My Fuel Treatment Planner:
A User Guide

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Abstract

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My Fuel Treatment Planner (MyFTP) is a tool for calculating and displaying the financial costs and potential revenues associated with forest fuel reduction treatments. It was designed for fuel treatment planners including those with little or no background in economics, forest management, or timber sales. This guide provides the information needed to acquire, load, and begin to use MyFTP.

Keywords: Financial analysis, silviculture, fire, prescriptions, economics, treatment cost, software.

Preface

This document is part of the Fuels Planning: Science Synthesis and Integration Project, a pilot project initiated by the U.S. Forest Service to respond to the need for tools and information useful for planning site-specific fuel (vegetation) treatment projects. The information primarily addresses fuel and forest conditions of the dry inland forests of the Western United States: those dominated by ponderosa pine, Douglas-fir, dry grand fir/white fir, and dry lodgepole pine potential vegetation types. Information, other than social science research, was developed for application at the stand level and is intended to be useful within this forest type regardless of ownership. Portions of the information also will be directly applicable to the pinyon pine/juniper potential vegetation types. Many of the concepts and tools developed by the project may be useful for planning fuel projects in other forest types. In particular, many of the social science findings would have direct applicability to fuel planning activities for forests throughout the United States. As is the case in the use of all models and information developed for specific purposes, our tools should be used with a full understanding of their limitations and applicability.

The science team, although organized functionally, worked hard at integrating the approaches, analyses, and tools. It is the collective effort of the team members that provides the depth and understanding of the work. The science team leadership included Deputy Science Team Leader Sarah McCaffrey (USDA FS, North Central Research Station); forest structure and fire behavior—Dave Peterson and Morris Johnson (USDA FS, Pacific Northwest Research Station); environmental consequences—Elaine Kennedy-Sutherland and Anne Black (USDA FS, Rocky Mountain Research Station); economic uses of materials—Jamie Barbour and Roger Fight (USDA FS, Pacific Northwest Research Station); public attitudes and beliefs—Pam Jakes and Sue Barro (USDA FS, North Central Research Station); and technology transfer—John Szymoniak, (USDA FS, Pacific Southwest Research Station).

This project would not have been possible were it not for the vision and financial support of Washington Office Fire and Aviation Management individuals Janet Anderson Tyler and Leslie Sekavec.

Russell T. Graham
USDA FS, Rocky Mountain Research Station
Science Team Leader

RMRS North Central Research Station PNW PSW

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Introduction

In face of rapidly changing public and political attitudes toward fire and fuel planning, the fuel planner is ultimately responsible for making decisions on the land. Of course, the planner works within the framework of the National Environmental Policy Act (NEPA) and other regulations to achieve objectives at the national, regional, and local levels, but the method of achieving those objectives (mechanical thinning or prescribed fire, for example) is often left to the planner's discretion. To evaluate the range of available alternatives, quality information about different treatment strategies is required, including estimates of how much treatments will cost.

My Fuel Treatment Planner (MyFTP) is an MS Excel-based tool for calculating costs and benefits of fuel treatments.[1] Designed for ease of use and integration with other available planning tools, MyFTP can assist fuel planners in evaluating the economic costs of fuel treatments and other management activities. It also provides direction on how to think through economic analyses and a discussion of the environmental, social, and other values associated with fuel treatments.

More information about stand structure, environmental impacts, economics, and human responses to these factors can be found in a series of fact sheets prepared by the USDA Forest Service. These can be accessed from the introductory page or from the navigation page of MyFTP. Information in the fact sheets is targeted for the dry forests of the inland West but is often applicable across broad regions of the country. For more information, visit the Web site at www.fs.fed.us/fire/tech_transfer/synthesis/synthesis_index .

Installation of MyFTP

System Recommendations

Hardware

- A personal computer with a Pentium III or faster processor
- At least 128 megabytes (MB) of total random access memory (RAM)
- Hard drive with at least 90 MB of free space (MyFTP application and related files take up 44 MB)

Software

- Microsoft Windows 98, 2000, NT 4.0, or Windows XP
- Microsoft Excel 2000, 2002, or 2003

[1] The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

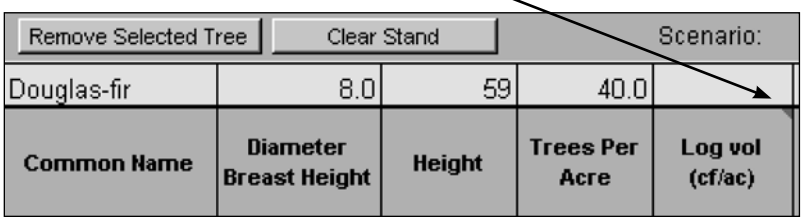
Installation Step by Step

1. The installation process will stop if a previous version of MyFTP is found. To uninstall a previous version, click on the Start button in the lower left-hand corner of the screen, select Settings / Control Panel / Add Remove Programs. Find MyFTP_installer, click on it and select Remove.
2. Access the MyFTP Web page: http://www.fs.fed.us/pnw/data/soft.htm.
3. Several files will be found in the directory including MyFTP.zip and readme.txt. The readme.txt file has change notifications and the most current installation instructions.
4. After examining the readme.txt file for changes or updates, download MyFTP.zip and other files of interest.
5. After file extraction, double click on Setup MyFTP.bat and answer the setup questions. (Check Step 1 for questions about uninstalling previous versions). The installation process places a MyFTP icon on the desktop.
6. **Users of Office XP only:** Press the Start button in the lower left-hand corner of the screen, select MyFTP and then select Only For Office XP. A file required for biomass calculations will be loaded onto the C drive.
7. Files should now be properly loaded and MyFTP ready for use.

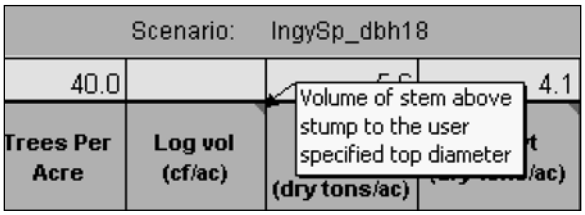
Using My Fuel Treatment Planner

Conventions

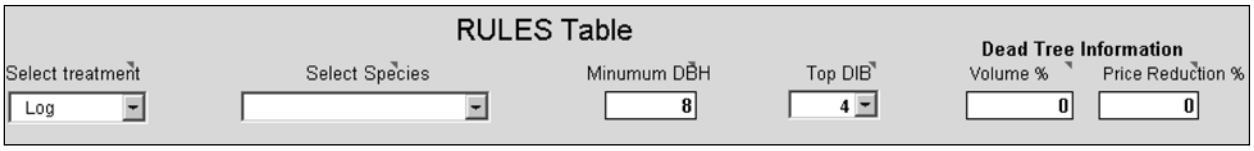
1. The small red triangles located throughout MyFTP indicate definitions or other useful information. These **comment triangles** are located in the upper right-hand corner of the cell. Notice the triangle below.



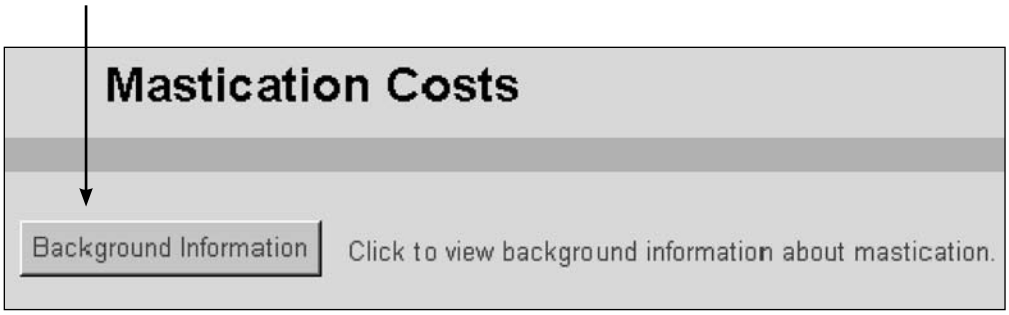
When in MyFTP, hover the cursor over the triangle and the comment will appear as shown below.



2. White cells are **user input cells**. Notice the white input cells in the Rules table.



3.Buttons with blue text are connected to documentation and helpful hints.



Starting MyFTP

1. Start the program by double clicking on the MyFTP icon on the desktop ***or*** press the Start button in the lower left-hand corner of the screen, select MyFTP, then MyFTP.

2. If the following security warning appears,

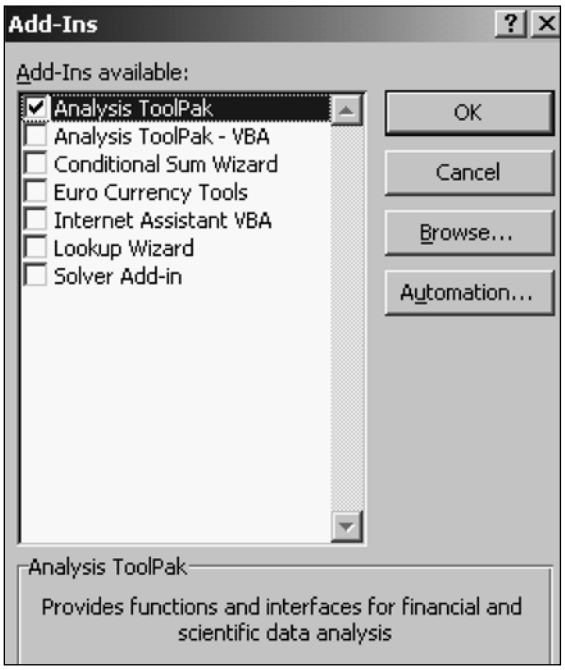
   choose Enable Macros. Macros must be enabled for MyFTP to run. If your macro security level is set on high, it must be changed in order to use MyFTP.[2]

3. Five Excel workbooks should now be open: MyFtpa.xls, Fuelsvolumecalculator.xls, FRCS.xls, TreatmentSum.xls, and Error_file.xls. User input will only occur in MyFtpa.xls. Workbooks Fuelsvolumecalculator.xls and FRCS.xls perform calculations and store data. These workbooks should not be directly changed by the user. Changes made to Fuelsvolumecalculator.xls and FRCS.xls may create errors in or disable the functionality of MyFTP. Workbooks TreatmentSum.xls and Error_file.xls are used in batch file entry.

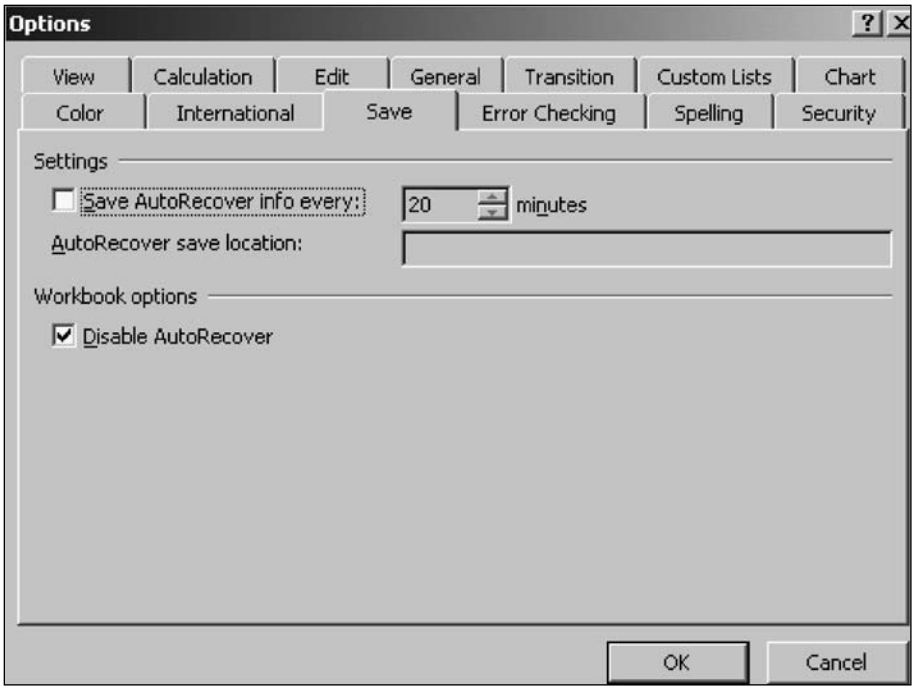
   If some of the five workbooks do not open, close the workbook(s) that are open and start over with step 1. If some of the workbooks still do not open, try to open each workbook individually by double-clicking each file name. All five workbooks help

[2] Try the following steps to change the security level. Choose Tools/Options and then select the Security tab. Activate the Macro Security button and set the security level to medium. The medium level allows the user to select whether or not to run macros. If you are unable to change your security level, consult your network administrator.

MyFTP function properly. The Analysis ToolPak must be selected as an Add-In. Select Tools/Add-Ins and check the box for Analysis ToolPak, as shown below.



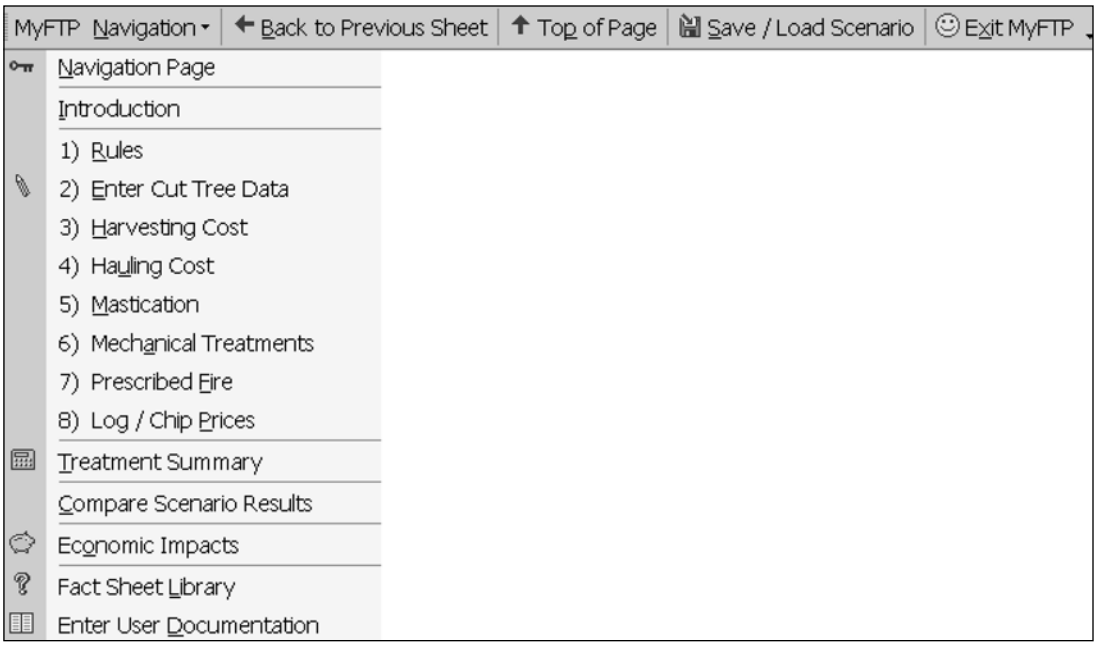
4. Select Tools/Options and then select the Save tab. Uncheck the Save AutoRecover and check Disable AutoRecover as shown below:



5. You are now ready to start using MyFTP. Begin by reading the following sections, "Organization and Flow" and "Required Input."

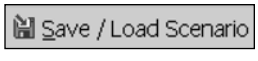
Organization and Flow

My Fuel Treatment Planner has been designed for ease of use and to flow logically through all the necessary input steps. There are two primary means of navigation through MyFTP. One is the MyFTP toolbar. It is available at the top of every screen within MyFTP. This will usually be the quickest and easiest means to get from place to place in MyFTP. The first button on the toolbar is a dropdown menu with all MyFTP pages ordered to provide a natural flow of data entry. The MyFTP toolbar and the dropdown for the first button on the toolbar (MyFTP Navigation) is shown below.



allows the user to return to the previous page. This button only returns one level. If the button is pressed repeatedly, the user will simply toggle between the last two pages.

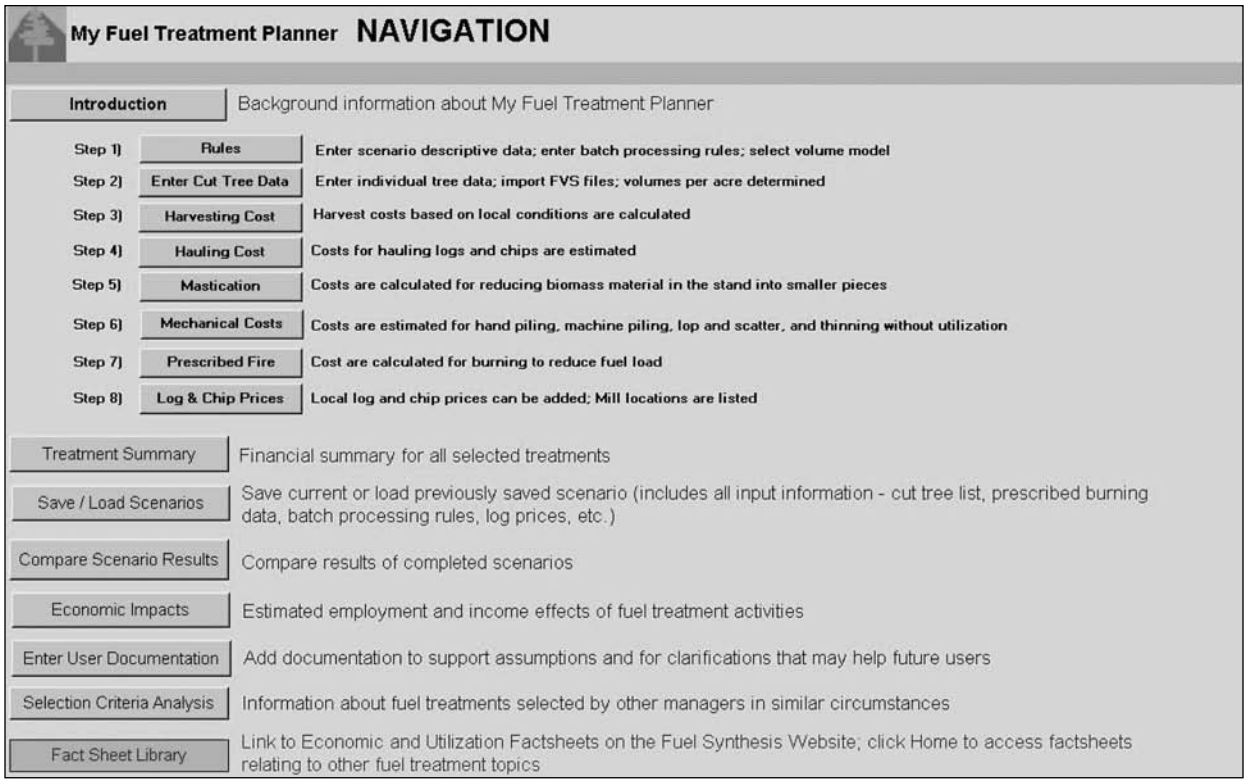
moves the cursor to the top of the current page.



brings up a dialog box for saving your work. This is covered in detail in a subsequent section.

Exit MyFTP provides a quick exit avoiding all the Save Workbook messages. You will be given two warnings before exiting. Answer "yes" to the first question to enter documentation or "no" to continue the exit process. Answer "no" to the second question to return to MyFTP in order to save data or answer "yes" to exit MyFTP. See the sections, "Enter Documentation" and "Saving Scenarios," located in this guide for more information.

The Navigation page of MyFTP, shown below, provides a brief description of the navigation buttons. Clicking on any button on the Navigation page will move the user to that location.



Closing and Exiting

The best way to close MyFTP is to select Exit MyFTP from the MyFTP toolbar. Before closing MyFTP, enter documentation on the User Documentation page and save scenario data on the Save/Load Scenarios page or on the Compare Scenario Results page.

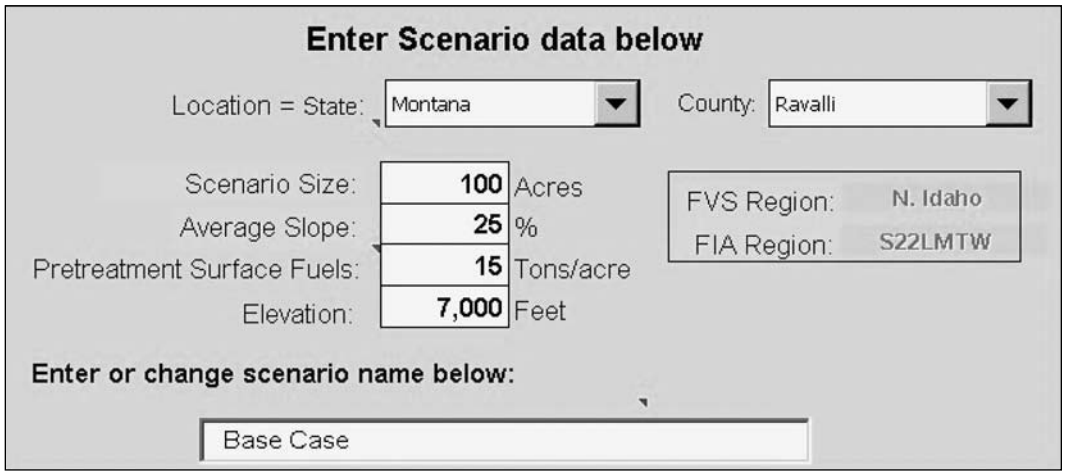
If File/Exit or the X at the top right of the screen is selected, MyFtpa.xls, Fuelsvolumecalculator.xls, and FRCS.xls will close without being saved. If the warning, "Microsoft Excel has encountered a problem and needs to close. We are sorry for the inconvenience," occurs when the files are closing,

uncheck the box "Recover my work and restart Microsoft Excel" and click the Don't Send button.

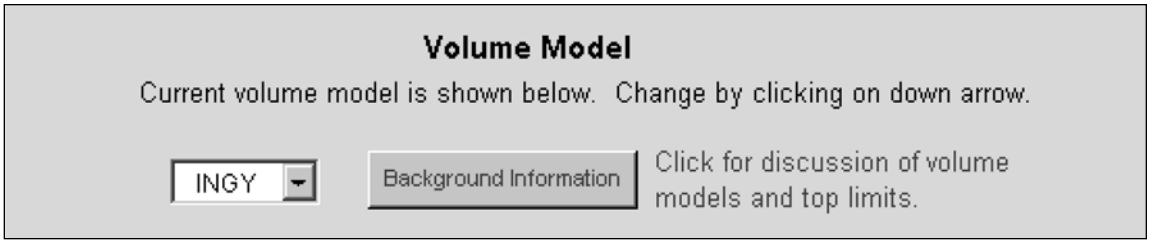
Required Input

Rules

From the Navigation page or on the navigation dropdown menu click Rules. Biomass calculations are performed immediately after each cut tree is entered. Therefore, changes to the Rules page must be made before any cut tree information is entered.



User input is allowed in white boxes within MyFTP. The scenario input portion of the Rules page is shown above. Select the state and county with the dropdown arrows. Click in the white box to the right of Scenario Size, type the scenario unit size and hit the Enter key. Follow the same process to enter average slope, pretreatment surface fuels, and elevation. The tons per acre of pretreatment surface fuels is optional, but is needed to account for surface fuels in the summary information. Click in the scenario name box to change the name. The box on the right-hand side shows the Forest Vegetation Simulator (FVS) regions (Dixon 2004) and the Forest Inventory and Analysis (FIA) regions. These regions are important in biomass calculations, are based on the state and county selected, and can only be changed by selecting a different state and county combination.



The volume model is selected from the dropdown menu on the bottom of the Rules page. The Inland Growth and Yield Cooperative (INGY) volume model is a set of volume equations for major commercial species developed from recent data with an equation that provides profile calculations (diameters at any point on the bole) and volume calculations that are fully consistent with each other (Flewelling and Ernst 1996). The INGY profile equations are used to divide each tree selected for the log treatment into one or more logs. The total volume per tree will be calculated by using the selected volume model (FIA or INGY), but the INGY profile equations are always used to allocate the volume to logs.

The INGY equations generally apply in the northern Rockies and east of the Cascade Range Crest (see INGY map by clicking the View INGY map button in the background information dialog). Within this area we encourage the use of the INGY volume model. Outside this area, however, the user takes responsibility for determining when the INGY model is a reasonable choice. A 4- or 6-in-top diameter limit for logs can be selected in the Pacific Coast States whereas only a 4-in-top diameter limit is allowed in the interior West.

Entering Data in the Rules Table—The first selection in the Rules table (fig. 1) is the chip type; only one chip type is allowed per scenario. Clean chips exclude bark, limbs, and foliage. Dirty

RULES Table

Select Chip Type: Dirty

Select chip type from the dropdown list. Clean chips exclude bark, limbs and foliage. Dirty chips include bark, limbs, and foliage and are usually used as fuel.

Dead Tree Information

Select treatment	Select Species	Minumum DBH	Top DIB	Volume %	Price Reduction %
Log	XC	9	4	NA	NA

Enter Rule in | Clear Selected Entry | Clear Rule Table

LOG					CHIPPED	
			DEAD			
Species	Minimum DBH	Top DIB	% of Total Volume	% Price Reduction	Species	Minimum DBH
LP	8	4	0	0	XC	5
XC	9	4	NA	NA	XH	5

Figure 1—Rules table.

chips include bark, limbs, and foliage and are usually used as fuel. The next section of the Rules table is used to enter specifications for record processing. Tree treatment choices are Log and Chipped. Log trees, as used in MyFTP, are trees with at least one merchantable log at least 16.5 ft long that is delivered to the landing, loaded on a truck, and hauled to a market. Chipped trees are felled, delivered to the landing, and chipped on site; chips are then loaded on a truck and hauled to a market. Any cut tree not meeting the requirements for either log or chipped will be designated as unutilized and will be cut, but not removed from the site; often some or all of the unutilized trees are selected for some subsequent treatment such as mastication or prescribed fire. Trees that are designated in the Rules table to be logs but do not have at least one 16.5-ft log may be moved to the chipped category. Treatments are changed from log to chipped when the species to be changed has a chipped entry in the Rules table and meets the minimum diameter breast height (DBH) requirement for chips. If the clean chips category is selected, the tree will only be classified as chipped if an INGY profile is available and if the tree is large enough to make a 16.5-ft log to a 3-in inside bark small-end diameter. Trees that do not meet the chipped qualifications are dropped into the unutilized category.

Select a treatment (either Log or Chipped) and then a species from the dropdown menus. Species selection depends on the treatment chosen. When the log treatment is picked, only 12 conifer species are available. The INGY log profile equations (Flewelling and Ernst 1996) are currently available for 12 conifer species (subalpine fir, Douglas-fir, Engelmann spruce, grand fir, lodgepole pine, mountain hemlock, ponderosa pine, western redcedar, white fir, western hemlock, western larch, and western white pine) and no hardwood species (see “Species List” for scientific names). Certain species may not be available in the state and county selected (even if they are shown on the dropdown menu). During record processing on the Enter Tree Data page, if volume or biomass equations are not available for a species in a specific location, an error message is either shown on the screen (in individual entry) or written to the error_file.xls (in batch mode).

Click in the white box below Minimum DBH and enter the smallest DBH that will be processed for the selected treatment. For logs only, click in the white box below “Top DIB” and select either 4 or 6 inches for the top diameter inside bark (DIB). **(Note: in the Rocky Mountain region the only available top DIB for volume calculations is 4 in.)**

If the treatment selected is logs and if there will be a price reduction for dead trees, click first in the white box below Volume % and enter the percentage of the volume that will have a price reduction. After entering the volume reduction percentage, click in the white box below Price Reduction % and enter the percentage reduction in the price for logs from dead trees. If no substantial dead tree volume occurs or if all logs will be treated the same, enter 0 in the Volume % box and in the Price Reduction % box, or just leave both boxes blank. After filling out the data line, activate the button:

Other buttons associated with the Rules table:

Clear Selected Entry Use the "Clear Selected Entry" to delete a single species from the Rules table. Place the cursor in the table in the cell with the species name and click on the button.

Clear Rule Table Activating this button will clear all entries from the Rules table.

Application of Rules—Most rules are applied during the tree entry process, either as each tree is entered individually or as the trees are processed during batch entry. The rules page information should be fully specified before entering data on cut trees by either method.

Log Volumes—Only species listed on the Select Species dropdown when Log is the selected treatment can be designated for logs. Log volumes for other species can be calculated by selecting a listed species of similar form and by using the "Change a Species Code in Imported File" utility found on the Enter Cut Tree Data page.

Rules Table Example Entry—Enter the minimum DBH values for each species in the log and chipped treatment categories. For log treatments, also enter the top DIB and dead tree information. For example, if log, DF, 8, 4, 0, and 0 are entered, every Douglas-fir with a DBH of 8 in or greater will be treated as a log with a 4-in top DIB and with no deductions for dead trees. If chipped, DF, and 6 are then entered, every Douglas-fir tree less than 8 and greater than or equal to 6 in DBH will be chipped. All Douglas-fir trees with a DBH of less than 6 in will be designated unutilized. Only one log entry and one chipped entry are allowed per species. Two catch-all species categories are available: XC and XH. The XC category is for all conifers if listed alone or for all remaining conifers if listed with other species. The XH category is used correspondingly for the hardwood designations. If a species has no DBH specifications listed in the table (and the catch-all category is not entered), all entries for that species will be designated unutilized regardless of size.

Dead Tree Information—Dead tree information is entered only for the Log category. The catch-all category of XC cannot be used for entering dead tree information. Any species with dead information must be entered individually.

Enter Cut Tree Data

Description of Data Fields—From the Navigation page or the navigation dropdown menu click Enter Cut Tree Data. Three data entry fields (species, DBH, and trees per acre) must be completed for every tree; the fourth, height, is optional.

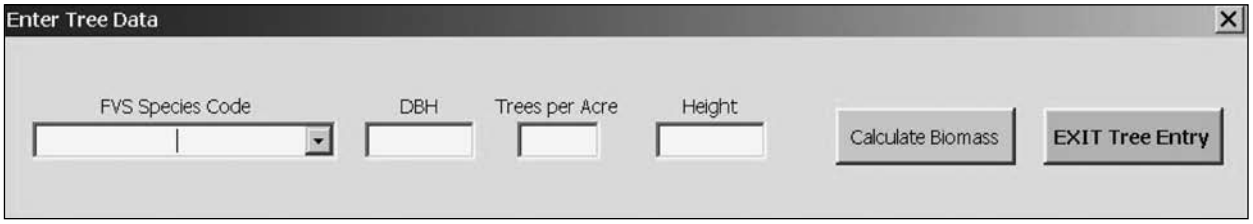
The DBH entries have a minimum of 1 in and a maximum of 30 in. The trees per acre entered must be greater than zero. Top DIB choices can be either 4 in or 6 in depending upon the current location and volume model. If known, tree height should be entered. If the height field is left blank

or entered as zero, MyFTP will attempt to calculate a tree height, based on the current FVS region. If height coefficients for the species are not available, the height cannot be calculated, and the biomass for that tree cannot be determined.

In My FTP, trees can be entered two ways; individually tree by tree or in batch mode by entering a text file containing multiple trees.

Individual Tree Entry—Start individual tree entry by clicking on the 

button found on the Enter Cut Tree Data page. When the button is activated, the following tree form will appear.



Begin filling out the tree data form by clicking on the down arrow in the FVS species code and selecting the desired species. Enter numbers greater than zero in the DBH, Trees per Acre, and Height fields. If height is unknown, leave the cell blank or enter 0 and MyFTP will attempt to calculate the height. After all fields have been entered, hit the enter key or press the Calculate Biomass button to calculate the biomass for the entered tree. If MyFTP was able to complete the biomass calculations, the user will be given the option to add the tree to the current table. When all trees have been entered, select the EXIT Tree Entry button on the Enter Tree Data form. The trees entered in the table on the Enter Cut Tree Data page should then be reviewed for accuracy. The data line shown on the screen in blue is the current calculated data and is not a part of the data table. To clear an entry from the data table, click in the species name cell of the tree to delete and press the Remove Selected Tree button.

When the data table is complete, as shown in figure 2, push the 

button to process the trees and update the Treatment Summary page.

Batch or Multiple-Tree Entry—Multiple-tree entry is possible with MyFTP. An FVS cut list file can be imported. The cut list file must have the .trl extension to be processed by the FVS import utility (see fig. 3).

Remove Selected Tree	Clear Stand		Scenario: Default Data							Dirty Chips selected		
Douglas-fir	8.0	59	40.0		6.3	5.14	1.2	NA	Chipped	Dirty		
Common Name	**Diameter Breast Height**	**Height**	**Trees Per Acre**	**Log vol (cf/ac)**	**Total Biomass (dry tons/ac)**	**Bole wt (dry tons/ac)**	**Tops and Limbs (dry tons/ac)**	**Top DIB**	**Treatment**	**Chip Type**	**Cut Trees (bf/ac)**
Douglas-fir	8.0	59	40.0		6.3	5.14	1.2	NA	Chipped	Dirty	
Douglas-fir	12.0	75	1.0	21	0.4	0.35	0.1	4	Log		100
Ponderosa pine	10.0	64	10.0	118	2.1	1.75	0.4	4	Log		542

Figure 2—Enter Cut Tree Data page.

0 FOREST VEGETATION SIMULATOR VERSION 6.21 -- INLAND CALIFORNIA / SOUTHERN CASCADES RV:06.04.04 06-14-2004 05:26:42

COMPLETE CUT LIST -- STAND: 111H3N115B MGMTID: NONE CUT CYCLE: 1 CYCLE LENGTH: 5 YRS YEAR: 2000 PAGE: 1

TREE NUMBER	TREE INDX	SP CD	SP NO	TR CL	SS CD	PNT NUM	TREES PER ACRE	MORTAL PER ACRE	CURR DIAM	DIAM INCR	CURR HT	HT INCR	CR	MAX CW	MS	BA %-TILE	POINT BAL	TOT CU FT VOL	MCH CU FT VOL	MCH BD FT VOL	MC DF	BF DF	TRC HT
31	1	DF	7	3	0	1	150.000	0.000	0.1	0.00	4.0	0.0	52	3.1	0	0.02	63	0.0	0.0	0.0	0	0	0
49	8	DF	7	3	0	2	500.000	0.000	0.1	0.00	1.0	0.0	66	0.8	0	0.07	41	0.0	0.0	0.0	0	0	0
32	2	OH	49	3	0	1	500.000	0.000	0.1	0.00	3.0	0.0	44	1.7	0	0.13	63	0.0	0.0	0.0	0	0	0
33	3	OH	49	3	0	1	34.405	0.000	7.3	0.09	55.0	0.0	45	13.0	0	23.08	40	9.5	6.7	0.0	0	0	0
35	5	OH	49	3	0	1	34.405	0.000	7.3	0.15	30.0	0.0	35	13.0	0	42.31	20	5.6	3.5	0.0	0	0	0
36	6	OH	49	3	0	1	50.000	0.000	2.2	0.10	12.0	0.0	15	5.6	0	3.84	60	0.2	0.0	0.0	0	0	0
48	7	OH	49	3	0	2	50.000	0.000	0.1	0.00	3.0	0.0	45	1.7	0	0.07	41	0.0	0.0	0.0	0	0	0
411	10	OH	49	3	0	2	25.985	0.000	8.4	0.39	33.0	0.0	25	14.6	0	61.54	20	8.0	5.2	0.0	0	0	0
412	11	OH	49	3	0	2	50.000	0.000	1.5	0.18	9.0	0.0	15	4.6	0	1.31	40	0.1	0.0	0.0	0	0	0

Figure 3—An example FVS cut list.

Start the import process by clicking **Import FVS File**. During the import process, a text file is created from the .trl cut list file. The text file is brought into MyFTP by clicking

Select batch file for processing.

Using an Excel File for Batch Processing—An Excel file can be selected directly for processing and the Import FVS File step omitted. The Excel fields must be positioned as shown in figure 4. Row 1 is an identifier row with data processing beginning in row 2. The StandId must be in column A, the StandYear in column B, and so forth with column G (TPA or trees per acre) the last column processed. The TreeId field is currently just a place holder and can be left blank. All other fields must be in the same columns as shown in the Excel example in figure 4. The crown ratio is imported by the FVS import utility but not currently used by MyFTP. Click on "Select batch file for processing" button to process the Excel file.

Batch Processing Results—All records in the tree data table (on the Enter Cut Tree Data page) are deleted. New cut tree records are added as the batch file is processed. The scenario name is a combination of the StandId and StandYear fields (the first two fields in the batch file); if either or both change, a new scenario is produced and the tree data table is cleared. During the batch run, the TreatmentSum.xls workbook is populated and contains the treatment summaries of all scenarios within the current run. Error_file.xls workbook is also populated and lists the errors from the

	A	B	C	D	E	F	G
1	StandId	StandYear	TreeId	Species	Diameter	Height	TPA
2	40010100601	2004	1006	AF	10	50	10.1
3	40010100601	2004	3002	DF	12	62	12.2
4	40010100601	2004	3003	WF	11	57	11
5	40010100601	2004	3004	WF	9	55	12.6
6	40010100601	2004	3005	DF	8	62	5.8

Figure 4—Example Excel file with data formatted to be read into MyFTP.

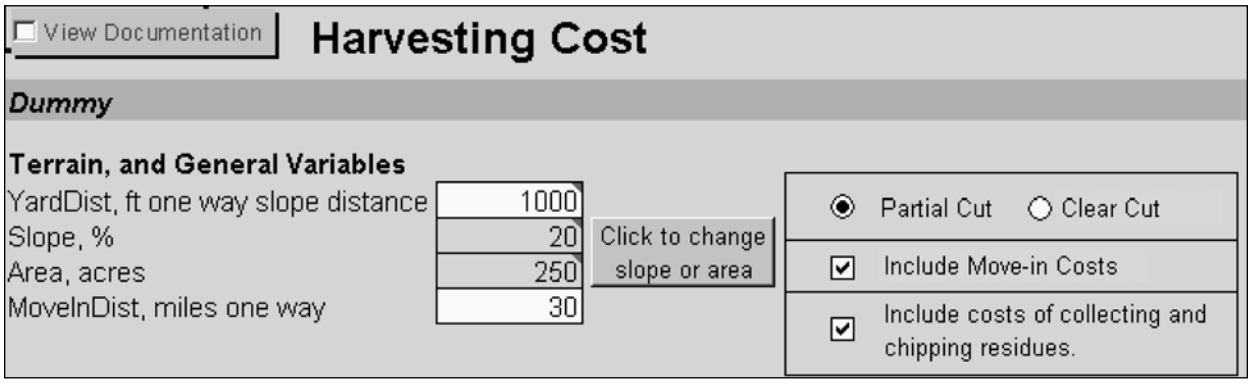
current run. Both of these files are cleared when a new batch run is initiated. The results from the final scenario in the batch file can be viewed on the Treatment Summary page. The cut trees from the final scenario will be found on the tree data table on the Enter Cut Tree Data page.

Changing a Species Code in a Batch File—Currently, 12 conifer species can be treated as logs (see "Description of Data Fields"). If, for example, a batch file contained one or more Jeffrey pine (JP) that should be treated as logs, the JP could be changed to PP (ponderosa pine) and then processed as logs. Click the Change a Species Code in Batch File button and rename JP to PP. This will result in the profile equations for PP being used in the volume calculations and the weights for PP being used in the weight calculations.

Species Availability—States and counties do not all have the same species available for biomass processing. The species dropdown lists contain all possible species for all combinations of Western States and counties. However, even if the species is found on the dropdown list, it may not be available in the selected state and county.

Harvesting Cost

From the Navigation page or the navigation dropdown menu click Harvesting Cost.



Check the current entries for yarding and move-in distances and change by clicking in the box and entering a new number. Change the slope percentage and total acres by clicking on the adjacent box. Select either Partial cut or Clear Cut. Check or uncheck the boxes to include move-in and residue collection costs.

Costs of moving equipment to the harvest unit are spread over the number of acres treated. The move-in costs are a small part of total harvesting costs unless the acreage treated is very small or the distance the equipment comes from is quite high, so this is not normally a number to agonize over. If nearby units could be treated together, the move-in distance might be an average of the initial move-in and short distances to a number of subsequent units.

The size and shape of units and the location of landings determine the average distance that logs or trees need to be transported to the landing. In some cases it might involve transporting logs or trees outside the unit boundary to a landing located some distance from the unit. Considering these factors, specify an average distance along the slope (in feet) for transporting logs or trees to the landing except for helicopter logging where horizontal distance is used. Maximums have not been set for ground skidding and forwarding distances, but cable yarding distances are limited by the drum capacity of yarders. Thirteen hundred feet is the maximum average yarding distance allowed by the program for cost calculation for cable systems.

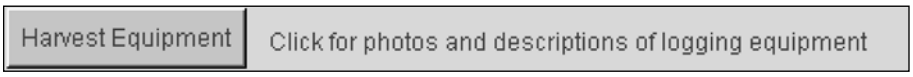
The weight of trees or logs affects machine speeds and turn loads, and therefore costs. Log or tree volumes are for the bolewood inside the bark, but the weight includes the bark, and in the case of whole-tree logging, it also includes the weight of limbs and foliage. These conversions are calculated by MyFTP from biomass and equations for each species that give the relative weights of tree components.

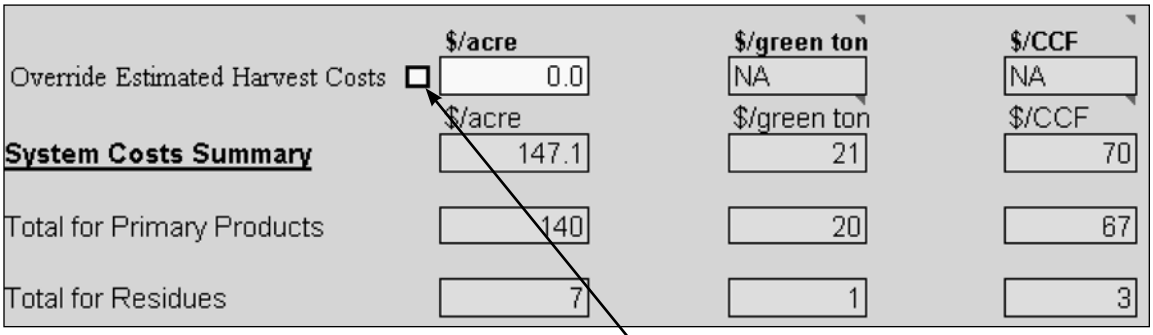
Select the harvest system, as shown in figure 5. Only one system can be selected. Four ground-based systems are available: manual log length, manual whole tree, mechanical whole tree, and mechanical cut-to-length. Four yarder or cable systems are available: manual log length, manual whole tree, manual whole tree with logs for larger trees, and mechanical cut-to-length. Two helicopter systems are available: manual log length and mechanical cut-to-length.

Ground-Based	Cable	Helicopter
○ (1) Manual log length ○ (2) Manual whole tree ◉ (3) Mechanical whole tree ○ (4) Mechanical cut-to-length	○ (5) Manual log length ○ (6) Manual whole tree ○ (7) Manual whole tree w/logs for larger trees ○ (8) Mechanical cut-to-length	○ (9) Manual log length ○ (10) Mechanical cut-to-length

Figure 5—Harvesting system selections.

Information and pictures of the various harvesting systems are found in MyFTP by clicking on the Harvest Equipment button shown below.

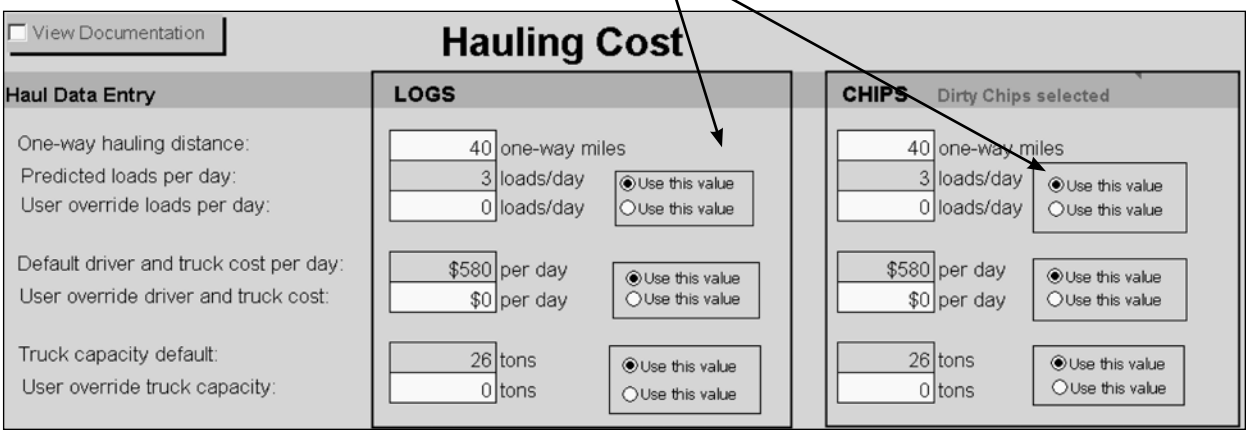




Override the calculated harvest costs by checking the box and then entering the per-acre cost in the white cell below $/acre. Other costs will be adjusted proportionately. If the override box is checked, the system costs summary line will use the numbers in the white override cells even if they are zero.

Hauling Cost

From the Navigation page or the navigation dropdown menu, click Hauling Cost. Enter the hauling information for logs or chips or both. Only one type of chip can be selected (on the Rules Page) per scenario, clean or dirty. Clean chips exclude bark, limbs, and foliage. Dirty chips include bark, limbs, and foliage and are usually used as fuel. Start with the hauling distance and verify the default values for loads per day, cost per day, and truck capacity. Change any of these values that are not valid for your area. Remember the white cells are user entry cells. Be sure to select the option button next to each value you want to use.



Mastication

From the Navigation page or the navigation dropdown menu click Mastication. Mastication is the process of reducing biomass material in the stand into smaller pieces that are left onsite for subsequent burning or decomposition. This term covers a wide range of equipment designs with capabilities that range from mowing brush to felling and grinding large-diameter trees. Machines may be known as brush hogs, mulching machines, slashbusters, or grinders.

Masticated tons in MyFTP originate from unutilized trees, utilized trees, and pretreatment surface fuels. Cut trees that have been classified as unutilized (see the Edit Cut Tree Data page) are often selected for some subsequent treatment such as mastication or prescribed fire. These trees are usually smaller than the logs or chipped trees and are expensive to process and yard to the landing. The tops and limbs of utilized trees also can be masticated. The final onsite fuels that are sometimes masticated are the logs, limbs, and other woody debris that existed before the planned treatment—the pretreatment surface fuels. The total dry tons available for mastication are shown to the right of TOTAL. Tons and acres masticated are entered in the white cells as shown in figure 6.

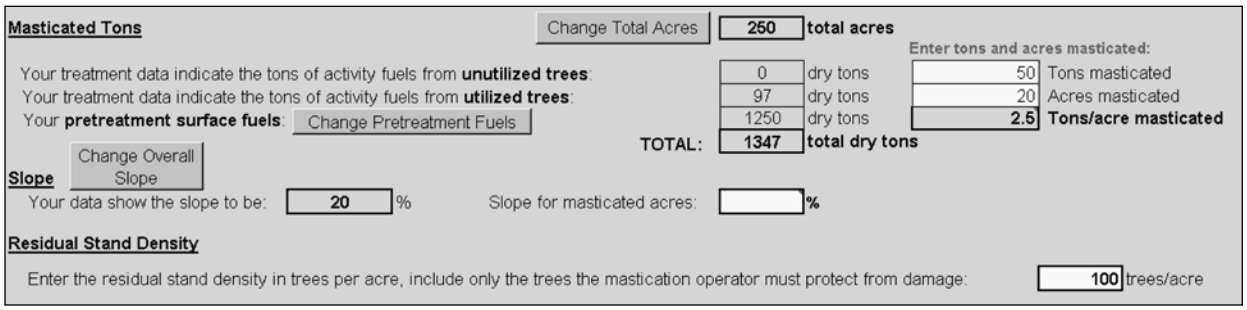


Figure 6—Mastication page.

Slope and residual stand density have a substantial effect on the production rate per hour and should be changed if they do not represent current scenario conditions. Based on slope, stand density, fuel and operator costs, largest piece size, and tons per acre to be masticated, the mastication costs are calculated and shown on the bottom of the Mastication page. Review the production rates per hour and the total costs. Enter your own costs if the calculated costs do not seem appropriate.

Mechanical Treatments

From the Navigation page or the navigation dropdown menu click Mechanical Treatments. Near the top portion of this page is data entry for predicted costs (see fig. 7). Please read the documentation and then complete the data entry. The default fuel load is the sum of the remaining activity fuels, before burning, and the pretreatment fuels. Override the default fuel load by entering a number in the white cell immediately below the default value (shown as a 10 in fig. 7) to reflect treatment of a nonrepresentative portion of the unit or to leave some fuel untreated.

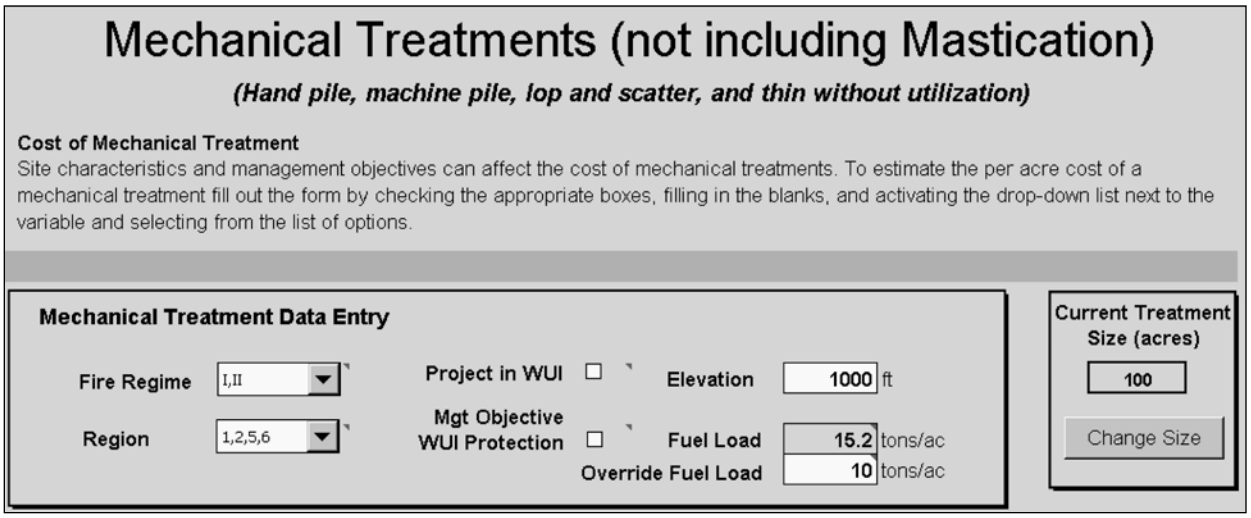


Figure 7— Portion of data entry form on Mechanical Treatments page.

The predicted costs will not show up in the Mechanical Treatments table unless the number of acres entered for a treatment method (in the area below what is shown in fig. 7) is greater than zero.

Prescribed Fire

From the Navigation page or the navigation dropdown menu click Prescribed Fire. Near the top portion of the Prescribed Fire page is data entry for predicted prescribed fire costs. Please read the documentation and then complete the data entry. The predicted costs will not show up in the Prescribed Fire Customized Treatment table unless the number of acres entered for a treatment method is greater than zero.

In figure 8, the user has indicated that machine piles of a 250-ac unit will be burned and 100 ac of the unit will be broadcast burned. Twenty percent of the total activity fuels will be consumed in the broadcast burn, and 50 percent of the activity fuels will be consumed when the machine piles are burned. Fifty percent of the pretreatment fuels will be consumed in the broadcast burn, but no pretreatment fuels will be consumed when the machine piles are burned. Predicted cost per acre (based on the user's input) for burning machine piles is $8. The user accepted this cost (by leaving $0 in the User Overrides column) and $8 is shown in the final column of the table. Cost of $50 per acre is predicted for the broadcast burn. The user entered a different cost of $131 in the User Overrides column. The final column of the table shows the $131 as the per-acre cost used in the calculations.

The Activity Fuels Consumed and Pretreatment Fuels Consumed columns contain percentages that cannot total more than 100 (total shown in bold print in the bottom row). The bottom cell in the per-acre costs column is a weighted average of per-acre costs spread over total scenario acres.

Prescribed Fire Customized Treatment Table						
Treatment Method	Acres	Activity Fuels Consumed (percent of total)	Pretreatment Fuels Consumed (percent of total)	Predicted Cost (per acre)	User Overrides (per acre)	Per acre costs (used in calculations)
Broadcast burn	100	20	50	$50	$131	$131
Burn machine piles	250	50	0	$8	$0	$8
Burn hand piles				$0		$0
		70	**50**			**$60**

Figure 8— Prescribed fire example.

For this example:

((100 acres × $131 / acre) + (250 acres × $8 / acre)) / 250 acres = $60 per acre.

One hundred acres are broadcast burned at $131 per acre. Two hundred and fifty acres of machine piles are burned at $8 per acre. The total burning costs are divided by the total scenario acres of 250, and the final per-acre cost of prescribed fire is $60.

Treatment Summary

A portion of the Treatment Summary page for the same example is shown in figure 9. Notice the $60 for prescribed burn costs. Also notice the fuels burned of 4.0 dry tons/acre. The fuel burned is calculated based on the percentages consumed entered in the Prescribed Fire Customized Treatment table.

Notice that 20 percent of the activity fuels (2.2 tons/acre) and 50 percent of the pretreatment fuels (5.0 tons/acre) were expected to be consumed in the broadcast burn. Burning the machine piles was expected to reduce the activity fuels by 50 percent.

The formula for this example is:

(20 % × 2.2 tons) + (50 % × 5.0 tons) + (50 % × 2.2 tons) = 0.4 + 2.5 + 1.1 = 4.0 dry tons / acre

	$ / Acre			Dry Tons / Acre
Gross Revenue	$356		**Cut Trees (Biomass)**	**6.6**
Harvest Costs	$194		Logs Removed	3.0
Hauling Costs	$70		Chipped Trees	0.0
Mastication Costs	$36	☐ Check to include	Residue Collected	1.4
Mechanical Treatment Costs	$0	☐ Check to include	**Remaining Activity Fuels**	**2.2**
Prescribed Burn Costs	$60	☑ Check to include	**Pretreatment Surface Fuels**	**5.0**
Other Costs (user specified)	$0		Masticated Fuels	0.0
Net revenue per acre	**$32**		Fuels Burned	4.0
	CCF / Acre		**Surface Fuels Remaining**	
Volume of Logs	2.3		**After Prescribed Fire**	**3.2**

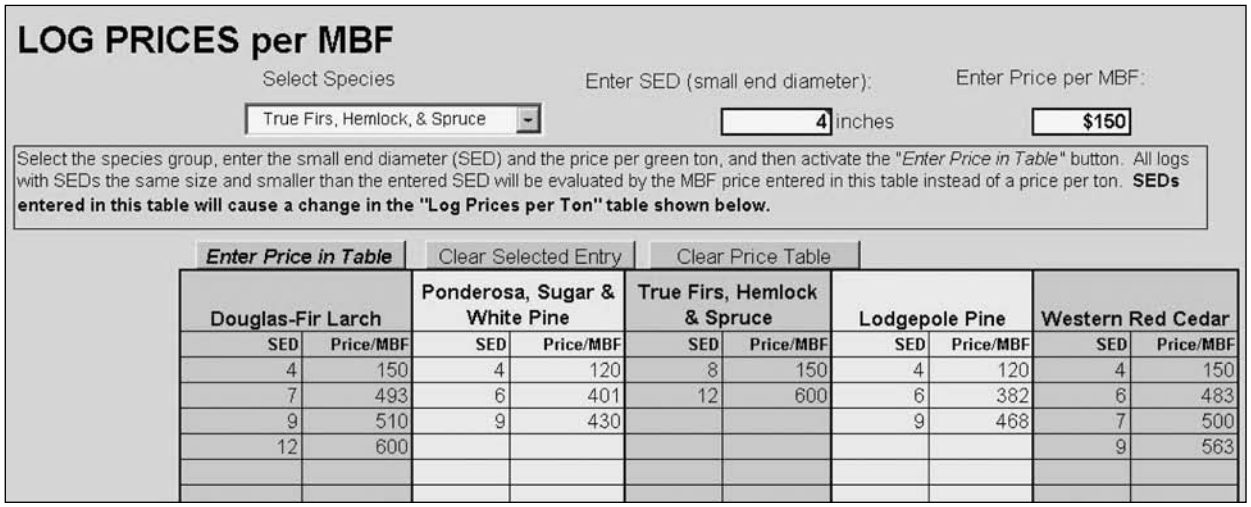
Figure 9—A portion of the Treatment Summary page.

Log and Chip Prices

From the Navigation page or the navigation dropdown menu click Log/Chip Prices. Log prices can be added for the following species groups: Douglas-fir and larch; ponderosa, sugar, and white pine; true firs, hemlock, and spruce; lodgepole pine; and western redcedar. Log prices are added according to the small-end diameter (SED). For example, if the Douglas-fir and larch species group, SED of 12 in, and price per thousand board feet (mbf) of $600 are entered, a Douglas-fir log must have an SED of at least 12 in to receive a price of $600. If no prices are entered for SEDs less than 12 in, all logs with small-end diameters less than 12 in will have a price of $0. When an SED is not listed in the table, the log price for the next smallest SED is applied. If a price is $150 for a 4-in SED and $493 for a 7-in SED, a log with a 6-in SED will have a price of $150.

Shown in figure 10 is a portion of the Log/Chip Prices page. Select the species group with the dropdown arrow. Enter the SED and the price per mbf. When the species group, the SED, and the price per mbf have been entered, click in a new cell and then select the Enter Price in Table button. Figure 10 shows the current inputs (SED of 12 in and price of $600) as the last entry for Douglas-fir and larch. These prices can be entered in any order. The program will sort them so that in each group the SEDs go from lowest to highest. To clear a single entry from the table, click in the SED cell of the price to delete and then click the Clear Selected Entry button. The Clear Price Table button will clear the entire log price table.

Log prices can also be entered by the ton in the Log Prices per Ton table on the Log/Chip Price page. The process is similar to the one described above for entering log prices per mbf except the price entered is per green ton. All logs with SEDs the same size and smaller than the entered SED will be evaluated by the ton price entered in the Log Prices per Ton table instead of a price per

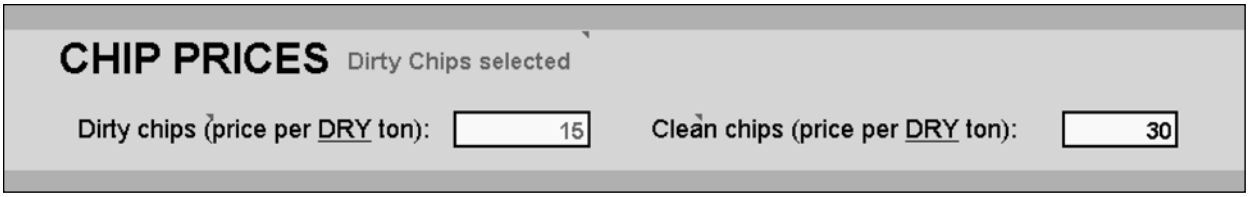


Douglas-Fir Larch		Ponderosa, Sugar & White Pine		True Firs, Hemlock & Spruce		Lodgepole Pine		Western Red Cedar	
SED	Price/MBF	SED	Price/MBF	SED	Price/MBF	SED	Price/MBF	SED	Price/MBF
4	150	4	120	8	150	4	120	4	150
7	493	6	401	12	600	6	382	6	483
9	510	9	430			9	468	7	500
12	600							9	563

Figure 10—The log prices per mbf portion of the Log and Chip Prices page.

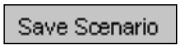
mbf. A new entry in either the Log Prices per Ton table or the Log Prices per mbf table will override a previous entry in the corresponding table. For example, if lodgepole pine, 6-in SED, and $400 are entered in the Log Prices per mbf table and a maximum SED of 6 in with a green ton price of $50 for lodgepole pine was previously entered in the Log Prices per Ton table, the price for a log with a 6-in SED will be $400 per mbf, and the price of a 5-in SED log will be $50 per ton. Note: SED classes are whole number diameter classes. For example, an SED of 6 in includes the range of small-end diameters from 5.6 to 6.5 in.

Enter chip prices on the bottom of the page as shown below:

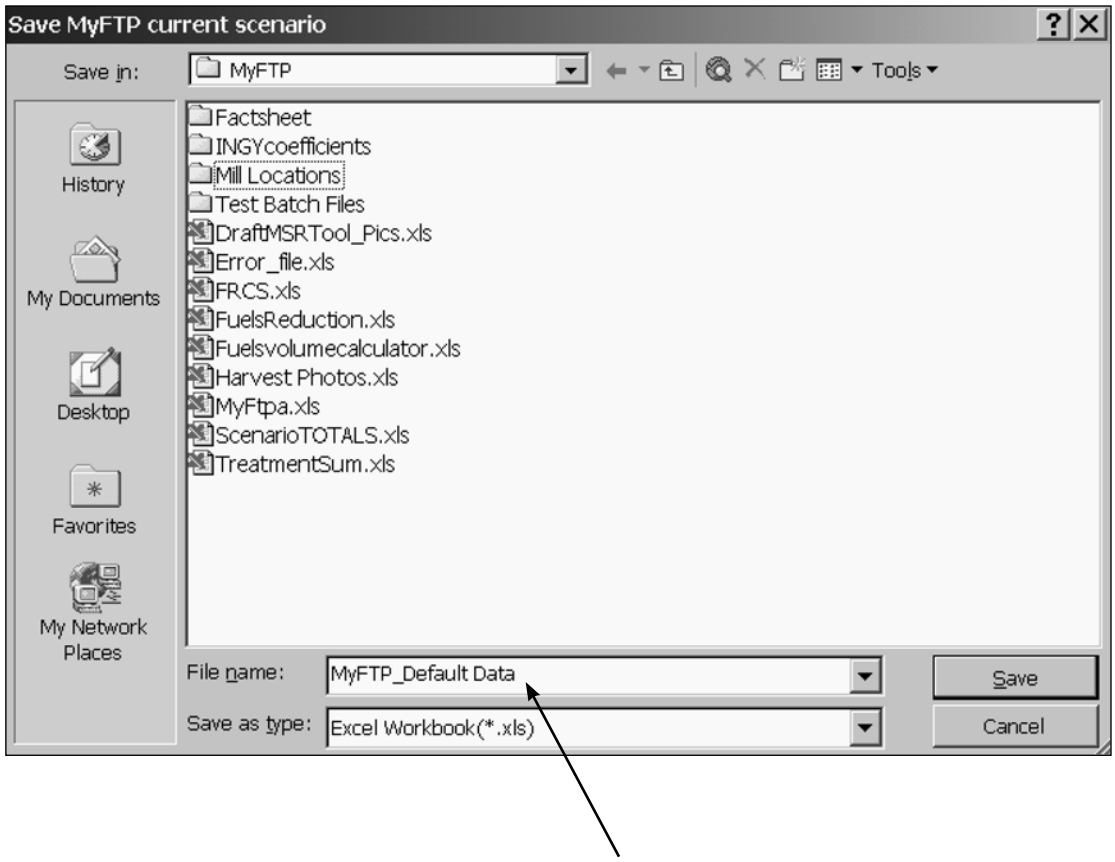


Saving Scenarios

The workbooks of the MyFTP application are very large, and saving a new workbook for every new scenario would soon take up a large chunk of disk space. A better solution for saving scenario data can be found on the Save/Load Scenario page. From the Navigation page or the MyFTP toolbar, click Save/Load Scenarios. On this page, the current scenario can be saved or a previously saved scenario can be loaded. All scenario details, including tables and user input data are saved. Saving scenario data is useful for comparing two or more scenarios and is important if the current scenario will be used again.

To save the current scenario, including all tables and inputs, click the button on the 

Load/Save Scenario page. The save screen pops up.



The file is given a default name of MyFTP_*ScenarioName*. In this case the default name is MyFTP_ Default Data because "Default Data" is the current scenario name. Numbers could be added to the end of the file name if more than one version of the same scenario is saved.

Load scenarios by clicking the Open Scenario button and finding the scenario to load. Note: opening a new scenario will replace all current data in MyFTP.

Compare Scenario Results

From the Navigation page or the navigation dropdown menu click Compare Scenario Results. On this page, the current scenario is located on the far left with other scenarios loaded immediately to the right. Scroll down on the page to view the content of the input fields.

Load previously saved scenario results by clicking the Load Comparison Scenario Results button and finding the MyFTP file to load. The new scenario is inserted immediately to the right of the current scenario (Default Data). Three scenarios are compared below: base case, pile and burn, and mastication. Remove a scenario by first clicking in the first cell of the scenario name and then by clicking the button Remove Scenario Results.

Compare Scenario Results

Print Report

Load Comparison Scenario Results | **Remove Scenario Results** | **Create TOTALS File**

	Base Case	Pile and Burn	Mastication
Financial Data	**per Acre**	**per Acre**	**per Acre**
Gross Revenue	$307	$307	$307
Harvest Costs	$135	$135	$135
Hauling Costs	$43	$43	$43
Mastication Costs	$0	$0	$222
Mechanical Treatment Costs	$0	$93	$0
Prescribed Burn Costs	$88	$21	$0
Other Costs (user specified)	$0	$0	$0
Net revenue	**$41**	**$14**	**-$93**
Log Volume (CCF)	1.5	1.5	1.5
Fuels Data	**Dry Tons / Acre**	**Dry Tons / Acre**	**Dry Tons / Acre**
Cut Trees (Biomass)	**2.9**	**2.9**	**2.9**
Logs Removed	2.5	2.5	2.5
Chipped Trees	0.0	0.0	0.0
Residue Collected	0.4	0.4	0.4
Remaining Activity Fuels	**0.1**	**0.1**	**0.1**
Pretreatment Surface Fuels	**15.0**	**15.0**	**15.0**
Masticated Fuels	0.0	0.0	10.0
Fuels Burned	12.1	12.1	0.0
Surface Fuels Remaining Including Masticated Fuels	**3.0**	**3.0**	**15.1**

Create a Scenario Totals File

The ScenarioTOTALS file can be used to sum up scenarios that might be combined as a unit for broader scale comparisons. It calculates the overall totals for each scenario as well as a final TOTALS column that summarizes the data fields for the scenarios shown on the Compare Scenario Results page. Activate the Create TOTALS File button and a save menu will appear. The default file name will be ScenarioTOTALS.xls. Shown below is a portion of the ScenarioTOTALS.xls file for the three scenarios previously discussed.

TOTALS For Each Scenario				
	Default Data	Prescribed Fire Change	Mastication Change	TOTALS
Financial Data				
Gross Revenue	$20,199	$31,538	$31,538	$83,275
Harvest Costs	$12,367	$13,562	$13,562	$39,492
Hauling Costs	$3,318	$3,816	$3,816	$10,949
Mastication Costs	$0	$0	$21,668	$21,668
Mechanical Treatment Costs	$0	$0	$0	$0
Prescribed Burn Costs	$0	$1,770	$8,800	$10,570
Other Costs (user specified)	$0	$0	$0	$0
Net revenue	$4,514	$12,390	-$16,308	$595
Log Volume (CCF)	118	149	149	416

Enter User Documentation

From the Navigation page or the navigation dropdown menu click Enter User Documentation. Add documentation to support the assumptions used in the scenario and for any clarifications that may help future users. The design of this page will allow the user to either add to a current comment box or add a completely new box. Click on Add New Comment Box to add a blank documentation area at the top of the screen. When a new box is added, the date and time are automatically inserted at the top of the box. Enter a user name under the date stamp and then enter comments in the large white area below the name cell. Scroll down the page to view or edit previous documentation.

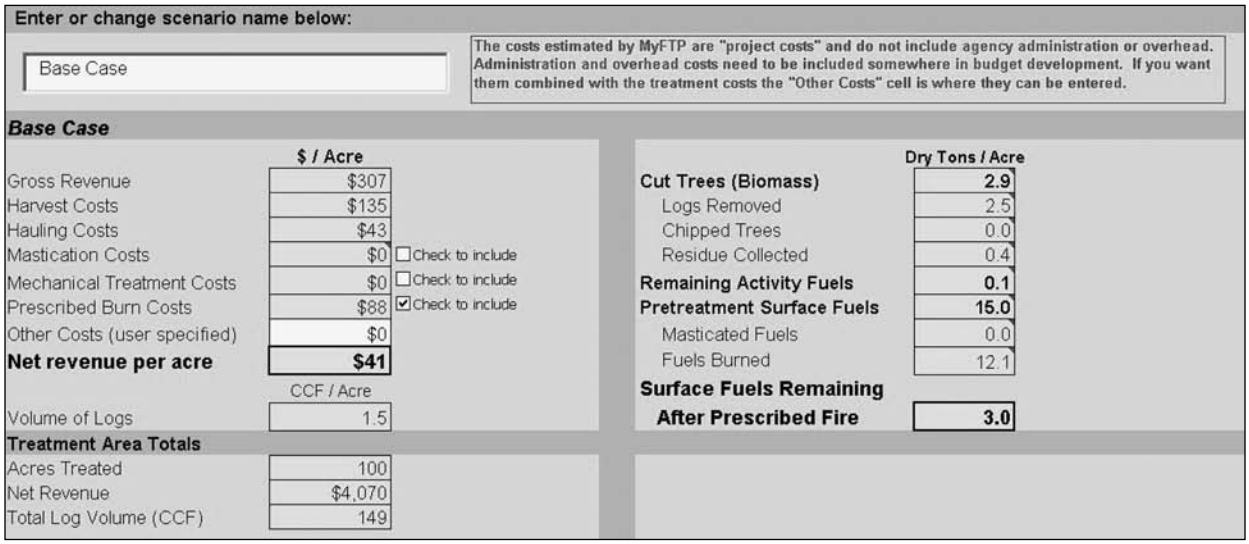
Results

Treatment Summary

From the Navigation page or the navigation dropdown menu click Treatment Summary. The information on this page is based on the current status of several other pages: Log/Chip Prices, Harvesting Cost, Hauling Cost, Mastication, Mechanical Treatments, and Prescribed Fire. If the input values on any of the pages listed above change, values on the treatment summary will be immediately updated. Certain values on the Rules page also connect directly to the treatment summary. If the

scenario name, size, pretreatment surface fuels, or percentages of dead volume or dead price reduction are changed, the adjustments are reflected in the treatment summary. Current data in the tree data entry table on the Enter Cut Tree Data page and the location, volume model, minimum DBH, and top DIB fields located on the Rules page are not directly connected to the treatment summary. If these data are changed, the treatment summary results will only be changed when the Calculate Tree Data button on the Enter Cut Tree Data Page is clicked or when a new batch file is loaded into the Enter Cut Tree Data Page.

The treatment summary table is shown in figure 11. Notice the scenario name (Base Case) at the top of the table. Gross revenue is just the summation of prices times volumes for all trees and products. The costs listed on the left side of the table are taken directly from the related table with the exception of the Other Costs category, which the user enters (notice the white cell designating user input allowed). This cell can be used for any cost that should be included in the project cost that has not been provided for elsewhere in MyFTP.



Enter or change scenario name below:

Base Case

The costs estimated by MyFTP are "project costs" and do not include agency administration or overhead. Administration and overhead costs need to be included somewhere in budget development. If you want them combined with the treatment costs the "Other Costs" cell is where they can be entered.

Base Case

	$ / Acre	
Gross Revenue	$307	
Harvest Costs	$135	
Hauling Costs	$43	
Mastication Costs	$0	☐ Check to include
Mechanical Treatment Costs	$0	☐ Check to include
Prescribed Burn Costs	$88	☑ Check to include
Other Costs (user specified)	$0	
Net revenue per acre	**$41**	
	CCF / Acre	
Volume of Logs	1.5	
Treatment Area Totals		
Acres Treated	100	
Net Revenue	$4,070	
Total Log Volume (CCF)	149	

	Dry Tons / Acre
Cut Trees (Biomass)	**2.9**
Logs Removed	2.5
Chipped Trees	0.0
Residue Collected	0.4
Remaining Activity Fuels	**0.1**
Pretreatment Surface Fuels	**15.0**
Masticated Fuels	0.0
Fuels Burned	12.1
Surface Fuels Remaining After Prescribed Fire	**3.0**

Figure 11—Treatment summary table.

Dry tons per acre of logs, chipped trees, and residue collected are calculated from the trees input on the Enter Cut Tree Data page. Foliage is not accounted for in MyFTP calculations. The Logs Removed category is the weight of boles of all trees designated for logs. The contents of the Chipped Trees category depends on the type of chip selected. For clean chips, the chipped trees weight is chipped boles excluding bark. For dirty chips it is the weight of chipped boles including bark plus, if the collect residue option is selected, the weight of tops and limbs from chipped trees. The Harvesting Cost page includes the option to collect residue. In the example shown above, this box was checked. Residue collected includes the tops and limbs of the trees classified as logs. Some

portion of tops and limbs remains as activity fuel because of breakage in harvesting and practicalities involved in collecting residues. If clean chips are selected, residue cannot be collected because only clean chips are hauled. The remaining activity fuels are the cut tree biomass created by the treatment minus the tons of logs, chipped trees, and residue removed from the site. The pretreatment surface fuels are user entered on the Rules page. Masticated fuels are selected on the Mastication page and appear in the table when the "Mastication Costs" button is checked.

Biomass is calculated for each tree as it is entered in the data table on the Enter Cut Tree Data table. The calculations for that tree are based on the current location and volume model selected. Once a tree is entered in the data table, the biomass calculations for that tree can only be changed by deleting the record and reentering. Changing the location and volume model will only affect the biomass calculations of trees that have not been added to the data table. In batch mode, the treatment (log, chipped, or unutilized) is matched to a tree entry according to the specifications in the Rules table. Changes to the DBH or top DIB (Rules table) or to the location and volume model made after a batch file has been processed will not change the biomass calculations of the tree records that are in the data table on the Enter Cut Tree Data page. To change those, reenter the cut tree data.

Economic Impact[3]

The objective of the economic impact module is to estimate regional economic effects stemming from stand-level fuel-reduction treatments. Costs, revenues, and volumes that have been calculated in the cost calculator part of MyFTP are used to estimate economic impact, so the results shown in the treatment summary should be considered complete before moving on to estimate economic impacts. The Forest Service's Inventory and Monitoring Institute (IMI) has developed and long supported the IMPLAN system for economic impact analysis. The IMI has also developed standard analysis protocols using IMPLAN for assessing economic impacts of Forest Service work activities, projects, and programs (Alward et al. 2003, Minnesota IMPLAN Group 1999). The IMPLAN processes and models have been customized to work with other parts of MyFTP.

Open the economic impact module by clicking the Economic Impacts button on the Navigation page or by selecting Economic Impacts from the MyFTP Toolbar.

The Economic Impacts module begins by requiring the user to enter the DBH of the smallest tree that will be considered a saw log (fig. 12). All trees with that DBH and larger will be categorized as saw logs and all trees with a smaller DBH will be roundwood. These classifications are necessary because of the varying economic impacts of producing solid wood products (saw logs) versus pulp (roundwood) production.

[3] The model underlying the economic impact calculations and the description of the model was provided by Greg Alward, Mike Niccolucci, Doug Smith, and Susan Winter all with the Inventory and Monitoring Institute, 2150 Centre Ave., Bldg. A, Suite 300, Fort Collins, CO 80526.

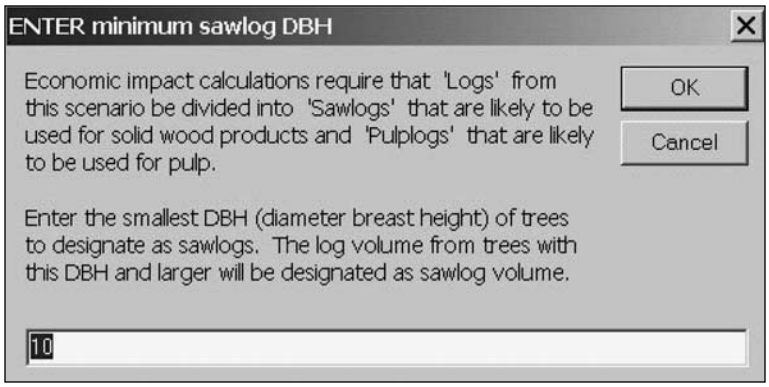


Figure 12—Input box for entering the minimum DBH of saw logs.

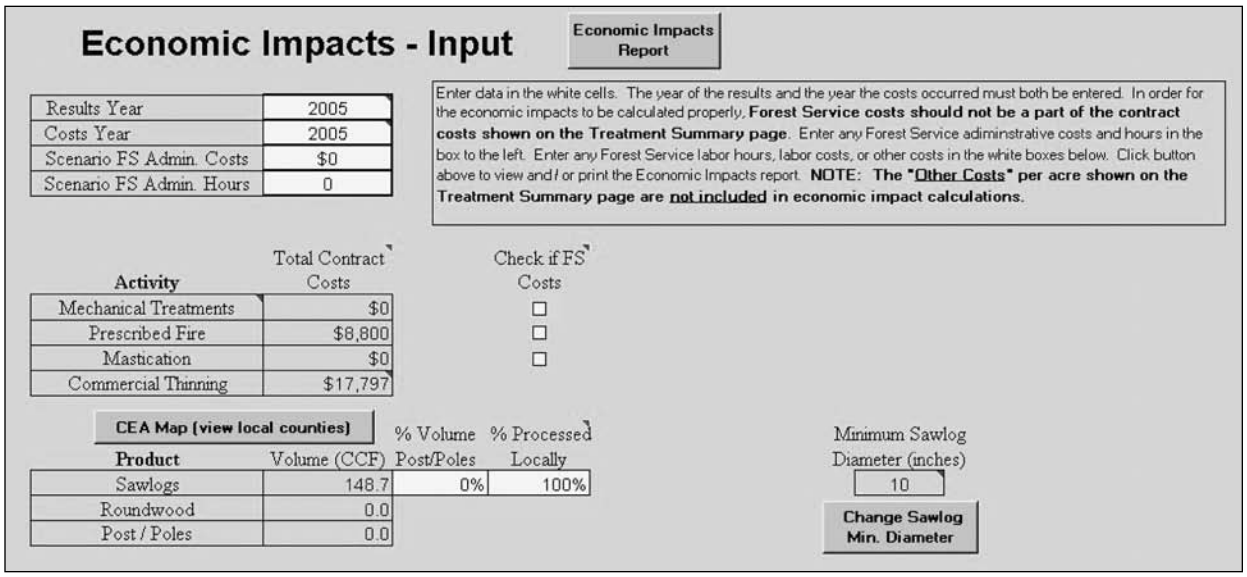


Figure 13—Economic Impacts-Input page.

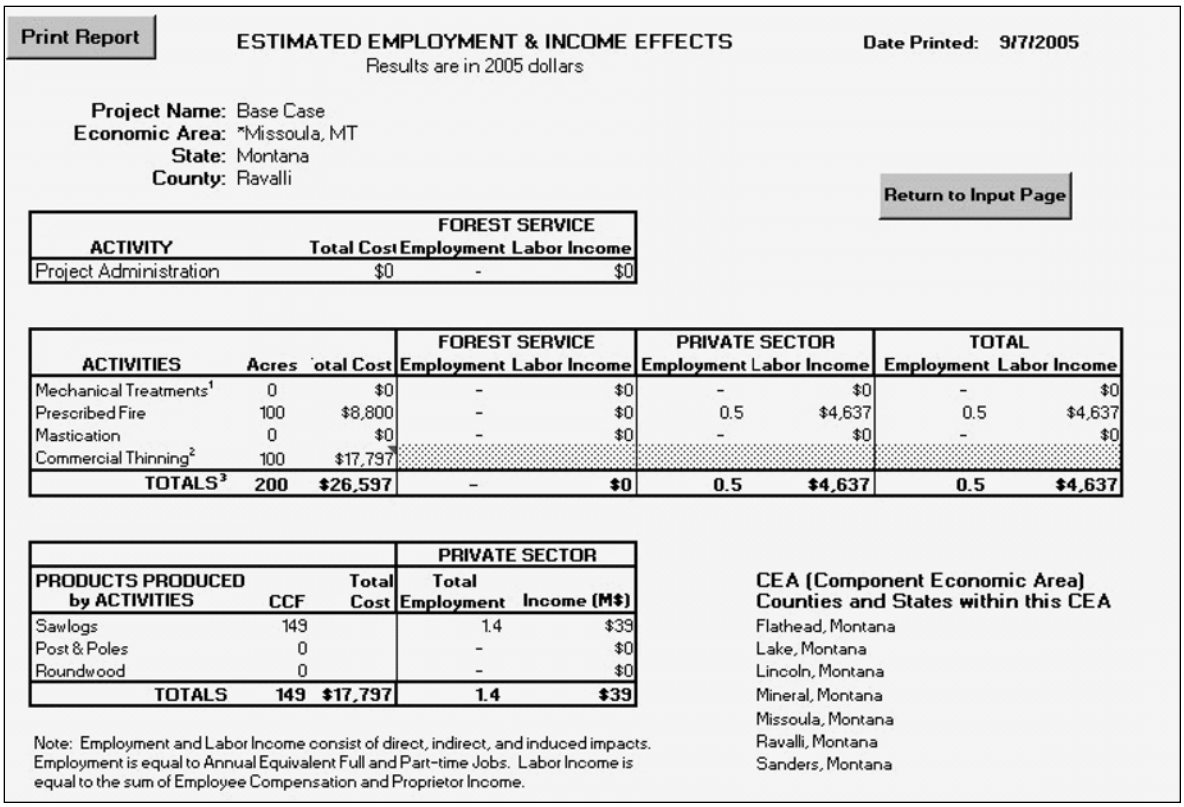
The Economic Impacts Input screen is shown in figure 13. The Results Year and the Costs Year are both required. The default value for both years is the current year. The dollar amounts on the Economic Impacts Report are based on the results year, and the cost year is the year of the cost data. If historical cost data are used to estimate economic impacts, the year the historical costs occurred should be entered as the costs year. If the estimated cost for the project is in the year of implementation, the results year and the cost year should be the same.

Forest Service administration costs and hours are entered, if they occur, below the year entries. Total contract costs are the values currently found in MyFTP for those activities. If Forest Service

employees performed any work or incurred any costs, check the appropriate box next to the activity. After the box is checked, additional cells will be available for entering Forest Service labor hours, labor costs, and other costs.

Products created by a commercial thinning activity are shown in the lower left portion of the input screen. If saw logs or roundwood have been produced, the percentage of the volume that is posts and poles and the percentage of the volume that is processed locally must be entered. Volume that is processed outside of the local area does not contribute to local jobs and income. Determine the local processing area by clicking on the CEA Map (view local counties) button. The local counties are also listed on the Economic Impacts Report.

The Economic Impacts Report (fig. 14), shows the economic impact results of all previous user entries and MyFTP calculations. This report is accessed by clicking the Economic Impacts Report button on the Economic Impacts-Input screen. No user entry is allowed on the report page. Print this report by clicking the Print Report button and selecting Print. This report may be suitable as an attachment to required environmental documents.



Print Report

ESTIMATED EMPLOYMENT & INCOME EFFECTS

Results are in 2005 dollars

Date Printed: 9/7/2005

Project Name: Base Case
Economic Area: *Missoula, MT
State: Montana
County: Ravalli

Return to Input Page

ACTIVITY	Total Cost	FOREST SERVICE Employment	Labor Income
Project Administration	$0	-	$0

ACTIVITIES	Acres	otal Cost	FOREST SERVICE Employment	Labor Income	PRIVATE SECTOR Employment	Labor Income	TOTAL Employment	Labor Income
Mechanical Treatments[1]	0	$0	-	$0	-	$0	-	$0
Prescribed Fire	100	$8,800	-	$0	0.5	$4,637	0.5	$4,637
Mastication	0	$0	-	$0	-	$0	-	$0
Commercial Thinning[2]	100	$17,797						
TOTALS[3]	**200**	**$26,597**	**-**	**$0**	**0.5**	**$4,637**	**0.5**	**$4,637**

PRODUCTS PRODUCED by ACTIVITIES	CCF	Total Cost	PRIVATE SECTOR Total Employment	Income (M$)
Sawlogs	149		1.4	$39
Post & Poles	0		-	$0
Roundwood	0		-	$0
TOTALS	**149**	**$17,797**	**1.4**	**$39**

Note: Employment and Labor Income consist of direct, indirect, and induced impacts. Employment is equal to Annual Equivalent Full and Part-time Jobs. Labor Income is equal to the sum of Employee Compensation and Proprietor Income.

CEA (Component Economic Area) Counties and States within this CEA

Flathead, Montana
Lake, Montana
Lincoln, Montana
Mineral, Montana
Missoula, Montana
Ravalli, Montana
Sanders, Montana

Figure 14—Economic impacts report.

Glossary

activity fuels—Fuels added to surface fuels as a result of some forest operation or treatment.

biomass—Total weight of aboveground parts of a tree.

bole—The central stem of a tree. Bole in MyFTP refers to the bole above the stump and may be to the tip of the tree or to the merchantable height where the minimum merchantable diameter is reached.

diameter at breast height (DBH)—Tree diameter measured outside bark at 4.5 ft (1.3 m) above ground level.

diameter inside bark (DIB)—The DIB measurement at the top of the log is used to determine log volume. Within MyFTP, a 4-in or 6-in top diameter limit for logs can be selected in the Pacific Coast States, but only a 4-in top diameter limit is allowed in the interior West.

Forest Inventory and Analysis (FIA)—The mission of the FIA Program of the U.S. Department of Agriculture Forest Service is to determine the extent and condition of forest resources and analyze how these resources change over time.

Forest Vegetation Simulator (FVS)—A model commonly used by the U.S. Department of Agriculture, Forest Service and other federal and state agencies for predicting forest stand dynamics. Forest managers have used FVS extensively to summarize current stand conditions, predict future stand conditions under various management alternatives, and update inventory statistics. More information and FVS software are available at http://www.fs.fed.us/fmsc/fvs/index.php.

Inland Northwest Growth and Yield Cooperative (INGY)—Established in 1984 to address mutual technical problems and concerns regarding the growth and yield of forests in the Inland Northwest. Participants come from industry, states or provinces, tribal councils, private consulting firms, federal agencies, and universities. For more information, see the INGY Web site at http://www.forestry.umt.edu/research/MFCES/programs/INGY/DEFAULT.HTM.

log—The portion of the delimbed bole of a tree that is intended to be used for some product.

My Fuel Treatment Planner (MyFTP)—An MS Excel-based tool for calculating costs and benefits of fuel treatments.

small-end diameter (SED)—The DIB of the small end of a log.

volume model—Set of volume equations that determine the log volume of the specified species. MyFTP includes two volume model choices: FIA and INGY. The INGY volume model was developed from recent data with an equation that provides profile calculations (diameters at any point on the bole) and volume calculations that are fully consistent. The INGY volume calculations generally apply in the northern Rockies and east of the Cascade Range crest. The FIA volume model is

a collection of equations that directly estimate volume. Log diameters are not available from this approach. When the FIA volume model is selected, the bole volumes are calculated with the FIA volume equations and the INGY equations are used to allocate the bole volume into logs.

Species List

Common name	Scientific name
Douglas-fir	*Pseudotsuga menziesii* (Mirb.) Franco
Engelmann spruce	*Picea engelmannii* Parry ex Engelm.
Grand fir	*Abies grandis* (Dougl. ex D. Don) Lindl.
Jeffrey pine	*Pinus jeffreyi* Grev. & Balf.
Lodgepole pine	*Pinus contorta* Dougl. ex Loud.
Mountain hemlock	*Tsuga mertensiana* (Bong.) Carr.
Ponderosa pine	*Pinus ponderosa* Dougl. ex Laws.
Subalpine fir	*Abies lasiocarpa* (Hook.) Nutt.
Western hemlock	*Tsuga heterophylla* (Raf.) Sarg.
Western larch	*Larix occidentalis* Nutt.
Western redcedar	*Thuja plicata* Donn ex D. Don
Western white pine	*Pinus monticola* Dougl. ex D. Don
White fir	*Abies concolor* (Gord. & Glend.) Lindl. ex Hildebr.

Metric Equivalents

When you know:	Multiply by:	To find:
Inches (in)	2.54	Centimeters
Feet (ft)	.3048	Meters (m)
Miles (mi)	1.609	Kilometers
Acres (ac)	.405	Hectares
Tons (ton)	.907	Tonnes
Board feet	.00566	Cubic meters

References

Alward, G.S.; Arnold, R.; Niccolucci, M.; Winter, S. 2003. Economic significance of the USDA Forest Service strategic plan (2000 revision): programmatic methods and results. Report No. 6. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Inventory and Monitoring Institute. 45 p.

Dixon, G.E. 2004. Essential FVS: a user's guide to the forest vegetation simulator. Rev. Internal Rep. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Forest Management Service Center. 196 p. http://www.fs.fed.us/fmsc/ftp/fvs/docs/gtr/EssentialFVS.pdf. (14 April 2005).

Flewelling, J.W.; Ernst, R.l. 1996. Stem profile estimation—east-side species. Unpublished report for the Inland Northwest Growth and Yield Cooperative. On file with: USDA Forest Service, Forest Management Service Center, 2150 Centre Ave., Bldg. A, Suite 300, Fort Collins, CO 80526.

Minnesota IMPLAN Group. 1999. IMPLAN professional users guide. IMPLAN professional, version 2.0, social accounting and impact analysis software. Minneapolis, MN: Minnesota IMPLAN Group, Inc. 418 p.

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