early September and height in September. We observed high survivorship across the board with an average survivorship of 63%. Survivorship of Q. chrysolepis and Q. wislizeni was not affected by the nurse plant, but Q. berbidifolia had slightly higher survivorship increasing from 58% in the open to 75% next to a shrub. In contrast to survivorship, we observed surviving individuals of Q. chrysolepis and Q. wislizeni grew taller in the open than next to a shrub. Q. berbidifolia's height response differed between the two sites, where a positive nurse plant effect was observed at one site but not at the other. We found some evidence for a nurse plant helping oak establishment, but future work should explore other strategies to ameliorate the harsh environmental conditions associated with planting directly in the open.

Title: Evaluating the efficacy of forestry plantations within Southern California chaparral

Authors: Erin McCann, University of California, Riverside (UCR); Janet Franklin, San Diego State University; Nicole Molinari, US Forest Service; Marko Spasojevic, UCR; Loralee Larios, UCR

Chaparral systems dominate the Angeles National Forest, and their management consists of a diversity of goals such as increasing wildlife habitat, promoting long term retention and health of forests across the landscape, and reducing wildland fire risk. Conifer planting is one action that is implemented within chaparral systems to support these management goals. More thorough monitoring of the survivorship and performance of seedlings is needed to further identify strategies to increase the efficacy of these efforts. Specifically, this study sought to evaluate the efficacy of conifer plantings as part of the Sawmill Liebre Reforestation Project. As part of this reforestation, 4700 seedlings of three conifer species (Pinus coulteri , P. ponderosa , P. sabiniana) were outplanted in March of 2021 across 13 sites. Within four of these sites, we surveyed seedling growth and survival in the summer of 2021 and 2022. Overall, we found limited survival across all species and sites. The survival rate across three plantations was only 2.7% in summer 2021 and decreased to 0.6% by 2022. Survival varied across species and plantations ranging from 0% for P. ponderosa to 2.4% for P. sabiniana in 2022. Growth was also limited for those seedlings that did survive through 2022. P. coulteri seedlings exhibited the greatest average change in height of the three species at 5.9 cm while P. ponderosa and P. sabiniana had similarly low increases in height at 2.75 cm and 2.89 cm. Overall, these results highlight the opportunity to research additional methods to increase outplanting success.

Title: Monitoring ecological integrity and type conversion of native shrublands in San Diego County

Authors: Emily Perkins, U.S. Geological Survey; Philip Gould, U.S. Geological Survey; Jennifer Kingston, U.S. Geological Survey; Chris Brown, U.S. Geological Survey; Kristine Preston, U.S. Geological Survey; Robert Fisher, U.S. Geological Survey

Invasion of nonnative grasses have altered the species and functional composition of native shrublands in San Diego County. Several factors have been identified as drivers of this change including fire, drought, and nitrogen deposition. The San Diego Management and Monitoring Program (SDMMP) has an ongoing vegetation monitoring program to incorporate remote sensing, GIS, and 100 field plots in the 2024 field season to investigate the relationship between these variables with invasive grass cover. Our goal is to inform better management activities by creating a spatially explicit model of the dynamic systems in coastal sage scrub and chaparral.

Title: Adaptive, collaborative, data-driven stewardship: A next-generation decision support tool for natural resource management and community resilience

The intersection of climate and human-driven disturbances are eroding landscape resilience, both rapidly, and at scale. The sheer complexity of these issues make it difficult for managers and decision-makers to respond quickly and effectively. Addressing complex, cross-boundary management challenges requires:

(1) explicitly incorporating stakeholder knowledge and values;
(2) generating consistent data and analytics that can be understood and customized by users;

Authors: Sophie Gilbert, Vibrant Planet; Katharyn Duffy, Michael J. Koontz, Sophie Gilbert, Tyler Hoecker, Joe Shannon, Hugh Safford

(3) prioritizing potential investments and actions dependent on data and stakeholder values; and
(4) easily visualizing cross-boundary consensus, evaluate tradeoffs, and accelerate the pace and scale of resilience planning

Vibrant Planet's cloud-based, scenario-building and decision support tool is built to resolve these and other management issues at local, regional, or national scales.

Title: Global change threats to southern California's shrubland plant diversity

Authors: Janet Franklin, Center for Open Geographical Sciences, Department of Geography, San Diego State University; M. Brooke Rose

Southern California's shrublands, including of coastal sage scrub (CSS) and chaparral, face a multitude of threats due to global change, including climate change, habitat conversion, and changing fire regimes. The magnitude of these threats varies across landscapes, and, as a result, some plant species and populations are more vulnerable than others. Identifying the species most at-risk to these change drivers as well as the places most likely to harbor refugia populations represent key goals for conservation in this system. We used species distribution models (SDMs) to assess the potential impacts of climate and land use change on habitat suitability for 16 CSS and 27 chaparral species found in southern California. We estimated SDMs using combination of vegetation surveys and relatively fine spatial scale hydroclimatic and soil data to compare baseline habitat (1980-2010) to habitat projected under future conditions (2070-2099). To account for uncertainty in atmospheric conditions on changing climates, we evaluated habitat projections under two (CMPI5) global climate models that predict diverging climate trends for the state of California: a warmer, wetter (CNRM-CM5) vs. a hotter, drier (HadGEM2-ES) future, driven by two greenhouse gas emissions scenarios (Representative Concentration Pathways 4.5 and 8.5). The land use scenario was from the Integrated Climate Land Use Scenario based on a human demographic growth model and are consistent with the IPCC Special Report on Emission Scenarios. We found that species varied substantially in their exposure to climate and land use change. At the species level, CSS species were predicted to experience greater declines in suitable habitat relative to current habitat (within their current range) than chaparral species under a warmer and wetter climate, while the opposite trend was observed under a hotter, drier future. Under land use change, our models predicted greater habitat decline for CSS than chaparral species, due to CSS species occupying lower elevation areas that are more likely to be developed or converted to agriculture over the next ~75 years. Additionally, the locations of refugia under global change were highly species-specific and dependent on the direction and magnitude of climate change. Refugia for some species tended to be found in the higher elevation regions of their current range, while some species were associated with relatively low elevation refugia, depending on the global climate model. These results demonstrate that the location of climate refugia for southern California's shrubland species will depend on the eventual magnitude and direction of temperature and precipitation changes, highlighting the need to consider multiple global change scenarios for conservation management in the region. Our research also emphasizes the importance of incorporating multiple change drivers in vulnerability assessments, as the impacts of climate change and land use change will vary across the plant species and landscapes found in southern California.