

Monitoring Study Group Meeting Minutes

February 13, 2007

CAL FIRE Shasta-Trinity Unit Headquarters, Redding

The following people attended the MSG meeting: George Gentry (BOF—acting chair), John Munn (CAL FIRE), Allyson Shaidnagle (CTM), Richard Gienger (HWC/SSRC), Dr. Michael Wopat (CGS), Dave Hope (NCRWQCB), Jason Smith (USFS), Dr. Dawn McGuire (DFG), Shane Cunningham (CAL FIRE), Curt Babcock (DFG), Duane Shintaku (CAL FIRE), Dennis Hall (CAL FIRE), Clay Brandow (CAL FIRE), Drew Coe (CVRWQCB), Guy Chetelet (CVRWQCB), Debra Hallis (CVRWQCB), Heidi Hall (SWRCB), Melenee Emanuel (SWRCB), Matthew Boone (CVRWQCB), Angela Wilson (CVRWQCB), Stacy Stanish (DFG), Anthony Lukacic (CAL FIRE), Joe Croteau (DFG), Dr. Lee Benda (Earth Systems Institute), and Pete Cafferata (CAL FIRE). **[Note: action items are shown in bold print].**

We began the meeting with general monitoring-related announcements:

- Pete Cafferata announced that the American Institute of Hydrology (AIH) will hold its annual meeting titled “Integrated Watershed Management: Partnerships in Science, Technology, and Planning” on April 22-25, 2007 in Reno, Nevada. For more information, see: <http://www.aihydro.org/>
- CLFA’s Spring Workshop titled “California Law and Forestry II” will be held on March 1, 2007 at the Sacramento Hilton. The CLFA annual meeting is on March 2nd and 3rd and titled “Taking Forest Management into the Future: Forest Management Strategies in California.” For more information, see: <http://www.clfa.org/workshops.htm>
- Richard Gienger reported that the 25th Annual Salmonid Restoration Conference will be held in Santa Rosa on March 7-10, 2007 (see: <http://www.calsalmon.org/>).
- Michael Wopat announced that the Western Forestry and Conservation Association (WFCA) will hold a workshop titled “Forest Road Surfacing: Basic Design Principles and Applied Practices” on March 5-6, 2007 in Canyonville, Oregon. For more information, see: http://www.westernforestry.org/roadsurfacing/forest_roads_final.pdf
- The final version of the BOF-approved MSG revised Strategic Plan is now posted on the MSG website at: http://www.bof.fire.ca.gov/board/msg_strplan.asp.
- Angela Wilson announced that the BOF’s Road Rules Committee has two more meetings scheduled, with the hope of taking a package to the BOF at their March meeting.
- Pete Cafferata informed the group that the data for the study to compare turbidity values from different turbidimeters by the USFS-PSW (Jack Lewis), RNSP (Randy Klein), and Rivermetrics, Inc., (Rand Eads) has been collected in Arcata. Instruments tested include YSI Environmental Sondes, FTS DTS-12s and D&A Instruments OBS-3 units. The study team is awaiting additional funding to complete the final report.
- Pete Cafferata announced that the four Review Team agencies will again be presenting interagency training workshops this spring. The purpose is to facilitate better working relationships among the agencies and to develop common understandings related to specific issues. The initial training topic will continue to be watercourse crossings and a workshop schedule will be established shortly. The main audience is Review Team agency field staff involved in plan review.
- Jack Lewis, USFS-PSW, informed Pete Cafferata that the following updated document is available from the USGS: “Guidelines and Standard Procedures for Continuous Water-Quality Monitors: Station Operation, Record Computation, and Data Reporting” (Techniques and Methods 1-D3). It is available on the web at: <http://pubs.usgs.gov/tm/2006/tm1D3/>.

NetMap Watershed Catalogue and Software Tools

Dr. Lee Benda provided the MSG with a PowerPoint presentation on the Earth Systems Institute's (ESI) NetMap Watershed Catalogue and software tools, as well as an ArcView interactive session illustrating several aspects of system. A detailed NetMap brochure, Forest Science journal article (in press), map of existing coverage in California, Oregon, and Washington, and PowerPoint presentations are available on ESI's webpage

(<http://www.earthsystems.net/>). Presently, there is NetMap catalogue coverage for over 30 million acres in these three states. Approximately 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 (see figure at right).



Work on the project began four years ago, with the goal of producing user-friendly software tools for monitoring and research, forestry applications, fish habitat management, watershed restoration, and wildfire planning. Essentially, NetMap is a digital information and communication tool covering watershed environments; some have referred to such systems as "desktop watershed analysis." ESI believes that NetMap is 10 to 100 times as powerful as conventional watershed analysis and it costs between 10 and 100 times less.

NetMap consists of a watershed catalogue containing base terrain parameters and a set of analysis tools that are used to create additional parameters addressing the types, abundance, and spatial distribution of aquatic habitats, degree of habitat diversity and disturbance potential, sources of erosion and sedimentation, and sensitivity to land uses. In essence, it is a tool to complete state-of-the-art watershed analyses for basins of multiple scales. A reasonable scale of analysis, given the computing requirements of NetMap's tool kit, is approximately 240,000 acres, an area that is further subdivided into Hydrologic Unit Code (HUC) subbasins of 6th to 7th fields (12,000 to 24,000 acres), or into user-defined subbasin polygons. Analyses can be extended to larger scales if necessary. The hillslope scale of resolution is 100 m (based on a 10-m digital elevation model or DEM) and the channel network is divided into segments of between 20 and 200 m.

Data used in NetMap include: DEMs (10-m or LIDAR¹ if available), PRISM climate information, vegetation layers, channel heads, roads, fish distribution, USGS river flow information, landslide information, sediment budget/wood budget information, geology, plus numerical models. The base parameters are created using digital data in conjunction with existing software and published studies on relationships between watershed attributes and aquatic environments. Altogether, there are 25 base parameter layers. Using NetMap ArcGIS tools, it is possible to generate 30 derivative parameters. The four general categories for NetMap "tools and maps" are: (1) erosion types/distribution/ delivery/ significance; (2) aquatic habitat types/quality/distribution; (3) other channel parameters, and (4) management relationships.

The subcategories under erosion include generic erosion potential, shallow landslide, debris flow, gully erosion, and deep-seated landslides. The subcategories under aquatic habitat are fish distribution, habitat intrinsic potential, biological hotspots, and habitat core

¹LIDAR (LIght Detection And Ranging) is an optical remote sensing technology used to collect very high quality topographic data.

areas. Subcategories under channel parameters include channel classification, channel disturbance potential, channel confinement, hillslope—channel connectivity, and tributary—mainstem connectivity. Management relationship subcategories are road/erosion/fire density, basin erosion and sedimentation, overlap of road and erosion potential, overlap of hillslope and channel conditions, and mass budget (large wood, sediment, thermal) gaming.² Lee explained that hillslope attributes such as erosion, sediment, and road density can be aggregated down to the channel scale (20-200 m). In contrast, watershed attributes can be aggregated up to subbasin scales, allowing comparative analyses to be made across landscapes and millions of acres.

Examples of specific tasks that NetMap can accomplish include: (1) locating hillslope areas with the highest erosion and sediment delivery potentials, so that higher-level forest management practices can be prescribed, (2) selecting appropriate stream monitoring sites, (3) locating sensitive or high risk stream crossings, (4) locating the best aquatic habitats within single watersheds or across several watersheds for adding appropriate protection measures, (5) locating the best sites for engineered instream habitat restoration projects, and (6) locating post-fire burn areas with high erosion potential.

Lee provided interactive ArcView examples of how the NetMap system can be used to predict shallow landsliding potential, as well as display fish distribution and channel confinement categories. He noted that while planning watersheds (typically 5,000 to 10,000 acres) often have road densities ranging from 4 to 7 mi/mi², very small headwater basins have road densities that range from 0 to 50 mi/mi², which can be easily displayed with NetMap tools. He illustrated to the group how hillslope erosion rates are extremely variable across a watershed (at least an order of magnitude), and how NetMap can locate the areas with the highest rates. In one example, Lee showed that in the Mattole River basin where the average erosion rate is 4,000 t km⁻² yr⁻¹, erosion rates at the scale of 100-m channel segments vary from 500 to greater than 20,000 t km⁻² yr⁻¹. He illustrated that it is easy to display stream reaches in watersheds that have specific combinations of habitat forming characteristics, including channel gradient, valley confinement, flow, woody debris accumulation types, and confluence effects, thereby rapidly mapping where higher value fish habitat for key salmonid species is located (i.e., hot and cold areas for different fish species). Forestry applications with NetMap generally relate to timber harvesting, riparian management, and roads. On timbered hillslopes, Lee showed how shallow landslide potential is extremely variable from one small basin to the next. He stated that the objective is to isolate the high risk areas and prescribe appropriate treatments to reduce erosion potential.

Although everyone recognizes that there is great spatial variability within a single watershed or across a landscape, the absence of analysis tools that explicitly define variability encourages “one size fits all” regulatory perspectives and management practices. This has generally been the case with respect to fish bearing channels, even though habitat conditions (or wood recruitment processes) vary dramatically along the fish bearing network. A similar perspective along non-fish headwater streams (that can

² “Gaming” assesses the watershed-scale implications of various land management practices and provides results in terms of altered risk to resources. This term was described in detail in the 2001 UC Report titled “A Scientific Basis for the Prediction of Cumulative Watershed Effects.”

encompass up to 80% of the channel network) is currently at the center of a debate about resource management and regulations in the state and private forest industry. Tools, such as NetMap, that can identify spatial variability in headwaters, as well as the rest of the fish bearing network, offers the potential for increasing the diversity of forest management, regulatory, monitoring, and restoration options.

Dr. Benda stated that while a licensing agreement is necessary to use NetMap, the non-proprietary base layers and software will soon be available; refer to access information on ESI's website under "NetMap". The plan is for Humboldt State University to host a website for the base parameter layers and it is hoped that this system will be online within one year. A detailed (400 page) hyperlinked user's manual and parameter library is available in the software. ArcMap 9.1 or 9.2 is necessary to run the system. To date, funding for NetMap coverage in the Pacific Northwest and California has come from NOAA Fisheries, the Oregon Department of Forestry, BLM, USFS-PSW, and private timber companies, including Campbell Timberland Management and PALCO. Currently, NetMap is being used in support of the TMDL analysis in the Mad River in northern California.

Level 1 NetMap analysis has primarily been completed for public agencies, and includes development of the base parameter layers and integration with NetMap tools. The cost of this work by ESI is scale-dependent, ranging from approximately \$0.15/acre for 100,000 acres to \$0.02/acre for 10,000,000 acres. These costs are generally 10 to 100 times less than conventional basin studies completed in the past. Work at this level is a screening tool that could be enhanced by a Level 2 analysis. Level 2 analysis has mainly been undertaken for the private sector, and includes the work done for Level 1, field validation of channel/habitat predictions, calibration of erosion parameters with empirical data, execution of all models/tools, construction of mass budgets, and a training seminar. Again the cost is scale dependent, at \$0.35/acre for 100,000 acres and \$0.15/acre for 1,000,000 acres. It is important to note that the area covered includes contiguous watershed boundaries, so the area is generally several times greater than the specific ownership or administrative area.

In addition to the ESI website, additional information on NetMap is available by contacting Dr. Benda at leebenda@earthsystems.net or (530) 926-1066.

Interagency Mitigation Monitoring Program Presentation

Following lunch, Pete Cafferata provided a short PowerPoint presentation summarizing Interagency Mitigation Monitoring Program (IMMP) work completed to date. Briefly, the IMMP has been developed by an MSG IMMP Subcommittee composed of 20 individuals from the resource agencies, timber industry, and the public, beginning in the spring of 2005. The main goals of the IMMP are to: (1) collect water quality-related monitoring data primarily on higher risk watercourse crossing sites within THPs and NTMPs, and (2) more broadly, to develop a process to reach agreement with an interagency team that can be applied to other forestry-related topics. A pilot IMMP project is being used to test the proposed methodology and make needed refinements prior to implementing the full scale program. The pilot is focusing on watercourse crossings and the road segments that drain to crossings, since past monitoring work has shown that these are particularly high risk sites for sediment delivery to stream channels.

The IMMP pilot project work is being conducted by two IMMP teams, with one team working in the Coast Forest Practice District headquartered in Santa Rosa and the other in the Northern Forest Practice District, working out of Redding. The IMMP teams are composed of one representative from each of the following state agencies: CAL FIRE, DFG, CGS, and RWQCBs. The team approach is being used to provide a balance of interests for all the Review Team agencies and greater public confidence in the monitoring results. A primary objective of the IMMP pilot is to provide a forum that allows interagency team members to cooperate and promote information sharing. The IMMP pilot project began in July 2006 and will extend through 2007.

Field work in the pilot has used performance-based effectiveness evaluations of forestry practices applied at or near pre-determined crossing sites on THPs and NTMPs that are thought to pose a particularly high risk to water quality. A limited number of lower risk crossings within sampled plans have also been evaluated. Most of these crossings have been through at least one winter period following installation/upgrading/abandonment of crossings and installation of road drainage structures, but are still within the Erosion Control Maintenance Period. Monitoring protocols include a mixture of qualitative and simple quantitative methods, including use of a BMP monitoring protocol developed in the eastern part of the United States by the USFS. Combined, the Coast and Inland Teams entered monitoring data in pocket PC units for 47 crossings last summer and fall. Limited data analysis has occurred to date.

Both the Coast and Inland Teams have reached similar conclusions regarding the first phase of the pilot project: (1) the USFS BMP Protocol has deficiencies for use in California that need to be corrected prior to further use, (2) even when the FPRs are followed or exceeded, there are usually trace amounts ($< 1 \text{ yd}^3$) of sediment delivered at crossings, and (3) improper installation of crossings and drainage structures near crossings is usually the major cause of documented problems. Team members have stated that the IMMP pilot has served as an excellent tool for interagency relationship and consensus building. Good discussions have been held at the crossing sites and team members have been able to reach consensus about the extent and cause of observed problems by working through the pilot protocols. **Currently, Coast and Inland Team members are revising the field protocols. This will include developing paper forms to replace the handheld computers and a database to facilitate data entry and subsequent analysis. Following IMMP Subcommittee agreement on the revisions to the protocols (keeping the general format but altering the questions), the revised system will be field tested in the second phase of the IMMP pilot project this spring, summer and fall.**

Following this introduction, Shane Cunningham, with assistance from Angela Wilson and Joe Croteau of the Inland Team, displayed Excel Spreadsheets with photo logs for approximately 10 crossings and crossing approaches evaluated in the first phase of the pilot project. These sites included abandoned crossings, upgraded culverts, bridges, rocked fords, and abandoned crossings. Shane, Angela and Joe explained what was done correctly and incorrectly for each site. Following their presentation, Anthony Lukacic, with assistance from Dave Hope, summarized the work completed by the Coast Team for the first phase of the pilot. They collected field data from 9 plans in Sonoma, Mendocino, and Humboldt Counties in July, August and September. A total of 29 crossings were evaluated, including culverts, bridges, fords and abandoned crossings. Approximately 27

of the 29 crossings were pre-identified high risk crossings. All the major timberland owners were represented (CTM, MRC, PALCO, an GDRCO).

CVRWQCB Waiver Monitoring Protocol Guidebook

Drew Coe, CVRWQCB, gave a short presentation on a waiver monitoring protocol guidebook he recently developed. The document is posted on the CVRWQCB website at: <http://www.swrcb.ca.gov/rwqcb5/programs/timberharvest/guidelines-rqrd-wvr-mntrng.pdf>. The protocols are primarily qualitative and require the landowner to determine if the FPRs and THP recommendations have been implemented correctly and are effective. They are written for plans enrolled in the waiver program and mainly designed for small landowners. **Drew stated that revisions to the guidelines document are possible and that suggestions for improvements should be emailed to him at: DBRCoe@waterboards.ca.gov.**

Gienger “Monitoring and Tracking by Plan Proponents” Proposed Rule Language

Richard Gienger and Pete Cafferata introduced this agenda item by summarizing work that has taken place since May 2006 on the Gienger monitoring and tracking by plan proponents proposal. Pete provided the group with an updated Word document describing monitoring work already being done by the state and federal agencies, industry, universities, watershed groups, and RCDs, with some revisions based on a review by BOF member Jim Ostrowski. Pete also handed out a single page Excel spreadsheet that summarized the existing monitoring work under column headings of permit requirements/agency programs/voluntary/research (also as suggested by Member Ostrowski). At the last MSG meeting, Stephen Levesque, CTM, stated that agency monitoring needs to be coordinated, with feedback on results provided to the public, landowners, and agencies. Tom Spittler, CGS, suggested that an MSG Subcommittee be established to determine the types of monitoring that are most effective based on past experiences. George Gentry, BOF, asked that a 3 paragraph description of these ideas be produced for further discussion. Tom, Stephen and Pete produced the short file and it was handed out at this meeting. Richard Gienger then summarized the reasons why he made this rule change proposal last year, including CEQA requirements and the coho recovery strategy process.

Following this introduction to the topic, Richard Gienger stressed that it is imperative to form the MSG Subcommittee and begin to address the 3 issues listed in the 3 paragraphs described above. These are: (1) review and improve the draft list of monitoring activities that are occurring on private timberlands, (2) evaluate the effectiveness of each approach in providing information on impacts to the beneficial uses of water associated with timber harvesting operations—especially impact to listed anadromous fish species, and (3) evaluate the costs and benefits of the various monitoring approaches to aid the BOF, timberland owners, regulatory agencies, and the public in selecting adequate, cost effective monitoring approaches that will help ensure the protection and recovery of listed species. **George Gentry stated that he will have the BOF Forest Policy Committee review the 3 paragraph document at their March meeting, prior to forming the MSG Subcommittee to work on this issue.**

BOF Technical Advisory Committee (TAC) Literature Review on Riparian Functions

Pete Cafferata presented a brief PowerPoint presentation on the BOF TAC work completed to date. The TAC was formed in September 2006 to oversee a scientific literature review of studies pertinent to riparian buffers and functions in support of the Threatened or Impaired Watersheds Rule Package. This committee is composed of 12 members (7 from universities, consulting, and industry and 5 from federal and state agencies). The main TAC tasks include: reviewing and editing a Scope of Work (SOW) prior to the Board's commissioning of a literature review contractor, ensuring the contractor's literature review is progressing in the appropriate time frame, ensuring the contractor's literature review is delivering useable products that meet the SOW, communicating progress and quality of accomplishments periodically to the BOF, and ensuring that contractor performance of the summary and synthesis of the literature review is completed appropriately.

During discussions at TAC meetings, the committee determined that there are five main riparian functions that can be influenced by timber operations and decided to form five TAC Subcommittees to refine SOW elements for each function. The TAC subcommittees are: wood, heat/microclimate, sediment, biotic/nutrients, and water. Due to limited funding (\$50K), the main approach being used by the TAC Subcommittees consists of: (1) developing a basic "primer" stating what is widely accepted by the scientific community regarding that riparian function, including the references in the literature supporting included statements; (2) developing a list of key remaining questions that the contractor will be focusing on in the literature review for that riparian function; and (3) developing a list of suggested references that the contractor will be responsible for reviewing (primarily literature published in the past decade).

The BOF anticipates approving the SOW at their March 7-8, 2007 meeting. The CAL FIRE Contracting Office is to solicit the contract by May 1st, with the contract to be awarded by June 1st. We expect the contractor to complete the project by August 1st, with a presentation on the contract work to the BOF on August 7th. We anticipate a Technical Expert Forum to begin by September 1st and to have BOF policy and regulatory deliberations start by September 7th.

Next MSG Meeting

The next MSG meeting date was set for April 10th in the Willits area. When an exact location is available, it will be emailed to the group along with the meeting agenda.