Fall/Winter 2008

WSA Currents & PROFILES

INFORMATION WITHIN REACH

Welcome

to the fall/winter issue of "Currents & Profiles," the National Watershed, Soil, and Air (WSA) Technology and Development Centers' news and notes to the field. It is time to submit project proposals for the FY 2010 Watershed, Soil, and Air T&D program of work. See the section "News from the WSA T&D Steering Committee."

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

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

0825 1817—SDTDC

• CURRENT PROJECTS—UPDATE

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

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

Four forests are participating in the winter logging study to identify and test robust indicators of soil conditions including frozen ground, and/or snow conditions that protect the soil resource during winter logging. Our focus is to develop practical, low-cost, science-based winter logging guidelines which are easily identifiable in the field by the sale administrator, logger, soil scientist, and the public.

Each of the participating forests has different guidelines yet there is little science-based documentation for the guidelines. An example of the differences in the guidelines is provided below:

- Okanogan-Wenatchee, Eastern Washington (R6)—Current forest plan direction is 8 inches of snow and frozen ground or a combination of frozen soil and compacted snow/ice.
- Idaho Panhandle, Idaho (R1)—Current forest design criteria for winter logging includes a 24-inch snow layer, or 18 inches of settled snow, or a slash mat in combination with 12 inches of settled snow, or frozen ground to a depth of 4 inches.
- Chequamegon-Nicolet, Wisconsin (R9)—Current forest plan direction is to operate heavy equipment only when soils are not saturated or when the ground is frozen.
- Hiawatha, Michigan (R9—Current forest plan direction is for equipment operations to occur when the soils are capable of supporting equipment without incurring detrimental compaction, puddling, or rutting. Design criteria include the guidance of 6 inches of frozen soil or 12 inches of frozen/compacted snow.

To determine the appropriate visual indicators for winter logging, each participating forest identified units which are likely to be logged during the winter of 2008-2009. San Dimas Technology and Development Center (SDTDC) and Rocky Mountain Research Station (RMRS) developed a study plan to correlate soil temperatures at 3, 6, and 9 inches with actual conditions above ground. We are incorporating the use of frost tubes and infrared thermometers to assess the effectiveness of these low-cost tools as indicators.

Collecting predisturbance data using the National Soil Disturbance Monitoring Protocol.

Hobo datalogger attached to tree. Datalogger will record soil moisture and soil and air temperature throughout the winter.

To date, SDTDC and RMRS have worked with each forest and collected the predisturbance soil condition survey information using the new National Soil Monitoring Disturbance Protocol. The field sites are instrumented with sensors to record air temperature, soil temperature at several depths, and soil moisture. Once logging begins, the vehicle traffic will also be recorded.

A Web page of our progress is posted on the WSA Web site and is updated as new information is available.

For further information, contact SDTDC project leader Carolyn Napper by phone (909) 599-1267, ext 229, or e-mail: cnapper@fs.fed.us.

Software Application for BMP Monitoring Field Data Recorder

Proposed by: Sherry Hazelhurst and Rick Henderson (WO)

The National BMP handbook is being reviewed and finalized at the Washington Office. Concurrently, several teams of subject matter specialists are working with Pam Edwards from the Northern Research Station to develop the effectiveness monitoring protocols for each BMP. Once the handbook and protocols are drafted, SDTDC will reinitiate work on this project.

For further information, contact SDTDC project leader Carolyn Napper by phone (909) 599-1267, ext 229, or e-mail: cnapper@fs.fed.us.

Low Impact Plow Fire Line Blower/Sweeper

Proposed by: Allen Nicholas and Kara Kleinschmidt, Shawnee National Forest, Region 9

The Missoula Technology and Development Center (MTDC) is working with the Shawnee National Forest to develop equipment to remove leaf and needle litter off of existing fire lines in forested units which are periodically prescribe burned. They have traditionally either used dozers or backpack leaf blowers to accomplish this task. The first method displaces excessive amounts of soil after repeated treatments and the second method is very labor intensive. MTDC arranged for a trailer mounted, high air speed (180 mph), large volume (10,500 cfm) turbine blower made by Buffalo Turbine to be demonstrated on the forest. After the machine received a positive review for its ability to clear the debris away, MTDC purchased and modified one of these blowers. It became obvious the trailer mounted blower would not work well in the forested units with steep ravines and closely spaced trees. To deal with these site conditions, the unit has been altered for easy installation in the bed of a Polaris Ranger UTV. Flexible material has also been installed in place of the factory rigid air chute to reduce the chances of it being ripped off. The unit comes with a wireless control box that allows the operator to rotate the air nozzle remotely. The forest has just installed the unit but has not had the opportunity to run it operationally yet because they are conducting burning operations at the time of this update. When time permits the forest plans to shoot stills of the blower installation, video the machine in action, and gather some fireline production rates.

Water Diversion Control Structures

Proposed by: Dave Gloss (Region 2)

Phase I: Diversion field guide

Objective: Provide information on planning and layout of surface water diversion and water control structures. Goal is to 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.

Work on the first draft of the guide has resumed, and we anticipate it will be ready for review by the extended technical group in early summer 2009.

Phase II: Variable flow diversion system

Objective: Find or develop diversion control systems capable of maintaining variable in-stream flows in the main channel. The goal is to permit diverters to implement in-stream flow agreements where environmental flow requirements vary over the course of the diversion season.

We plan to visit one or more sites where headgates are automatically controlled based on either incoming flow or in-ditch flow. We will collect information on how these systems work, conditions where they succeed and fail, and what their strong and weak points are. The goal is to understand the state of the art in automatic or remotely controlled diversion installations.

Please contact Kim Clarkin (909 599-1267 x209) if you have experience in these systems and want to contribute ideas or examples.

Low-Cost Fish Screens at Diversions

Proposed by: Mark Weinhold (R2) and Bob Deibel (WO)

Objective: Find or develop moderate-to-low cost fish screens for small diversions to protect most fish from entrainment in diversion ditches. One proposal particularly mentions protecting juveniles that normally inhabit stream margins, where most diversions originate.

We are making initial contacts with State screen shops and companies that fabricate and install screens. These screens will need to be compatible with a range of available head, access, and existing control structure types. These conditions and others will limit the alternatives for structural improvements to protect fish. We will need to get an overview of forest diversions that might use these screens. If you have examples of small diversions you think could benefit from a fish screen, and can provide photos and description of them, please e-mail Kim at kclarkin@fs.fed.us.

Stream margin diversion without water control structure—Battle Creek, Medicine Bow NF. The diversion dam is reconstructed every year from rock in the channel (Photo by Dave Gloss.)

Synthesis of Effectiveness Literature for Roads Best Management Practices

Proposed by: Carolyn Napper (SDTDC)

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

EPA's Assessment and Watershed Protection Program is partnering with SDTDC on this project and has provided partial funding. Pam Edwards, of the Timber and Watershed Lab in Parsons, WV, part of the Northeast Research Station, will write the synthesis next year. Pam is fully employed this year on other projects, including leading the effort to complete the national protocols for BMP effectiveness monitoring, so work this year will be limited. Nonetheless, we will get a start on it by collecting literature on forest road erosion control as well as research from other areas (agriculture, construction). A preliminary review of those papers will be done to establish relevance.

We anticipate using peer-reviewed literature, but not necessarily restricting it to established journals. If you have a bibliography of useful papers on this topic relevant to your area, please send it to Kim at kclarkin@fs.fed.us. I will compile them and ensure they are included in the list to be reviewed.

Water-Level Datalogger Upgrade

Proposed by: Robert Kenworthy, R4

Objective: Make available a water-level recorder similar to the AquaRod, but cheaper and with upgraded functionality.

Patent issues limit what can be done to upgrade the AquaRod, and other similar instruments are even more expensive. At this point, we are not certain if work will proceed on this project, given current T&D workload; however, we plan to consult with engineering staff to identify feasible options.

• NEW PROJECTS

Biomass/Whole-Tree Harvesting, Soil Impacts, and Measurement Methods

Proposed by: Jim Gries (Region 9, Hiawatha NF)

The biomass project was approved in April 2008, by the Watershed Steering Committee. To date the following work plan has been developed:

- Literature review of effect of biomass removal on soil nutrient cycling—December 2008.
- Collaborate with RMRS and Michigan Tech on funding a graduate student to look at long-term soil productivity data and develop a synthesis document of what are the biomass removal effects to the aspen and jack pine ecosystem.— June 2009.
- Identify potential tools to determine amount of large and fine woody debris—Web site links to provide one-stop shopping.
- Contracts used to implement biomass harvests and achieve the coarse and fine woody debris requirements—Web site.

Continue to check the Watershed Web page as information is posted. For further information, contact SDTDC project leader Carolyn Napper by phone (909) 599-1267, ext 229, or e-mail: cnapper@fs.fed.us

Training for National BMP Monitoring Program

Proposed by: Sherry Hazelhurst (WO)

The development of a training program as a final phase of the Best Management Practices program is currently on hold until the BMP handbook and monitoring protocols are drafted. We anticipate starting this project in summer 2009 after most of the sampling protocols and associated reporting forms have been developed. The BMP monitoring program is planned to be implemented throughout the Forest Service in 2010. In order for a smooth transition in collecting accurate information, a uniform training program will be developed.

Project objectives:

1. Develop a comprehensive set of curricula, training manuals, and other media for each of the BMP monitoring modules (both train-the-trainer and student, and for in-person and electronic venues).
2. Develop a testing program or practicum to evaluate student understanding.
3. Participate in the first round of training sessions.

For further information, contact SDTDC project leader Carolyn Napper by phone (909) 599-1267, ext 229, or e-mail: cnapper@fs.fed.us.

Training Curriculum for Potential Users of the National Soil Disturbance Monitoring Protocol

Proposed by: Steve Howes (Region 6)

This year has been a landmark year for the soils program with many watershed events occurring. First, numerous soil scientists from every region participated in a critical review of the Soil Disturbance Field Guide and provided valuable input to SDTDC, which will greatly improve the document. In June 2008, the Senate of the Unites States passed Resolution 440, "recognizing soil as an essential natural resource, and soil professionals as playing a critical role in managing our Nation's soil resources." In October, Debbie Page-Dumroese, Ann Abbott, and Tom Rice received the Soil Scientist of the Year award for their hard work on the National Soil Disturbance Protocol. Finally, the training curriculum for the protocol was approved by the Watershed Steering Committee and we have started to gather material for the training.

At this time we envision the training will include the following:

- Two-day training course on how to evaluate soil conditions.
- Preparation of standardized course training materials.
- Preparations of "task book" to ensure participants have mastered key elements of the training and are consistent in their evaluation of soil condition.
- Development of Web site for the project to include reference material, sample monitoring documents, and training materials.

We welcome your suggestions, comments, or recommendations on the project. Contact Carolyn Napper SDTDC project leader by phone (909) 599-1267, ext 229, or e-mail: cnapper@fs.fed.us

Soil scientists from the Lake states attending soil monitoring training overview.

• NEWS FROM THE WSA T&D STEERING COMMITTEE

The formal FY 2010 call letter for proposals was mailed out in October. The due date to receive proposals is February 11, 2009. The WSA committee plans to have a video conference on March 4, 2009, to review proposals for new projects. If you have an idea for a project, we encourage you to contact your regional representative of the steering committee first so they can help improve the proposal to have a broader focus. Regional steering committee representatives are there to help with proposal submittals so they can ensure the proposal is responsive to the selection criteria.

The steering committee recently approved the following project selection criteria:

1. Nationally significant: Explain how your proposal addresses a need that exists nationally or in more than one USFS region.

2. Not scientific research—Verify that the proposal is not research, but technology development. Technology development is defined as the practical application of research science to solve agency soil, water, or air problems. Research is defined as a detailed study of a subject, especially in order to discover (new) information or reach a (new) understanding.

3. Visible link to field applications—Explain how your proposal addresses a need at the field level.

4. Partnership potentia—Explain how your proposal incorporates input or participation from internal and/or external partners. What other partners might participate in the project?

• LINKS OF INTEREST

Download a copy of the National Soil Disturbance Monitoring Protocol by visiting the Rocky Mountain Research Station web page called SoLo: http://forest.moscowfsl.wsu.edu/smp/solo/InfoPath/monitoring/documents.php.

Examples of how to measure biomass in the woods: http://fsweb.sdtdc.wo.fs.fed.us/programs/fm/fy06/Biomass/biomass_weight_sampling.html.

Literature review of research articles that provide equations to determine tree biomass: http://fsweb.sdtdc.wo.fs.fed.us/programs/fm/fy06/Biomass/biomass_lit.html.

Synthesis of Knowledge from Woody Biomass Removal Case Studies: http://www.firescience.gov/Science_You_Can_Use/Biomass_Case_Studies_Report1.pdf.

Information on climate change: http://www.climatescience.gov/.

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