

Monitoring Study Group Meeting Minutes

June 24, 2010

CAL FIRE Shasta Trinity Unit Headquarters
Redding, California

The following people attended the MSG meeting: George Gentry (BOF—MSG chair), Crawford Tuttle (CAL FIRE), Dr. Matthew Buffleben (NCRWQCB), Richard Gienger (public/HWC/SSRC), Peter Ribar (CTM), Dr. Michael Wopat (CGS), Dennis Hall (CAL FIRE), Don Lindsay (CGS), Mike Liquori (Sound Watershed Consulting), Clay Brandow, (CAL FIRE), Matt Boone (CVRWQCB), Maggie Robinson (NCRWQCB), Drew Coe (CVRWQCB), Dr. Cajun James (SPI), Dr. Sam Litschert (Earth Systems Institute), and Pete Cafferata (CAL FIRE). **[Action items are shown in bold print].**

The meeting began with general monitoring-related announcements:

- The third coast redwood forest science symposium will be held on June 20-23, 2011 at the University of California, Santa Cruz. A formal call for papers will be issued in July, 2010. The conference web site can be viewed at: <http://ucanr.org/sites/redwood>. This conference is jointly sponsored by the University of California, Cal Poly San Luis Obispo, and Humboldt State University.
- The NorCal Society of American Foresters (SAF) Summer Meeting will be held July 9-10 in Sonora (field session in Tuolumne County). The meeting title is "Restoring Working Forests." For more information, see: http://norcalsaf.org/temparticles/Summer_2010_meeting_flyer_FINAL_0526.pdf
- The California Forest Soils Council 2010 Field Tour/Technical Meeting will be held on August 13-14, 2010 in Humboldt County. See the following website for more information: http://www.humboldt.edu/~cfsc/cfsc_summer_2010.rtf
- The following new published paper by William Elliot, USFS-RMRS. is available: "Effects of Forest Biomass Use on Watershed Processes in the Western United States" (Western Journal of Applied Forestry, January 2010). For a pdf version, contact Pete Cafferata.
- The public review version of the National Marine Fisheries Service Central California Coast coho recovery plan is available at the following site: http://swr.nmfs.noaa.gov/recovery/Coho_Recovery_Plan_031810.htm
Comments on the plan must be received no later than July 6, 2010.
- The final version of the California Department of Water Resources Forest Resource Management Chapter, part of the 2009 DWR Water Plan Update, is available at: <http://www.waterplan.water.ca.gov/>. Several MSG participants contributed to this chapter.
- The Alluvial Fan Task Force (April 2010) report, which addresses future land use decisions on alluvial fans, is available. Tom Spittler, CGS, was part of this task force and contributed to this report. It is available at: http://aftf.csusb.edu/documents/IA_PUBLICcomment_WEB.pdf.
- The video "A Guide for Field Identification of Bankfull Stage in the Western United States" is posted at the following website: <http://www.stream.fs.fed.us/publications/videos.html#eastandwest>

- Richard Gienger announced that the 5th annual Spring-Run Chinook Symposium will be held in Chico on July 21-23, 2010, and that the 13th annual Coho Confab will be in the Russian River watershed on August 13-15, 2010. More information on both events is available at: <http://www.calsalmon.org/>
- Michael Wopat announced that Mark Lancaster, Five Counties Salmonid Conservation Program, will be holding road workshops on July 21st and July 22nd. For additional information, contact Mark at: mlancaster@trinitycounty.org.

Predicting Cumulative Watershed Effects in Small Forested Watersheds

Dr. Sam Litschert, Earth Systems Institute, provided a PowerPoint presentation on her recently completed Ph.D. dissertation titled "Predicting Cumulative Watershed Effects in Small Forested Watersheds." Both Sam's dissertation and PowerPoint are posted on the Monitoring Study Group's Archived Documents webpage at: http://www.bof.fire.ca.gov/board_committees/monitoring_study_group/msg_archived_documents/.

The presentation began with background information on cumulative watershed effects (CWEs), defined as the physical and ecological impacts that result from multiple land use disturbances over space and time. Dr. Litschert researched: (1) hydrologic CWEs (changes in timing and magnitude of flows), and (2) sedimentary CWEs (changes in erosion and deposition, degraded water quality, reservoir sedimentation, and changes in channel morphology). Causes of CWEs in forested watersheds include legacy and current timber harvesting, roads, and fire. Land managers are required to address CWEs by NEPA (federal) or state laws, such as CEQA in California, and past, present, and reasonably foreseeable future impacts must be considered in CWE assessments. Several legal challenges to land management decisions highlight three main issues with past CWE analyses: (1) they did not adequately account for disturbances over time, (2) models were not sufficiently evaluated with measured data, and (3) model assumptions were inadequately disclosed. To address these deficiencies, Dr. Litschert developed Delta-Q for hydrologic CWEs and FOREST (FOREst Erosion Simulation Tools) for sedimentary CWEs. In terms of algorithm complexity, these models are intermediate when compared to simple indices/checklists and process-based models such as DHSVM.

Delta-Q and FOREST are composed of a series of 13 models designed to calculate: (1) annual changes in relative and absolute 1st, 50th, and 99th percentile flows (determined from flow duration curves), and (2) annual sediment production, delivery and yield, respectively (see: <http://warnercnr.colostate.edu/~leemac/model.htm> to download the models). They allow resource specialists to predict changes in runoff and sediment yields due to forest harvest, roads, and fires for watersheds ranging in size from approximately 10 to 100 km². DELTA-Q and FOREST are PC based models that require an ESRI ArcGIS license to run. Both are spatially and temporally explicit, use readily available data, and are user-friendly models characterized by a sequential, menu-driven graphical user interface (GUI).

GIS layers used by these models include hydrography, roads, forest management history, fire history, soil texture, and elevation (DEM). Management-induced changes in peak flows, median flows, and low flows are estimated from published values. Background and management-induced erosion rates were obtained from a combination of literature values and field data collected in the Sierra Nevada. The predicted changes in runoff are summed

over the catchment being modeled, while the sediment model has procedures to deliver sediment from the hillslope to the stream network as a function of hillslope gradient, land cover, soils, and distance from the channel. Sediment is routed through the stream network as a function of stream gradient, drainage area, and particle size. Model outputs include GIS layers of hillslope and road sediment production and delivery to streams, and summary tables of annual changes in flow, sediment production, delivery, and sediment yields by watershed.

Model verification and testing were undertaken to ensure that the model programming was correct and that they function as intended. Verification work was done with data collected on the Eldorado National Forest and showed that changes in flow and sediment yields were dominated by areas burned in wildfires. Model runs showed repeatable and consistent results. Additionally, the following sites were selected to compare measured to modeled values: Caspar Creek, CA; H.J. Andrews, OR; and Mica Creek, ID. Evaluation of Delta-Q involved comparing predicted changes in the 1st, 50th, and 99th percentile flows to measured flows. The calculated changes in flows were more accurate for the 50th percentile than the 1st and 99th percentiles because Delta-Q predicts mean values, and the more extreme flows are more sensitive to fluctuations in annual precipitation. FOREST modeled suspended sediment yields were compared to measured annual suspended sediment yields at the North and South Forks of Caspar Creek. Modeled bedload yields were compared to annual yields from weir ponds at Caspar Creek. Predicted suspended and bedload sediment yields in FOREST usually fell within the range of measured values except at Caspar Creek during 1971-1973, when a splash dam failed and released large amounts of sediment. FOREST over-predicted suspended sediment yields on average because: (1) the background sediment production rate is too high, and (2) sediment delivery is too low from 3-10 yrs after harvest, since regrowth is efficient at filtering sediment.

Modeling conclusions for Delta-Q and FOREST include: (1) a reasonable first order estimate of CWEs is provided, (2) the models allow land managers to identify source areas for sediment on hillslopes and roads, (3) stream reaches that have the greatest risk for sedimentation can be predicted, (4) CWEs for different scenarios in the same watershed can be predicted (i.e., "gaming scenarios"), and (5) these models document and support management scenarios that minimize CWEs.

Dr. Litschert also completed field work to assess sediment delivery to stream channels from timber harvest units on the Lassen, Plumas, Tahoe, and Eldorado National Forests in the Sierra Nevada. The downslope edges of nearly 200 timber harvest units were traversed during the field study. Only 19 rills or sediment plumes were found that originated from harvest units rather than roads. Six of the 19 features were connected to streams. Five of the six features that extended through the streamside management zone to a stream channel were generated by runoff from skid trails. Harvest units ranged from 2 to 18 years old. General conclusions were that timber harvest alone was rarely found to initiate large amounts of surface erosion, and newer practices were found to be more effective in preventing erosion. In some cases post-harvest skid trail treatments are needed to reduce concentrated surface runoff and sediment delivery to streams.

This talk was completed with suggestions for future research. These included building sub-models for landslides, bed and bank erosion, and gully headcutting, as well as having a stochastic function for modeling impacts from very large storms and a timeline for road construction and maintenance.

Brief Update on NetMap Watershed Catalogue and Analysis Tools

Dr. Litschert rapidly updated the MSG on recent improvements in Earth Systems Institute's NetMap system (see the following website for a detailed MSG presentation on NetMap: http://www.bof.fire.ca.gov/board_committees/monitoring_study_group/meeting_minutes/2007_meeting_minutes/msgfebruary2007.pdf). NetMap is a community-based watershed science system comprised of uniform digital watershed (map) databases, analysis tools, and technical support materials. It contains approximately 70 functions/tools and 80 parameters and is designed to integrate with ESRI ArcMap 9.2/9.3. There is extensive NetMap catalogue coverage for in WA, OR, and CA (<http://www.netmaptools.org/coverage>). Roughly three million acres have been completed in northern California, including the upper Sacramento River basin, the Trinity River watershed, and parts of the North Coast. Watershed attributes and processes such as fluvial geomorphology, fish habitat, erosion, watershed disturbance, road networks, wildfire, hydrology, stream temperature, and large wood can be evaluated with NetMap. Two new tools have recently been added: (1) a thermal tool, and (2) wood tools. The thermal tool calculates incoming solar radiation and allows users to determine where the most thermally sensitive stream reaches are located, the types of buffers needed to protect against thermal loading, and variability in thermal loading. The wood tools allow users to model how wood loading changes under different forest conditions, the types of wood accumulations expected to form in different channel types, where the highest wood loading is expected, and where mass wasting is important as a source of large wood. Additional information on NetMap is available at: <http://www.netmaptools.org/>.

Research and Monitoring Recommendations by the Jackson Advisory Group

Mr. Mike Liquori, Sound Watershed Consulting, provided a PowerPoint presentation on research and monitoring recommendations by the Jackson Advisory Group (JAG). The Jackson Demonstration State Forest (JDSF) Management Plan was approved by the Board of Forestry and Fire Protection (BOF) in January 2008. The JAG, an independent advisory body, was appointed by the CAL FIRE Director in 2008 to provide advice/recommendations to the BOF and CAL FIRE regarding issues relevant to the review of the Management Plan for possible changes during the initial implementation period. The JAG has until January 2011 to recommend changes to the JDSF Management Plan. There are 13 JAG members and the group is chaired by Dr. John Helms, UC Berkeley Professor Emeritus.

The existing JDSF Management Plan has approximately 30 items listed related to research/demonstration and monitoring/adaptive management, with no clear listing of priorities or the research direction desired. The JAG is proposing to prioritize research and make JDSF a "world class" research center, similar to the H.J. Andrews Experimental Forest in the Oregon Cascades. To that end, there are four pending JAG recommendations: (1) having a research-oriented management framework, (2) creating centers of excellence, (3) defining the research scope, and (4) implementation, administration and governance to support this program. Details on these items follow.

Research-oriented management framework: The goal is to have regional perspective, with JDSF operating as the "hub" of the research. Additional goals include having a more collaborative effort with other coast redwood landowners; having research be largely independent of normal JDSF operations, building a mission-oriented focus for research, having an experimental basis for management, building a comprehensive monitoring and adaptive management framework, and demonstrating research/monitoring protocols.

Centers of Excellence: The focus is to be on three main areas: (1) coho salmon recovery, (2) upland terrestrial habitat and forest structural relationships, and (3) sustainable management practices.

Defining the Research Scope: The goal is to have a research-oriented landscape allocation. While one vision being discussed by the JAG calls for expanded late seral and old-growth development areas, expanded reserves, and additional silvicultural constraints, a technical basis for landscape allocation is desired.

Implementation, Administration and Governance: To implement these concepts, the vision is to collaborate with cooperating entities where possible, including the MSG, the newly forming BOF Research and Science Committee (RSC), and other existing entities. Permanent staff or contractors are to provide guidance for these endeavors.

Mr. Liquori stated that there is general agreement on these four pillars of the research and monitoring program, but disagreement on some of the details. Considerable funding for research is anticipated to be available in the near future when the timber harvesting program is fully implemented again, and third party funding may also be available if the “compelling research vision(s)” are sufficiently developed.

Explicit Riparian Design

Mr. Liquori presented a second PowerPoint presentation on explicit riparian design (ERD), also known as spatially explicit riparian management (SERM). A team of scientists composed of Mr. Liquori (PI), Dr. Doug Martin (co-PI), Dr. Ken Cummins, and Dr. Kevin O’Hara has been awarded a USFS Small Business Innovation Grant (Phase 1—Feasibility) to work on explicit riparian design. Dr. Chuck Curtis and Dr. Dick Miller have also volunteered their participation on the team. The Phase 1 (feasibility) grant is for \$90,000; the team will also apply for a Phase 2—Implementation Phase grant for \$300,000 in December 2010 or December 2011. The basic problem statement is “how can we develop a riparian design process that varies the importance of various riparian functions based on site conditions.” The process recognizes that “one-size-fits-all” riparian management is often not a good ecological strategy, and that it is better to use site conditions for designing riparian prescriptions. The goal is to move beyond a passive or protective management perspective to an “ecosystem processes” approach. To that end, Mr. Liquori’s team will be building a rigorously developed, scientifically justified rational design process to protect, maintain, restore, or enhance riparian functions.

Mr. Liquori’s team will develop site-specific decision making tools that will limit the potential for misuse. The basic design elements will include: (1) evaluation and diagnosis of existing conditions, (2) projection of likely future conditions and trends under existing and alternative treatments, (3) comparison of trends across key functional areas (e.g., wood supply, thermal regulation), (4) implementation of recommended designs, and (5) programmatic adaptive management. These design elements will be the main focus of the team for the next two years. Tools will initially be developed for the site level and be expanded to the watershed scale over time. While models may be used, the goal is to develop tools that can easily be applied on the ground. Potential analytical tools for evaluating wood supply, thermal loading, and erosion control were briefly described. The plan for Phase 1 is to: (1) develop an organizational framework, (2) seek additional insight from the literature and the professional community, (3) develop a “strawman” document describing a preliminary ERD conceptual approach, (4) identify the key opportunities and constraints, and (5) determine the technical and regulatory feasibility for use in California and Washington. If Phase 2 is funded, the team

plans to further develop the ERD methodology by testing the analytical procedures, collaborating with key stakeholders, and implementing 3-5 pilot tests.

Development of Riparian Management Pilot Projects Required by the ASP Rules

Pete Cafferata briefly summarized two documents that CAL FIRE staff have produced related to the formation of a Anadromous Salmonid Protection (ASP) Rule Section V Pilot Projects Technical Advisory Committee (VTAC). The VTAC will act as a technical advisory committee for the development of at least two pilot projects that use site-specific information and measures to protect and restore the beneficial functions of the riparian zone in watersheds with listed anadromous salmonids. The primary tasks for the group, as described in the VTAC Charter, are to: (1) provide recommendations for the development and completion of at least one coast and one inland pilot project, (2) process facilitation development, (3) development of a workable context assessment process, including planning watershed assessment and cumulative watershed effects assessment as appropriate, and (4) development of a general guideline document that will allow broad application of the site-specific approach for riparian zone management. The VTAC Charter and Request for Applicants are posted on the BOF website under "Hot Topics" (see: <http://www.bof.fire.ca.gov/>). **Resource professionals interested in applying for the VTAC should send in their applications by July 15th to CAL FIRE.** Crawford Tuttle stated that CAL FIRE Director Del Walters is encouraged that a group is being formed that will be able to begin comprehensive work on the pilot projects.

Update on the Formation of a New BOF MSG Effectiveness Monitoring Committee

George Gentry informed the group that CAL FIRE staff has produced a three page information document describing the rationale for forming an Effectiveness Monitoring Committee (EMC). This document was distributed to the MSG. He stated that while we will continue to work on forming the EMC, the first priority will be to form the VTAC, since there is a mandated deadline in the Forest Practice Rules for the ASP rule section V pilot projects. The VTAC could possibly evolve into the EMC. **Mr. Gentry stated that he intends to convene meetings with several caucus groups this summer to determine their interest in participating in the EMC.**

Introduction to the California Water Quality Monitoring Council

Clay Brandow provided a brief summary and handout on the California Water Quality Monitoring Council (Monitoring Council). In November 2007, an MOU was signed by the Secretaries of Cal/EPA and the California Natural Resources Agency to establish the Monitoring Council. The MOU was mandated by Senate Bill 1070 and requires the boards, departments and offices within Cal/EPA and the Natural Resources Agency to integrate and coordinate their water quality and related ecosystem monitoring, assessment, and reporting. To increase public accessibility to monitoring data and assessment information, the Monitoring Council has a website denoted as "My Water Quality" that is organized into portals, each labeled with a unifying water quality-related question (e.g., Are Our Aquatic Ecosystems Healthy?) (see: <http://www.swrcb.ca.gov/mywaterquality/>). "Portal partners" will be or are supplying data to answer the specific portal questions. **Mr. Brandow stated that the MSG may want to volunteer to be a portal partner for the question relating to aquatic ecosystem health, and that the BOF may want to participate as a full member on the Monitoring Council or as an alternate member for the Natural Resources**

Agency. Also, it was suggested that an existing member of the Monitoring Council give a presentation to the MSG at a future meeting. At a minimum, the Monitoring Council should be aware of the MSG and its purpose/activities. More detailed information on the Council is available at:

http://www.waterboards.ca.gov/water_issues/programs/monitoring_council/index.shtml.

Next Monitoring Study Group Meeting Date

The next MSG meeting date was tentatively set for **September 15th** in either Willits or Willows. When a definite date, venue, and agenda are available, this information will be emailed to the MSG contact list.