



# SCOTT RIVER WATERSHED COUNCIL



## Scott Watershed Informational Forum & Forest Health & Resiliency Summit 2023

# AVERY THEATRE

430 Main Street, Etna, California

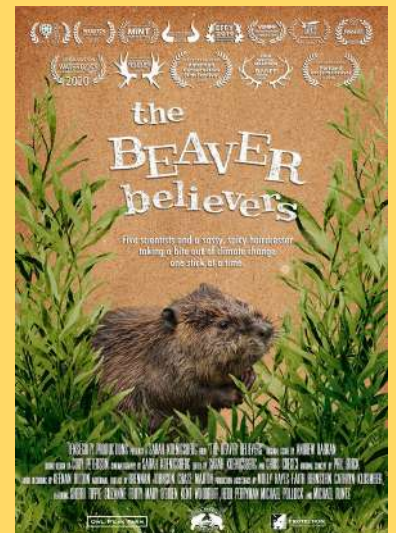
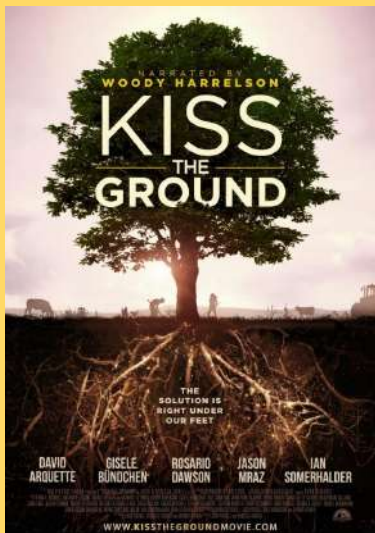
**Kiss the Ground Screening**

February 22<sup>nd</sup> at 6:30pm

**The Beaver Believer Screening**

February 24<sup>th</sup> at 2:00pm

*No cost and all are welcome*

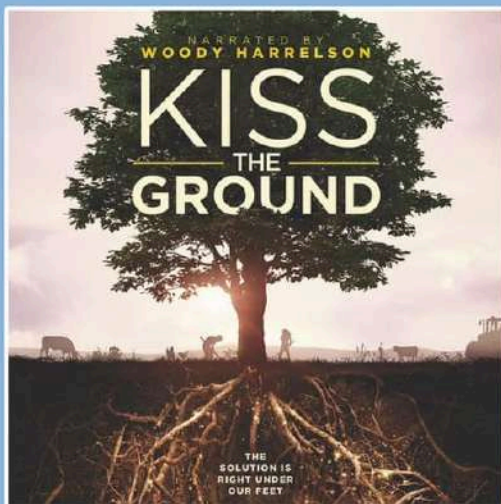




# THE AVERY

## Scott Watershed Informational Forum

February 22 - 24



2/22

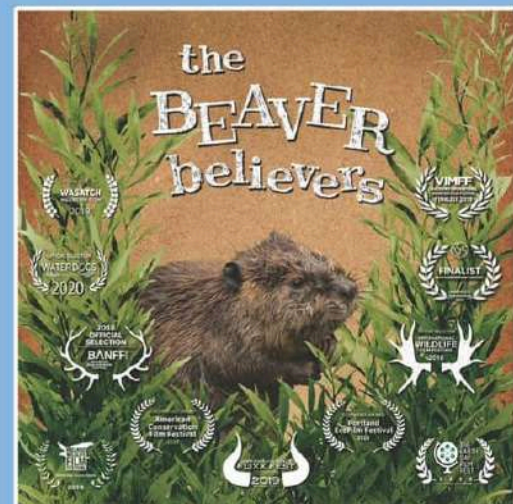
SCOTT VALLEY INFORMATIONAL  
FIELD TOURS ... "KISS THE  
GROUND" SCREENING

2/23

SCOTT WATERSHED  
INFORMATIONAL FORUM

2/24

FOREST HEALTH & RESILIENCY  
SUMMIT ... "THE BEAVER  
BELIEVERS" SCREENING



VISIT [WWW.SCOTTRIVER.ORG/SWIF](http://WWW.SCOTTRIVER.ORG/SWIF) FOR DETAILS



Scott River Watershed Council is proud to host the annual  
***Scott Watershed Informational Forum and  
the Forest Health and Resiliency Summit***

This year we are also excited to focus our attention on the issues around forest health and how fire plays an important role. As such, the Forest Health and Resiliency Summit will provide a great venue to explore some of the complex issues and ways we can mitigate the impacts of climate change.

This is an opportunity for our community to hear a wide variety of local, regional, and national experts address topics affecting our local ecosystem and economy. Scott Valley can feel isolated and protected from the larger world, but these complex and challenging times do not leave us unaffected.

Fostering a collective understanding of the issues facing our watershed and greater Klamath River basin remains of the utmost importance, as our river and ecosystem connect us all into one larger community.

We would like to give a special thanks to Becky Hyde, an Upper Basin rancher and community member, for her service as moderator on the Scott Watershed Informational Forum. We would also like to give thanks to Jake Burgess, CALFIRE Scott Valley Battalion Chief, who will serve as the moderator for Forest Health and Resiliency Summit.

To the many presenters, thank you for your willingness to share your knowledge with our community. We appreciate your dedication to your respective fields of expertise.

The amazing photos featured throughout the event's program were taken by our very own talented Mel Fechter. The flyer on the opposite page was created by Chris Browne, an artistic and dedicated Avery Theatre Board of Directors. Thank you to you both, your artistic ability to capture the essence of our Valley is greatly appreciated.

We would also like to thank the community members who have donated and who find this an invaluable opportunity for our community.

**Thursday, February 23, 2023 - SWIF Presentation Day - Avery Theater, Downtown Etna**

<b>Time</b>	<b>Presenter</b>	<b>Title</b>
8:00am	Check in & Morning Social	
9:00am	Becky Hatfield Hyde	Welcome & Opening Commentary
9:15am	Natalie Kelly, District Ranger & Danika Carlson, Deputy District Ranger, Klamath National Forest, Scott & Salmon	Update on the Klamath National Forest
9:35am	Christine Found-Jackson, Wildlife Management Supervisor, California Department of Fish & Wildlife	Managing Deer Populations in the Scott River Watershed
9:55am	Kent Laudon, Senior Environmental Scientist Specialist, California Department of Fish & Wildlife	California Department of Fish & Wildlife Wolve Program
10:15am	Theo Johnson, Founding member of Scott Valley Agriculture Water Alliance	A voice for Scott Valley's farmers and ranchers
10:45am	Break	
11:00am	Jon Traum, Hydrologist, U.S. Geological Survey	Quartz Valley Indian Reservation Hydrologic Groundwater Model
11:20am	Laura Foglia, PhD., Department of Land Air and Water Resources, University of California, Davis	Scott Valley Irrigation District Groundwater Recharge Project
11:40am	Chris Voigt, District Manager, Siskiyou Resource Conservation District	Scott Valley's Local Cooperative Solutions
12:00pn	Robyn Grimm, Director, OpenET	Open ET
12:20pm	Lunch	
1:05pm	Dave Coffman, PG, Director, Northern California and Southern Oregon, RES	Klamath Dam Removal Update
1:25pm	Harrison Morrow, Fisheries Biologist, Scott River Watershed Council and Alta Harris, Ecologist	Klamath Basin Passive Integrated Transponder (PIT) Database
1:55pm	Erich Yokel, Monitoring Supervisor, Scott River Watershed Council	Restoration Implementation and Planning in the Scott River Tailings
2:15pm	Michael Pollock, PhD., Ecosystem Analyst, National Oceanic and Atmospheric Administration	Restoration of fish, hydrology and biological diversity in the Scott Valley in the context of drought and a changing climate.
3:00pm	Break	
3:15pm	Will Harling, Director Mid Klamath Watershed Council	Bringing Fire Back to the Klamath Mountains
3:45pm	Paul Hessburg, PhD., Senior Research Ecologist, US Forest Service, Pacific Northwest Research	Forests and fire in an era of climate change: A case for proactive management
4:45pm	Becky Hatfield Hyde	Closing statement
5:00pm	Adjournment	





## Welcome to SWIF 2023

### Scott Watershed Informational Forum (SWIF) Moderator

Becky Hatfield Hyde

Becky Hatfield Hyde ranches in the Upper Klamath Basin, and the High Desert East of Bend. She has worked on Klamath Basin water and restoration issues for almost 25 years and has a deep respect for the communities and natural resources in the Klamath. She is a current ODFW Commissioner and enjoys learning about issues affecting Fish & Wildlife across the State. She has the same husband and five children that she has had for some time!



### Update on the Klamath National Forest

Natalie Kelly, District Ranger & Danika Carlson, Deputy District Ranger, Klamath National Forest, Scott & Salmon

### Managing Deer Populations on a Changing Landscape Christine Found-Jackson, Wildlife Management Supervisor

Not much is known about black-tailed deer (*Odocoileus hemionus*) populations within the “B-zones” of California, including the B-6 hunt zone centered around Scott Valley in Siskiyou County. Deer populations in this area exist in a rapidly changing landscape affected by catastrophic wildfire, drought, and varying occurrences of predation and effects of increasing anthropogenic development and influence. Deer management by CDFW is currently transitioning from an old model where population estimates are built upon biased information sources and the previous year’s estimate, to a new model where detection error is accounted for and deer population statistics are determined in “real time”. This presentation will describe the journey of deer management in the B-zones beginning with hand-drawn herd maps of the 1980’s to current use of fDNA, camera traps, and radiotelemetry for gathering relevant information on local deer populations and tracking the effects of current landscape changes, hunting regimes, and other limiting factors to deer.

Christine is a wildlife biologist with 25 years experience managing a variety of big game species throughout North America. Born and raised in northern Canada, after she obtained her Master's Degree in Wildlife Biology, she traveled throughout Canada working for various government agencies studying woodland and barren-ground caribou, gray wolf, American marten, and white-tailed deer. She immigrated to the US in 2010 and now considers California her home. After a brief stint with the Department of Water Resources as a Biological Monitor, she was hired by CDFW as a Senior Environmental Scientist Supervisor and accepted her current post in Siskiyou County in 2019. Here she works on big-game management and resource assessment in northeast California. When not working, Christine and her partner spend their time camping and hiking in the "high country" of northern California. Christine is also an avid equestrian and loves to train and ride her two horses, Spicey and Lea.

## California Department of Fish & Wildlife Wolf Program

Kent Laudon, Senior Environmental Scientist Specialist, California Department of Fish & Wildlife



### A voice for Scott Valley's farmers and ranchers

Theo Johnson, Founding member of Scott Valley Agriculture Water Alliance

Scott Valley Agriculture Water Alliance (AgWA) is a grassroots group that was formed in Spring of 2022 in response to the State Water Board's Emergency Drought Regulation. AgWA serves as a unified voice communicating on behalf of local farmers and ranchers, spreading accurate information about Scott Valley's ag producers, the Scott River, and its fish. Vision. The State's handling of our water rights poses an existential threat to our community. We must debunk the myths that are driving the state's severe water regulations.

Theo is a sixth-generation Scott Valley native who raises cattle and kids with her husband, Dave. Before coming home to raise her family, she spent time in Washington, DC advocating for ranchers on Capitol Hill. She now does some freelance writing on agriculture issues. She is a co-founder of and the spokesman for Scott Valley Agriculture Water Alliance.

### Quartz Valley Water Availability and Integrated Hydrologic Model Development

Jon Traum, Hydrologist, U.S. Geological Survey

The Quartz Valley Indian Community of the Quartz Valley Reservation of California (QVIR) is seeking strategies to manage their limited water supplies effectively. QVIR tribal wells have gone dry in recent years, and water quality issues have caused concerns about available drinking water. Observed long-term decline in late summer and fall flows in Shackelford Creek is likely due to increased groundwater pumping as well as climate variability. To improve the understanding of the hydrologic system in the Quartz Valley and to help the QVIR achieve effective conjunctive management of limited water supplies, the U.S. Geological Survey (USGS) in collaborating with the QVIR is developing the Quartz Valley Integrated Hydrologic Model (QVIHM). The QVIHM is designed to be a tool that QVIR and interested water managers can use to help quantify water-resource issues and to determine potential effects of water-management decisions.

The QVIHM is based on the Scott Valley Integrated Hydrologic Model (SVIHM), a hydrologic model of the entire Scott River Valley Groundwater Basin developed and maintained by University of California, Davis. The QVIHM simulates fully coupled groundwater flow, surface-water flow, and land-surface processes with MODFLOW-OWHM. The model uses data sets and interpretive information from local stakeholders and State and Federal sources. The QVIHM simulates conditions from 1990 to 2020 using monthly stress periods and surface water on a daily time step. Historical groundwater level and streamflow observations will be used to calibrate the QVIHM. Simulated hydrologic budgets, including groundwater-surface water interaction, groundwater recharge, and groundwater pumping, will be analyzed to provide the basis for water management decisions. Model postprocessing to calculate outputs such as groundwater flow paths, magnitudes, and travel times can be used as a basis for addressing of water quality, temperature, or habitat concerns.

Jon Traum has been a hydrologist and water resource engineer for 19 years in both the private and government sectors. He has developed, calibrated, and applied numerous integrated hydrologic models that simulate groundwater flow and transport, land subsidence, surface water flow, landscape processes, and seawater intrusion. The models have been utilized throughout California for planning purposes such as estimating groundwater sustainable yield, estimating groundwater and surface water interactions, and comparing the hydrologic effects of alternative water management scenarios. Jon received his M.S. in 2004 from the University of California Berkeley. He is a registered professional civil engineer in the state of California.



### **On-farm groundwater recharge: storing water for critical times**

Dr. Laura Foglia is a Vice President at Larry Walker and Associates

Precipitation in California (and especially in Northern California) is difficult to predict in timing and intensity. Many Groundwater Sustainability Agencies (GSAs) and Irrigation Districts are feeling the need to enhance their capacity to store water. Managed aquifer recharge is one of the tools readily available to store water when it is available to guarantee future sustainability of groundwater basins and to enhance conditions for rivers and ecosystems. Scott Valley Irrigation District (SVID) embraced the idea of intentional winter flooding of agricultural land as a way to store water in the groundwater system. The SVID pilot projects started in 2016. To conduct this project, SVID submitted an application to the State Water Resources Control Board (SWRCB) to obtain permits to divert water from January through March to underground storage for fish and wildlife enhancement. The purpose of this study is to evaluate the use of groundwater recharge to augment Scott River flows during critical periods (i.e., late summer and fall). Key outcomes of this study include the determination of if, when, and where water that is recharged enters the Scott River, the amount of water that recharges the groundwater system, and the potential water quality benefits (mostly related to temperature) associated with groundwater recharge. After the first test in 2016, during which about 15 acres (ac) were flooded and instrumented to understand the fate of the applied water, more landowners have been demonstrating interest in studying the potential benefits of managed groundwater recharge, and more acreage has become available for winter on-farm groundwater recharge. The goal of the fully upscaled project is to apply 5,400 ac-ft to fields for recharge. SVID understands the importance of demonstrating and “measuring” the benefits of groundwater recharge and an extended monitoring plan was included in the latest permit received by the SWRCB in January 2023. The added monitoring includes new stream gages, measurement of diversions within the ditch, continuous groundwater levels and temperature, water quality, and isotopes as well as a comprehensive biological monitoring plan developed in collaboration with the local RCD. The 2016 pilot project showed that about 90% of the applied water was contributing to deep percolation and only 10% was lost in the shallow soil and through evaporation. The main goal of the current study is to quantify the amount of water that, from deep percolation, is contributing to the river in the critical summer and fall months. SVID understands the need to conduct the project over multiple years to be able to demonstrate the potential success of this practice.

Dr. Foglia is a Vice President at Larry Walker and Associates is assisting with projects in the areas of hydrological modeling, groundwater management assistance, and managed aquifer recharge. At LWA, she leads the groundwater services for the Ukiah Basin Groundwater Sustainability Agency, the development, and implementation of Groundwater Sustainability Plans for Siskiyou County, Sierra Valley, and for the South American Subbasin Sacramento Central Groundwater Authority. She is supporting the design and implementation of groundwater recharge projects for the Omochumne-Hartnell Water District, the Scott Valley Irrigation District, and the Dunnigan Water District with the goal of understanding, modeling, and monitoring the benefit that recharge can bring to different beneficial uses. Since January 2016, Dr. Foglia is also an Adjunct Faculty in the Land, Air, and Water Resources (LAWR) Department at the University of California, Davis, where she supervises students and teaches a graduate class on groundwater models and model calibration. Dr. Foglia holds a diploma in Physics from the University of Milan, Italy, and a Ph.D. in Environmental Engineering from ETH in Zurich, Switzerland.

## **The Local Cooperative Solution and Binding Agreement: Emergency Drought Regulation of Agricultural Groundwater in Scott Valley**

Chris Voigt, District Manager for the Siskiyou Resource Conservation District

This presentation will cover the who, what, when, where and why of the State Water Board's regulation of agricultural groundwater use in Scott Valley, Siskiyou RCD's involvement and the activities necessary to formulate a new compliance monitoring program on the fly with perhaps some speculation on whether it achieved its goals, how could we have done things differently: more efficient, more effective, better, smarter, etc. and what future agricultural groundwater regulation might look like if drought continues.

Chris Voigt has been involved in natural resource conservation and environmental data collection for almost thirty years. His educational background includes a BS in Soil Water Science and MS in Soils and Biogeochemistry, both from UC Davis. Additional work experience includes wetland specialist/consulting at Jones & Stokes as well as UCI International in Sacramento and now District Manager for Siskiyou RCD in Etna. Current projects involve fisheries, discharge (flow) and water quality monitoring, habitat typing, habitat enhancement, riparian revegetation and floodplain connectivity.

## **OpenET data for improved land and water management**

Dr. Robyn Grimm, Executive Director for the Open ET

A growing scarcity of water, compounded by the impacts of changing climate and a growing population, has made sustainable water management one of the most challenging issues of our time. Adequate freshwater supplies are critical for the health of communities and wildlife, and nothing is more important to agriculture's ability to grow food. But in arid regions such as the western U. S., freshwater resource are dwindling. To maximize the benefits of our water supplies, we must know how much water is available and how much is being used. Evapotranspiration (ET) is a measure of the water used by crops and other plants as they grow. Scientists are currently using satellite and weather data to calculate ET at the individual field level. However, access to this data has previously been limited and expensive, keeping it out of the hands of most water users and decision-makers. OpenET uses best available science to provide easily accessible satellite-based estimates of evapotranspiration (ET) for improved water management across the western United States. Low-cost, reliable, and widely accessible ET data at the field scale can help: Rural communities to design locally driven water conservation and trading programs; Water managers to develop more accurate water budgets, incentive programs and other innovative strategies; Farmers to improve irrigation practices to maximize "crop per drop" and reduce costs for fertilizer, water, and energy; Policymakers to more accurately track water supplies, simplify regulatory compliance, and co-develop solutions with local communities In this presentation, Dr. Robyn Grimm will discuss the wide range of current and potential applications of OpenET data, including forest management to protect drinking water supplies, irrigation management and scheduling for better use of water resources, and monitoring/evaluation of community driven water conservation projects.

Robyn's work is primarily focused on filling critical water information gaps to enable more sustainable land and water management practices across the Western United States. For the past five years, Robyn has been working with partners at NASA, the Desert Research Institute, Google Earth Engine, a dozen other organizations and more than 100 stakeholders on the development of an online open platform for estimating consumptive water use, called OpenET. With the October 2021 launch of OpenET, Robyn is now serving as Interim Director to the OpenET nonprofit and working with partners to drive adoption of the platform and expansion to additional geographies. The platform provides critical information for the sustainable management of groundwater basins, the development of healthy water trading programs, and other land and water management practices that increase the sustainability of our water resources and related economies and ecosystems.



## **Klamath River Dam Removal – Update**

Dave Coffman, PG, Director, Northern California and Southern Oregon, RES

Removal of four hydropower dams (Iron Gate, Copco 1, Copco 2, and J.C. Boyle) on the Klamath River in northern California and southern Oregon represents the largest dam removal and river restoration project in the country. The project will restore free-flowing conditions and volitional fish passage to more than 400 miles of currently cut-off anadromous fish habitat upstream of the lower-most dam, Iron Gate. RES was selected by the Klamath River Renewal Corporation to lead restoration for this ambitious effort, as well as accept liability associated with ensuring restoration meets ecological and biological performance standards and long-term goals/objectives. RES is leading design and implementation efforts for the restoration of nearly four miles of priority tributary streams and associated fish habitat, as well as vegetation restoration for approximately 2,000 acres of previously inundated lands. Restoring volitional fish passage to hundreds of miles of the Klamath River, once the third largest producer of salmon on the West Coast, will be an important achievement for this large, complex project. Area Tribes have relied on salmon as a vital resource for generations; rehabilitation of salmon and steelhead populations is not only environmentally important but critical to sustaining their culture. This presentation provides an update on project schedule, overview of the approach to dam removal, restoration goals and approach, and key elements of stream, riparian, and wetland restoration for the project.

Dave Coffman is RES's Director, in Northern California and Southern Oregon, and lead fluvial geologist. He specializes in watershed-scale restoration projects, synthesizing complex technical topics and coordinating diverse stakeholders to plan, permit, and implement the nation's largest restoration projects. Dave has worked on the evaluation and design of over 250,000 linear feet of stream restoration, erosion protection, and streambank stabilization projects. Prior to starting his consulting career, David was a hydrologist with the USGS and conducted investigations for a range of projects that involved fluvial geomorphology, sediment, and water quality. His project background ranges from stream geomorphic assessments, hydrology and erosion monitoring, sediment transport and stable slope analyses, scour analysis, and natural channel restoration and mitigation design on fluvial systems ranging in size from small streams to the largest rivers in North America.



## **Klamath Basin Passive Integrated Transponder (PIT) Database**

Harrison Morrow, Fisheries Biologist, Scott River Watershed Council and Alta Harris Ecologist, USGS

In an expansion of effort started in 2010 to develop an online collaborative PIT tagging database for the Klamath Basin, a working group named the Klamath Basin Fisheries Collaborative was formed in 2020. The goal of the Collaborative is to make integrated data accessible to those studying and managing Klamath fishes and to guide further database development. The Collaborative has evolved as a “bottom up” effort driven by the many data collecting and using entities, now over 30 organizations, rather than originating from a central authority. The database currently includes data for more than 60,000 individual salmonids tagged in the lower Klamath River Basin along with over 1.2 million remote PIT tag detections from over 30 remote antenna systems. Another 82 antennas operated by USGS in the upper basin are available to detect salmon that migrate into the upper basin after dam removal. 11 million fish detections in the upper basin are housed in a separate database. US Geological Survey ecologist Alta Harris has been leading the effort to create the portal for this exchange. Alta will discuss the development of the database - covering topics such as the goals discussed at the outset, the current state of the database and where it is headed. Scott River Watershed Council (SRWC) biologist Harrison Morrow will provide an overview of the PIT tag work being carried out in the basin that will contribute to the database. Finally, Harrison will provide examples of the PIT tag data being collected by SRWC and how that data can be used to glean new insights about the species inhabiting the Klamath River watershed.

Harrison Morrow is a biologist with the Scott River Watershed Council. His work focuses on monitoring aquatic species in the Scott River and its tributaries and maintaining a PIT tag array network in the watershed. Prior to joining SRWC, Harrison received a B.S. in Wildlife, Fish and Conservation Biology from the University of California, Davis. He then spent several years working as an Environmental Scientist with the California Department of Fish and Wildlife, overseeing a juvenile salmonid monitoring project in the Scott and Shasta Rivers.

## **Restoration Implementation and Planning in the Scott River Tailings**

Erich Yokel, Monitoring Supervisor, Scott River Watershed Council

The Scott River Watershed Council has been performing habitat restoration, physical and biological monitoring, and project development and design in the Scott River Tailings since the installation of Beaver Dam Analogues (BDAs) in Sugar Creek in 2014. Initial monitoring of the Sugar Creek BDAs greatly increased the understanding of the complex surface water and groundwater dynamics in the highly altered tailings reach. Biological monitoring of coho salmon in the BDA reach documented the increase in carrying capacity and production of juvenile fish from the BDAs. The SRWC and Stillwater Sciences developed a design, received funding and plan to implement the Sugar Creek Coho Refugia Project to create complex off-channel fish habitat for coho salmon in Sugar Creek to continue to increase the habitats available for all life stages of juvenile coho salmon. The SRWC installed the first phase of the mainstem Scott River Tailings “Oasis” Project and constructed a floodplain in Sugar Creek in 2020. Both projects had unintended results due to the extreme hydraulic conductivity of the tailing’s reach. Adaptive management treatment was utilized to remedy the situation and a lesson was learned that a better understanding of the hydrodynamics in the tailings reach is required to advise restoration approaches. The SRWC continues to work with collaborators (SWS, UC Davis and Larry Walker and Associates) to understand the existing conditions in the tailings reach and develop projects that will increase stream function and complexity while preserving water quality in this highly altered working landscape.

Erich Yokel has over twenty years of experience working in Western Siskiyou County in the natural resource profession with an emphasis on anadromous fisheries and stream habitat characterization and restoration. Erich has extensive experience performing environmental monitoring throughout the Scott River Watershed working with private landowners, government agencies and researchers. Erich’s work with the Scott River Watershed Council has allowed him to continue his professional fascination with Coho Salmon in the Scott Valley and continue to study and enjoy the rich natural resources in this unique and beautiful area.

**Restoration of fish, hydrology and biological diversity in the Scott Valley in the context of drought and a changing climate.**

Dr. Michael Pollock, Ecosystem Analyst, NOAA – Fisheries Science Center

Data from the Scott River appear to show that habitat restoration is having a positive effect on salmon, hydrology and biodiversity in general, but climate change and drought add complexity to the interpretation of relationships. Herein we discuss long-term changes in freshwater and marine environmental conditions in relation to changes in salmon abundance and restoration efforts and discuss the scale of future habitat restoration that is likely to be useful towards creating a resilient hydrology and an abundance of salmon in the Scott River watershed.

Dr. Michael Moritz Pollock is an Ecosystems Analyst who works on restoration of fluvial ecosystems to support recovery of fish, biodiversity and resilience to a changing climate. He was invited by the community to work in the Scott Valley over 12 years ago and has enjoyed every minute of it since. He has been inspired by the depth of commitment and perseverance of community members to protect their environment, water and livelihoods while working to develop a sustainable economy in the midst of an unprecedented multi-year drought.



Photo Credit: Erich Yokel, August 1, 2022



## **Klamath Mountain Meadow Partnership and Tools to Support this Important Work**

Will Harling, Director, Mid Klamath Watershed Council

The Western Klamath Mountains have experienced more large, severe wildfires for the past five decades, than perhaps any other region in California. Rugged terrain, dense fuels, and low population densities have both increased resistance to wildfire control and decreased the socio-political necessity to extinguish fires. Human factors, including the criminalization of cultural burning, concerted efforts to suppress all fires for more than a century, and a warming climate have combined to create the conditions for frequent, extreme wildfires that are severely impacting forests, rivers and communities. Communities in the Western Klamath Mountains, in part due to the consistent influence of tribes who use fire as a powerful tool to manage ecosystems, and because they have been so impacted by fire exclusion policies, are creating partnerships and models that are being emulated throughout the West to restore fire process at the landscape scale. Since 2014, the Western Klamath Restoration Partnership has brought together diverse interests to work together towards shared values using collaboratively identified strategies with the core principle that we choose projects that everyone agrees are a priority. Prescribed fire training programs like the Klamath Prescribed Fire Training Exchange and All Hands All Lands bring together local, tribal, state, national and international fire practitioners to learn together by burning together, increasing capacity and understanding of beneficial fire both here and abroad. These trainings have treated over 3,500 acres in the past nine years and trained over 700 fire practitioners. The Community Liaison Program, since its inception on the Salmon River in 2009, has demonstrated how communities can work with wildfire Incident Management Teams to reach better mutual outcomes during wildfire events. Mapping of past, current and potential fuelbreaks, and massive investments in strategic manual and mechanical thinning are creating more opportunities for implementing large-scale prescribed fire and stopping unwanted wildfires. In 2023 alone, approximately \$12 million will be spent on proactive treatments in the Western Klamath Mountains as state and federal governments recognize the need to address not only the fire emergency, but the fuels emergency that has spawned recent wildfires. Most importantly, we are mapping a path back to humans not only living with wildfire, but benefitting from frequent wildfire on the landscape, as indigenous communities have done since time immemorial. Working from the communities out, using strategic fuelbreaks to safely allow for larger scale prescribed and cultural burning, we are creating the social license for managed wildfire. We are returning the ownership and management of fire to the people, and restoring fire knowledge so that it once again becomes a practice of place and one of our most powerful land management tools. This is a multi-generational process that requires people of place, regardless of political affiliation, to work together to bring fire back in a good way.

Will Harling serves as a Director of MKWC, along with Luna Latimer, overseeing MKWC program directors, funding and program development, and partner engagement. Will's background in fisheries biology, GIS, botany, and forest and fire ecology and management (BS – Humboldt State University – 1999), help him guide the fisheries and fire and fuels programs at MKWC. Will is a qualified federal Single Resource Boss and a CA state certified CARX burn boss. Previous job experience includes work with the US Forest Service, Karuk Tribe, Salmon River Restoration Council, and private consulting and contractual work. Will currently serves on the steering committee of the Northern CA Prescribed Fire Council, the board of the Humboldt County Fire Safe Council, as a co-lead for the Western Klamath Restoration Partnership, and on the board of the Salmon River Restoration Council. Will has a passion for storytelling through both spoken and written word, as well as videography. He co-produced several grassroots films on prescribed fire including "Catching Fire: Prescribed Burning in Northern California (2012)", "Sparking a Change (2010)", and "Lifestyles of the Rural and Fire Safe (2010)". Will has pioneered the sport of whitewater scuba, primarily to capture on video and in photography the life histories of salmon, sturgeon and other underwater wonders in the Klamath River system. This love for the people and this place drive Will's work to create a sustainable restoration economy in the Western Klamath Mountains based on working with local communities and natural systems to restore our natural abundance and diversity.





## Forests and fire in an era of climate change: A case for proactive management

Dr. Paul Hessburg, Senior Research Ecologist, US Forest Service, Pacific Northwest Research

Forest landscapes across western North America (wNA) have experienced extensive changes over the last two centuries, while climatic warming has become a global reality over the last 4 decades. Resulting interactions between historical increases in forested area and density and recent rapid warming, increasing insect mortality, and wildfire-burned areas, are now leading to substantial abrupt landscape alterations. These outcomes are forcing forest planners and managers to identify strategies that can modify future outcomes that are ecologically and/or socially undesirable. In this presentation, I highlight main points of a recent trilogy of review articles by Hagsmann et al., Prichard et al., and Hessburg et al. 2021. I review a century of observations and multi-scale, multi-proxy research evidence that details widespread changes in forested landscapes and wildfire regimes since the influx of European colonists. I then review the research on management practices historically applied by Indigenous tribes and currently applied by forest and fire managers to intentionally manage forests for resilient conditions. To do so, I address ten common assertions surrounding the application and relevance of these management practices. Finally, I highlight the main findings of these papers and offer recommendations for forward-looking management. I discuss progress paralysis that often occurs with strict adherence to the precautionary principle; offer insights for dealing with the common problem of irreducible uncertainty; and provide suggestions for reframing management and policy direction.

Paul Hessburg is a Senior Research Ecologist with USDA-Forest Service R&D and affiliate Full Professor at four western US and Canadian universities (UW, WSU, OSU, UBC). He is also the 2022-2024 President of the International Association for Fire Ecology (AFE) and Division 4 Deputy, International Union of Forestry Research Organizations: Forest Assessment, Modeling, and Management. His research explores wildfire and climate change effects on landscape dynamics and the structure and organization of historical, current, and future landscape resilience. Paul is keenly interested in partnering with managers to advance the work of forest restoration and climate change adaptation, and stronger science and management partnerships.



# Welcome to Forest Health & Resiliency Summit 2023

Friday, February 24, 2023 – Forest Health & Resiliency Summit - Avery Theater, Etna

Time	Presenter	Title
8:00am	Sign in and morning social	
8:30am	Jake Burgess, CALFIRE Scott Valley Battalion Chief	Welcome & Event Details
8:45am	Yurok Tribe Vice Council Chairman Mr. Myers	Opening Commentary
9:00am	Lyndsey Lascheck, Forest and Fuel Project Manager, Shasta Valley RCD	Bringing Beneficial Fire Back to Communities with the Siskiyou Prescribed Burn Association (PBA)
9:30am	Megan Ireson, Mountain Meadow Coordinator, Scott River Watershed Council	Meadows and Restoration Work in the Scott River Watershed
9:50am	Break	
10:00am	Adam Cummings, Ecologist, United States Forest Service, Pacific Southwest Research Station	Klamath Mountain Meadow Partnership and tools to support this important work
10:45am	Eric Knapp, Research Ecologist, United States Forest Service, Pacific Southwest Research Station	The influence of forest thinning and prescribed fire on wildfire effects: outcomes from the 2021 Antelope Fire
11:30am	Emily Fairfax, PhD., Assistant Professor at California State University Channel Islands and Adjunct	Smokey the Beaver: how beavers keep ecosystem green during megafires
12:15pm	Jake Burgess, CALFIRE Scott Valley Battalion Chief	Closing
12:30pm	No host lunch	
2:00pm	The Beaver Believer Film	

## Welcome & Event Details

Jake Burgess, CALFIRE Scott Valley Battalion Chief

## Opening Commentary

Mr. Myers, Yurok Tribe Vice Council Chairman



## Bringing Beneficial Fire Back to Communities with the Siskiyou PBA

Lyndsey Lascheck, Forest and Fuel Project Manager, Shasta Valley RCD

In 2020 local partners throughout Siskiyou County joined together to start the Siskiyou Prescribed Burn Association (PBA) with the goal of increasing local capacity for prescribed fire. The Siskiyou PBA includes landowners, Tribes, local organizations and agencies that work together to support burns in the interest of restoring historic roles of fire, using fire as a management tool, and reducing wildfire hazard to our communities and watersheds throughout the diverse fire-adapted landscapes of Siskiyou County. This presentation will tell the story of the Siskiyou PBA, why it's important, how the partners adapted it to fit the needs of Siskiyou County, and how you can get involved to support its mission.

Lyndsey has a diverse background in ecological fuels reduction, prescribed fire, fire research, as well as native plant restoration and monitoring. She holds a B.S. in Environmental Science with an emphasis in Ecological Restoration from Humboldt State University and has worked for numerous agencies and organizations including The National Park Service across eight different Parks, The Nature Conservancy, and the University of Washington. At the Shasta Valley RCD, Lyndsey manages complex fuel reduction and forest restoration projects and helps coordinate the Siskiyou PBA bringing both her technical knowledge for project implementation as well as experience in collaborative conservation work. She enjoys working in the dynamic landscapes of Siskiyou County to restore fire and its processes to fire-dependent ecosystems and communities.

## **Meadows and Restoration Work in the Scott River Watershed**

Megan Ireson, Mountain Meadows Coordinator, Scott River Watershed Council

Functional mountain meadows provide important ecosystem services such as moderating stream flow and sediment, decreasing downstream erosion and flooding, storing carbon, and providing habitat for a diverse range of plants and animals. Additionally, they are home to species traditionally utilized by Indigenous peoples for basket weaving materials and medicinal herbs. Human impacts have damaged many meadow systems; we are beginning the work to repair and enhance the meadows in the Scott River watershed. The Scott River Watershed Council began meadow work in 2017 and has several more projects beginning this year. Projects involve both public and private landowners and include aspen stand protection and monitoring, groundwater monitoring, road impact mitigation, range management, thinning encroaching conifers, and installation of instream structures to reduce channel incision and increase infiltration.

Recent addition to the Scott River Watershed Council team, Megan Ireson has a BS in Earth Systems from Stanford University and a MA in Education from Humboldt State University (now CalPoly Humboldt). As the Mountain Meadows Project Coordinator, she manages SRWC's meadow restoration and monitoring projects. She worked as a science educator before joining SRWC.

## **Klamath Mountain Meadow Partnership and tools to this important work**

Adam Cummings, Ecologist, United States Forest Service, Pacific Southwest Research Station

Meadows in the Klamath Mountains are a scarce but vital landscape feature. They offer key ecosystem services such as serving as a refuge from fire and climate change, sequestering carbon, enhancing water quality and flow, and harboring rich biodiversity. Over a century of human impact and fire suppression has led to a decline in meadow abundance, making them rarer than in the past. In this presentation, I will explore the use of Process Based Restoration to restore meadows in the Klamath Mountains and present tools and strategies that support restoration design and envision the full potential of these vital ecosystems beyond the limited remnants that still exist.

Adam Cummings is an Ecologist with the US Forest Service. He conducts research and develops tools to help support low-tech process-based restoration in meadows in the Sierra Nevada and Klamath Mountains.

## **The influence of forest thinning & prescribed fire on wildfire effects: outcomes from the 2021 Antelope Fire**

Eric Knapp, Research Ecologist, United States Forest Service, Pacific Southwest Research Station

Many forests are denser and more fuel loaded today than they were historically and therefore prone to burning at higher severity in wildfires. However, consensus of what to do to counter this challenge is lacking. Does forest thinning reduce fire severity, or will opening up a stand dry out forest fuels and increase fire severity? Does prescribed fire really help moderate fire behavior? Evaluation of wildfire outcomes from areas that have received thinning and burning treatments, compared with those that did not, helps to answer these questions. In 2021, the Antelope Fire on the Klamath National Forest burned through the Goosenest Adaptive Management Area silvicultural study, where large, replicated units were either thinned, treated with prescribed burning, thinned and burned, or left untreated. Remeasurement of research plots in the aftermath show that the thin and prescribed burn treatment performed the best, with a high percentage of trees surviving. On the other extreme, a large proportion of the untreated controls burned in a crown fire and average tree survival was low. Units treated with just thinning or just prescribed burning experienced intermediate severities. While thinning reduced the probability of crown fire behavior, in the absence of a surface fuel treatment, fire was still hot enough to kill many trees. Two rounds of prescribed burning without mechanical thinning either didn't thin the stands enough, or fire-killed trees generated fuel, enhancing the intensity of the wildfire. A great deal of variation was noted within each treatment, highlighting the important role of weather at the time of burning. While data analyses are still preliminary, this is an important test of how treatments actually perform. Findings provide ideas for how future treatments might be improved and illustrate the critical role of prescribed fire or lower-intensity wildfire for long-term forest resilience.

Eric Knapp is a research ecologist with the US Forest Service Pacific Southwest Research Station, based in Redding, CA. He has been studying fire effects for over 20 years and has published numerous papers on the ecological outcomes of forest management, including thinning and prescribed fire. His ideal work day is one spent in the woods, observing and learning.

**Smokey the Beaver: how beavers keep ecosystem green during megafires**  
Emily Fairfax, PhD., Assistant Professor at California State University Channel Island

Beaver dams and beaver mimicry (e.g. Beaver Dam Analogs) are gaining popularity as a low-cost, nature-based strategy to build climate resiliency at the landscape scale. Beavers slow and store water in their ponds, canals, and the surrounding soil during wet periods which can then be accessed by riparian vegetation during droughts. As a result, the well-watered vegetation in beaver-dammed riparian corridors is less flammable. My research has shown that these beaver-influenced patches of the landscape stay green and can serve as fire refugia, preserving intact, mature riparian habitats, even during megafires. Perhaps instead of relying solely on human engineering and management to create and maintain fire-resistant waterways and riparian zones, we could benefit from partnering with beaver's ecosystem engineering to achieve the same goals at a lower cost.

Emily Fairfax is an Assistant Professor of Environmental Science and Resource Management at California State University Channel Islands. Dr. Fairfax double majored in Chemistry and Physics as an undergraduate at Carleton College, then went on to earn a Ph.D. in Geological Sciences with an emphasis in Hydrologic Sciences from the University of Colorado Boulder. She uses a combination of remote sensing, modeling, and field work to understand how beaver ecosystem engineering can create drought and fire-resistant patches in the landscape under a changing climate. Her research has been featured internationally in National Geographic, the New York Times, the LA Times, BBC, Vox, and others. When Dr. Fairfax says she can talk about beavers all day, she's not kidding.

**Thank you to all our 2023 SWIF & Forest Health and Resiliency Summit Presenters**



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**SWIF 2024 – February 21<sup>st</sup>, 22<sup>nd</sup> & 23<sup>rd</sup> 2024**

**Thank you to our private landowner partners who allow restoration work to be done on their property!**

