



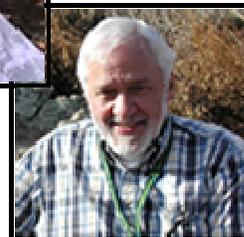
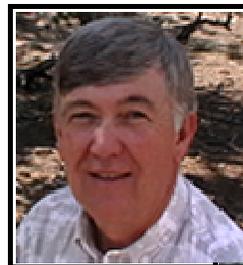
United States
Department of
Agriculture

**Forest
Service**

Forest
Management
Service
Center

Forest Management Service Center

Annual Staff Report Fiscal Year 2008

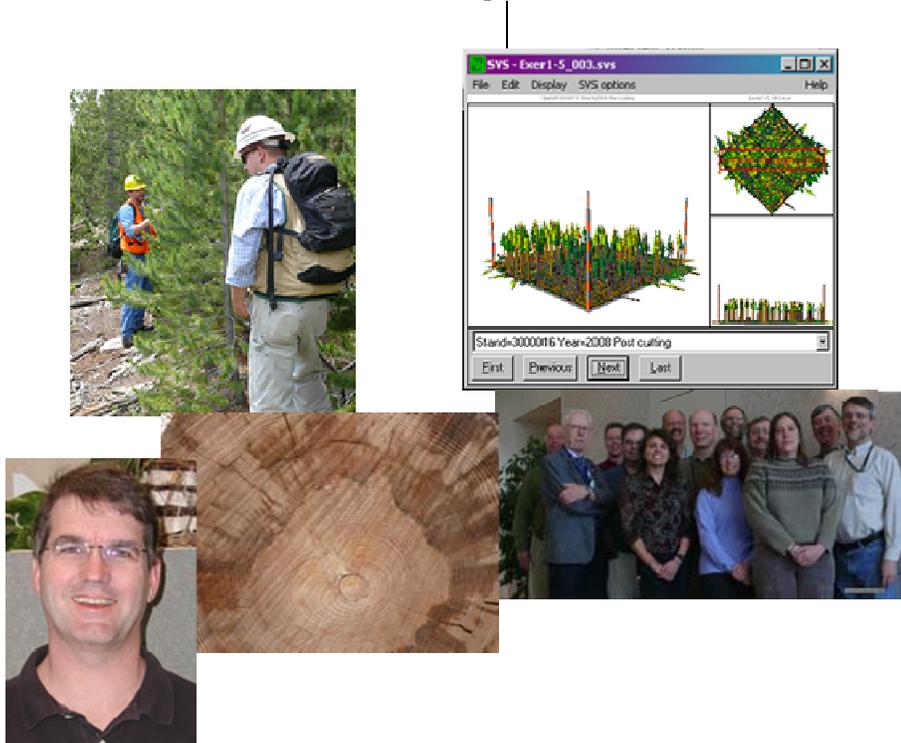


About Us

The Forest Management Service Center (FMSC), located in Fort Collins, Colorado, is a detached unit of the USDA Forest Service National Forest System Forest Management Staff, Washington Office. The Service Center provides mensuration, statistical, modeling, biometric, sampling, and analysis skills to the Forest Service and also cooperates and works in partnership with other government agencies (federal, tribal and state), research, colleges and universities, forest industry, consultants, and individuals in the United States and other countries. The FMSC is staffed with biometric and mensuration specialists possessing skills not available at most regional and forest level offices and is considered an extension of each region's technical staff.

Our Program Emphasis

We provide products and technical support for forest vegetation modeling and forest product measurements to the National Forests and our partners.



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

Message from the FMSC Center Manager

Fiscal year 2008 was a very busy year in the delivery of biometric services to the field in the areas of Forest Vegetation Simulation (FVS) and Forest Products Measurements.



In the FVS area, new activities focused on climate change. We participated in a workshop to discuss incorporation of climate variables into FVS variants to better address concerns on climate change. One of our research partners, Nick Crookston of Rocky Mountain Research Station, received funding in April to develop a climate sensitive version of FVS. We have supported Nick's work through testing and validation of different versions of "Climate-FVS". This work will continue through next year.

The carbon report continues to be used by not only the Forest Service but also many consultants and other users. The carbon report is used in both the Chicago Climate Exchange and California Climate Action Registry for calculation of carbon offsets or credits.

We continued maintenance and enhancement of the FVS base model and Fire and Fuels Extension (FFE) code. FVS was used extensively in project planning, landscape analyses, and in support of forest plan revision.

We conducted 10 FVS training sessions throughout the United States and answered about 20 hotline calls per week. An FVS Steering Team was initiated this past year to provide strategic guidance in the development of FVS. The first meeting was in March.

Our partners include Forest Service Research Stations as well as universities, other land management agencies, and international users. Several foresters from China visited our office in Fort Collins in December 2007 to better understand FVS applications and pest extensions.



On the Forest Products Measurements side, we maintained a suite of programs related to cruising, scaling, volume estimation, and area determination.

With an increased emphasis on biomass, we are looking for ways to measure small-diameter trees used for biomass energy. Quick and easy sampling techniques, such as randomized branch sampling, photo estimation, and tree count methods, are being developed to support biomass estimation. In addition, a national biomass library is being developed to allow users to determine the green tons of biomass for a tree species in their local area.

The measurements group is also working on ways to quickly measure land area and assist with navigation using GPS. In partnership with the Department of Defense, we developed an accuracy matrix for several GPS units under a variety of canopy conditions. Handbook direction for area determination will be released in FY09.

We are also planning to increase the use of computer-based tutorials for teaching forest measurements. Nine are completed and another 16 are planned.

Staffing in FY08 was and still is a challenge. Two key program managers retired – Rich Ernst, who was the National Mensurationist and headed up the measurements program, and Gary Dixon, the FVS program leader. Ken Cormier has filled behind Rich but Gary's position is still vacant. We also anticipate our budget to be about \$1.6 million, up slightly from the past three years.

We will continue to provide excellent products and technical support for vegetation modeling and forest product measurements to the National Forests and our partners.

Dave Cawrse
Director, Forest Management
Service Center



Forest Products Measurements Staff Report

We maintain a suite of programs related to cruising, scaling, volume estimation, and area determination.

Cruising



Timber cruising is the process of measuring forest stands to determine stand characteristics, such as average tree sizes, volume, and quality. The primary purpose of cruising is to obtain a volume estimate to appraise and prepare timber sales. This fall marked the release of a new version of the field data collection program FS Cruiser, incorporating two additional cruise methods (S3P and FIXCNT). FS Cruiser runs on many field data recorders and personal digital assistants (PDAs). This allows field units to purchase hardware fitting their local environmental conditions and budget. Continued maintenance and enhancements were made to CruiseProcessing throughout the year.

With an increased emphasis on including biomass products in timber sales, the measurements group has been looking for new ways to measure small-diameter trees from NFS lands for biomass energy, one of the objectives of the USDA Forest Service Strategic Plan. New methods have been developed for quickly and efficiently collecting biomass information in the field for the development or validation of biomass weight equations. These methods, including randomized branch sampling and importance sampling, were presented at the National Check Cruiser Workshop in October of 2008.

A new cruise method, Fix Count, has been developed and implemented into the cruising software. This method is designed

to quickly estimate trees per acre by species and diameter class for stewardship sales and project work.

A method for determining the weight of slash piles was also developed and tested this year with the assistance of Region 2.

Volume Estimation



The Volume Library, which provides consistent volume estimation from tree measurements using state-of-the-art volume models, had several updates. This library is used in nearly all our software applications and also used by our partners.

The development of a new Biomass Estimation Library is nearly completed and will be incorporated into FMSC software in the upcoming year. The FMSC has entered into a partnership with FIA on the development and validation of biomass equations. The Biomass Estimation Library is anticipated to provide complete tree estimates (bole, branches, crown, and roots) in terms of green tons. This library will be useful for timber sales involving biomass as well as more accurate carbon reporting.



Scaling



Scaling is the determination of the gross and net volume of logs. The primary purpose of scaling is to determine the volume by product or species to be charged at a predetermined rate. The FSScaler field data collection software went from a beta program to a production program. The

Sample Load Activity Program was updated and the Scale Expansion Program was modified to transmit data to the Timber Information Management system (TIM) located at the National Information Technical Center (NITC) in Kansas City following new procedures outlined by the Forest Service Chief Information Officer (CIO).

With the loss of certified scalers within the Forest Service, Barbara Menzel has started creating a computer-based tutorial on cubic and Scribner scaling procedures to be completed during FY09.

Area Determination



The measurements group is also working on efficient ways to quickly and quantitatively measure land area and assist with navigation using GPS and traditional traverse methods. We continued to work with the Missoula Technology and Development Center (MTDC) supporting procedures using GPS and other surveying techniques in FS operations and with the MTDC and the Department of Defense on developing an Accuracy Matrix for the various GPS units to support quantitative values in unit area measurements. We developed a new program, GPS Calculator, to use raw GPS signals to get the required information for the Accuracy Matrix which will lead to a joint MTDC web project.

A beta version of the timber cruising survey tool, TwoTrails, was released for field testing. A final version is expected next year. A draft of handbook direction on area determination will be available next spring.

One of our team members, Gary Boyack, serves on the Interagency Global Positioning System Challenge Team, which looks at developing a consistent policy to manage

GPS as a national asset. Most federal land management regulatory agencies are part of this board, as well as academia, local governments, and individuals. The work provides direction on applied positional accuracy from satellite navigation systems and survey methods. This information is necessary to determine standards.

General

We coordinate the Regional Measurements Committee which meets annually and provides direction for the measurements group.

The Service Center has been working with the Regions to update the Timber Cruising Handbook to accommodate an increased emphasis on biomass products for potential inclusion in timber sales.

Important Partnerships

We are gaining more partners in the measurements area. We continue to assist Oregon/Washington on BLM and the Idaho Department of Lands with transition to the National Cruise System and made initial contact with seven outside agencies interested in using the Measurements software. Nearly all land management agencies involved with land and timber measurement use our software (BLM, BIA, National Park Service, Agriculture Research Service, Fish and Wildlife Service, Natural Resource Conservation Service and Army Corps of Engineers), as well as five state forestry agencies.



This past year Barbara Menzel assisted the FVS group in developing computer based training packages for self-taught FVS instruction.

Customers

Besides the National Forests, users of our measurements software include state, tribal, and other federal agencies, educational institutions, and individuals and companies.



Federal Agencies	State Agencies	Individuals/ Companies	Educational Institutions
USFS	South Dakota	Private consultants	Colorado State Univ
BLM	Texas	Timber purchasers	Front Range CC
BIA	Wyoming	Contractors	Univ of New Hampshire
NPS	Idaho	Forestry consultants	Univ of Montana
ARS	Colorado	Logging companies	Utah State Univ
USFWS			Univ. of Washington
USGS			
NRCS			
Department of Defense			
Army Corps of Engineers			

Customer Support



The measurements staff participated or assisted in cruiser training workshops in Regions 1, 2, 3, 4, and 9. New training programs used to automate the classroom projects were developed and implemented this year. The staff assisted in biomass estimation field study in Region 9 on the Chequamegon NF and in Region 2 on the Black Hills NF.

Over 1400 emails and phone calls were handled pertaining to volume, cruise, scaling, and area determination questions from all regions of the Forest Service and other government agencies, as well as state agencies, universities, and private consultants.

Contact	# of contacts
Forest Service	966
Other Gov. Agencies	237
State/University	50
Private	114

Future Initiatives and Projects



Future projects include developing the biomass estimation library and continuing to explore cost effective methods for cruising biomass material. We will continue to support all software components within the National Cruise System. FS Cruiser enhancements include built-in help and a tatum aid system. TwoTrails and FS Cruiser will allow transmission of data between the two programs so cruise information can be joined with geospatial information. A field data collection program, called FSAddOnVolume, is being developed which allows sale administrators to tally trees by diameter class, calculate tree volumes and generate an “Add On Volume” report with calculated volumes by species. We are also planning the development and release of 12 additional computer-based tutorials ranging from basic cruise measurements to area determination to development of weight factors. A sampling simulator is being developed to assist in training for cruise design. We plan to modify our FSScaler software to allow for Scribner and long log data entry and processing as required legislatively in Region 10.

Forest Vegetation Simulation Staff Report

The Forest Vegetation Simulator is an individual-tree, distance-independent growth and yield model. FVS will simulate growth and yield for most forest tree species, forest types, and stand conditions. FVS can simulate a wide range of silvicultural treatments.

National



At the national level, one of our most important jobs is to maintain and support the Forest Vegetation Simulator (FVS) base model and Fire and Fuels Extension (FFE)

code, and enhance FVS capabilities for all users. This year we enhanced FVS functionality by adding:

- keywords and event monitor functions related to carbon and climate change to the base model and the FFE,
- the ability to process an inventory of all dead trees,
- new tree level output variables such as tree height to a top diameter inside bark for total, merchantable cubic foot, and board foot volumes;
- and the ability to recognize all FSVEG potential vegetation codes and to output more descriptive error messages.

Additionally, we maintained, supported and upgraded FVS pre- and post-processing programs. A post processing program, PRESIDE, was developed to calculate mean stand age, mean residence time, and transition probabilities in support of state and transition models used for landscape planning. This program was developed for R3 and R6 planning efforts and has application nationwide. Improvements were also made to the way trees and fuel are

depicted when the SVS (Stand Visualization System) post-processor is used.

Ongoing tasks included maintaining the FVS User bulletin system and distributing source code as requested. Also, all FVS documentation was kept up-to-date, with a major improvement to the variant overviews. In addition, the Proceedings from the Third FVS Conference were prepared for publication.

An FVS Steering Team was initiated this past year to provide strategic guidance in the development and enhancement of FVS using best available science. The first meeting was in March. The program of work was reviewed. Guidance was given on needs for base model and extension enhancements, training, and new projects such as Climate-FVS.

The FVS carbon reports continue to be used by not only the Forest Service but by many consultants and other users outside the Forest Service. The carbon reports are used in both the Chicago Climate Exchange and California Climate Action Registry for calculation of carbon offsets or credits.

We hosted a meeting to address current issues in the use of Stand Density Index within the Forest Vegetation Simulator. Topics included calculation methods used for determining the maximum stand density index, which is a key factor in adjusting stand mortality.

We again co-hosted a workshop to discuss incorporation of climate change variables into FVS variants. The workshop was held at the Priest River Experimental Forest in September 2008. The purpose was to plan continued development of a climate-driven version of



the Forest Vegetation Simulator (FVS). One of our research partners, Nick Crookston in Moscow, Idaho, received funding in April to develop a climate sensitive version of FVS. We supported Nick's work through testing different approaches to "Climate-FVS", including the application of keywords to more complex models that incorporate climate variables. This work will continue through next year.

Regional and Forest Support

We provided national FVS support to Regions and National Forests for various projects. Much of this support included site visits. Here are some highlights of our national support efforts:



Region 1

- Added Beaverhead-Deerlodge NF and Helena NF location codes to the NI and IE variants.
- Implemented the FSveg potential vegetation code to FVS habitat type code crosswalk provided by the Region.
- Completed a carbon analysis for the Trapper-Bunkhouse demonstration project.

Region 2

- Added the COVER extension to the CR variant.
- Provided project assistance to the Black Hills National Forest, Mystic Ranger District
- Provided on-site project assistance for an R2 Mountain Pine Beetle analysis

Region 3

- Added the COVER extension to the CR variant.

Region 4

- Added the COVER extension to the UT variant.

Region 5

- Added the COVER extension to the CA variant.

- Corrected site index related reference values in the SO variant.
- Added Dunning site codes 6 and 7 to all R5 variants.
- Implemented the Fisher Resting Habitat Suitability Index as an event monitor variable in all R5 variants.
- Provided on-site project assistance to the Six Rivers National Forest (Orleans Community Fuel Reduction Project)
- Assists on the Big Pony thinning project on the Klamath NF.

Region 6

- Added the COVER extension to the PN and WC variants.
- Corrected site index related reference values in the SO variant.
- Implemented FSveg potential vegetation codes to FVS plant association codes crosswalks provided by the Region for the WC variant.
- Developed new large tree diameter growth equations and height-diameter relationships for red alder in cooperation with the Washington Hardwoods Commission.
- Provided support and assistance to the IMAP project and the Cedar River Municipal Watershed project
- On-site project assistance provided to the Umpqua National Forest (Cottage Grove, Doris Thinning Project)
- Assisted on the Butcherknife thinning project (Rogue River-Siskiyou NF)

Region 8

- Corrected various bugs in the base model and FFE.
- Worked with VA Tech on improvements to FFE for the Southern variant.

Region 9

- Worked with Robert Froese, and others, at Michigan Technological University on testing and validation issues with the Lake States variant.

- Developed the FFE extension for the CS variant.
- Provided assistance to the Mark Twain National Forest on mid-scale vegetation classification.

Region 10

- Added the COVER extension to the AK variant
- Developed the FFE extension for the AK variant
- Processed 3 of 4 datasets to be used in creating the Interior Alaska variant for Northern Boreal Forests.

Important Partnerships

Our partners include Forest Service Research Stations as well as universities and other land management agencies, including the BLM and BIA. Some of our important partners and projects this year included:

- Rocky Mountain Research station on FVS, FFE, and Climate Change development;
- Northern Research Station on FFE carbon reporting;
- Pacific Northwest Research Station on maintenance of My Fuels Treatment Planner software;
- Southern Research Station on FVS development and validation;

- NRIS-FSVEG staff to maintain FVS data link and update the R10 database link with FSVEG;
- Forest Health Technology Enterprise Team (FHTET) on maintenance and enhancement of FVS insect and disease extensions;
- Virginia Technological University and Southern Research Station for validating the FVS Southern variant and expansion of FFE to other areas of the south.
- University of Maine on validation studies using the FVS Northeastern variant;
- Beijing Forestry University for development of FVS technology for China;
- Bureau of Indian Affairs to provide technical assistance on forest inventory methods, volume determination, and FVS modeling;
- BLM, DOD, S&PF, and University of Alaska (Fairbanks) on the development of the Alaska northern forest (interior) FVS variant, R10;
- Virginia Department of Conservation and Recreation for using FVS in state land management plans.

Customers

FVS software, with adaptations, has been increasingly used internationally to model growth and yield.

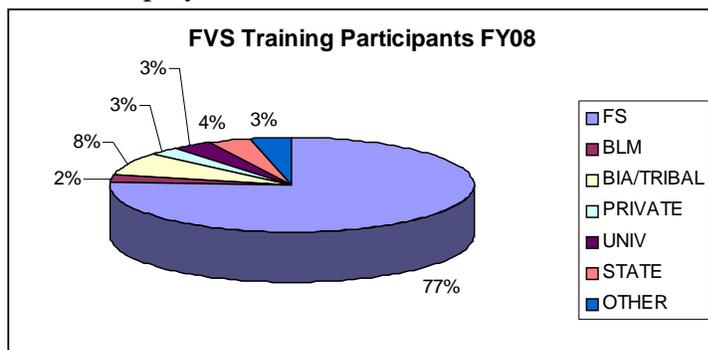
Besides the National Forests, other users of FVS software include state, tribal, and other federal agencies, educational institutions, and individuals and companies.



Federal Agencies	State Agencies	Individuals/ Companies	Educational Institutions	International
USFS	Washington	Timber industry	Colorado State Univ	Canada
BLM	Michigan	Forestry consultants	Virginia Tech	China
BIA	Colorado State FS	Silviculturists	Univ of Maine	South Korea
NPS	Utah DNR	Wildlife biologists	Beijing Forestry U	Japan
USGS	Idaho Dept of Lands	Ecologists	Univ of Alaska	Costa Rica
DOE	California	Economists	Michigan State Univ	Great Britain
DOD	Florida	Entomologists	Michigan Tech Univ	Portugal
NRCS	Oregon	Pathologists	Northern Ariz Univ	Indonesia
USFWS	Texas	Fire/fuel professionals	Purdue University	Russia
NRCS	Virginia	Forestry researchers	Univ of Arkansas	
		Forest planners	Steven F. Austin U	
		Carbon consultants	Univ of Vermont	
			Mississippi State U	

Customer Support

This past year we conducted 9 FVS-FFE formal regional week-long classes, and 2 custom FVS classes. We trained approximately 172 users, with about one fourth of the users non-Forest Service employees.



We also gave presentations on FVS at several conferences and conventions including:

- Society of American Foresters --- carbon poster
- Natural Resource Conservation Service --- carbon presentation
- RapidSpot workshop --- FVS-FFE presentation and assistance

- National Conference on Science and the Environment --- carbon presentation
- Western Mensurationist meeting – Site productivity in FVS
- The Nature Conservancy Technology Transfer Meeting in Region 3 - Linking FIA Data, Forest Vegetation Simulator, and VDDT Model for Forest Planning Revision
- Washington State Dept of Natural Resources Cooperative Monitoring, Evaluation, & Research Committee Meeting - Red Alder Equations
- Purdue University – Forest Management Class (with Dr. Ralph Johnson)
- Priest River Climate workshop – changing productivity variables in two variants as related to climate change
- PNW FIA Client Meeting --- new Fisher Resting Habitat Suitability Index

Training documentation was updated to reflect changes in the Suppose Interface and carbon modeling. The FMSC web site was kept current with software and documentation updates and we implemented a new software installation procedure.

We provided FVS-FFE phone hotline user and e-mail support 5-days/week during normal working hours. We answered approximately 20 support requests per week, assisted nearly every National Forest, and made eight site visits.

Entity	Percent of hotline calls received
Forest Service	59.7
Private	15.2
State agencies	10.9
University Systems	6.4
Dept of Interior (BLM, BIA, NPS)	6.7
Other Federal	.9
Other	.3
Total	100.0

Future Initiatives and Projects



For FY09, in addition to the above on-going activities of model maintenance, enhancements, and training, our future initiatives and projects include: continued development of carbon modeling capabilities; continued movement towards incorporating climate change variables into FVS variants; continued effort to capture vegetation classification algorithms based on mid-scale structure attributes for all USFS Regions; and continued movement towards a full regeneration establishment model for all variants.

Forest Management Service Center Staff

Dave Cawrse, Center Manager
Josie Wedlock, Administrative Support

Vacant, FVS Group Leader
Bob Havis, FVS Programmer
Chad Keyser, FVS Model Support
Stephanie Rebain, Fire and Fuels Model
Development
Erin Smith-Mateja, Model
Development, Training
Coordinator

Don Vandendriesche, FVS Model Support

Ken Cormier, Measurements Group
Leader

Gary Boyack, Forest Product Measurement Support

Vacant, Measurement Specialist

Barbara Menzel, Cruise Processing Programming Support, Training Support

Matt Oberle, Field Data Collection Programming Support

Andrew Sánchez Meador, Biometrician

Andrea Steiner, Computer Programming Assistant



Front, L to R: Gary Boyack, Bob Havis, Andrea Steiner, Stephanie Rebain, Rich Ernst (retired), Josie Wedlock, Gary Dixon (retired).
Back: Don Vandendriesche, Chad Keyser, Matt Oberle, Dave Cawrse, Ken Cormier,
Not pictured: Andrew Sánchez Meador and Erin Smith-Mateja.
Behind the camera: Barbara Menzel

Our website can be reached through the following link:

<http://www.fs.fed.us/forestmanagement/>