Monitoring Study Group Meeting Minutes

February 11, 2003
Howard Forest

The following people attended the MSG meeting: Tharon O'Dell (BOF-chair), John Munn (CDF), Dr. Jerry Ahlstrom (CDF), Tom Spittler (CGS), Chris Keithley (CDF-FRAP), Mark Rentz (CFA), Syd Brown (CDPR), Richard Gienger (HWC/SSRC), Bernie Bush (SRCO), Peter Ribar (Campbell Timberland Management), John Siperek (DFG), Trinda Bedrossian (CGS), Brad Valentine (DFG), Dr. Matt O'Connor (O'Connor Environmental), Joe Croteau (DFG), Ted Oldenburg (Hoopa Tribal Forestry), Dr. Rich Walker (CDF-FRAP), Robert Darby (PALCO), Dr. Kate Sullivan (PALCO), Charlotte Ambrose (NMFS), Patrick Vaughan (CDPR), Tim Robards (CDF), Clay Brandow (CDF), Sandra Brown (NRM), Tom Suk (Lahontan RWQCB), Roger Poff (R.J. Poff and Associates), Tom Shorey (FGS), Sam Flanagan (NMFS), Matthew Buffleben (NCRWQCB), Adona White (NCRWQCB), Matthew House (SRCO), Dean Lucke (CDF), Brenda Rosser (O'Connor Environmental), Dr. Marty Berbach (DFG), Julie Bawcom (CGS), Liz Keppeler (USFS-PSW), Dr. Richard Harris (UCCE), and Pete Cafferata (CDF). **[Note: action items are shown in bold print]**.

We began the meeting with general monitoring related announcements:

- Pete Cafferata and Peter Ribar announced the CLFA Spring *Watercourse Crossings Workshop* is scheduled for March 6, 2003 in Sacramento. There are no remaining spaces for this session, but a second workshop is now planned in Redding for May 16th. The contact for further information is Hazel Jackson, CLFA, clfa@volcano.net or (209) 293-7323. Also, information is available at CLFA's website: http://www.clfa.org/workshops.htm

- John Munn announced that the California Forest Soils Council Winter meeting was held on February 21st in Sacramento. The title of the meeting was "*Management vs. Wildfire and Their Impacts on Soil*." (see http://www.humboldt.edu/~cfsc)

- Richard Harris announced that a two day conference titled "*California's North Coast Riparian Forests—The Link Between Wood and Fish*" is scheduled for May 2nd and 3rd. The first day will be at the Mendocino Community College in Ukiah, while the second day will be a field trip to Jackson Demonstration State Forest and Gualala Redwoods Co. watersheds. This conference is focused on measurement, monitoring, and management of large wood in North Coast stream systems. The first day will consist of four sessions: 1) keynote/overview of issues, 2) field measurement and monitoring of wood in streams, 3) management of wood in streams (retention, placement, riparian zone management), and 4) regulatory and cost-sharing incentives for managing wood in streams. For further information, including a registration packet, contact Sherry Cooper, UCCE, shcooper@ucdavis.edu or (530) 224-4902. Information is also available online at: http://danr.ucop.edu/ihrmp/nrn.html

- Richard Harris announced that there will be a "*Monitoring Road Restoration Field Day*" at Hopland Field Station on February 26th, and a second field day on March 5th. Participants will see major road improvement project work, as well as the effectiveness monitoring program in place. The contact is Sherry Cooper, UCCE, shcooper @ucdavis.edu or (530) 224-4902.

Richard Harris followed his announcement regarding the Hopland Field Days with a short Power Point presentation on the Hopland monitoring work titled " Monitoring Effectiveness of Upland Restoration at the Watershed Scale: A Pilot Study to Develop Methodology." A description of the pilot study is included as part of the large project UCCE is completing for DFG on monitoring fish habitat restoration projects. A draft manual for the contract dated November 2002 is currently in peer review, and is scheduled for release at the Salmonid Restoration Federation 21st Annual Conference, March 26-29, 2003, San Luis Opispo. (see http://www.northcoastweb.com/srf/conference.html). The Hopland project is a collaborative effort with UC-Berkeley, Forestry Center; DFG; UC Hopland Research and Extension Center; and Pacific Watershed Associates (PWA). The goal of the work is to create sampling strategies and field methods to monitor erosion control effectiveness at the watershed scale. The field site is a small tributary to Parsons Creek, which enters the Russian River. Vegetation is composed of montane hardwood, chaparral, and oak-grass savanna, and streamflow is intermittent in the summer. Existing ranch roads have numerous legacy problems and high erosion rates. Restoration actions being implemented to reduce erosion include outsloping with rolling dips, ditch relief culverts, culvert upgrades, gully dewatering, and revegetation of road cut and fill slopes.

Effectiveness of the road restoration efforts is being determined by measuring the difference in stream and ditch fine sediment load before and after road treatments. Grab samples are used to measure total suspended solids (TSS); discharge is measured in culverts and in simple weirs in ditches. There are 11 instream sampling locations, as well as sampling stations above and below 5 culverts. The field team is attempting to sample 5 storms of varying intensities between December 2002 and February 2003. Other data being collected includes: 1) the amount of hydrologically connected road, 2) amount of contributing watershed area to road reaches or culverts, and 3) non-management related sediment sources. Additionally, gully restoration effectiveness is determined by documenting changes in gully dimensions over time, and longitudinal profiles are used to monitor stream channel morphology above and below new culverts. Richard emphasized that this work is a pilot project to develop practical methodologies, and is not a scientific study.

The next agenda item was a presentation by Dr. Matt O'Connor, O'Connor Environmental, on sediment budget work completed for the Freshwater Creek watershed, Humboldt County. Matt stressed that this work was the product of many companies and individuals, including O'Connor Environmental, PWA, Kathy Dube, Terry Rollerson, Ed Salminen, Thomas Dunkin, Tom Koler, Dominy Glass, Karen Kuzis, and others. This project was completed as part of the PALCO HCP watershed analysis requirement, based on the Washington DNR approach. Information for the sediment budget came from several of the modules, including mass wasting, surface erosion, hydrology, and stream channels. Most of the field work was completed in 1999/2000. This analysis builds on the previous work undertaken by PWA for the Freshwater Creek basin. Matt provided the MSG with a Power Point presentation and a handout with several of the tables from the Freshwater Creek Watershed Analysis (draft 2001) [CDs are available from Matt or PALCO—the document in not available online at this time].

An in-depth discussion followed regarding sediment sources and methods used to document them, including soil creep, bank erosion and small streamside landslides, deep seated landslides, shallow landslides in harvest units, surface erosion in harvest units, erosion of tractor filled channels, erosion of low order valley fill, shallow landslides related to roads, road surface erosion, and gullies/culvert fill failures. Matt stressed that all items have substantial uncertainty, and that this was more of an applied approach than pure scientific research. A summary of grain size and bulk density data was provided which indicated that, in general, silt and clay sized fractions are high, while sand and gravel fractions are low. In the presentation, sediment inputs for the various sub-basins in Freshwater Creek were

compared for two time periods: 1942-1997 and 1988-1997; a more extensive set of time comparisons was developed in the analysis. Most of the sub-basins were similar for both time periods, with the exceptions being Graham Gulch and Little Freshwater—which were both higher in the more recent period. Graham Gulch has a very large deep seated landslide feature present and Little Freshwater has had numerous smaller landslide features during the 1988-1997 time period, where inputs were elevated relative to long-term averages. First cycle logging was estimated to have had a minimum total sediment input of approximately 600 tons/mi^2/yr based solely upon gully-like erosion in the upper portions of the channel network, with an assumed 40-year time interval. Total sediment inputs for the periods from 1942-1954, 1955-1966,1967-1974, 1975-1987, 1988-1997, and 1998-2000 were estimated to range from about 300 to 600 tons/mi^2/yr. The largest components of total sediment inputs from 1988 to 1997 were road surface erosion, background, and shallow landslides (road-related). It is important to note that road surface erosion rates are modeled with SEDMODL, and were not measured in the field. Overall, for 1988-1997, management related sediment was 56% of the total, background was 26%, and indeterminate (shallow landslides (non-road related) and deep seated landslides) was 18%. Landslide rates from different forest stand types for the 10-yr period from 1988 to 1997 were displayed, with recent clearcuts having a rate of 0.007/ac/10 yrs, while thinned second growth was 0.002, and second growth (40-60 yrs old) was 0.003. Therefore, approximately 60% of these features were attributed to management and 40% to background conditions.

Total sediment inputs from 1988-1997 is dominated by road surface erosion. Most of the roads in the Freshwater Creek basin are native-surfaced, and Matt noted that the magnitude of road surface erosion was unexpected based on prior watershed analysis projects. The percentage of sediment inputs for 1988-1997 was recast for the synthesis process focused on management prescriptions, which resulted in attributing portions of the management related sources to legacy effects and the apportionment of 40% of non-road related shallow landslides to background inputs. In this scenario, input from management was 57%, background 36%, and legacy impacts 7%. Estimates of sediment inputs were then compared to those measured at the Salmon-Forever gaging site (http://salmon-forever.org). The range of data for that site has been between approximately 350 and 470 tons/mi^2/yr (annualized rates based on measurements for half of the water year 1999 winter and all of the 2000 winter). The sediment budget estimate for the combined sub-watersheds contributing to the Salmon-Forever gage site (drainage area = 13 mi^2) is about 460 tons/mi^2/yr for 1988 to 1997 and about 340 tons/mi^2/yr for 1998 to 2000 (this latter estimate is derived from the surface erosion models only). Matt stated that the fact that these numbers are in such close agreement is surprising, but that the degree of agreement suggests that the magnitudes of the largest sediment inputs may be reasonable.

Dr. O'Connor also presented a graph showing modeled bedload sediment transport capacity over time for sub-basins and various mainstem reaches, based on the record of peak runoff events at Little River, about 20 miles to the north. The estimated mean annual bedload transport yield modeled for all the Freshwater stations is 128 tons/mi^2/yr. Research conducted in the nearby Jacoby Creek watershed by the USFS-PSW has produced an estimate of 120 tons/mi^2/yr, so this estimate for Freshwater seems reasonable. Residence times for stored bedload sediment was estimated to range from about 20 to 50 years in the lower reaches, with an average movement rate of approximately 300 feet/year. A review by NCASI (1999) reported that the mean sediment velocity for pebbles and cobbles in mountain streams is 330 feet/year, so again, this estimate appears plausible.

Kate Sullivan commented that SEDMODL results for road surface erosion estimates are really the starting point for hypothesis testing—monitoring results can tell us if this is indeed a reasonable approach for estimating road surface erosion and validate the types of numbers generated in this sediment budget work.

Following lunch, Julie Bawcom of CGS gave a Power Point presentation titled "Landslide Inventory and Even-Aged Management." This study was conducted on Jackson Demonstration State Forest (JDSF) in the Coast Range of western Mendocino County. Julie began by providing some background information on JDSF (48,562 acres, mostly second-growth redwood/Douglas-fir, average annual harvest rate of about 29 million board feet, over 300 miles of maintained roads, etc.). She also briefly summarized past land management activities, which included old-growth harvest by the Caspar Lumber Company from the 1860s to 1946 on the majority of the Forest. Most roads were built from the 1950s to the 1970s. The bedrock geology is composed of coastal belt Franciscan Complex. Some areas are deeply weathered and mechanically sheared/poorly bedded; more competent units are susceptible to slope movement due to fracturing. Past work completed in the North Fork of Caspar Creek revealed that precipitation amounts of at least ~2 inches in 1 day combined with either about 5 inches in 3 days or 8 inches in 10 days were required to trigger landslide events over a 25 year period. Rapid sediment budget work completed by Stillwater Sciences for the draft JDSF HCP/SYP indicated that for JDSF as a whole, road related surface erosion accounted for 50% of sediment input, shallow landslides-35%, deep seated landslides-3%, soil creep-3%, background hillslope surface erosion-3%, and change in sediment storage in channels-6%.

The landslide inventory work on JDSF was completed on even-aged units logged from 1982 to 1995 in four separate watersheds. Aerial photo interpretation and field mapping were undertaken on 50 clearcut units covering 1800 acres within 19 timber sales. The four watersheds included in the study were: North Fork Caspar Creek (above the weir) 1168 ac, coastal stream; South Fork Noyo River, 17,548 ac, tributary to the Noyo River; Hare Creek, 6179 ac, coastal stream; and Berry Gulch, 7993 ac, tributary to the North Fork of Big River. For North Fork Caspar Creek, 10 units were clearcut from 1985 to 1992 totaling 681 acres as part of the USFS/CDF Caspar Creek watershed study (see http://www.rsl.psw.fs.fed.us/projects/water/caspar.html). Through 1998, the size and number of landslides in the NF Caspar Creek basin (above the weir) were similar in logged and unlogged units. Additionally, the volume of sediment discharged by landslides from uncut and cut units was about the same. In December 2002, a 2000 yd^3 debris slide occurred in clearcut unit "G" in the North Fork, about 40 feet below a road built in 1950's (this slide may be partly related to the old road). In total, there have been 22 landslides, 16 historic before recent clearcutting began, and 6 after clearcutting was completed. Four landslides occurred in the clearcut harvest units and 2 were road related.

In the South Fork Noyo River watershed, there have been 17 clearcut units covering 557 acres. Approximately 50% of the clearcut units were within dormant relic landslide features. Fifteen landslides were found, 6 of which were found to be historically active and were road related; none were within harvest units. In Berry Gulch, there were 9 clearcut units totaling 228 acres. Approximately 55% of the clearcut units were within dormant relic landslide features. Eleven landslides were located, 8 of which are historically active; and all 8 were judged to be related to roads and skid trails. For Hare Creek, there were 16 clearcut units covering 353 acres. Fourteen landslides were documented, 12 of which appear to be historically active. All 12 were found to be related to roads, landings, and skid trails. In summary for the 1800 acres clearcut over 14 years, a total of 32 landslides were found, 28 of which were road/skid trail/landing related, and 4 of which were in-unit failures not associated with compacted areas. Overall, there is little evidence that clearcutting reactivates dormant, relic slides for this area, and where factors are similar, it is reasonable to expect that these findings could be extrapolated. Nearly all the active slide features are shallow features related to roads, most of which were built several decades ago. Julie will write a paper for this study that will be included in the proceeding of the 24th Annual Forest Vegetation Management Conference held in Redding in January 2003 (contact Sherry Cooper, UCCE, shcooper@ucdavis.edu or (530) 224-4902 for the proceedings).

Pete Cafferata provided a brief summary of the MSG Workgroup Meeting held on February 10th at Howard Forest to discuss the cooperative THP-scale instream effectiveness monitoring projects planned with SPI and Campbell Timberland Management. Twenty people attended the workgroup meeting and there were two main agenda items: 1) discussion of goals/objectives from different agency perspectives, and 2) discussion of study plans developed to date by the 2 companies. David Kuszmar began with NCRWQCB input regarding the 2 instream monitoring projects. He reviewed Regional Water Board monitoring objectives, which included information on types of monitoring, spatial scale, and temporal scale. For these projects, Basin Plan compliance and forensic monitoring are the primary types of monitoring to be used, with a THP project spatial scale and a time frame of approximately 10 years. The U.S. EPA Quality System was recommended for quality assurance measures to be used, including a quality assurance project plan for each site and Standard Operating Procedures (SOPs). The "Road Map" to success was stated as: develop clear objectives, select parameters, find appropriate field sites, develop/approve QA documents, implement project, and report results/revise if necessary. Brad Valentine of DFG stated that documenting biological response is very difficult due to extreme levels of "background noise." Results will be largely categorized as a case study and will be difficult to extrapolate to other areas. A full Before-After Control-Impact (BACI) design is clearly preferred, if possible. Sam Flanagan of NMFS added that we must be clear whether we are trying to measure impacts from specific types of treatments or documenting impacts from a project as a whole. Finding sediment source areas can be difficult, with 90% of the impact coming from 10% of the landscape.

Graham Matthews described Campbell Timberland Management's study design to date in the MSG Workgroup meeting held on February 10th. The primary candidate watershed site is South Fork Wages Creek, located in western Mendocino County. The 2 proposed hypotheses to be tested are: 1) do current harvest practices increase turbidity >20% over background, and 2) do road rehabilitation practices reduce turbidity levels. The drainage is 2500 acres, was tractor logged in the 1970s, and has a mid-slope road which has not been opened for 20 years. The mid-slope road crosses 8 small tributary basins, with 1 or 2 control tributaries possible. Twelve possible monitoring sites for flow and turbidity (basin sizes range from 29 ac to 2451 ac) were displayed (some sites would be continuous measurement, some sampled with grab samples and crest stage gages). Road treatments would primarily involve conversion to outsloping with rolling dips and timber harvesting would be completed with cable yarding and seed tree/commercial thin silviculture. The plan described was to operate all sites for a minimum of 3 years prior to treatment; year 4 perform road treatments and sample for 3 years, and year 7 perform harvest and monitor for 3-5 years. The MSG Workgroup discussed this in depth and decided that it felt that the logging and road work should proceed like a normal project—not in a phased manner. **Graham and Stephen Levesque (CTM) agreed to have a draft study plan developed for CDF to obtain partial funding for the project by the end of February. It was agreed that the contract with CDF should be developed with the Mendocino County RCD.**

Cajun James described SPI's study plan development to date at the MSG Workgroup meeting held on February 10th. Currently, Cajun has 6 watershed monitoring sites in operation, including Southern Exposure, Millseat Creek, and Upper San Antonio Creek. Her vision for instream effectiveness monitoring is to sample a larger watershed, where sub-tributaries are treated differently. One major tributary would be clearcut, one selectively harvested, and one remaining as a control. Sampling for turbidity, DO, pH, etc. with Sonde probes would occur above and below impacts in each sub-tributary, as well as lower down in the larger basin. Less emphasis would be placed on road improvement work than the Campbell example. LYDAR would be flown for detailed geomorphic mapping and sediment budget development. Sediment budget calculations could be made and then checked with actual field data. Ten potential planning watershed scale basins were presented as possible field sites—both in the Big Chico Creek area and the SPI Weaverville District area. Acreages range from 5192 ac to 8682 ac.

Two highly rated potential basins are Nine Mile Creek (7624 ac) and Upper Fall River (7524 ac)—both in the Trinity River watershed. SPI and the USFS are the major landowners in these basins. Dr. Lee Benda added that watershed simulation modeling will be integrated into the SPI monitoring program, as a platform for "gaming" and risk analysis, as was proposed by Dr. Tom Dunne in the UC Report titled "*A Scientific Basis for the Prediction of Cumulative Watershed Effects*." **Pete Cafferata and Cajun James will write the study plan for CDF partial funding of the project, with possible contractors for CDF being the Shasta RCD or the UC Berkeley Forestry Center**.

In addition to these two instream monitoring projects, Pete Cafferata stated in the MSG Workgroup meeting that he is working with Tom Schott, MCRCD, and Terry Jo Barber, Ridge to River, on a new Garcia River instream monitoring contract. The current plan is to revisit 3 or 4 of the original 12 tributary sampling stations to: 1) measure gravel composition and permeability, 2) continuously monitor turbidity, 3) complete forensic monitoring to locate sediment source areas associated with spikes in turbidity, and 4) continue spawning surveys. This is a cooperative project between the NCRWQCB, CDF, MCRCD, and the landowners in the selected tributaries.

A considerable amount of discussion following at the full MSG meeting (February 11th) on the merits of THP scale instream effectiveness monitoring projects. It was agreed that a clear goal statement on what is attempting to be accomplished with these types of projects is needed, so that everyone has similar expectations regarding what these projects can and cannot accomplish. **Mark Rentz agreed to take the lead on this, working with Pete Cafferata and David Kuszmar.** Syd Brown suggested that State Park ownerships may be valuable control watersheds and that DPR is interested in being a cooperator in these types of projects. Robert Darby and Kate Sullivan added that PALCO has learned a large amount regarding instream monitoring in the past 5 years and that they would like to share this knowledge to make the new cooperative projects better.

Due to time constraints, the remainder of the MSG agenda was largely not attempted. Clay Brandow stated that at the next MSG meeting, Modified Completion Report (MCR) monitoring would be covered and Mike Anderson's concerns regarding "the difficulties of drawing informed conclusions from monitoring results without input from the operator, RPF, and original CDF inspector for the site being monitored" would be addressed. He also handed out a one-page MCR update, which he asked the MSG to read. **Clay invited MSG members to phone or email him if they had any questions**.

Under the public comment agenda item, Richard Gienger reported that the Mattole River watershed crossing monitoring project is proceeding well. Randy Klein, Redwood National Park Hydrologist and independent contractor, is completing the field work. To date, 50 to 60 removed crossing sites have been monitored. Fill volume removal appears to be largely at the correct channel depth for higher gradient channels, but some problems have been found with removal sites on lower gradient channels. No progress reports are available for this study at this time. Richard also stated that the "*Final Report on Sediment Impairment and Effects on Beneficial Uses of the Elk River and Stitz, Bear, Jordan and Freshwater Creeks*" is available online at the following website: (http://www.swrcb.ca.gov/rwqcb1/Agenda/01_2003/item12_ISRP_Report.pdf). Richard displayed photographs of the Bear Creek watershed taken after the record rainfall of December 2002. Mark Rentz stated that that CGS's technical report completed at the request of CDF titled "*Review of July 2002 EPA Analysis of Impacts of Timberland Management on Water Quality*," dated November 27, 2002, is available and provides significant information regarding North Coast TMDLs. Copies are available from CDF in Sacramento.

It was agreed that the next MSG meeting will be held on April 21, 2003, 10:00 a.m., at Howard Forest.