Winter/Spring 2012

WSA Currents & PROFILES

INFORMATION WITHIN REACH

Welcome

to the winter 2011-2012 issue of "Currents and Profiles," the National Watershed, Soil, and Air (WSA) Technology and Development (T&D) Center's news and notes to the field. In this issue we note several personnel changes that have occurred in the T&D WSA program.

"Currents and Profiles" updates the watershed community on the progress of our projects and newly available publications. This issue includes the following topics:

- CURRENT PROJECTS – UPDATE
- NEW PROJECTS
- EQUIPMENT HIGHLIGHT – THE OTT ORPHEUS MINI IN STREAM GAUGING INSTALLATIONS
- COMPLETED PROJECTS
- LINKS OF INTEREST
- WSA STEERING COMMITTEE MEMBERS
- T&D STAFF AND STAFF CHANGES

Mission Statement

To systematically apply scientific knowledge and advanced technology to create new or substantially improved equipment, systems, materials, processes, techniques, and procedures to meet the challenges and objectives of sustainable forest ecosystems management.

Watershed, Soil, and Air Technology & Development Program

1225 1802—SDTDC

• CURRENT PROJECTS—UPDATE

Water Diversion Control Structures

Proposed by: Dave Gloss (Region 2)

Objective: Provide information on planning and layout of surface water diversion and water control structures. Assist diverters and field personnel who work with them in evaluating alternative structures and layouts to meet instream-flow needs, protect aquatic habitat, and minimize detrimental effects on channels and riparian areas.

The completed report is in the final review process. We expect the document to be posted on the T&D Web site sometime in the first half of 2012.

Figure 1. Rock riffle diversion control structure on the Malheur Wildlife Refuge, designed and photographed by author Dan Axness.

Literature Synthesis on Effectiveness of Forest Roads Best Management Practices

Proposed by: Carolyn Napper (SDTDC)

Objective: Provide a comprehensive technical reference on the effectiveness of national BMPs for limiting erosion on forest roads and protecting water quality.

The draft report is near completion and should be in peer review early in 2012. For more information contact Pam Edwards at the Northern Research Station at 304-478-2000, ext. 129, or <pjedwards@fs.fed.us>.

Figure 2. Rolling dip—BMP implemented on Plumas NF.

Winter Logging (Development of Science-Based Winter Guidelines for Mechanical and Fuels Treatment Operations)

Proposed by: John Townsley, Randy Tepler, and Brad Flatten (Region 6)

Objective: Develop science-based guidelines for winter logging by using low-cost, easily identifiable indicators of frozen soil.

Field work and data analysis are complete and the guidelines are in preparation. A good description of the project (2009) is in this narrated slide presentation: <http://fsweb.sdtdc.wo.fs.fed.us/programs/wsa/soilqual/winter_log/Winter%20Logging%20Study/player.html>. A final report is being written.

Videos: Sampling Stream and Lake Waters for Chemical Analysis

Proposed by: Cindy Huber (Region 8)

Objective: Develop two training programs for employees who collect water samples from streams and lakes specifically for water chemistry measurements.

The program, "Collecting Water Samples for Chemical Analysis: Streams" has six parts:

1. How To Prepare for Your Trip
2. How To Locate Sample Sites
3. How To Document Sites
4. How To Collect Water Samples
5. Taking Measurements at the Collection Site
6. Sample Handling and Shipping

The stream program (released in 2008) is being updated to meet the national water chemistry sampling protocols currently being developed. This revised program will be released in conjunction with the national protocols in 2012.

The program, "Collecting Water Samples for Chemical Analysis: Lakes," has seven parts:

1. Types of Lake Sampling
2. Planning for a Sampling Trip
3. Packing for a Sampling Trip
4. Shoreline Sampling
5. Mid-Lake Sampling
6. Documenting the Samples and Site
7. Handling and Shipping Samples

The completion of this program was delayed to ensure its consistency with the national protocols. This program will also be released with the national protocols in 2012.

For more information, contact Lisa Outka-Perkins (MTDC) at 406–329–3849, or <loutka-perkins@fs.fed.us>.

Remote Smoke Monitoring

Proposed by: Cindy Huber (Region 8)

Objective: Allow individuals to visually monitor smoke remotely through cellular networks.

Several devices have been configured and evaluated locally (Missoula area). The devices tested range from a Smartphone with the Android OS to an HD Pan/Tilt/Zoom IP camera. Testing has included real-time interval still captures of the Clark Fork River during the spring of 2011 floods, smoke monitoring of a controlled burn on the Bitterroot National Forest, and wildlife monitoring using motion detection triggers with email alerts. Each device tested could be valuable for field use depending on the monitoring requirements. The obvious limiting factor for each device has been battery life and cellular signal strength. In the future, we plan to test different battery configurations possibly including solar panels. To improve cell strength, several antennas and a Wilson amplifier have been purchased and will be tested in fringe coverage areas.

For more information, contact Damien Hoffman (MTDC) at 406-829-6751 or <damienhoffman@fs.fed.us>.

Figure 3. Photo of a weatherproof HD pan, tilt, and zoom camera that operates on cellular networks.

Low-Cost Fish Screens at Diversions

Proposed by: Mark Weinhold (Region 2) and Bob Deibel (WO)

Objective: Produce a catalogue of fish screens useful for small diversions describing how and where they work best, how and when they fail, their reliability, and cost. The catalogue should help agency staff and diverters understand the types of screens available, and communicate with screening professionals to make preliminary selections based on site conditions.

The catalogue is in preparation by Brent Mefford of the Bureau of Reclamation's Denver Technical Service Center, who has extensive experience with fish screens of all sizes. Along with Forest Service T&D, the U.S. Fish and Wildlife Service's Anadromous Fish Screen Program, the Natural Resources Conservation Service, and the Bureau of Reclamation are contributing to the publication. Those agencies, together with Wyoming Game & Fish and NOAA-Fisheries, are represented in the working group, which provides oversight and assures the catalogue's usefulness for all our customers.

Approximately 20 fish screen types will be described. The catalogue will also cover screening basics and work with agencies to get design and funding help. The intended audience is small diverters and agency personnel who work with them to protect fish, including those in States without screening regulations or threatened and endangered fish species.

Figure 4. End of pipe pump suction screen from Pump-rite: <http://www.pump-rite.com/screens/MM-L15.htm>

Construction Guide for Stream Restoration and AOP Projects

Proposed by: Bob Gubernick (Region 10) and Brian Bair (TEAMS)

Objective: Provide a practical reference for field construction personnel on construction planning and implementation for stream restoration and aquatic organism passage projects. Include details on construction scheduling, equipment capability, specifications, dewatering, construction methods for various structure types, administering equipment rental contracts, etc.

This Guide will cover all phases of aquatic restoration projects after design to include: planning, contracting, preconstruction, construction, maintenance, and monitoring. It is being written by a working group comprised of experienced restorationists from the Forest Service, Natural Resources Conservation Service, U.S. Army Corp of Engineers, the Bureau of Reclamation, and Federal Lands Highways (FHWA). FHWA-Vancouver secured partial funding for the project from the FHWA's Coordinated Technology Improvement Program to support the project and will also host and manage the Web site that will ultimately house the Guide. Several agencies are providing salary support for their employees' participation.

Figure 5. Stream Restoration Implementation Working Group on field trip at Green River near Seattle, WA, April 2011.

Removal of Small Dams: Removal Techniques and Monitoring Environmental Effects

Proposed by: Mary Rye, Jason Butcher, Dana Gauthier, Luke Rutten, Randy Kolka, and Steve Sebestyen (Region 9)

Objective: Compile a synthesis of the current knowledge of removal methods, particularly for small structures, as a tool for specialists and decisionmakers to evaluate how best to remove unwanted structures. Compile a synthesis of the monitoring methods and environmental effects of small dam removal to aid project managers in preparing environmental documents and, ultimately, monitor and document the results of dam removals.

A number of documents from recent forest dam removal projects have been collected together with an extensive list of literature from other sources. Final project report will be written this summer.

Figure 6. Restored segment of Sheridan Creek, upstream of Growden Dam removal site, Colville NF. Photo provided by Karen Honeycutt.

BAER Hydrology Modeling Tools Review

Proposed by: Cheryl Mulder (Region 5)

Objective: Review selected hydrologic models and methods that are available for peak flow analysis in a post-fire landscape, identify the relative accuracy of the models, and determine which models perform better in certain hydro-climatic regimes based on established model evaluation criteria.

Dr. Terri Hogue, from UCLA's Department of Civil and Environmental Engineering, working with the Forest Service, will produce a technical guide explaining commonly used and accepted peak-flow models and will develop and give training courses on their use. Several webinars on the USGS Regression Model TR-55, HEC, WEPP, and Wildcat 5 are planned for early 2012. The training will also be posted on the project Web site: <http://fsweb.sdtdc.wo.fs.fed.us/programs/eng/baer_hydrologic_toolbox/background.shtml>. Expect to have a draft by June 2012.

For more information, contact Dexter Meadows at (909) 599-1267, ext. 276, or <dmeadows@fs.fed.us>.

Proposed Contract Language for Fuels Mastication Treatments

Proposed by: John Lane and Vince Archer (Region 1)

Objective: Compile or develop provisions for fuel mastication that protect resources and can be used as standard templates regionally or nationally in service contracts.

Regions have contributed a few examples of existing fuel mastication contracts. The current project plan is to post them on a project Web site. The Web site also will highlight and explain standard soil and water protection clauses that implement BMPs in various types of contracts.

T&D is looking for a detailer to accomplish the goals of this project. If interested, contact Dexter Meadows at (909) 599-1267, ext. 276, or <dmeadows@fs.fed.us>.

Eco-Friendly Designs for Developing Springs and Seeps for Livestock and Wildlife Watering

Proposed by: Joe Guerreri (WO), National Program for Groundwater Dependent Ecosystems

Objective: Provide information on methods of developing springs and seeps that protect soil and water quality.

Joe Gurrieri is leading an interagency working group that will develop inventory, analysis, and design guidance for springs and seeps that are water sources. Information is being collected on the project Web site: <http://fsweb.sdtdc.wo.fs.fed.us/programs/eng/developing_springs_toolkit/spring3.html>.
For more information, contact Dexter Meadows at (909) 599-1267, ext. 276, or <dmeadows@fs.fed.us>.

Test and Compare Effectiveness of Aerial Hydromulch Formulations

Proposed by: Brent Roath (Region 5)

Objective: Compare effectiveness of different combinations of tackifiers and mulch materials with respect to soil erosion control and persistence on the ground.

Not started.

E-Sampler Extended Life Power Source

Proposed by: Tedd Huffman (Region 9)

Objective: Develop a power system for (air quality) E-Samplers that allows users to work in the field for 5 to 7 days without the need for line power.

MTDC purchased a commercially available Ecotricity 1800S solar power unit for testing. The Ecotricity 1800S consists of a rigid 90 watt solar panel assembly and a "solar generator" that contains a battery, charge controller, battery charger, and inverter. The "solar generator" is not designed to be exposed to rain or snow and must be protected by a cover when used outdoors. During initial testing at MTDC in July, the unit successfully powered a GOES transmitter equipped E-Sampler for 20 days. Further testing is planned including adapting the Ecotricity 1800S to use folding solar panels.

MTDC has also designed and fabricated a prototype power unit that can be charged by up to three 62-watt folding solar panels or from line power. The unit is designed to contain everything, including the solar panels, in one carrying case. Testing with a GOES transmitter equipped E-Sampler is expected to begin soon. If testing proves successful, the unit will be sent to the field for further evaluation.

For further information, contact Wesley Throop (MTDC) at (406) 329-3957, or <wthroop@fs.fed.us>.

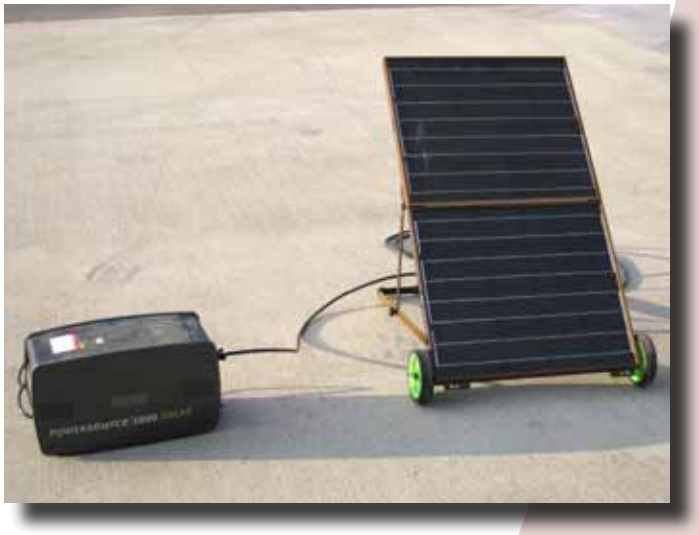

Figure 7. Ecotricity 1800 solar generator with solar panel.

Figure 8. MTDC power unit with folding solar panel.

Figure 9. Folding solar panel shown unfolded (left) and folded (right).

Volatile Organic Compounds (VOC) Portable Monitor

Proposed by: Trent Wickman (Region 9)

Objective: Litigants are increasingly focusing on air quality as an issue in NEPA documents. While it is easy to show the impacts are insignificant on a regional scale, it is harder to dismiss on a local scale. Identify existing or develop a portable VOC monitor to quantify toxic gas emissions from OHV or snowmobiles on a local scale.

MTDC found that there were no off-the-shelf monitors that had low enough sensitivity levels to quantify OHV emissions that would be produced in a national forest setting.

A sampling protocol was developed to collect stainless steel canisters at an OHV park in Minnesota and have an analytical lab analyze for air VOCs. The proposer set up particulate monitors and collected canister samples. The canister analysis showed very little in VOC concentrations that would pose a health hazard to the public.

MTDC will collaborate on a publication of the findings and test protocols in FY 2012.

For more information, contact MaryAnn Davies (MTDC) at (406) 329-3981, or <mdavies@fs.fed.us>.

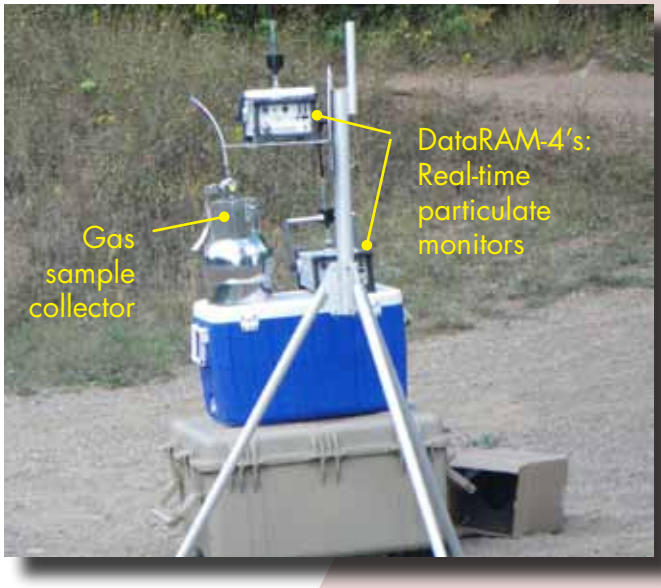

Figure 10. Trial VOC monitoring set up, Minnesota, summer 2011.

• NEW PROJECTS FOR 2012

Effectiveness of Soil Restoration Techniques

Proposed by: Meg Foltz (Region 1)

Objective: Provide guide to soil restoration treatments and their effectiveness in different soil and climate types.

Literature search and survey distributed requesting information related to successful soil restoration techniques.

BAER Team Leader/Member Training

Proposed by: Penny Leuhring (WO, BAER Program Leader)

Objective: Develop webinar or self-study computer-based training modules that cover key concepts of BAER assessment, including team leadership, risk assessment, and treatment prescription. Include modules for BAER resource specialties.

T&D is looking for a detalier interested in managing this project. If interested, contact Dexter Meadows (SDTDC) at (909) 599-1267, ext 276, or <dmeadows@fs.fed.us>.

Training for Monitoring Implementation and Effectiveness of BMPs

Proposed by: Mike Furniss and Sherry Hazelhurst (WO)

Objective: Develop training manuals, curricula and interactive, multimedia modules to train field practitioners to monitor activities in each of 10 BMP categories. In-person, as well as Web-and-CD-based training courses with tests, was requested.

This project was tabled until the BMP monitoring protocols were finalized.

Software Application for BMP Monitoring Field Data Recorder (aka Hardware/Software for Field Documentation of BMP Effectiveness Evaluations)

Proposed by: Sherry Hazelhurst and Rick Henderson (WO)

Objective: This project has been tabled until the BMP monitoring protocols can be finalized.

Disposition of some nonselected projects:

- Detection of Marijuana Gardens: Sent to RSAC.
- Correlating Fuel Sticks and Duff Moisture: Sent to Fire and Aviation steering committee.
- Remotely Sensed Data for Forest Inventory and Monitoring on the Kisatchie NF: Sent to RSAC.

• EQUIPMENT HIGHLIGHT

C&P readers may recall T&D's efforts (2008-2010) to find a water level recorder for remote sites, particularly for surface water diversions where data must be downloaded and sent to regulators. The original proposal expressed the need for a device that tolerates freezing. For a time, we worked with the vendor of the Aquarod, but results were unsatisfactory. Region 4's Instream Flow Team has continued the search. This article describes what they currently see as the best instrument for the purpose.

Use of the Ott Orpheus Mini in Stream Gauging Installations

By Bob Kenworthy

Since 2005, the Boise-based Region 4 Instream Flow Team has operated up to 18 stream gauges during the summer months. These data are needed to understand the effects that diversions on National Forest System land are having on streamflow and aquatic habitat. Over the past 2 years we have replaced all of our instrumentation with Orpheus Minis (Minis) developed and marketed by Ott <http://www.ott-hydrometry.de/web/ott_uk.nsf/id/pa_orpheusmini_e.html>.

The Orpheus Mini consists of a "vented pressure probe" attached by a Kevlar cable to a datalogger and was developed primarily for use in ground water wells. We have been using it in to measure water level and temperature in streams and rivers in gauging installations originally designed for AquaRods. We had experienced a number of problems and shortcomings with the AquaRods that have largely been overcome through use of the Minis.

Our typical stream gauge consists of a 54-inch galvanized pipe attached to a staff plate that is in turn attached to a metal stake that has been driven into the stream bottom (see attached photo). The pipe is configured like a crest stage gauge with holes drilled per USGS specifications in the bottom and top caps. The Mini is attached by pipe clamps to a metal sleeve that is placed in the galvanized pipe, with the top of the Mini projecting above the pipe to allow downloading without removal (see photos). The Mini is built to our specified length enabling us to use all of our installations (with minor changes) that were originally built to accommodate AquaRods.

We have been very satisfied with the performance of the Minis. Instrument setup and download is simple and occurs through an infrared link that we attach via cable to a mini-notebook (see photo). The software to set time, time interval, units, etc. is simple to use, includes instantaneous readings, and the instrument can be easily set to staff elevation. In contrast with our experience with the AquaRods, we have found that the Minis, once set to an accurate staff elevation, generally retain the correct staff reading between site visits, barring problems with pipe intakes, etc. We have not seen any of the erratic behavior in stage or temperature readings that we experienced at certain sites with the AquaRods.

The Minis use three easily obtained AA alkaline or lithium batteries that last for the entire summer and have a large nonvolatile memory (500,000 samples versus 9,600 for the AquaRods). While we always download during each site visit, the data are retained on the instrument for the entire summer time period, eliminating post-processing work of stitching time periods together. The only downside we have found with the Minis in comparison to the AquaRods is that you have to remove them before freeze-up. We have been told that the ceramic cell will be damaged if it freezes.

The cost for one Mini is comparable to an AquaRod at about $1,300, with an additional expenditure of about $300 for a download cable that can be shared between sites.

For additional information, contact Bob Kenworthy at (208) 342-9049 or <rkenworthy@fs.fed.us>.

Figure 11. Typical stream gauge.

Figure 12. Ott "Mini" attached to sleeve that slides in pipe.

Figure 13. Top of Ott "Mini" in pipe, located to allow download.

Figure 14. Downloading using optical reader

• COMPLETED PROJECTS

GOES Satellite Telemetry System For Smoke Monitors (2011)

Particulate Monitor Training Aids (2010)

Low Impact Fire Plow/Line Sweeper Blower (2010)

• LINKS OF INTEREST

Useful Tools for Identifying Surface Fuels and Biomass: <http://www.fs.fed.us/eng/pubs/pdf/hi_res/10191802hi.pdf>

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• STAFF CHANGES

John Potyondy, Chairman of our steering committee, retired in September from his job as Director of the Stream Systems Technology Center. John oversaw improvements in T&D watershed program accountability and communications with the steering committee.

Having been involved in the Forest Service watershed program since the 1970's he was often able to put new project proposals in a historical context and to help to focus the program on important, sometimes recurring issues. He was also an important point of connection between T&D and the Stream Team, which frequently work on overlapping problems. We will miss John greatly.

Also in September, Carolyn Napper moved on to be district ranger for the Shasta-McCloud Management Unit on the Shasta-Trinity NF. Carolyn has a straightforward, uncluttered style that allows her to be highly effective and efficient in working with groups and project material. Her experience and understated leadership in BAER and other soils work were a great benefit to the T&D program and she will certainly continue to contribute to the rapidly advancing BAER technology from her platform at Shasta-McCloud. Best wishes, Carolyn!

Andy Trent, program leader and point of contact for the T&D air program, has taken on leadership of several other programs at Missoula T&D Center, and is co-lead with Dexter Meadows of the T&D watershed, and soil program.

Kim Clarkin retired at the end of 2011 to refocus on improving conditions in actual watersheds rather than reading and writing about them.