Monitoring Study Group Meeting Minutes

September 10, 2015
Mendocino National Forest Headquarters
Willows, California

The following people attended the MSG meeting: Matt Dias (BOF—MSG Acting Chair), David Fowler (NCRWQCB), Richard Gienger (Forests Forever+), Stacy Stanish (CAL FIRE), René Leclerc (CVRWQCB), Mike Fuller (CGS), Jim Harrington (DFW), Ryan Bey (NCRWQCB), Allison Clark (NCRWQCB), George Gentry (CFA), Mike Mitzel (SPI), Steve DeBonis (SPI), Dr. Cajun James (SPI), Dr. Bruce Krumland (public), Dr. Russ Henly (CNRA), Melanie McFarland (USFS), Mandy Culpepper (DFW), Laurie Earley (USFS), Angela Moran (DFW), Steve Tussing (BCWC), Tom McCubbins (TCRCD), Dr. Lee Benda (Terrain Works), Drew Coe (CAL FIRE), Don Lindsay (CGS), Jacob Lee (CGS), Tricia Parker Hamelberg (USFWS), Rich Wade (BOF), Nick Simpson (DFW), Matthew Reischman (CAL FIRE), Dennis Hall (CAL FIRE), Arne Hultgren (Roseburg), and Pete Cafferata (CAL FIRE).

Webinar participants were not recorded (14 people attended online).

[Action items are shown in bold print].

The meeting began with general monitoring-related announcements:

- The CLFA Fall Meeting titled "Fire on the Mountain" will be held on September 25th in Auburn and September 26th at Blodgett Forest Research Station. See: http://www.clfa.org/wp-content/uploads/2010/08/CLFA_Fall_2015.pdf

- The 22nd Annual Meeting of the California Aquatic Bioassessment Workshop will be held on October 20-21, 2015 at UC Davis. For additional information, contact Jim Harrington, DFW, Rancho Cordova.

- The State Board of Forestry and Fire Protection is meeting in Fresno from September 29th to October 1st. There will be a field trip to view fuel treatments in the southern Sierra Nevada.

- The North Coast Regional Water Quality Control Board will hold an Elk River TMDL Workshop on November 19th in Santa Rosa.

- Richard Gienger announced that the 18th Annual Coho Confab took place on August 21-23, 2015 in Occidental, California. For more information, see: http://www.calsalmon.org/programs/coho-confabs/18th-annual-coho-confab

- Richard Gienger also announced that an erosion and sediment control BMP workshop would be held on September 16th in Piercy, CA. The workshop was co-hosted by Pacific Watershed Associates and the Salmonid Restoration Federation (http://www.calsalmon.org/news/erosion-and-sediment-control-bmp-workshop).

- The revised "Handbook for Forest, Ranch and Rural Roads" by Dr. Bill Weaver, Eileen Weppner, and Danny Hagans (Pacific Watershed Associates) is posted on the Mendocino County Resource Conservation District website: http://mcrcd.org/publications/

- Trisha Parker Hamelberg, USFWS, announced that the Battle Creek Working Group meets at the USFSW office in Red Bluff the third Tuesday of every month (for more information: Tricia_Parker@fws.gov).

Battle Creek Watershed Monitoring Forum

Dr. Cajun James provided a brief introduction to the main topic for the meeting, Battle Creek watershed monitoring. She stated that a considerable amount of monitoring data was collected in this basin prior to the 2012 Ponderosa Fire, and that there has been a significant effort to obtain an understanding of what happens after a high severity wildfire. Dr. James stressed that what is learned here must be adequately transferred to the field foresters working in Sierra Nevada and Cascade Range watersheds.

Forest Road Analysis in Battle Creek and Post Fire Road Risk Assessment using NetMap

Dr. Lee Benda, Terrain Works, provided a PowerPoint presentation titled "Forest Road Analysis in Battle Creek and Post Fire Road Risk Assessment using NetMap." He began by providing background information on Battle Creek: volcanic rocks—mainly andesite, areas of "tablelands" with low stream density, and considerable areas covered by fire since 1911—including the ~27,000 ac Ponderosa Fire in 2012. The first part of the presentation dealt with road conditions prior to fire, and asked two questions: (1) how much forest road erosion and sediment delivery has been reduced due to existing management?, and (2) where would future road management be most effective at further reducing road erosion and sediment delivery to streams? Important drivers of road erosion and sediment delivery include road segment length connected, road slope, road surface type, road maintenance, traffic, geology/soils, climate, distance to stream, drainage density, and road density. Two options were considered to model road sediment production: WEPP and GRAIP-Lite. GRAIP-Lite was selected and used in NetMap, since it is more empirically-based (requiring field data). Illustrations showed how sediment delivery can occur either with sediment plumes on the forest floor below drainage structures or by direct entry from culverts. The key question is what the plume length is compared to the distance to the stream. Important data to run the model include soil infiltration rate, precipitation intensity, road segment length, distance to the stream, and geometry of the plume.

Three analysis scenarios were modeled: (1) sediment production and delivery with intrinsic drainage (i.e., at streams and at natural high/low points along the road), but no surfacing and no SPI drainage points, (2) production and delivery with intrinsic drainage and surfacing, and (3) production and delivery with intrinsic drainage, surfacing, and SPI drainage points (GPS locations for drain points were obtained from SPI for the Battle Creek watershed). There was a 100% increase in road drain points over intrinsic drain points alone when SPI structure locations were added, and an 80% increase in the number of road segments. Mean road segment length decreased 44% to ~60 m. Dr. Benda stated that decreasing road segment lengths reduces road water/sediment runoff volume, and that this, in combination with increasing distances to streams, results in a reduction in water/sediment transport distances below road drain points.

The modeling exercise goal was to mimic actual field data and Drew Coe's (2006) MS thesis data from the central Sierra Nevada were used as a field check (see: http://bofdata.fire.ca.gov/board_committees/monitoring_study_group/msg_supported_reports/2006_supported_reports/drewcoe_finalthesis.pdf). Mean road segment length for Battle Creek and the Coe data set were found to be similar, as were modeled sediment travel distance (26 m) and Coe's measured data below relief culverts (29 m). Additionally, predicted road sediment production was found to be in general agreement with the Sierra field dataset. Predicted sediment delivery for scenario (2) with surfacing of 30% of the road network was reduced 71%, and for scenario (3) with surfacing and SPI drain points, predicted delivery was reduced 84%. While almost 100% of road segments produce sediment, only 6% were modeled to deliver sediment to streams. Of these, only ~3% produce and deliver relatively large sediment volumes. NetMap analysis shows where the top 1%, 5%, and 10% of the sediment production and delivery locations are in the watershed road network, allowing prioritization to occur for adding road drains and/or surfacing. Differences for the three modeled scenarios were provided for three sub-basins in Battle Creek (Bailey, Digger, and Rock Creeks), with differing drainage densities.

The second part of Dr. Benda's presentation focused on how fire severity can alter road erosion and sediment delivery, and where future forest road management would be most effective at reducing post fire increases. Modeling was completed for the Malheur National Forest pilot project in eastern Oregon (see: http://www.netmaptools.org/Pages/FireFish/NetMap_Fire&Fish_Malheur.pdf). Modeling inputs included the fire BARC map, and modeling goals included identifying at-risk infrastructure and at-risk aquatic resources. Modeled fire effects include more runoff and ditchflow, along with decreased infiltration rates. This produces longer sediment plumes and increases connectivity between the roads and the streams. Infiltration capacity is reduced by a factor of 2 to 3, depending on soil burn severity ratings from the BARC map, and the model predicts which roads are connected to streams that were not connected before the fire. The process was illustrated for the Canyon Creek Complex Fire in eastern Oregon. Areas of the road network predicted to have higher post fire sediment delivery were displayed and Dr. Benda explained that this will allow the Forest staff to target road improvement work (i.e., additional drains, surfacing) to these locations.

Post Fire Riparian Vegetation and Ground Cover

Dr. Bruce Krumland provided presentations on post fire riparian vegetation and ground cover with two separate PowerPoints. The first presentation focused on riparian tree mortality and sprouting following the 2012 Ponderosa Fire and the 2013 Rim Fire. Field work by SPI two years after the fires included installing 10 m x 20 m plots bordering both sides of major watercourses and recording species, basal diameter (~1 ft above ground) for all trees >0.5 in, as well as status (alive, dead, dead + sprouting). Plots were 500 ft apart. Photos of the plots showed considerable annual vegetation covering the ground with dead trees. Ponderosa Fire sampling included Rock, Bailey, Canyon, and Digger Creeks (284 total plots); Rim Fire sampling was located near Cherry Lake (296 total plots).

Pre-fire ground basal area (based on nearby upland inventory plots) was estimated to have 341 ft^2/ac and 343 ft^2/ac for the Ponderosa and Rim Fires, respectively. Hardwood ground basal area was estimated to be 28% for the Ponderosa and 48% for the Rim Fire. Sierra alder was estimated to comprise 65% of the hardwood basal area for the Ponderosa and 83% for the Rim Fire. Overall, stocking in the riparian areas was approximately two times higher than on the hillslopes. Ponderosa Fire mortality in the riparian zone was 81% for both conifers and hardwoods; for the Rim Fire it was 67% for conifers and 64% for hardwoods. The percentage of hardwoods that sprouted was 51% for the Ponderosa Fire and 15% for the Rim Fire. Approximately 50-60% of the alder sprouted for the 2 inch diameter class on the Ponderosa Fire, but was much lower for all the other diameter classes. For the Rim Fire, <10% of the alder sprouted for all the diameter classes. For both fires, other types of hardwoods sprouted at a much higher rate. Dr. Krumland stated that it is not clear why Sierra alder is sprouting at a much lower rate than other hardwoods, but he suggested that it may be appropriate to consider pre-fire riparian management options, as well as post-fire regeneration efforts.

The second PowerPoint focused on post-fire ground cover and summarized two studies: the SPI Ponderosa Fire swale study, and Ponderosa and King Fire ground cover surveys. The Ponderosa Swale study area was comprised of 10 swales, each approximately 1 ac in size. Seven swales were treated with different logging and site preparation treatments. Five surveys were conducted: immediately after the fire, one month later after site prep work, and annually thereafter (2013, 2014, 2015); 200-400 sample points per swale were classified as to the type of cover present. There was one backpack herbicide treatment in the spring of 2013. Cover included wood >1 cm and rock >2 mm. Immediately after the fire, cover was estimated as ~10%; after site prep work in the 7 treated swales it ranged from ~10-30%. By 2013, cover was ~70% for all the swales, ~80% in 2014, and ~90% by 2015.

For the broader Ponderosa and King Fire studies, large burned areas on SPI lands were stratified by soil types; sample plots were randomly allocated proportional to soil type area. Plots consisted of two 100 m transect lines with cover recorded every meter. Approximately 16,000 acres were stratified for the Ponderosa Fire (112 plots) and 20,000 for the King Fire (69 plots). Burned areas were salvage logged, treated with herbicides, and planted within one year of the fire. Sampling occurred ~three years after the Ponderosa Fire and one year after the King Fire. Results presented showed that bare soil for both fires was approximately 20% and covered condition was roughly 80%. These results were described as being generally similar to those reported for the Ponderosa Fire swale study.

Achieving Regulatory Biological Objectives in California

Mr. Jim Harrington, DFW, gave a PowerPoint presentation on bioassessment work that has been conducted in California. He began with a biological assessment overview, similar to an earlier MSG presentation (http://bofdata.fire.ca.gov/board_committees/monitoring_study_group/meeting_minutes/2012_msg_meeting_minutes/msg_meetingminutes_091912_1_.pdf). In particular, he noted that the State's SWAMP perennial stream assessment from 2000-2014 has a statewide average of 44% in good condition, 22% fair, 16% very poor, and 18% very poor. Sixty six percent of the perennial stream miles were in reference condition, while in the Sierra Nevada, it was 83%. These averages are from ~2200 randomly selected sites statewide, as well as 586 reference sites. Mr. Harrington also described the California Stream Condition Index (CSCI) as a key bioassessment tool available for predicting the benthic macroinverebrates that should be present in a

given watershed based on similar reference sites, and illustrated its use with Trout Creek in the Lake Tahoe Basin. He briefly described a study conducted for the USFS to determine biotic conditions on Forest Service vs. non-Forest Service lands. A cooperative pilot project to assess stream biota and habitat quality of California private forest lands was also described. It is being funded through the Timber Regulation and Forest Restoration Fund (TRFRF) and will sample 60 random sites and 12 reference sites from 2016-2018 (SWRCB will pay for the reference sites). Mr. Harrington stated that this project is necessary since sites on private timberlands are currently under-represented.

Regarding wildfire impacts, Mr. Harrington described a study his team conducted in San Diego County following the 2003 and 2007 fire sieges to document the effects on macroinvertebrate assemblages. Post-fire index scores at burned reference sites were 30-50% lower than pre-fire reference site scores for the first two years following the 2003 fires and for one year following the 2007 fires. In most cases, scores recovered by the third year following the fires. Streambed alteration due to large scale sediment input appears to be the primary mechanism that led to decreased biological integrity scores after the fires (see: http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reglrpts/rb9postfire_tech.pdf).

Mr. Harrington concluded his presentation by discussing data being collected on SPI timberlands during 2014-2015 for the Ponderosa and King Fires. For the Ponderosa Fire, 4 sites were sampled above, within, and below the burned area in the Digger and Rock Creek drainages, close to Cajun James' long term monitoring stations. Sites sampled in 2014 all had CSCI scores of ~1.0 (or reference condition); they are being resampled this year to see if conditions have changed. At the King Fire, 2 sites were sampled in 2014 above and within the fire area in the Pilot Creek drainage, and they also had CSCI scores of ~1.0. Similarly, these sites are being resampled to see if conditions change over time and affect the stream biota. To date at both the Ponderosa and King Fire sites, no problems have been observed.

Ponderosa Fire—Water Quality Impacts

Dr. Cajun James, SPI, provided a PowerPoint presentation on her water quality monitoring work in the Battle Creek watershed following the 2012 Ponderosa Fire. She stated that pre-fire monitoring data are presented in a report authored by James and MacDonald (2012) (see: http://www.spi-ind.com/research/JamesandMacDonaldGreaterBattleCreekWatershedUpdateAdditions_SPI.pdf). The considerable data set that existed prior to the Ponderosa Fire (3 stations in Bailey Cr, 2 in SF Digger, and 1 in Canyon Cr) makes the post fire observations a valuable addition to the literature (3 of the stations were installed in 2012). Equipment used for data collection include a YSI Sonde, ISCO pumping sampler, gas bubbler for stage, and multiple weather stations. Daily precipitation values were displayed for water years 2012, 2013, and 2014; typically there are 1-2 storms per year >2.0 inches.

Average daily turbidity data were displayed for the South Fork Digger Cr., North Fork Digger Cr., and Rock Cr. Stations for water years 2012, 2013, and 2014. Average values ranged from ~1-2 NTUs for SF Digger, ~2 NTUs for NF Digger, and ~4 to 6 NTUs for Rock Cr. The Rock Cr. Station is located within the fire perimeter; the other two stations are near the fire edge. All values were described as documenting low turbidity in these Battle Creek tributaries. Individual storm events of short duration, however, did produce large turbidity values, as illustrated by the Dec. 2, 2012 9-10 year return interval storm, which produced a value of 6400 NTUs at the Rock Cr. station, 1000 NTUs at SF Digger, and 300 at NF Digger. The maximum value at the Bailey Cr. stations for the same storm event was 105 NTUs at the lowest station. Post-fire average Rock Creek daily turbidity values were then displayed. Each year, there are approximately 7-8 days with post fire turbidity values of 25 NTUs. Roughly 300-325 days for water years 2013 and 2014 had values of 0-5 NTUs, and ~30-50 days with values of 6-25 NTUs. The number of consecutive days where NTU values were >25 were also displayed for the SF Digger, NF Digger, and Rock Cr. stations. For water years 2012, 2013, and 2014, these values ranged from 0 to 4 (highest values in Rock Creek, within the fire perimeter). Daily average turbidity values for Bailey Creek spanning 11 years (outside of the Ponderosa Fire perimeter) show values ranging from ~1 to 4 NTUs (mean daily values for a given year). For the lower Bailey Cr. station (within the fire perimeter), the number of days are mostly 0-5 NTUs, but the number of days varies for any given year due to the stream going dry at this location. Dr. James stated that the number of days greater than 25 NTUs is biologically important. Cumulative turbidity

percentages by water year were then displayed and showed that values are low (~5-10 NTUs) up to approximately 90% of the time. Finally, turbidity vs daily precipitation values were displayed, and it was stated that there was considerably more variability in turbidity with high daily precipitation after the fire.

The percentage of organic material in the suspended sediment samples taken in the Battle Creek basin was discussed next. Dr. James work builds on the work Dr. Mary Ann Madej did for coastal watersheds (see: http://www.bof.fire.ca.gov/board_committees/monitoring_study_group/msg_supported_reports/2005_supported_reports/madej_2005.pdf). Dr. Madej reported that for coastal watersheds, early fall water samples had a much higher organic percentage than samples taken later in the water year. Dr. James has found a wide range of percent organic matter in her filters from the pumped water samples (0 to 100% for samples with less than 200 NTUs). She estimated the pre-fire average percent organics was 15-25%, while it was 40% after the fire. Additionally, after the fire, the higher level of organics was consistent throughout the water year. Dr. James asked what role organic matter plays in stream recovery after a fire, and how this might affect the food chain and aquatic insects. As with the previous work, the Battle Creek samples confirm that turbidity readings are composed of both organic and inorganic matter, and that the organic percentage changes after a wildfire.

Daily water temperature data were also displayed for Battle Creek monitoring stations. For the Rock Cr. station within the fire, temperature increased ~3 ^{o}C after the fire, up to 13 ^{o}C. For the middle Bailey Cr. station outside of the fire area, water temperatures increased 3-6 ^{o}C, up to 16 ^{o}C, partly due to diminished stream flows in lower Bailey Creek.

Finally, Dr. James reviewed her Ponderosa Fire salvage logging erosion study (see: http://www.spi-ind.com/research/PostWildFireSalvageLoggingPrelimSummary_CJAMES_SPI.pdf; and notes from the MSG meeting held on March 20, 2013, when this topic was presented in detail: http://bofdata.fire.ca.gov/board_committees/monitoring_study_group/meeting_minutes/2013_msg_meeting_minutes/msg_meeting_minutes_03-20-13__final-a_.pdf). Briefly, 10 swales, approximately one acre in size, were selected within the Ponderosa Fire perimeter. Sediment fences were installed prior to the first fall rain storms. Three swales were designated as controls and seven were treated (2 std log and rip, 1 std log and no rip, 2 biomass harvest and rip, 2 biomass harvest and no rip). Detailed mapping was completed for rills and ground disturbance. The first winter, the controls produced considerably more erosion than either the standard logged swales or biomass logged swales; the logged and ripped swales had the lowest sediment production. The amount of disturbance was stated as being the primary factor that explained the amount of sediment produced. Overall, approximately 8,500 acres within the Ponderosa Fire perimeter on SPI timberlands were ripped on slopes less than 35%, shortening the slope length and increasing infiltration. During discussion, Jack Lewis raised the point that the control swales are approximately 10-15% steeper than the treated swales.

Battle Creek Watershed Conservancy Historic, Ongoing, and Proposed Monitoring

Mr. Steve Tussing, Battle Creek Watershed Conservancy (BCWC), provided a PowerPoint presentation on past, present, and proposed monitoring in this basin. He stated that the BCWC has been involved in several monitoring and assessment projects over the past 15 years, including Ward and Moberg's (2004) Battle Cr. assessment done by Terraqua (data collected in 2001-02), Terraqua's (2004) Battle Cr. salmon and steelhead restoration project plan, Ward et al.'s (2008) Battle Cr. stream condition monitoring plan, and Tussina and Ward's (2008) Battle Cr. stream condition monitoring report (data collected at the same 50 sites used in the 2004 report). Mr. Tussing briefly described the $125 million dollar restoration plan being implemented in the Battle Creek watershed to improve anadromous fish passage (opening up 44 mi of habitat).

After the Ponderosa Fire in 2012, the BCWC implemented a rapid stream condition/ bioassessment protocol at 9 sites--5 below the fire perimeter and 4 sites above the fire area. These 9 sites have been sampled every year since 2012. Mr. Tussing stated that he has seen evidence of pool filling in the South Fork, and that this tributary of Battle Creek has had the largest response from the fire (particularly after the winter of 2014-15). The South Fork has rhyolitic geology that makes it more erodible.

In terms of future monitoring and assessment work, Mr. Tussing stated that he is working with SPI, CVRWQCB, and Terraqua to develop a project to conduct a new watershed assessment and revisit the original 50 sites assessed in 2001-2002. The goal is to address data gaps and determine how the 2012 Ponderosa Fire and recent timber harvesting has impacted stream channel conditions. He wants to develop a watershed based plan with 9 elements, including establishing reach-specific goals and identifying/ prioritizing projects to address sediment sources to meet stated goals. Mr. Tussing will submit a Water Board 319(h) grant proposal using Timber Regulation and Forest Restoration funds. He also mentioned the recent DFW FRGP drought 2015 grant proposal developed by PWA and Tom McCubbins, Tehama Co. RCD. This project, if funded, will conduct an erosion inventory and assessment along 12 mi of Ponderosa Way, an unmaintained road in the South Fork of Battle Creek. The assessment will lead to a prioritized plan for future erosion control projects.

BOF Effectiveness Monitoring Committee and AB 1492 Updates

Dr. Russ Henly provided a brief update on the BOF Effectiveness Monitoring Committee (EMC) and AB 1492 work. The EMC was formed in 2014 to develop and implement a monitoring program to address both watershed and wildlife concerns and to provide an improved active feedback loop to policymakers, managers, agencies, and the public. This Committee continues to meet approximately every month, mainly in Redding. EMC meetings have focused on developing a draft EMC Strategic Plan, which is now complete. The plan will be presented to the BOF at their September meeting in Fresno. It includes, among other items, a list of monitoring priorities by entity/organization, critical monitoring questions organized by categorical themes, and proposed monitoring projects. Main monitoring themes include: WLPZ Riparian Function, Watercourse Channel Sediment, Road and WLPZ Sediment, Mass Wasting Sediment, Fish Habitat, Wildfire Hazard, Wildlife Habitat: Species and Nest Sites, Wildlife Habitat: Seral Stages, Wildlife Habitat: Cumulative Impacts, and Wildlife Habitat: Structures. The EMC Charter and the draft Strategic Plan are posted at:
http://www.bof.fire.ca.gov/board_committees/effectiveness_monitoring_committee_/

AB 1492 Leadership Team meetings continue to be held approximately every month, mainly in Sacramento. The charters for three of the AB 1492 working groups (Ecological Performance Measures, Data and Monitoring, and Interagency Information Systems) have been finalized and posted on the California Natural Resources Agency (CNRA) website (http://resources.ca.gov/forestry/). The Administrative Performance Measures Working Group charter is also completed but not posted. The AB 1492 Working Groups have begun to meet more regularly and develop detailed timelines. It is estimated that it will be 2017 before a working set of ecological performance measures will be developed. These measures will drive the monitoring questions that the Timber Regulation and Forest Restoration (TRFR) Program answers.

Additionally, a draft concept paper has been posted on the CNRA website describing a potential approach for conducting planning watershed-based pilot projects to identify opportunities to increase efficiencies for timber harvest planning processes. Public input is being solicited on this draft document. The main areas to be addressed by the pilot projects include data collection and characterization, identification of information and methods used for cumulative impacts assessment, and the identification of restoration opportunities. The pilot projects are planned to be collaborative, multi-disciplinary efforts that provide opportunity for public participation. **An initial public meeting will be held on October 14th in Ukiah**. See: http://resources.ca.gov/docs/forestry/Planning_Watershed_Pilot_Projects_Concept_Paper_Public_Review_Draft_150824.pdf

The Center for Collaborative Policy (part of Sacramento State University) has been conducting a stakeholder analysis for the AB 1492 Program. The Center has interviewed approximately 30 stakeholders to date and will prepare a summary report, including recommendations regarding establishment of an advisory committee for the program.

Brief Updates on Cooperative Instream Monitoring Projects

Pete Cafferata provided very brief updates on the MSG Cooperative Instream Monitoring Projects.

Caspar Creek Watershed Study

Dr. Salli Dymond, USFS PSW Post Doc Research Hydrologist, is actively developing a detailed study plan for the third experiment at Caspar Creek. In addition to flow, temperature, sediment, and turbidity data collection, Salli is currently implementing in the South Fork a plant-soil water dynamics experiment (includes sap flow, soil moisture, photosynthetically active radiation (PAR), fog, and groundwater measurements along hillslope transects). Also under discussion are a sediment source/fingerprinting component, bioassessment work with DFW's Jim Harrington, and detailed watershed modeling work using the Distributed Hydrology Soil Vegetation Model (DHSVM). Two subwatersheds will act as controls and six subwatersheds with more than a decade of background data will be treatment subwatersheds, with varying levels of basal area remaining post harvest. Logging is planned for 2017-2018. See: http://www.fs.fed.us/psw/topics/water/caspar/

South Fork Wages Creek Cooperative Instream Monitoring Project

As reported previously, Kevin Faucher, Campbell Global, states that a road building and upgrading plan was implemented in the South Fork Wages Creek watershed in the summer of 2014, and that Campbell Global plans to complete two years of post road construction monitoring occurring prior to timber harvesting. A THP is planned to be implemented in 2017, so that this THP-scale effectiveness monitoring project can move past the background data phase (data collected since 2004).

Judd Creek Cooperative Instream Monitoring Project

Dr. Cajun James, SPI, reports that all of the field work, including stream water quality data collection and hillslope erosion monitoring, is finished for the Judd Creek cooperative study. She has worked with Dr. Lee Benda to use GRAIP-Lite (Geomorphic Roads Analysis and Inventory Package) for modeling road erosion and comparing it to the data collected with sediment fences. **Dr. James will have a final report for the Judd Creek study available in 2016.**

Little Creek Cooperative Instream Monitoring Project

Dr. Brian Dietterick, Cal Poly San Luis Obispo, has finished a summary report titled "Post-Harvest and Post-Fire Watershed Response in the Little Creek Watershed, Santa Cruz County, California." It is posted at: http://www.bof.fire.ca.gov/board_committees/monitoring_study_group/msg_supported_reports/2015_supported_reports/calpoly_slo_2015_littlecreekwatershedstudy_summaryreport.pdf Scaled back monitoring will continue in Little Creek that will include flow, turbidity, and channel geomorphic parameters. Dr. Dietterick has a new project developed titled "Predicting Instream Community Structure to Inform Spatially-explicit Riparian Management Strategies." Initial work has begun and CAL FIRE will be preparing a contract to help fund this project.

Railroad Gulch Best Management Practices Evaluation Project

Dr. Andy Stubblefield, HSU, reports that the Railroad Gulch study has completed two winters of pre-treatment monitoring. This included road surveys, continuous turbidity and grab sampling, instream and landslide monitoring and cross sections. This summer the road network was put in for the selective harvest planned for summer 2016 on the treatment watershed. Monitoring will continue this winter to observe the impacts of the road network. **A report summarizing the first two years should be available shortly which will provide further details.**

Next Monitoring Study Group Meeting Date

The next MSG meeting date was not scheduled. When a date, venue, and agenda are available, this information will be emailed to the MSG contact list. **MSG participants are invited to provide Pete Cafferata with monitoring topics suitable for presentation and discussion.**