Public Meeting: Resources Available for Controlling Erosion & Improving Forest Health

Saturday, October 4, 2014 from 10 AM – 1 PM

Harwood Hall, 44400 Willis Avenue, Laytonville

Co-Sponsored by CALFIRE, US Bureau of Land Management, Mendocino County Resource Conservation District, and the Eel River Recovery Project. Minutes provided by Vivian Helliwell who facilitated the meeting.

Lodge Fire Suppression and Restoration Activities - CALFIRE and Bureau of Land Management

Tony Howard, CALFIRE Unit #4 Battalion Chief– Tony described how the Lodge Fire started and progressed. Lightning strikes at several locations on the night of July 30 caused a complex of fires. BLM and CALFIRE were over the fire in a helicopter within hours and immediately began preparation for fighting the fire. A multi-disciplinary team was assembled and began meeting four to five times a day to plan suppression. The fire progressed north along Elkhorn Ridge, which is named for its resemblance to elk horns and is extremely steep. The fire burned into BLM Wilderness, which had few or no roads. The combination of these two factors made deploying resources very challenging.

BLM Fire Management Officer Tim Jones conferred with Tony Howard and the CALFIRE team and devised a plan of attack and immediately sought BLM State Office level clearance to use heavy equipment to create fire breaks on ridges within the Wilderness. The initial points of attack planned did not prove feasible because the necessary resources were not available and the fire was expanding rapidly in steep terrain. Several other wildfires were burning in California and the West at that time, which was the reason for a manpower shortage. CALFIRE and BLM decided to set up outside perimeters to prevent the spread of the fire into communities and adjacent private timberlands.

The fire made a transition from spreading slowly on August 1, and the incident command center shifted at that point. By August 6, the Lodge Fire had grown to 3,527 acres, and was only 15% contained. From August 7th through the 9th, the two major areas of fire converged and made a major run. Wind conditions picked up and a very hot fire swept out of Hog Shed Creek, which caused the fires only injuries as eight fire fighters suffered injury and had to be evacuated. This was the fires only accident and there were no other major injuries and no fatalities. The Lodge Fire eventually expanded to just over 12,000 acres. CALFIRE and BLM began planning remediation of suppression activities even while fighting the fire, and immediately swung into a restoration mode as the fire was controlled. Tony said he felt lucky to have Lou Sciocchetti in charge of remediation after leading attack crews during suppression efforts. A great deal of resources were used to perform erosion control activities. Not everyone was pleased, but that is human nature. In hind sight, Tony said he wouldn't change anything

Lou Sciocchetti, CALFIRE Mendocino Unit, North Area Forester: Lou made a Power Point presentation, which is posted on-line at www.eelriverrecovery.org. Fire suppression repair applies only to damage resulting from fire suppression activity. The goal of suppression repair is to repair anything that is altered by suppression activities in order to prevent further resource damage. Suppression repair may involve multiple agencies, large and small private landowners, public landowners and public utilities on a single incident.

The authority for CALFIRE to fund suppression repair comes from CA Public Resources Code (PRC) 4675, which states that:

> " It is in the public interest and to the benefit of the state that watershed lands are rehabilitated to conserve water and soil and to prevent destructive floods. In furtherance of this policy, the department may conduct surveys and studies, formulate plans, and perform all acts incidental to establishing and maintaining vegetative cover on watershed lands and maintaining watercourse channels free of natural impediments or destructive materials during peak flood flows, including any work necessary to accomplish these purposes."

The question for CALFIRE to consider is whether significant damage will occur, or whether erosion risk is low and fuels loading is low and conditions are likely to return to natural regime without remediation. Typical problems caused by fire suppression are: 1) Dozer / Hand fire lines, 2) Watercourse crossings, 3) Slash piles, 4) Dozer damaged fences/gates, 5) Roads opened and waterbars removed, 6) Broken waterlines, 7) Land improvement features damaged, 8) Public safety

issues, and 9) Damage to archaeological resources. Bulldozer fuel breaks must be at least 100 feet wide to be effective because flame lengths can be that great when a fire is running.

CALFIRE approaches erosion control on roads by applying the "6D" rules Water Bars and their benefits. Examples of erosion after fire. 6 D Rules (Furniss): 1) Distance spacing between waterbars 50 feet to 150 feet depending on the percent slope and soil type; 2) Diagonal – build water bars at an angle of 30 to 45 degrees off perpendicular; 3) Divert – water bar must be sufficiently deep (12-18 inches); 4) Discharge - a good waterbar cannot create a dam—it must have an open outlet; 5) Dissipate - The outlet of a good waterbar should direct the flow to vegetative cover, slash, rock, or debris to dissipate the energy of the running water; and 6) Drainage Area - waterbar spacing is also considered relative to dozer line width. More waterbars are installed on wider lines.

Lou then showed examples of equipment remediating suppression damage from the Lodge Fire and elsewhere in California. Slides showed examples of waterbar spacing on private land and mulching to prevent surface erosion. Rolling dips and outsloping were used in areas where roads were on flatter terrain. Also, BLM dozer trails were mostly on ridges and less subject to erosion, but were often completely covered with slash and brush to give maximum protection to the Wilderness. In at least one case, CALFIRE constructed a brush cover mattress to cover fill that a road was diverting water into. Culverts damaged during the fire were replaced as were gates that CALFIRE had to dismantle because there wasn't time to get landowner permission. Although there were no paved or rocked roads damaged in fighting the Lodge Fire, costs for repair sometimes kick those projects into a process where the landowner has to pay repair costs and be reimbursed through a compensation claim.

Slash treatment to prevent leaving fuel "jack pots" is another major area of rehabilitation focus. 1) Limbs, brush and downed small logs lopped and scattered near residences and other high value areas; 2) Fuels along public roadways are chipped or masticated to reduce fire risk; 3) Pile fuels for later burning using hand crews and available equipment; and 4) Piles with lots of soil and slash need to have slash separated out and lopped and scattered or piled for a winter controlled burn. Lou finished his talk by covering how CALFIRE responds to disturbance of archaeological sites in northern California and elsewhere in the State.

Tim Jones, U.S. Bureau of Land Management, Arcata Filed Office Fire Manager – Tim's presentations included many slides of the fire and terrain and many will be posted as part of the October 4 meeting summary at www.eelriverrecovery.org. The primary objective of any fire fight is first to keep firefighters and the public safe, then to protect homes and communities, and also in the case of the Lodge Fire to minimize damage to federally designated Wilderness. BLM and CALFIRE consulted early on Wilderness protection concerns and a game plan was devised not just to fight the fire but on how damage due to suppression would be mitigated. BLM State Office permission was granted for creating fire breaks in Wilderness very rapidly as a result of the assurances for remediation immediately after the Lodge Fire was under control. Tim had the highest praise for his CALFIRE partners and said the working relationship with BLM could not have been better.

Tim acknowledged that the initial attack planned did not receive resources to attack the fire early, and lines ended up being much further back as a result. Because of the extreme drought conditions, the Lodge Fire was expected to have more areas of stand replacing intensity. In the worst case scenario, such intensely burned areas may have altered soil productivity and the vegetative community can also be altered. The Lodge Fire, however, mostly burned with low intensity with the fire moving slowly along the ground from ridge top locations of lighting ignition down the steep canyons. Hillslope photos after the fire show mostly green trees with strips of fire where burning debris rolled down hill and then burned back up. Photos shown next by Tim showed a full range of ground fire intensity from just leaf duff burning, to a few trees being girdled by the creeping fire, to areas of high intensity. The side of the conifers and hardwoods that it lightly charred, indicates which direction the fire burned. Why things didn't burn more intensely is still a puzzle to fire managers and scientists. Sometimes the fire would burn slowly through a place, but later patches burned intensively. Stumps may smolder for days and then flare up, causing the fire to re-start.

Areas of extreme fire intensity included Brushy Mountain and other ridge top areas with chaparral vegetation. Tim pointed out that there areas naturally sprout and the community heals itself because it is fire adapted, but that these areas represent high risk for fire fighters. Conditions of wind, slope, and fuels coincided when the Hog Shed Creek run occurred, but it was a rare instance of stand replacing fire in coniferous forest within the boundaries of the Lodge Fire. As the fire approached containment lines, BLM and CALFIRE used back fires or "burn outs" to starve the advancing fire of

fuel. Tim pointed out that these back fireswere never lit very far down a hillside. This prevented the back fire from gaining too much momentum and causing hot burns to starve the advancing fire of fuel. Tim then played BLM fire footage taken from a helicopter showing the progression of the Lodge Fire and different burn intensities.

Sam Flanagan, U.S. Bureau of Land Management, Arcata Filed Office Geologist: BLM was pleased with remediation activities after the Lodge Fire, but field monitoring will have to take place following intense winter storm events to make sure that no erosion problems develop, especially related to water bars and areas where dozer trails crossed steeper slopes. In a worst case scenario, Sam was concerned about stream capture and diversion onto unarmored hillslopes that could result in mass wasting. Another major concern of BLM is whether there might be an influx of invasive plant species after the fire. Because of the remoteness of the terrain, BLM is considering utilizing citizen monitoring to expand its potential area of data collection. There is a legacy problem with old roads, especially on the west side of the Wilderness that may be adversely affected by the fire and will require monitoring.

Panel Discussion: Audience members commended CALFIRE and BLM for their decisive action to fight the fire and their extensive remediation efforts after the fire. Lou Sciocchetti said that cooperation extended to the California Department of Fish and Wildlife that granted them exemptions for fire fighting and remediation. He continued, however, to point out that all remediation activities conform to Best Management Practices (BMPs) already agreed upon by CDFW and would be able to be permitted if it wasn't an emergency. Lou Sciocchetti was asked whether the CDFW exemption could be extended, if more work was necessary. He said CDFW would be OK with that. Someone raised a question as to the effectiveness of fire breaks and Lou responded that there was only one instance of the over-running a break.

An audience member pointed out that the Shamrock Fire at the southern end of the Laytonville Valley had caused forest areas to be replaced by brush interspersed with trees, but that there was a greatly increased fuels load. Isn't something that could be done to convert brushy areas to reduce areas of high flammability. Lou responded that to some degree trees will shade out brush and fuels will be reduced by natural succession. The audience member continued to say that there was more regular fuels reduction formerly, much of it conducted by local ranchers. Tony Howard pointed out that these sites are not able to be converted to other less flammable vegetation types because of local conditions. Controlled burns in these areas are difficult to manage and there is a much higher density of rural residences than there were historically, which restricts opportunities. He noted that the Mendocino County Fire Plan takes brushy areas with high intensity burn potential into account when assessing fire fighting strategies.

Could private land owners do more remediation under the CDFW/CALFIRE environmental exemption? Lou said he thought that stream crossing and stream bed and back related projects should all be completed, but that he would certainly discuss this issue with any landowner and CDFW, if necessary. Sam Flanagan was then asked whether monitoring might include aquatic data. He said that there wasn't enough baseline data in order to discern trends. In response to a following question, Sam also pointed out that all equipment used to fight the Lodge Fire and for remediation of suppression activities afterward were all sterilized before being deployed to avoid introduction of invasive plant species.

Another question posed was whether there was any problem with water bars deflecting sediment into water courses. Lou responded that waterbars were designed to gently disburse water onto vegetated side hill areas or into brush. He used the term hydrologic disconnection and said that foresters were very conversant with this concept because of overseeing roads associated with timber harvests. The last question was about the level of supervision of equipment operators to make sure they were meeting 6D objectives. One forester was put in charge of an average of one bulldozer, two excavators and one water truck and would manage and oversee all their activities.

Considerations in Establishing an Erosion Monitoring Program in the Lodge Fire Area

Dr. William Dietrich, UC Berkeley Professor, Dept. of Earth and Planetary Science- Bill and UC Berkeley have been studying the Angelo Preserve as part of a National Science Foundation monitoring network, which is one of several stations located elsewhere in the United States. Studies at the Eel River Observatory have demonstrated that hillslopes can store a great deal of moisture in fractured rocks below the surface. Monitoring of soils, groundwater levels, and use of water by trees and vegetation has been monitored extensively. UC Berkeley and NSF are particularly interested in how the Eel River ecosystem adapts to climate change.

The Lodge Fire did not burn onto the Angelo Preserve, but it is immediately adjacent and it offers an opportunity for study. For example, monitoring devices in trees in Elder Creek indicate that they actually shut down their evapotranspiration during the Lodge Fire and resumed when smoke levels dropped, which shows that vegetation is very much attuned to the atmosphere surrounding it. Another example is the temperature cycle of the South Fork Eel, which climbs during hot days, not just because of thermal loading from solar energy but also because the flows are reduced because of cumulative use of moisture by trees. Smoke from the Lodge Fire likely reduced river temperatures due to both a reduction in solar energy but also because of decreased use of moisture by trees. Climate change will likely alter the fire cycle, likely making fires more frequent and possibly of higher intensity.

Work in Elder Creek, an undisturbed South Fork Eel River tributary within the UC Angelo Preserve, has shown that Douglas fir trees take up most of the water they need for the year during the wettest periods when the zone where their deep roots are is saturated. This "rock moisture" layer captures slower moving groundwater that is delivered to the adjacent stream gradually. Hardwoods absorb moisture from upper soil layers, but do not tap rock water. They can cause stream flow fluctuation during periods of high solar intensity due to evapotranspiration. Streams like Elder Creek, and others in watersheds with healthy or recovering conditions, maintain vitality during summer and fall and viable habitat for salmon and steelhead because there is a cold water supply in the rock moisture within the hillslope. Groundwater recharge in this strata was much higher in 2014 (300 mm) than expected, despite only moderate spring rains. Thus, firs were hydrated and therefore somewhat fire resistant.

Bill then began to discuss potential effects of the Lodge Fire. Will it cause accelerated erosion in the areas that were burned? Will suppression activities, such as fuel breaks created using bull dozers, be a source of erosion? If roads and fuel breaks are treated rapidly with appropriate methods after the fire, the latter will not necessarily be the case. Is post fire erosion necessarily a bad thing? Historically fires delivered pulses of sediment and rock to serve as spawning gravels, so they are in fact part of the processes that foster productive salmon streams. Excessive erosion or prolonged soil loss from road failures or gully erosion degrades aquatic environments.

Not all erosion control activities after fire are effective. Bill and his student Fred Booker studying in southern California after large wild fires found that grass seeding methods meant to assist in re-vegetation did not take provide any benefit during the first intense rainfall event when most soil loss occurred. When fires are particularly intense they may change soil properties, and southern California soils sometimes become hydrophobic and cannot absorb water and are highly susceptible to erosion. Dr. Dietrich has not seen this in the Lodge Fire or evidence of it in the Eel River watershed.

There are three sources of natural sediment after fires: 1) dry ravel or surface erosion caused by a loss of land cover; 2) gully erosion and mass wasting related to hydrophobicity; and 3) hillslope erosion, including shallow landsliding caused by loss of root strength of larger trees. Ravel will happen before the first storms but hydrophobicity is not likely to be a source of sediment after the Lodge Fire. However, sediment delivery from loss of root strength will occur where the fire burned hot causing large tree mortality. Large trees like Douglas firs have roots that extend down 10 meters in depth and can bind the soil mantle to the underlying bedrock. This causes a delayed delivery of material from these colluvial hollows starting about 5 years after the disturbance and continuing for several decades. Since not many places in the Lodge Fire burned with high intensity, the likely level of sediment input from natural landsliding should not far exceed the South Fork Eel River's transport capacity. Areas of failure can be predicted using the Shallow Landslide Stability Model (SHALSTAB)(see map in Power Point).

Erosion from roads, however, may be significant and environmentally undesirable. Work by Dr. Mary Power and her associates on the Angelo Preserve shows that the growth of young salmonids is impacted by excess sediment delivery. High levels of fine sediment can decrease the production of insects and the ability of the fish to locate prey items. At the same time, young fish will have higher energy demands because they become more active and aggressive if the river bed topography is embedded and smoothed by fine sediments. If these fish grow slowly, their survival to adulthood in the ocean is greatly compromised. Therefore, preventing excessive erosion helps maintain a healthy South Fork Eel River salmonid population.

Dr. Dietrich then extolled the virtues of technology in providing tools for watershed analysis and LIDAR imagery in particular. This imagery is developed using laser impulses that bounce back from the canopy and the ground and imagery has been obtained by UC Berkeley as part of the NSF Eel River Observatory study for 2004, 2009, and this summer in August 2014. The 2004 and 2009 data are available to the public and Bill encouraged their use. These

images were generated with a frequency of 25,000 laser beams per second while the 2014 data has 100,000 beam per second frequency. The latter provides not just accurate ground elevation data but signatures that allow analysis of canopy cover. Data available at www.opentopography.org.

LIDAR shows an extremely high road and skid trail network on the west side of the South Fork Eel River watershed. These old roads, although long abandoned, are likely a chronic source of sediment. Fire may change drainage or run off patterns in this area with a consequent increase in hillslope failures and gully erosion from this source. LIDAR data allows models like SHALSTAB to predict where erosion risks are high. If a sub-set of areas that have the highest risk of erosion can be identified, then monitoring will be more narrowly targeted and likely more feasible. Bill cited models developed for the U.S. EPA's South Fork Eel River Total Maximum Daily Load (TMDL) studies as having utility in this regard.

After roads, fuel breaks and skid trails have been treated and waterbars installed, driving on them can undo much of the work and can cause significant waterbar failure. In evaluating the effectiveness of remediation activities, a key factor will be where waterbars were constructed so that they delivered water and sediment into active stream courses or gullies that were effective delivery mechanisms. Hydrologic connection of roads to streams is the big question. If connected, they not only deliver sediment but also alter the hydrology of the watershed. Increased peak flows and decreased base flows can result, when road densities are high and there is higher connectivity (Dr. Gordon Grant). LIDAR can help determine where potential problems may occur, where to monitor, and where further remediation might be needed.

Bill closed by saying that UC Berkeley was extremely grateful to CALFIRE for preventing the spread of the Lodge Fire onto the Angelo Preserve.

Funding Mechanisms and Project Possibilities to Improve Forest Health and Prevent Erosion on Private Lands

Jill Butler, CALFIRE Santa Rosa – *Using California Forest Improvement Program (CFIP) and other CALFIRE Grant Opportunities to Improve Community Safety and Forest Health* – Jill administers the CFIP grants not only for Mendocino County, but also Lake, Santa Cruz and all Bay Area counties. The CFIP grants have been in existence for 35 years and are available to landowners with parcel sizes from 20 to 5,000 acres and have at least 10% tree cover comprised of native species. Neighbors can work cooperatively on projects that include parcels less than 20 acres, but must have a management plan. Conifers, oak woodland, riparian species, or a mix of any native coastal tree species meet criteria.

Jill said that timely CFIP grants were available to landowners affected by the Lodge Fire and that the grant application deadline for that process was November 21. She also said more CFIP resources would be available for northern California than at any time before, Also, there is a new CALFIRE Greenhouse Gas Reduction Fund and Forest Management grant opportunity that had the same deadline. Orientation meetings on the new grant process will take place soon (October 21 in Ukiah). Project types will include:

- Urban and Community Forestry - for tree planting, inventories and management plans; biomass
- utilization; parcel purchase and greening; and green infrastructure projects.
- Watershed Reforestation and Restoration - Selective removal and utilization of vegetation to reduce wildfire
- hazards (i.e. Fuel Reduction). Projects include thinning, pruning, brush removal, and biomass utilization.
- Post-Fire Restoration: Large scale reforestation and watershed restoration resulting from catastrophic wildfire or other catastrophic events. Projects include site preparation, seedlings production, planting forest trees, maintaining seedlings (release), thinning for wildfire fuel reduction, and utilization of biomass.
- Forest Legacy Program - Conservation easements for landowners through CALFIRE's Forest Legacy program.
- Forest Pest Control - Timber stand improvement/forest health, removal of dead trees, restoration of damaged forests, and utilization of biomass.
- Program Timberland EIRs - develop Program Timberland Environmental Impact Reports designed to increase carbon sequestration and reduce carbon emission from wildland fires.

Some of the new CALFIRE grants are open to landowners; others are open to Tribes, non-federal agencies, or 501 c (3) nonprofit organizations. See the CALFIRE grants web page at http://calfire.ca.gov/resource_mgt/GGRF.php for complete information on grants available. She recommended that the public take advantage of Forestland Steward magazine put out by CALFIRE, which is free and has a wealth of information on forest health, restoration, and grant

programs. She also noted the good information on *What to Do After Wildfire* available through the Mendocino County UC Extension Office's website at http://cemendocino.ucanr.edu/UC_FIRE_LINKS/ .

Joe Scriven, Mendocino County Resource Conservation District – *Funding Available for Erosion Control in Private Lands* – Joe opened his talk by explaining the MCRCD was a governmental entity that serves private land owners and has a Board of Directors comprised of land owners within the county. The MCRCD works closely with the U.S. Natural Resources Conservation Service (NRCS) and has a similar mission with regard to preventing soil erosion and maintaining water quality. NRCS engineers can sometimes provide services to MCRCD sponsored projects. RCDs and NRCS (formerly the Soil Conservation Service) have a national history and track record back to the 1930s and the MCRCD has been carrying out successful projects since the 1950s.

Joe is a fisheries biologist and conservationist who helps land owners identify projects. The MCRCD does not directly fund projects, but they may help identify sources of funding, and assist land owners in applying for grants. Specific problems and opportunities Joe can help with are erosion control, forest health, fish barriers, and fish habitat improvement projects.

Potential significant funding sources include the California Department of Water Resources administered Prop 84 grants, Clean Water Act 319H non-point source pollution abatement grants administered by the State Water Resources Control Board, and California Department of Fish and Wildlife fisheries habitat improvement grants that are offered annually. The MCRCD likes to see local people trained in conservation and restoration implementation because of the benefit to the local economy and because they care more and generally do better work. This improves the quality of the project and leads to more lasting benefits. Joe shared hand outs and offered to come and see any land owners in the Ten Mile Creek basin.

The MCRCD and Joe are non-regulatory and friends of the landowner. However, agencies that fund grants may need to come and visit project location and may have regulatory concerns; therefore, that is a consideration for private landowners before applying for grants. Groups of landowners may also apply in the form of road associations, where only one landowner from the group can be a liaison with agencies. Joe and the MCRCD have very good rapport with agencies and can expedite and assist with project permitting. They can get your permits a lot cheaper or even handle most of the cost and time involved in developing permits. Joe's services in this regard are paid in part by a CDFW grant currently. The MCRCD has just helped acquire funding for the new Pacific Watershed Associates forest roads manual and he said that it was available on the web and that he had paper copies with him to share. GET ON WEB

Joe said that people should weigh in with the North Coast Regional Water Quality Control Board staff and request that more of the Eel River basin be targeted for 319H grants. Currently only the South Fork Eel watershed, which includes the Ten Mile Creek basin where Laytonville is located, is on the priority list.

Tom LeRoy, Pacific Watershed Associates – *Post Fire Erosion Control on Roads, Thoughts for Landowners* – Tom started by saying that his experience in the field had been a major revelation in terms of how the Lodge Fire was actually a very good thing for forest health. He was very surprised by the lack of high intensity fire visible from areas of the Lodge Fire he had visited was really an eye opener. There are lots of very knowledgeable folks here today, including Dr. Bill Dietrich who addressed you earlier. As Bill noted, the largest risk of post-fire erosion is generally the roads and skid trails, although gullies can be significant. Tom showed a slide of the quantities of sediment yielded by the 2003 Biscuit Fire in southern Oregon where erosion from roads and failed stream crossings comprised more than 85% of delivery.

People's roads have undoubtedly changed as a result of CALFIRE's suppression activities. Tom noted varying levels of disturbance on road networks he observed that had been opened for vehicle access some to build or access fire breaks. He said in general that there were varying degrees of skill and expertise of equipment operators who are brought on to build fire breaks but who are also retained to do remediation and restoration activities. Some have appropriate background knowledge and skills and others less so; therefore, the less knowledgeable ones need more supervision. He said he observed have extensive areas of bare soil that remained susceptible to erosion when he visited the field earlier in the week. He showed examples of compaction patterns using heavy equipment and notes that such activities can create variability in soil heights and that depressions catch water and grass seeds sprout there more easily and are less likely to wash away. If water bars deflect into vegetated slopes, then sediment is filtered and groundwater re-charged.

Tom said that the existing roads and legacy road network, shown by Dr. Dietrich on the LIDAR imagery, may change substantially. Debris from the fire may be perched and ready to flush down the stream channels and inboard ditches, plugging old culverts and creating an elevated risk of mass wasting. Culverts on all accessible road networks need to be inspected to prevent such plugging and failures after this year's first storm events.

Landowners might expect the following with regard to their roadsand skid trails after full and successful remediation:

1) Maintenance of the preexisting road shape without long through-cuts (not out-sloped to in-board ditch);
2) Well placed and tightly spaced road drainage features such as waterbars or rolling dips;
3) Removal of side cast material from culvert inlets;
4) Critical dips at all of the stream crossings;
5) Available downed trees should be used as mulch (prevent stream diversion); and
6) Graded surfaces should be track-walked for seed retention and water infiltration.

Land owners should ally with an erosion control specialist and make a plan. Try to get as much mulch and seed as possible down to prevent surface erosion; however, seeding may or may not succeed due to the timing of rains, rainfall intensity, and the amount of bird predation of seeds. Landowners and property managers must not drive on newly re-contoured roads after suppression mitigation. Driving over waterbars before they are compacted by rains and "seasoned" can cause them to deflect water improperly or not at all and can lead to increased erosion and possibly even road failure. Watch for areas of concentrated water and erosion on the road and do what you can to disperse the water more frequently up road of the area being eroded. Sometimes just timely work with a shovel by an individual can prevent failure during large events. Nothing is perfect in terms of fixes and landowners should continue to surveillance for the next few years.

Kelly Harris,BioEngineering Associates Riparian Specialist – *Successful Upland Erosion Control Options for Private Lands*– Kelly was presenting in the place of Evan Engber, who is the owner of BioEngineering Associates. Kelly showed slides of low tech gully erosion techniques, many of which were piloted in the Ten Mile Creek watershed on the Black Oak Ranch. Low tech brush structures with willow stakes driven into the ground perpendicular to the flow through the gully. These trap soil and then vegetate, if properly constructed. These are low cost and can normally be constructed with farm equipment or manual labor. Branches may be tied in or may be weighted down with rock or layered in with rock and forest duff combined. If successfully built, these structures can trap fines and act as a very good water filter. If there are factors causing gully formation or enlargement, like stream diversion upslope, it may be necessary to attack these causal mechanisms. Although Evan Engber has had some success with these techniques, there is no systematic monitoring. Sometimes the water table will come back up as gullies are rebuilt and willow or alder can successfully recruit.

Kyle Keegan, Eel River Recovery Project – *Post Fire Opportunities for Restoring Native Grasslands* – Kyle is not a grassland specialist, although he considers himself as a "specialized generalist". He has been working with and learning about native grasses and their benefits to the land and ecosystem for the past 17 years. Just as Dr. Dietrich stressed the importance of forested hillslopes for storing water, native grasslands also had substantial moisture holding capacity.

Native grasses were perennial and long lived, with life spans varying from 5 to 200 years or more. These species are adapted to our Mediterranean climate and fire and could rebound and spread after fire events historically. The root systems of native grasses are deep-rooted and fibrous, with root lengths varying from a minimum of three and a maximum depth of 20 feet or greater. These roots enhance infiltration and percolation of water deep into soil profile, which increased moisture storage and yield and provided forage for native deer and elk throughout the year. Since the root mass grows in an anaerobic zone, it sequesters carbon as it grows. Kyle also finds native grasses quite beautiful.

California and Eel River watershed grasslands acted like sponges in before disturbance. Indians burned grasslands and meadows to encourage game animal forage and the proliferation of species needed for cultural practices. Heavy grazing regimes by cows and sheep introduced by European settlers caused a conversion to annual, shallow rooted non-native grasses. Heavy grazing kept grasslands and prairies open, but when grazing stopped in some areas, Douglas fir encroached on meadows.

Kyle described himself as "salmon-centric" and asked how we might get our grasslands into optimal water storage conditions for the benefit of salmon. His experiments on his own place in lower Salmon Creek near Miranda in

Humboldt County have had mixed success. He found it easier to restore grasslands lower down on hillsides, but more difficult to re-establish them higher on slopes. In addition to soils being drier upslope, he thought there might be differences in soil microbes. A major impediment to restoring native grasses in the Eel River basin at present is that there is no seed bank. The Mattole Restoration Council has worked with BLM in that basin and has a seed bank, but it is small scale and seeds are mostly for projects on BLM land. You can buy California native grass seed commercially, but it may not be well adapted to local conditions. He recommended:

- Pacific Coast Seeds (925) 373-4417
- Hedgerow Farms (530) 662-6847
- California Coastal Prairie website: http://www.sonoma.edu/preserves/prairie/
- Landowner's Guide to Native Grass Enhancement and Restoration (Hastings Reserve: Mark Stromberg)

David Kahan, Full Circle Forestry & ERRP –*Forest Health for Fire Safety - Only You Can Prevent Smoking Bears* – Dave started his talk and touched in his experience. In his youth, he spent several seasons as part of a "hot shot" crew fighting fires throughout the West and learned a great deal about fire behavior and ecology. Dave still works as a contract timber faller in fire fights as an on-call contractor. He moved to southern Humboldt and became involved with visionary forester Jan Iris, who was working on commercial use of hardwoods. It became clear to David that the forest ecosystem was far from its normal range of variability and that suppression of fire was leading it to further departure. Fuel loads are high and the moist climate is causing fast growth. He helped form the Institute for Sustainable Forestry to work on these issues. We need to think like a fire. It may take 20 life times to restore the natural fire cycle.

A popular conception in southern Humboldt was that it was too much work. Dave just started doing it and has used CFIP grants and other funds to make 200 rural residences to be more fire safe. Taken together, he has helped advance forest health over a surprisingly wide area. The ideal way to achieve fire safety is to generally improve forest health. Also, if we change forest stands to fewer, larger trees by thinning smaller trees, then there will be less evapotranspiration and we will get greater water storage and late season water yield.

Forest health decisions depend a great deal on what the objectives of the land owner are. Different areas of emphasis could be production of merchantable timber or to enhance wildlife habitat. Too much thinning can make sites hotter and drier, so it is important to have an appropriate stocking target. Also, opening up the canopy can also allow brush and other flammable under-story species to get established. Site conditions may vary substantially across one ownership, so formulas for tree spacing and thinning may not apply. You need advice from a professional forester. Dave then described different more efficient approaches to team work between sawyers and swampers, who clear work spaces after trees are felled. It is very important that crews be thorough and make sure vegetation that could compete with conifers and cause increased fire risk need to be completely removed, if possible. Limbing trees up from the ground is very effective in removing ladder fuels and is desirable when building fire breaks. This reduces the bulk density of ladder fuels, which are highly flammable. A pole saw is the best tool. Tree trunks are full of water and rarely burn.

Concluding Panel Discussion

Dr. Mary Power said she had done lots of experiments with grasses and said the timing of rainfall was only opportune in a few instances. She asked if Kyle Keegan had a way to increase success of planting grasses from seed or if there was a native strain that was easier to use. Kyle responded that current domination by annuals made our grasslands somewhat difficult to change back to native perennials. Some of the best success may be with planting plugs and going back to the same area. Kyle has gone through his native grassland areas pulling seeds from stalks and them spreading them in gopher holes. He has had good luck using this method. The easiest species to work with are California Oatgrass (Danthonia) and Blue wild rye grass. Kyle then also noted that fire is an excellent time to re-seed native grasses, but you need to have a seed bank.

The next question was for Dave Kahan related to what was done with slash and small trees left after forest health or fuels reduction treatment. Left over slash can be chipped for mulch in some cases or lopped and scattered. However, more commonly piles are covered after drying and then ignited once rains have come to limit controlled burns escaping. Dave also sometimes burns slash green shortly after projects and he described his methods for that approach. Given the fact that Douglas fir is encroaching into oak woodlands as well as grasslands, Dave Kahan was asked if he ever logged firs

to help maintain native oak forests. His answer was yes, and he said he thought maintaining native forest communities off all types was important. Firs can be girdled and will then die. Evan Engber's son Ammon was doing work like this.

What about inoculating chainsaw bar oil with mycelium? Dave experimented with this about 10 years ago. Chain stretched and he quit using it. Maybe it has improved. BLM said it had experimented with the same product and found similar problems.

Jill Butler was asked if there might be more resources available to the residents of the Laytonville area, if they formed a fire safe council. She said it might help the community to organize and could prove advantageous, but that they could also apply through 501c3 organizations or governmental agencies like the MCRCD.

Is there anyone in Humboldt County RCD that can help with forest health grants? Joe Scriven said his counter-part on forest health at the HCRCD is Matt Cocking.

Could we convert large areas back to native grasslands. Kyle says that he hasn't seen anything larger in scale than the MRC efforts on BLM land. There still seem to be ecological impediments. Mary Power suggested that feral pigs are a big problem because they are attracted to native grasslands.

Facilitator Vivian Helliwell thanked the presenters, organizations that sponsored the event, and members of the public that attended. Sixteen of those attending joined carpools and went into the field on the property of Chris Hrabak immediately after the meeting.

Field trip attendees pose for a group photo on the Hrabak property in lower Ten Mile Creek, with Iron Peak in the background.