Personal Computer Historic Analysis (PCHA)
User's Guide

USDA Forest Service
USDI Bureau of Land Management
USDI Bureau of Indian Affairs
USDI Fish and Wildlife Service
USDI National Park Service

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Preface

This document describes the functions of the PC Historical Analysis module of the Fire Program Analysis (FPA) system. Individuals from the USDA Forest Service, USDI Bureau of Land Management, USDI Bureau of Indian Affairs, USDI Fish and Wildlife Service, and USDI National Park Service participated in the development of FPA. If you find errors, omissions, or items that need correction, please send your comments to the address below.

USDA Forest Service
National Systems Unit
3833 S. Development Ave
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To talk to someone at the Support desk with questions and/or comments regarding this publication or any of the fire applications mentioned, call 800-253-5559.

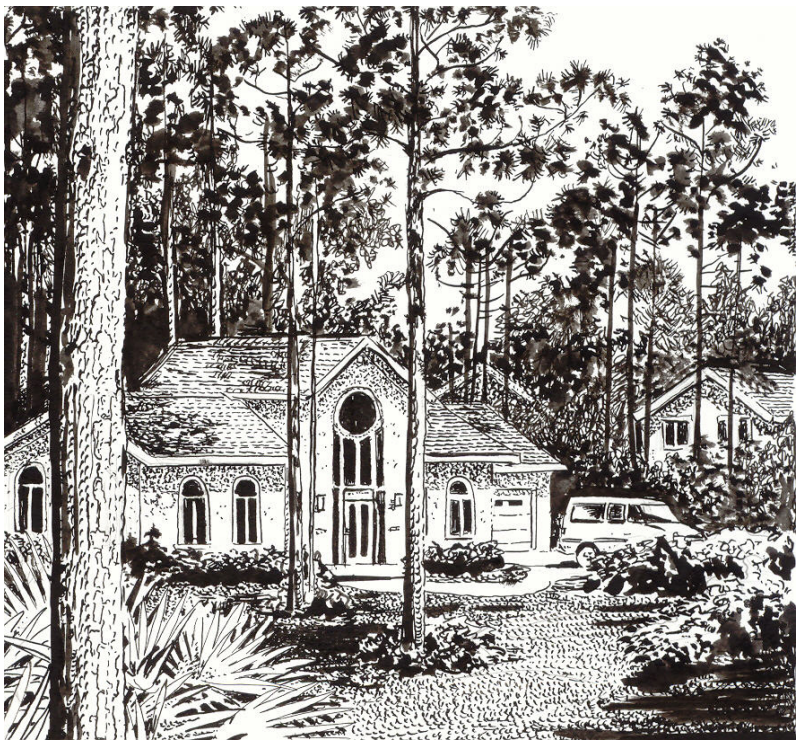


Table of Contents

Introduction

Welcome to the PCHA software program. The software has been developed to support the historical analysis process within the Fire Program Analysis system. PCHA allows for the import of fire occurrence and daily weather observation data for a Fire Planning Unit (FPU) to support the generation of fire event scenarios. Bighorn Information Systems developed PCHA under contract with the USDI Bureau of Land Management. PCHA may accept all legacy PCHA database files.

The fire occurrence and weather data records imported to PCHA reside in national corporate databases. Forest Service fire occurrence records are stored in the National Interagency Fire Management Integrated database (NIFMID). The U.S. Department of Interior agency fire occurrence records are stored in Boise, Idaho. Weather data records are also stored in the NIFMID database. Both data sets are available for downloading from the Internet.

How This Users' Guide Is Organized

The General Processing Flow chart that follows describes the process steps and provides some background material on external tasks required before starting PCHA runs. The other chapters describe what to do on each of the screens. The sections, with a few exceptions, have the same name as the commands on the PCHA menus.

Conventions Used In This Users' Guide

Bold text and arrows will designate selection of menu items. An example is: **Fire > Edit Fires**. This notation directs the user to click on the Fire menu on the program taskbar and then to select the Edit Fires menu (Figure 1). In addition, bold underlined text will designate the clicking of buttons or tabs; i.e. **Browse**.

Figure 1

Outline Format and Context

The outline format for section heading of this guide is as follows:

Level 1 – Times Roman 18 Bold

Level 2 – Times Roman 14 Bold

Level 3 – Times Roman 12 Bold, Underline

Level 4 – Times Roman 12 Bold, Italic, Underline

Level 5 - Times Roman 12 Bold

Level 6 - Times Roman 12 Bold, Italic

Level 7 – Times Roman 12

Level 8 - Times Roman 12, Italic

Program Availability

The PCHA software installation file, when released, may be downloaded from the Internet. The URL is as follows:

http://www.fs.fed.us/fire/planning/nist/distribu.htm

It will also be available on a CD ROM from the National Helpdesk, which may be reached by calling (800) 253-5559.

Until that time, the current beta version of the PCHA software installation file may be downloaded from:

http://www.fs.fed.us/fire/nfmas-beta/

Program Installation

The following text describes the tasks necessary to install PCHA on a personal computer.

Minimum System Requirements

Before program installation, verify that the computer meets the following minimum system requirements:

Table 1 – Minimum System Requirements

Item	Required	Recommended
Operating System	Windows 95 or higher	Same
CPU	80386	Pentium
Monitor Resolution	800 x 600	Same
RAM	4 MB	256 MB
Available Memory on the Hard Drive	5 Gigibits	Same
Mouse	Yes	Same
Printer	Any configured for use with the operating system	Color

Program Download Instructions from the NFMAS-Beta Site

Download instructions are as follows:

Step 1
Open Internet Explorer or any web browser.

Step 2
Navigate to the URL below:

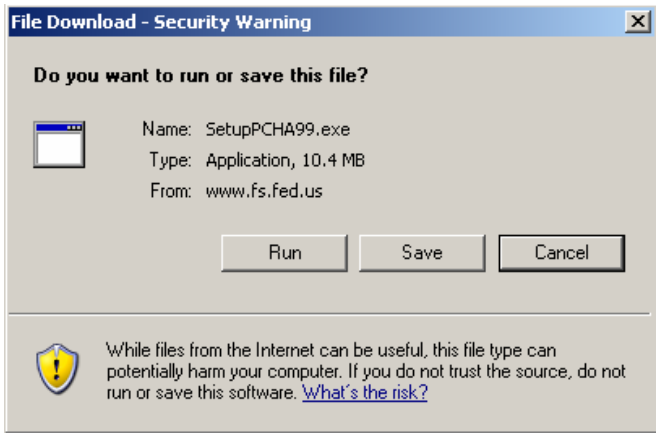
http://www.fs.fed.us/fire/nfmas-beta/

Step 3
Click on the PCHA link. The screen in Figure 2 will be displayed.

Step 4
Click **Save** on the screen shown in Figure 2.

Step 5
Navigate to the folder on the computer where the PCHA installation file titled SetupPCHA.exe is to be saved. Be sure to write down this file location. Click **Save**.

Figure 2



Program Download Instructions from the NFMAS Distribution Site
Download instructions are as follows:

Step 1
Open Internet Explorer on any web browser.

Step 2
Navigate to the URL below:

http://www.fs.fed.us/fire/planning/nist/distribu.htm

Step 3
Scroll down the page to software, NFMAS modules. Double-click on PCHA_Version 1.2. link where X is the current version.

Step 4
On the next screen, double click on the PCHA_Version 1.2.X Download File link.

Step 5
Double-click on the PCHASetup.exe link. The screen in Figure 2 will be displayed.

Step 6
Click **Save** on the screen shown in Figure 2.

Step 7
Navigate to the folder on the computer where the PCHA installation file titled SetupPCHA.exe is to be saved. Be sure to write down this file location. Click **Save**.

Installation Instructions

The setup program installs the programs and support files required to run PCHA. The installation must be performed within the Windows environment.

Step 1

Program installation on most agency computers requires the user to have Administrator privileges. If necessary, have a user with Administrator privileges log onto the computer to perform the program installation. It is recommended the user have read and write permission for the folder into which PCHA is to be installed.

Step 2

Start Windows Explorer.

Step 3

If the SetupPCHA.exe file has been downloaded from the Internet, navigate to the folder where it was saved.

If the distribution CD ROM is being used, place the CD ROM in the CD ROM drive and navigate to the location of the SetupPCHA.exe file.

Step 4

Double-click on PCHA_install.exe. Install Shield will unpack PCHA. The user will be prompted throughout the following boxes:

The Welcome box will open. Click **Next** to continue setup.

The user will be prompted to accept the default location of:

c:\fsapps\fsprod\fam\nfmas\pcha

If desired, change this to another location by clicking on the Browse button. Click **Next** to accept the default or click **Browse** to change the location. Once this activity has been completed, click **Next** to continue.

The user will be prompted to select a program folder. The default is FPA. To accept click **Next**, to change scroll through the list of available choices or enter a new choice, then click **Next** to continue.

PCHA will install.

Navigating in PCHA

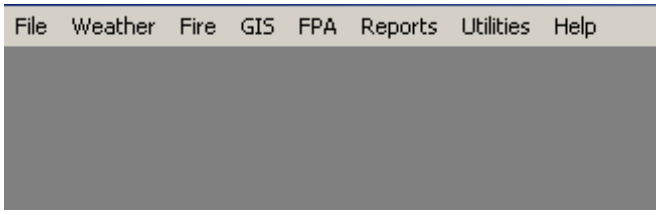
This documentation assumes the user knows how to use a mouse, open a menu, and choose a menu and dialog options. For those who need a refresher, the following brief review may help.

Using a Mouse

Using a mouse to run PCHA is much faster than keyboard control, and is much more efficient. The mouse moves the "cursor" (usually an arrow) around the monitor screen. To select an item on the screen, click on it by pressing the left mouse button. The left mouse button is used in the PCHA program. In some cases, it is necessary to click the mouse button twice in rapid succession. This action is called a double-click.

Menus

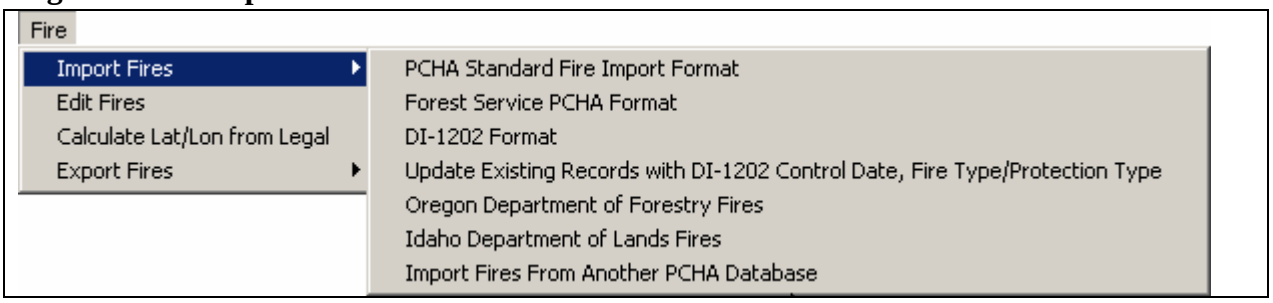
Figure 3 – Main Menu on Program Taskbar



The program taskbar across the top of PCHA screen contains menus (Figure 3). The planner may select a menu either by clicking on it with the mouse, or by using the keyboard. To use the keyboard, press and release the ALT key. The planner will see the File menu item highlighted. Select the menu desired by pressing the highlighted letter or by moving the cursor with the right, left, up and down arrow keys. Then press the ENTER key once the desired menu item is highlighted. If the ALT key is pressed by mistake, press the ESC key to exit from the menu.

Some menu items have a right facing arrow on the right side of the menu (Figure 4). This indicates that there is a sub-menu with more choices. Clicking on the small arrow will open the sub-menu and give more choices related to the menu item.

Figure 4 – Example of Sub-menus



Screen Tabs

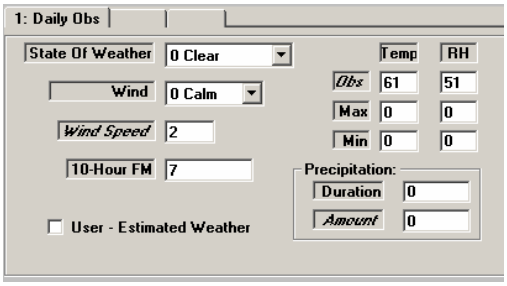
Figure 5

Both the Edit Weather and Edit Fire screens use folder tabs to display a portion of the information stored for those data groups (Figure 5). The command buttons and some information show all the time above or below the tabs. Click on the tab to display the information desired. For example, the Daily Obs. tab shows a daily weather observation.

The Tab Key

The TAB key moves the cursor from one field to another field on an Edit screen or a Dialog box. To move backwards, hold down the SHIFT key and press the TAB key. For example, refer to Figure 6. The cursor is moved from one cell to another in a specific order by pressing the TAB key.

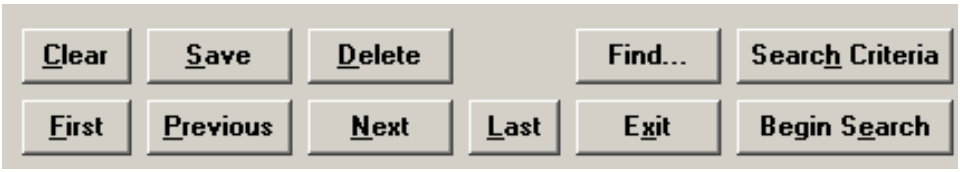
Figure 6



Command Buttons

Many screens have Command Buttons such as **OK**, **Exit**, or **Save**. Clicking on the command button with the mouse will activate that command. If there is an underlined letter, the planner may also hold the ALT key down and press the underlined letter to activate the Command button.

Figure 7 – Command Buttons



Use of Command Buttons

All of these buttons are usable from any of the tabs to enter a new record or a search.

Save Button

The **Save** button saves the information for the active data to the PCHA database. Until this button is clicked, any changes made in fields are not permanently saved to the PCHA database.

Clear Button

The **Clear** button resets all data fields to blank.

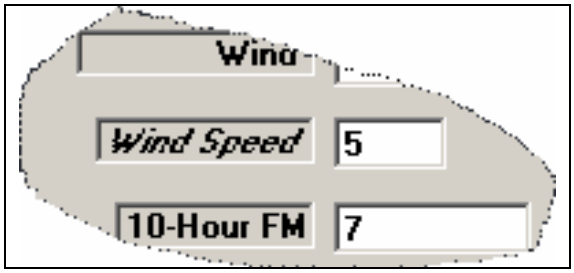
Delete Button

This button deletes the current record from the database. If there are no records in the database or displayed on the screen, this button will appear light gray and will be inoperative.

Labels in Italics

On some screens, some labels for fields are in italic (slanted) text (Figure 8). Fields designated this way are searchable fields. For example, the Wind Speed field allows the planner to search for a single wind speed value or wind speed values greater than or less than a specific value.

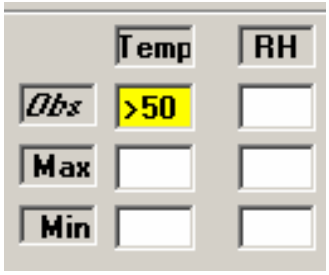
Figure 8



Begin Search Button
Click **Begin Search** to find the first record in the database or the first record that meets defined search criteria.

Search Criteria Button
Click **Search Criteria** to clear the screen and define the fields that will control, which records you want to find in the database. Fields with their names written in italic text are available for searches. After the criteria are entered, click **Begin Search**.

Figure 9



For example, the planner may search for all observations with temperatures greater than 50. Click Search **Criteria** , click in the Obs Temp field. Enter the following >50 and then click **Begin Search,** (Figure 9).

Searching may be done based on a range of values. For example, to find precipitation events between 2 inches and 10 inches, click **Search Criteria** . Click in the Precipitation Amount field and enter >=2.0 and <=10.0. Click **Begin Search.** This search will find all active weather observations where the daily precipitation was between 2 inches and 10 inches.

First, Previous, Next, and Last Buttons
The **First** button displays the first record in the database or the search list. The **Previous** and **Next** buttons display the record before or after the current record. The **Last** button displays the last record in the database or search list. These buttons appear light gray if there are no records in the database or displayed on the screen.

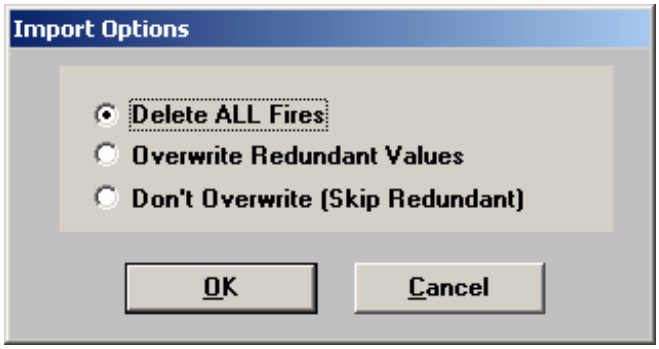
Find Button
Unlike the **Search Criteria** and **Begin Search** buttons, which retrieve a set of records to view, the **Find** button is used to jump to desired records within those already retrieved with **Begin Search**. Click **Find** and then select Clear for Find from the pop-up menu. This will clear all fields. Enter the value(s) to determine the desired record, and then click **Find** and select Find from the pop-up menu. To move from this record to another similar record after a **Find** command, click **Find** and then select Find Next or Find Previous from the pop-up menu.

Exit Button
The **Exit** button closes the screen and returns the user to the main PCHA screen.

Option Radio Buttons

Some screens have Radio Buttons (small circles) where the planner may select one item from the group. When the planner chooses one, a small black dot notes the selected option. In the example in Figure 10, the Delete ALL Fires option has been selected. The planner may select an option by clicking on wording with the mouse. The planner may also select an option by using the up or down arrows to highlight the desired Option. Select that option by pressing the **OK** key.

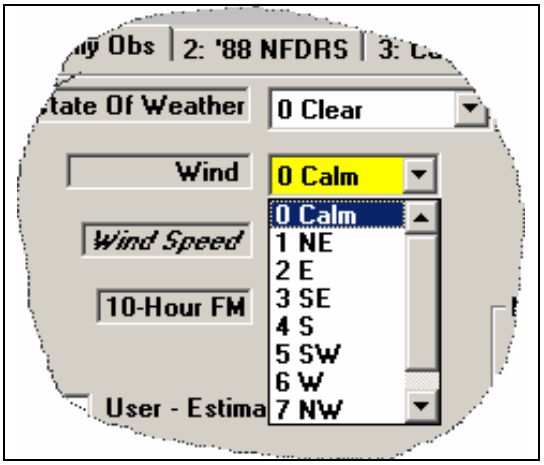
Figure 10 - Option Box with Radio Buttons



List Boxes

Some screens have List Boxes with a pulldown list. The planner may choose one item by clicking on it with the mouse (Figure 11).

Figure 11 – List Box



Shortcut

When the planner highlights a list box, the planner may press a valid letter or number in the list box. In the example in Figure 11, pressing a number from 0 to 7 will cause the item to be highlighted. Pressing the ENTER key will select the highlighted item.

Using Online Documentation and Help

The PCHA release includes this documentation in electronic form to help guide the planner. In addition, there is extensive online help for nearly every field and command. Many parts of PCHA include context-sensitive help. Full online help may not be available for work needed to support Fire Program Analysis, FPA.

Product Support

Several groups and individuals support the PCHA software. Federal users should first contact their agency support personnel for assistance. Forest Service and other users should contact local and regional support personnel before contacting the National F&AM Application Helpdesk.

General Process Flow

The process used to complete an analysis in Fire Program Assessment (FPA) starts with the establishment of the FPU in FPA-PM. Refer to the Users' Guide for FPA-PM and the FPA-PM Reference Guide for instructions on this process.

The purpose of Historical Analysis is the review and validation of fire occurrence and weather data for use in the creation of a fire event scenario. A fire event is a single wildland fire measured in time from its estimated ignition time until declared out. A fire event is the collective sum of attributes that describe the statistical and physical characteristics of the fire. Grouping of fire events yields a fire event scenario.

The creation of a fire event scenario is accomplished using PCHA. Figure 12 shows the link between the FPA-PM program and the PCHA program. The FPUs are created in FPA-PM by the importing into FPA-PM of GIS shape files. A FPA shape file containing all of the FMUs is then downloaded to the local computer from FPA-PM. The FPA shape file this then imported into PCHA creating the FMUs in PCHA. After a fire event scenario is created by PCHA, the fire planner imports the resulting file to FPA-PM.

The process flow for tasks to be performed in PCHA is described via a stepwise process in Table 2. Provided in the table is the page number in this Users' Guide where implementation details are provided for a step. Also provided in the table is the page number in the FPA-PM Reference Guide where technical documentation and guidance are provided.

Figure 12 – Process Flow Between FPA-PM and PCHA

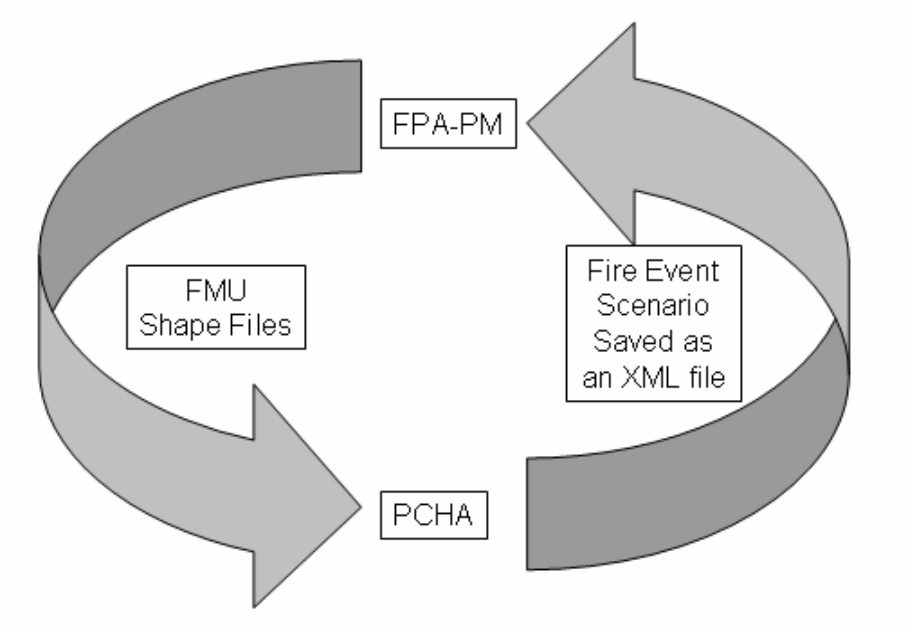


Table 2 - Process Steps to Completion of Historic Analysis Using PCHA

Step	Description	PCHA Menu	Users' Guide Page	Reference Guide Page
1	Install PCHA on the computer.			
1a	Setting up PCHA start icon.			
2	In PCHA, define the planning unit.			
2a	Input data.	File > Planning Unit Setup		
2b	Import FMUs from FPA-PM.	FPA > Import FPA-PM Layer to Start New Analysis		
2c	Edit FMU Slope Class	FPA > Edit FMU Slope Class		
3	Define weather stations, weather data sets and retrieve these records.			
3a	For each FMU, determine if weather stations will be used to develop the weather data set for the FMU or if the GRID weather process will be used.			
3b	For each FMU where weather stations will be used, determine the weather stations to use.			
3c	For FMUs where GRID weather will be used, estimate the latitude and longitude for a point that will represent the FMU.			
3d	Define the weather stations and GRID weather data sets in PCHA.	File > Weather Stations		
3e	For weather stations being used, retrieve all available weather records from the corporate database or other recommended sources.			
3f	For FMUs where GRID weather data sets will be used, retrieve the data set via the Internet.			
3g	Import all weather records and weather data sets into PCHA.	Weather > Import (Applicable Format)		
4	Retrieve Fire Report Records.			
4a	Retrieve all available fire occurrence records from the corporate database.			
4b	If necessary, transform an agency's fire occurrence records into a format that may be used to import these fire occurrence records into PCHA.			

Table 2 - Process Steps to Completion of Historic Analysis Using PCHA

Step	Description	PCHA Menu	Users' Guide Page	Reference Guide Page
4c	Import all fire records into PCHA.	Fires > Import Fires > (Applicable Sub-menu)		
4d	Implement substitute measures if fire records are not available.			
5	Verify completeness and accuracy of weather records.			
5a	Repair invalid weather observations.	Weather > Repair Invalid Weather Observations		
5b	Do queries to find obvious invalid weather observation values.	Weather > Edit Weather Observations		
6	Use weather records.			
6a	Assign weather station(s) or GRID weather data set to each FMU	FPA > Assign Wx Stations to FMUs		
6b	Create the weather data set for each FMU.	FPA > Create FMU Weather Data Set		
6c	Check for missing weather observations.	FPA > View Missing Weather Report		
6d	Implement additional weather data gathering processes if necessary. If necessary, go to Step 3.			
6e	If wildland fire use will be used in any FMU in the FPU, define the criteria for the fire ending weather event for each applicable FMU.	FPA > Determine Waiting Time Distribution		
7	Verify completeness and accuracy of fire occurrence records.			
7a	Check for possible duplicate fires occurrence records.	FPA > Report Possible Duplicate Fires		
7b	Assign latitude and longitude to fires where necessary.			
7b1	Determine the appropriate latitude and longitude for the fire's ignition location. Enter it manually into the fire's record in PCHA.	Use Fires > Edit Fires > Location Tab.		
Or				
7b2	Automatically assign latitude and longitude from Township, Section, Range and Meridian.	Fire > Calculate Lat/Lon from Legal		

Table 2 - Process Steps to Completion of Historic Analysis Using PCHA

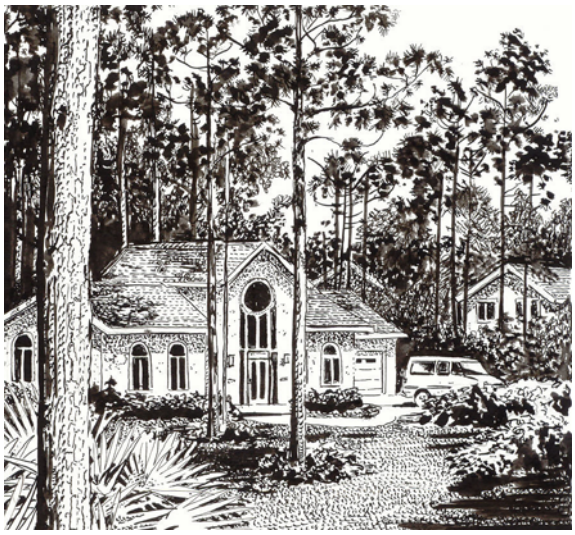
Step	Description	PCHA Menu	Users' Guide Page	Reference Guide Page
7c	Check for accuracy and completeness of required or recommended data fields.	FPA > Fires Missing Data Required for FPA		
7d	Edit fire occurrence records.	Fire > Edit Fire Records		
8	Use fire occurrence records.			
8a	Assign each historic fire that occurred during the Analysis Period to an FMU.	FPA > Assign FMUs to Fires Using GIS		
8b	Review FMU assignment results.	FPA > View FMU Assignment Results		
8c	For fires without an assigned FMU, make changes to the fire record.			
8c1	If the latitude and longitude are incorrect, determine and enter the correct latitude and longitude. Then repeat Step 6a.	Fire > Edit Fires > Location Tab.		
Or				
8c2	Manually assign fires to an FMU.	Fire > Edit Fires > FPA Tab		
8d	Calculate and make edits if necessary to each FMU fire workload point.	FPA > Calculate/Edit FMU Workload Point		
9	Locate and gather topographic grid files.	FPA > Identify FMU ASCII Grid Files		
10	Use spatial fuel types for some or all FMUs by locating or generating fuel type grid files. (Optional – Complete this Step or Step 12)			
10a	Locate and make available fuel type grid files.			
Or				
10b	Generate and make available fuel type grid files.			
10-b1	Obtain in a GIS Format the Vegetation Data Layer			
10-b2	Obtain the Availability and Commitment of Necessary Resource Specialists			
10-b3	Utilize the Specialists to Assign a Value for each of the Five Fuel Type Attributes to Each Vegetation Class			
10-b4	Use the Services of a GIS Specialist to Creates the Five ASCII GRID Files			

Table 2 - Process Steps to Completion of Historic Analysis Using PCHA

Step	Description	PCHA Menu	Users' Guide Page	Reference Guide Page
10c	In PCHA, specify the path to the folder containing the fuel type grid files	FPA > Identify FMU ASCII Grid Files		
11	Collect FMU ASCII grid files into PCHA.	FPA > Collect FMU ASCII Grid Information		
12	Use non-spatial fuel types for some or all FMUs by developing fuel types for the FPU and assigning these the occurrence proportion for each fuel type to the applicable FMUs. (Optional – Complete this Step or Step 10)			
12a	Define all of the fuel types in the FPU.	FPA > FPU Fuel Types		
12a-1	Obtain in a GIS format the vegetation data layer			
12a-2	Obtain the availability and commitment of necessary resource specialists			
12a-3	Utilize the specialists to assign a value for each of the five fuel type attributes to each vegetation class			
12b	For each FMU where non-spatial fuel types will be used, assign the percent of the FMU that exists in each fuel type.	FPA > FMU Fuel Type Percents		
13	Edit NFDRS Fuel Models to Use for WFU and ERC Calculation, Rain Days for WFU use and WFU spread days percent.	FPA > Edit FMU Attributes		
14	Calculate fire behavior and wind speed bins and fire probabilities.	FPA > Calculate ERCg and Wind Speed Bins, Fire Probabilities		
15	Determine preparedness staffing season.	FPA > Determine Preparedness Season		
16	Prepare the fire event scenario.			
16a	Prepare probability-based fire event scenario.	FPA > Prepare Probability-based Fire Event Scenario and XML File for FPA		
Or				
16b	Prepare historic-based fire event scenario.	FPA > Prepare Historic-based Fire Event Scenario and XML File for FPA		
17	View FPA scenario details.	FPA > View FPA Scenario Details		

Table 2 - Process Steps to Completion of Historic Analysis Using PCHA

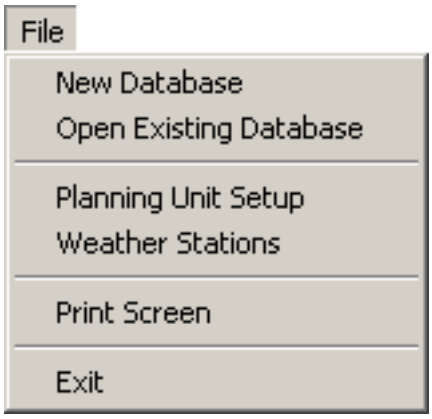
Step	Description	PCHA Menu	Users' Guide Page	Reference Guide Page
18	Transfer XML file to FMA-PM. Use FPA-PM to do this.			



The File Menu

The file menu allows the planner to create or open an existing PCHA database, to create and edit attributes of the FPU and to define and edit attributes for weather stations to be used. The planner may print a screen using the Print Screen menu items. The Exit menu item allows the planner to quit the program (Figure 13).

Figure 13 – The File Menu

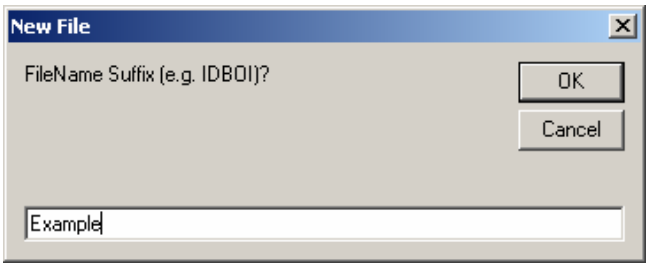


The PCHA Database

All data entered or imported via the PCHA program is stored in a Microsoft Access® database. The file extension for this database is mdb.

New Database

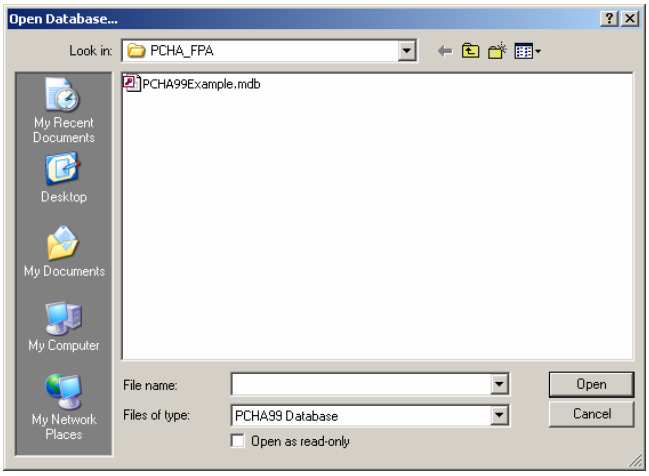
Figure 14



This menu item allows the planner to create a new PCHA database. This activity is preformed when a new FPU is created. When this menu is selected, the dialog screen shown in Figure 14 appears. As with all files, a name must be designated for this new database. Enter that name in the box provided using only characters that are allowed in the Windows® file naming convention. For example, the name Example is entered in Figure 14. The new database will have a file name of PCHA99Example.mdb. Notice the program adds the PCHA99 identifiers in front of the name specified.

Open Existing Database

Figure 15

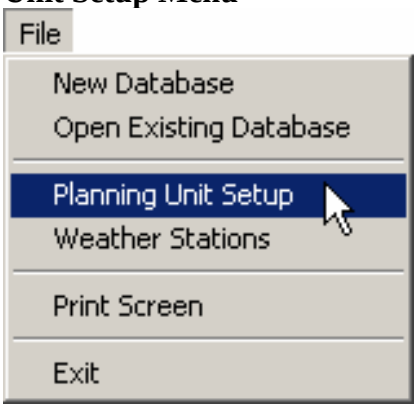


This menu item allows the planner to open a currently defined PCHA database. When this menu item is selected, the standard file open dialog (Figure 15) is displayed. The default location where PCHA looks for existing databases is in the folder where the PCHA software is installed. If the desired PCHA database is not located there, navigate to the folder where the database is located. Click on the file so that it appears in the File name box at the bottom of the dialog screen and click **Open**. When PCHA is started, the last active database is opened automatically.

Planning Unit Setup

Before the planner may import weather and fire records, the Planning Unit Setup values must be entered. Once these values are defined, the planner will not usually need to return to the Planning Unit Setup menu.

Figure 16 – The Planning Unit Setup Menu



Selecting the Planning Unit Setup screen will display the screen shown in Figure 17. The last part of the screen in Figure 17 is used to select the fire planning process being used. This controls the menu options made available. Select the **FPA** radio button.

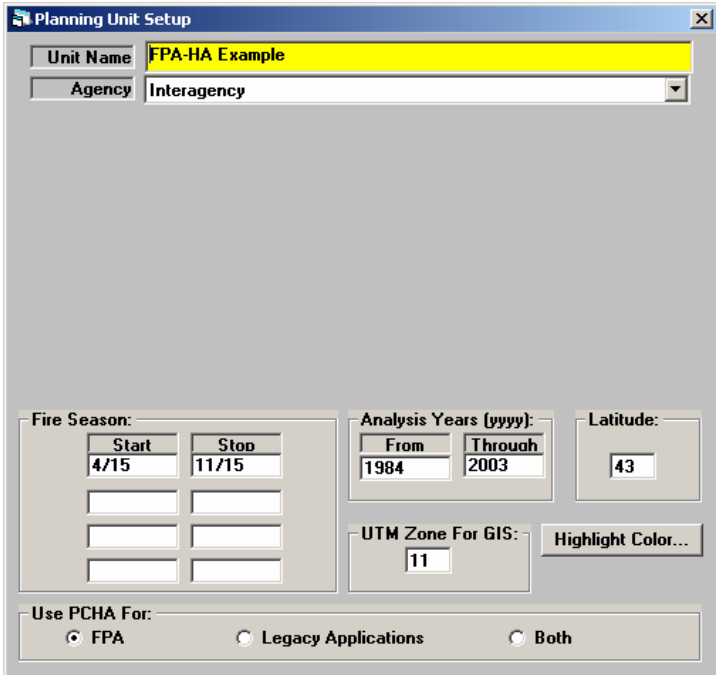
Unit Name

Enter the FPU name. This is an optional but highly recommended entry.

Agency

Click on the pulldown to select the agency group that best describes the agencies participating in the FPU. If more than one agency is participating, select Interagency.

Figure 17 – The Planning Unit Setup Screen



Preparedness Staffing Season
For FPA, disregard this entry as the Preparedness Staffing Season starting and ending dates are automatically determined by the program (**FPA > Determine Preparedness Staffing Season**). The Preparedness Staffing Season is defined by PCHA as the period(s) containing 90% of the fires in the Analysis Period. Multiple discontinuous periods may be designated.

Analysis Years
Enter the beginning and ending years for the specified analysis. Data may be imported beyond the analysis years, but most reports only show fires within the analysis period. Fire occurrence records may contain fires from 1970 to 1995, but if the analysis period is from 1986 to 1993 then only fires from 1986 through 1993 will be used.

Enter the beginning year (e.g. 1984) and the ending year (e.g. 2003) to define the analysis period.

Latitude
Enter the average latitude for the FPU as an integer.

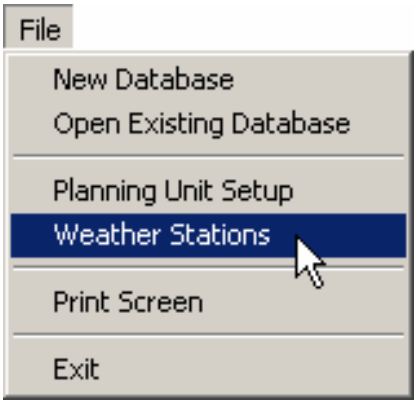
UTM Zone for GIS
Enter the UTM Zone for the FPU. If a UTM zone is entered into this box, PCHA will project any GIS layers viewed in UTM. If the layers to be viewed are in geographic projection (latitude/longitude), leave this box blank. For example, if you desire to view the FMU shape file from FPA-PM, leave this box blank, since its projection is geographic. If you do need to view UTM layers, ask your GIS personnel for the zone. They have selected one to represent your Planning Unit.

The Highlight Color Button
The default light color (the color shown in the box where entries are made) is yellow. To change this color from the default, click on **Highlight Color**. Select the color desired from the 48 basic colors or create a custom color.

Weather Stations

Selecting **File > Weather Stations** the screen shown in Figure 19. Figure 19 shown an example of data to be entered for each weather station identified for use in the analysis. PCHA requires all data fields be completed. Each weather station must be defined before weather observations for a weather data set may be imported. One source for most of the information is the WIMS station catalog available at http://famweb.nwcg.gov/weatherfirecd/.

Figure 18 – The Weather Stations Menu

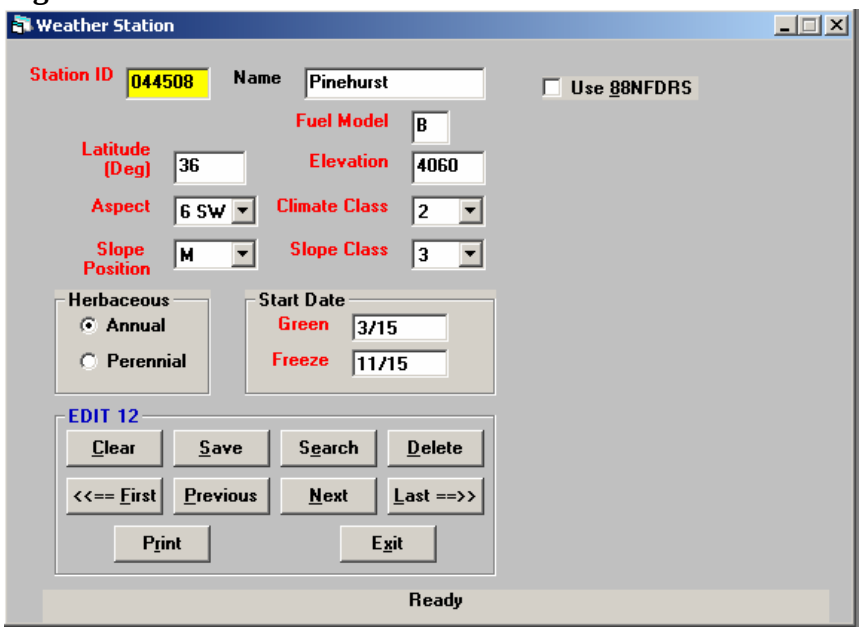


Search Button
Click **Search** to find the first weather station record in the database. Once weather station is displayed, the planner may use **First**, **Previous**, **Next**, and **Last** to move through the stations. The planner may also search for a particular weather station.

Station ID

Enter the six-digit weather station identifier. The station identifier may contain both numbers and letters. Be sure to include any leading zeros in the identifier (e.g. 061432).

Figure 19 – Screen to Define Weather Stations Attributes



Station Name

Enter the station name (up to 12 characters). This entry is optional but strongly recommended. Many people know the station name but not the station number.

Fuel Model

Enter the NFDRS fuel model assigned to this station. Valid entries are letters A-L and N-U. Table 3 contains a list of NFDRS fuel models.

Table 3 – NFDRS Fuel Models

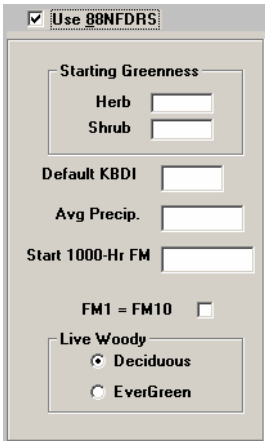
Fuel Model	Description	Fuel Model	Description
A	Western annual grass	K	Light logging slash
B	California mixed chaparral	L	Western perennial grass
C	Pine grass savannah	N	Sawgrass
D	Southern rough	O	High pocosin
E	Hardwoods (winter)	P	Southern pine plantation
F	Intermediate brush	Q	Alaska black spruce
G	Closed short needle conifer (heavy)	R	Hardwoods (summer)
H	Closed short needle conifer (light)	S	Alaska tundra
I	Heavy logging slash	T	Sagebrush grass
J	Medium logging slash	U	Western long needle conifer

Latitude (Degrees)
Enter the latitude in degrees for the station. This value affects fire danger calculations. Daylight length changes with latitude and season, which affects solar radiation on fuels.

Elevation
Enter the elevation in feet above mean sea level of the station. This value affects the calculation of fire behavior indices PCHA adjusts the fire behavior indices from the weather station site to the fire location.

Use 88 NFDRS
Check the box if the 1988 version of NFDRS is to be used. Additional required inputs include the starting greenness factor for both herbaceous and shrub vegetation, the default Keetch-Byram Drought Index (KBDI), the average annual precipitation, the starting 1000-h timelag fuel moisture and designation of live woody vegetation as deciduous or evergreen (Figure 20). Checking this option will enable the use of 1988 NFDRS models in calculations. Some calculated values will show for each day in the '88 NFDRS tab. This box should remain unchecked unless all the required data is available. Although 88 NFDRS is shown as an option in PCHA, the daily data required in order to facilitate it are not available to PCHA users. At this time, selecting **88NFDRS** by clicking this the checkbox has no effect.

Figure 20



Aspect
Select the aspect the weather station is on.

Climate Class
Select the climate class that best describes the rainfall regime in the FMU represented by the weather station (Table 4). Climate class defines variable drying rates for annual, perennial, and woody plants within the live fuel moisture model. Plants have adapted to various moisture regimes and respond differently to rainfall. Those adapted to moist environments lose moisture faster than those from dry environments. Plants growing in drier climates typically respond more quickly to rainfall events. Choose the appropriate climate class that represents how local plants respond to rainfall events.

Table 4 – Climate Class Definitions

Code	Definition
1	Arid, semiarid.
2	Subhumid (rainfall deficient in summer)
3	Subhumid (rainfall adequate in all seasons)
4	Wet

Slope Position
Choose the slope position that best describes the location of the weather station (Table 5).

Table 5 – Slope Position Definitions

Alpha Code	Numeric Code	Description
L	1	Flat to Lower 1/3rd of slope
M	2	Middle 1/3rd of slope
U	3	Upper 1/3rd of slope

Slope Class

Enter the NFDRS slope class that best describes the slope class where the weather station is located (Table 6). Percent slope is the rate of elevation gain or loss in feet per 100 feet horizontal distance

Table 6 – Slope Class Definitions

Code	Definition	Slope Used
1	0 – 25%	22.5%
2	26 – 40%	31.8%
3	41 – 55%	44.5%
4	56 – 75%	66.3%
5	75%+	90.0%

Herbaceous

Select the option for either annual or perennial that represents best the herbaceous vegetation in the FMU represented by this weather station.

Start Date

Enter the date herbaceous vegetation typically greens-up, and the date herbaceous vegetation freezes in a typical year for the FMU represented by this weather station. Entries must be month and date numbers separated by a slash or period.

Print Button

Print tells the computer to generate a page that looks like the weather station screen. This is a nice way to document entries and allows an easy check of the data.

Exit Button

Exit closes the Weather Station entry screen and returns to the main PCHA screen.

Print Screen

This command allows the printing of any screen for documentation purposes (Figure 21).

Exit

The Exit menu closes all PCHA files and screens and returns control to the Windows program manager (Figure 22).

Figure 21 – The Print Screen Menu

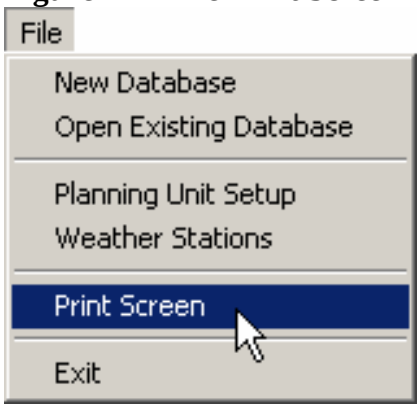
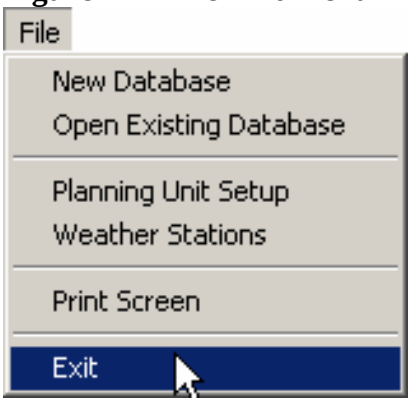


Figure 22 – The Exit Menu



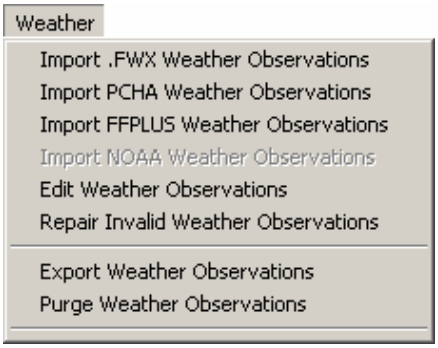
The Weather Menu

The functions on this menu are available when selecting Weather from the main menu. The planner may import, edit, and export weather observation records and GRID weather data sets. The planner may also edit weather observation fields, enter Keetch-Byram Drought Index (KBDI) starting values, repair certain problems on observations and calculate National Fire Danger Rating System values.

Import Weather

Importing weather data into PCHA for review, editing, and use as part of the fire planning effort is a powerful tool. This release allows the importing of ASCII weather observation or data set files in fwx or fw9 format. Options also exist for importing the weather station attributes and weather observation records from another PCHA database or a FireFamily Plus database. In addition, import of weather observations taken at a National Oceanographic and Atmospheric Administration (NOAA) weather stations may be supported in future releases (Figure 23).

Figure 23 – The Weather Menu



Obtaining .FWX Weather Observation Records

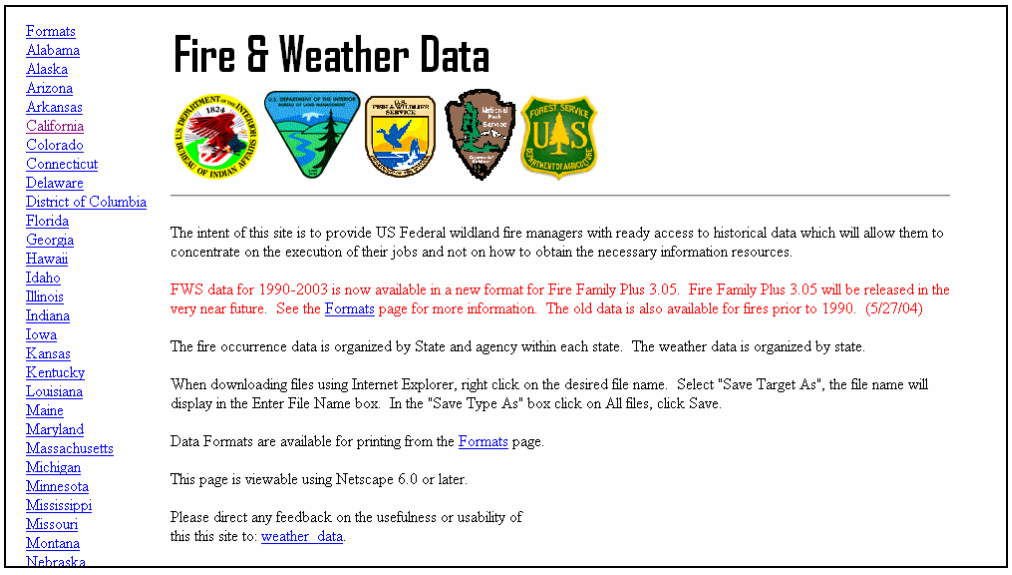
The fire planner must obtain weather observation records. Several sources are available.

Obtaining NFDRS Weather Station Observation Records

Weather records from a NFDRS weather station are available from the FAMWEB Internet site at the URL:

http://famweb.nwcg.gov/weatherfirecd/

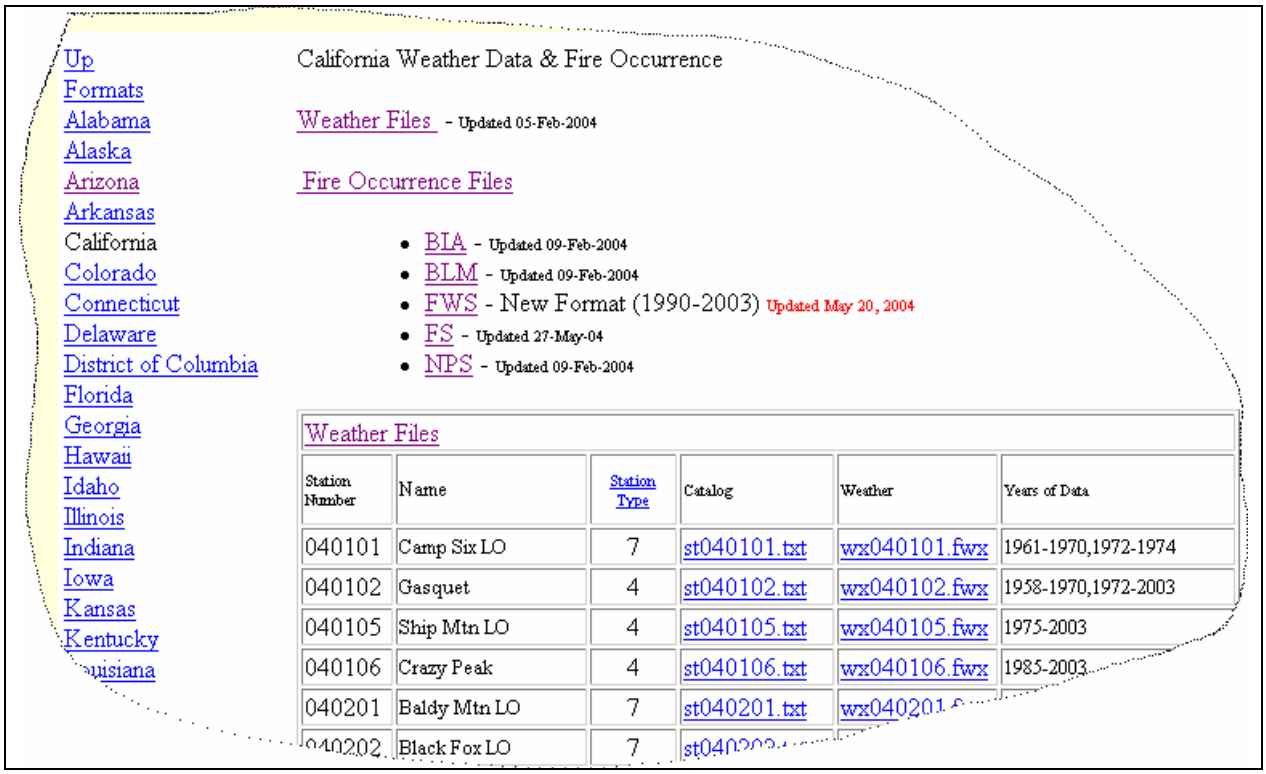
Figure 24



Select the state and then weather stations from which the weather observations will be downloaded. These files, on the Internet site, include station catalog attributes (NFDRS catalog

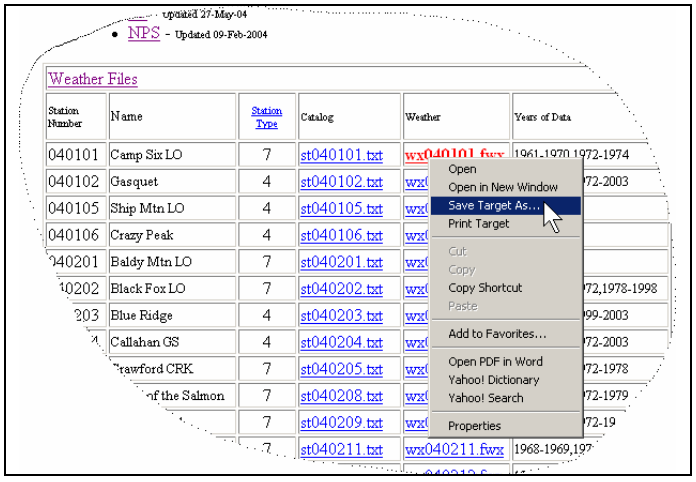
information) and weather data sets. The time period that weather data is available varies by weather station. The years available are noted in the far right column in the table (Figure 25).

Figure 25



When downloading a *.fwx file, the planner should right click on **File > Save Target As** in Windows Explorer (Figure 26).

Figure 26



Navigate to the folder the file will be downloaded to using Windows Explorer®. Be sure to note this folder location.

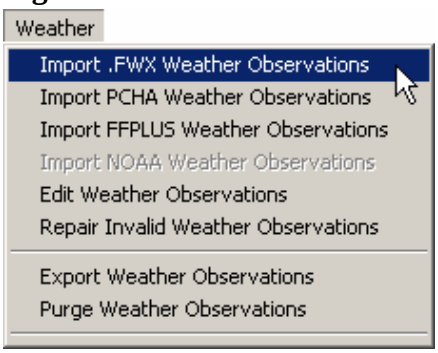
Obtaining GRID Weather Data Records

Reserved. To be completed at a later date.

Import .FWX Weather Observations

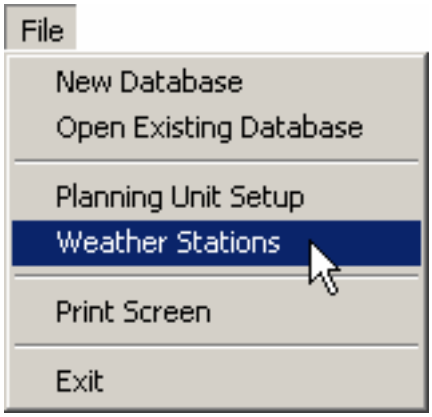
The weather records for each weather station must be in separate files (one file per station).

Figure 27



Before these weather observations may be imported to PCHA, the weather station attributes must be defined using the **File > Weather Stations** menu (Figure 28). See the description of this menu item for details.

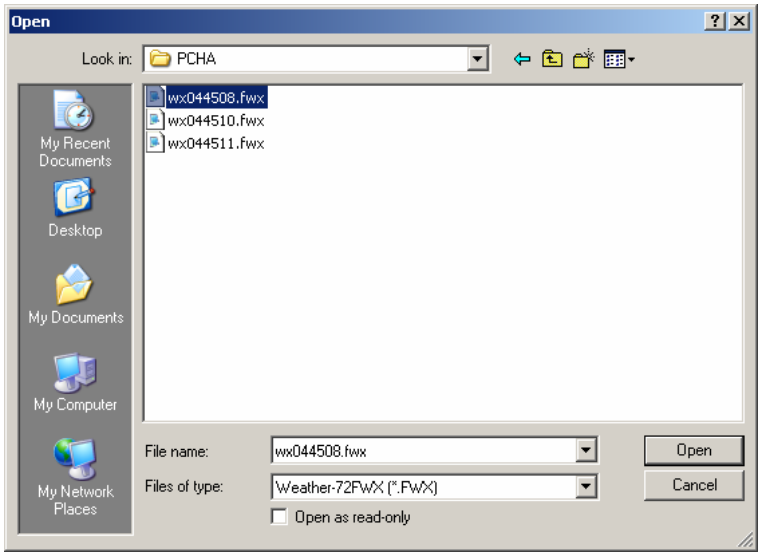
Figure 28



The ASCII file naming convention requires that the last six characters of the file name be the weather station identifier. Weather observation files downloaded from the FAMWEB Internet site will have WX as the first two characters of the filename and fwx as the file extension (Figure 29).

GRID weather files should be named using this convention. It is recommended the six-character "station name" given to the GRID weather data set be related to the FMU name it is assigned to.

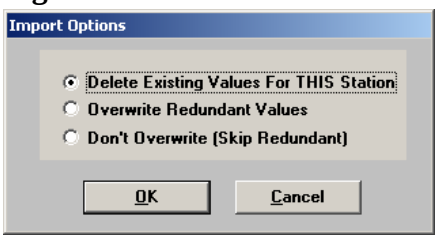
Figure 29



When the planner selects **Weather > Import .FWX Weather Observations**, a dialog box similar to the one in Figure 29 appears. It will be necessary to navigate to the folder where the weather observation files have been saved. Once there, the dialog will list files with the .fwx extension. To import the *.fwx weather observations file, the planner may either double click on the file name, or click once to highlight the file name and then click **OK**.

The screen in Figure 30 will appear. The planner must choose one of three options listed on the screen.

Figure 30



Delete Existing Values For THIS Station
The default option deletes all weather records for this station that currently exist in PCHA. Use this option to delete all existing records from the current database and import a new weather data set.

Overwrite Redundant Values
This option imports new weather observations and replaces a weather observation in the PCHA database by a new observation if one exists in the ASCII weather observation file.

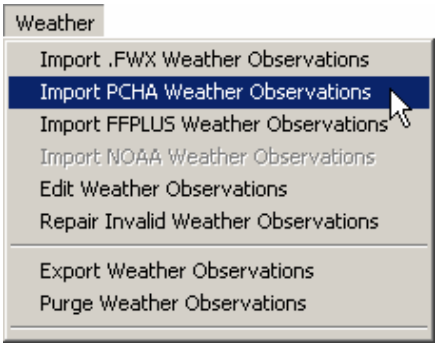
Don't Overwrite (Skip Redundant)
This option does not delete duplicate observations so it is possible to have more than one weather observation for the same day. Use this option to add new records to the database, but keep all the existing records without changing them.

After an option is selected, click **OK** to start the import process. A progress bar will appear along the bottom of the screen. There is **Cancel** button in case the planner wishes to stop the import part way through the process.

Importing from a PCHA Database

All weather station attributes and weather observation records that exist in a PCHA database may be imported to a new PCHA database. This option is of value if weather observations have been imported and verified in a past planning effort that used PCHA.

Figure 31



Selecting **Weather > Import PCHA Weather Observations** will result in the screen in Figure 32 appearing. Clicking **Browse** will result in the screen in Figure 33 appearing.

Figure 32

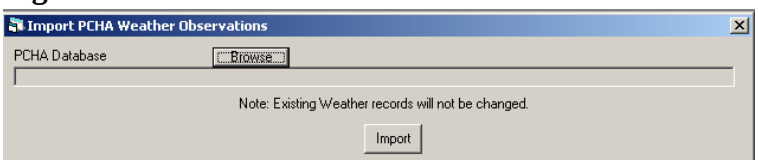
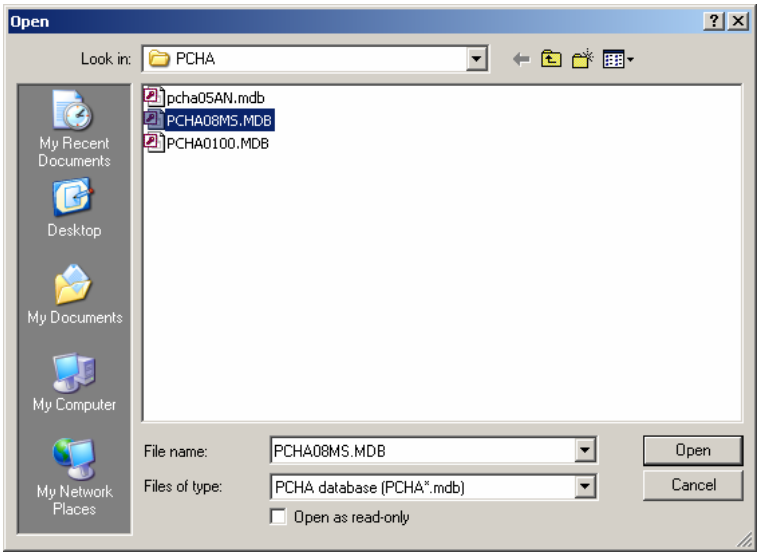
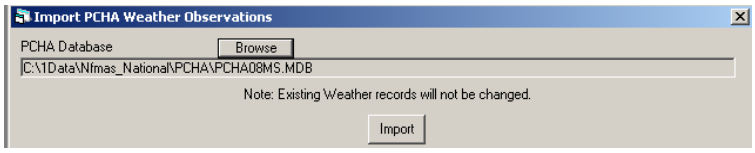


Figure 33



Navigate to the folder where the PCHA database file has been saved. Once there, the dialog will list files with the .mdb extension. The planner may either double-click on the file name, or click once to highlight the file name and then click **OK**. The screen in Figure 34 will appear.

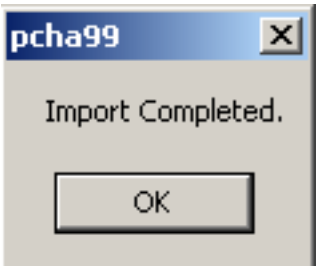
Figure 34



Notice the path to the file is shown. If the correct file has been selected, click **Import**. Be aware that all weather stations and weather observations in the PCHA database selected will be imported once the **Import** button is clicked.

When all weather station attributes and weather records have been imported, PCHA will display the screen in Figure 35.

Figure 35

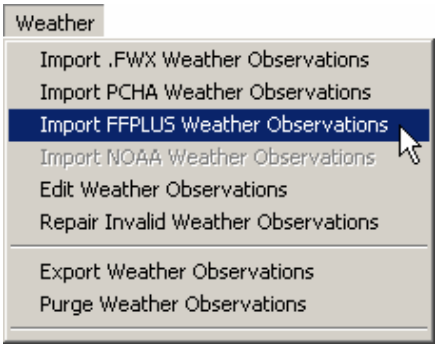


Importing from a FireFamily Plus Database

All weather station attributes and weather observation records that exist in a FireFamily Plus database may be imported to a new PCHA database. This option is used if weather observations have been imported and verified in a past planning effort that used FireFamily Plus.

This option only supports weather observation data import from a FireFamily Plus, Version 2, database.

Figure 36



Selecting **Weather > Import FFPLUS Weather Observations** will result in the screen shown in Figure 37. Clicking **Browse** will result in the screen shown in Figure 38.

Figure 37

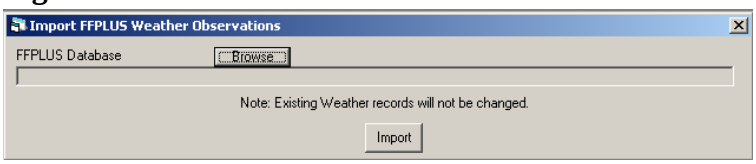
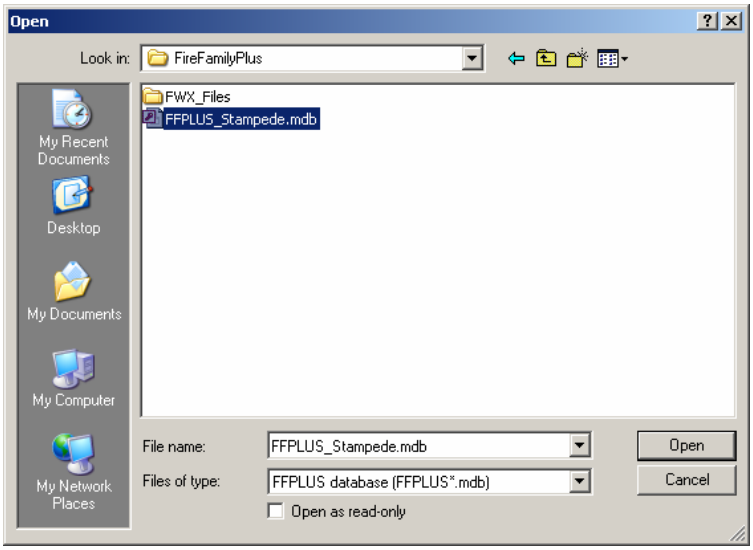


Figure 38



It will be necessary to navigate to the folder where the FireFamily Plus database file has been saved. Once there, the dialog will list files with the .mdb extension. The planner may either double-click on the file name, or click once to highlight the file name and then click **OK** . The screen in Figure 39 will appear.

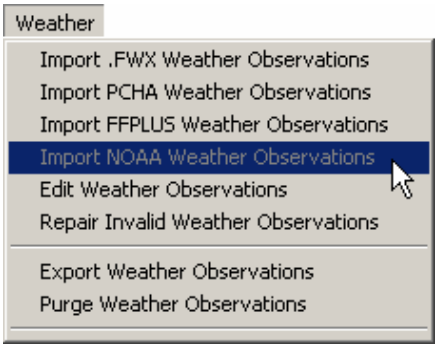
Figure 39

Notice the path to the file is shown. If the correct file has been selected, click IMPORT. Be aware that all weather stations and weather observations in the FireFamily Plus database selected will be imported once the IMPORT button is clicked. When all weather station attributes and weather records have been imported, PCHA will display the screen in Figure 35.

Importing NOAA Weather Observation

Reserved. To be completed at a later date.

Figure 40



Edit Weather Observations

After importing the weather data, it must be checked for errors and missing observations. Some observations may be incomplete or there may be significant gaps in the weather observations. Data fields in individual weather records may be edited. If a data field in a weather record is an estimated field value, be sure to check the User-Estimated Weather box. Weather records may be added to fill gaps. Selecting the **Weather > Edit Weather Observations** menu will result in the screen in Figure 42 being displayed.

Figure 41

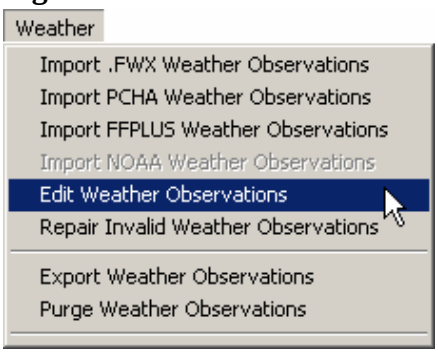
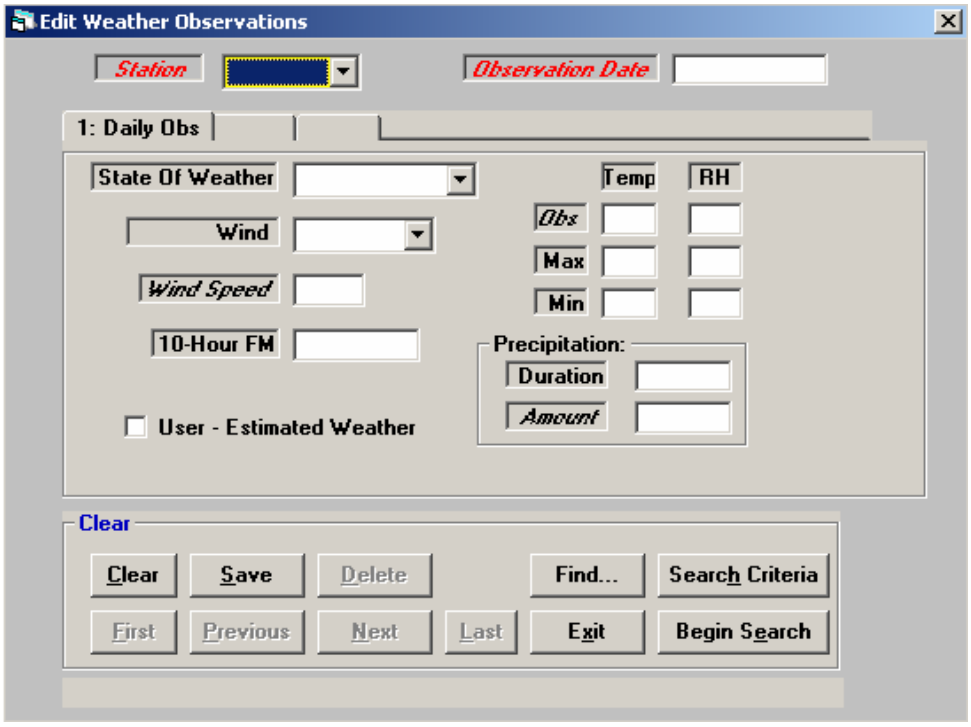


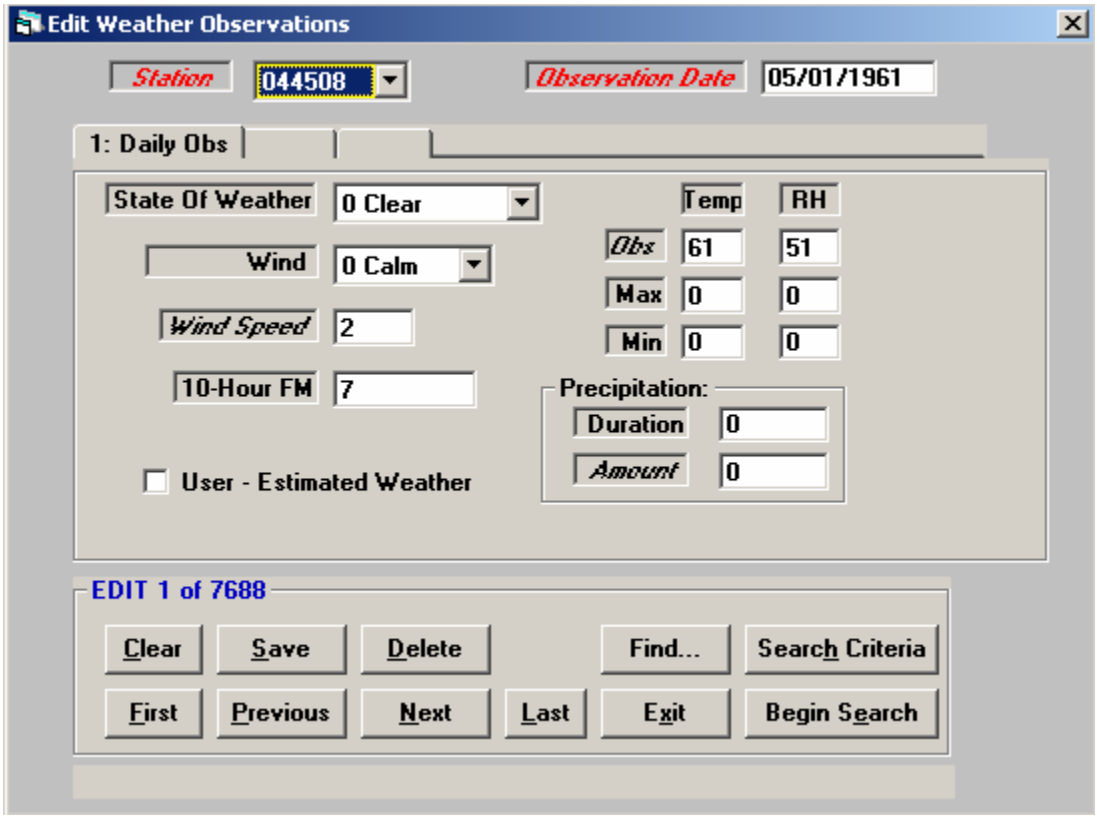
Figure 42 – Edit Weather Observations Screen



Displaying Weather Records for a Station

Use the Station pull-down to select a weather station. Do a left mouse click on the **Clear** button followed by a left mouse click on the **Begin Search** button. A screen similar to the one shown in Figure 43 will be displayed.

Figure 43 – Daily Weather Tab



Top of Weather Screen

The station number and observation date are always visible so the planner knows which weather station and observation date are displayed.

Station ID

This field shows the weather station or GRID weather data set identifier. This field is searchable for specific records or groups of records as described under the **Search Criteria** button.

Observation Date

This field is the date of the weather observation. A planner may search for observations on specific dates or a range of dates in searches as described under the **Search Criteria** button.

Daily Observations Tab (Daily Obs)

The screen in Figure 43 shows the content of the **Daily Observation** tab on the **Edit Weather Observations** screen. The fields on this tab contain the values for each variable for the observation date. The definitions of the fields follows.

State of Weather

State of Weather indicates the amount of cloud cover and type of precipitation at the weather station at the observation time. Table 7 shows the State of Weather definitions.

Table 7 – State of Weather Definitions

Code	Definition
1	Scattered clouds
2	Broken clouds
3	Overcast
4	Foggy
5	Drizzling
6	Raining
7	Snow or sleet
8	Showering
9	Thunderstorms in progress

Wind Direction

This field shows the direction from which the wind blew at the observation time coded into one of eight directions. Table 8 shows the wind direction definitions.

Table 8 – Wind Direction Definitions

Code		Definition
0	---	Calm
1	NE	Northeast
2	E	East
3	SE	Southeast
4	S	South
5	SW	Southwest
6	W	West
7	NW	Northwest
8	N	North

Wind Speed

Wind speed in miles per hour is the 10-minute average measured at 20-feet above the average height of the vegetative cover.

10h Timelag Fuel Moisture (10-h FM)

This is the moisture content of the 0.26 – 1.00 inch dead and down fuels. It is measured by weighing calibrated fuel sticks or calculated using equations and weather observations attributes.

Temperature (Temp)

This field is the dry bulb temperature measured in degrees Fahrenheit.

Relative Humidity (RH)

Relative humidity, expressed as a percent, is the proportion of the amount of water in the air to the amount of water at saturation given the same temperature and barometric pressure.

Precipitation
Precipitation is expressed both in the amount and the duration.

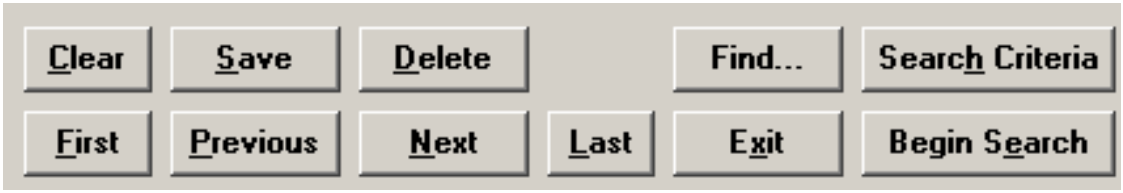
Precipitation Duration
Precipitation duration is the time expressed in hours that measurable precipitation events lasted during the previous 24-hour period.

Precipitation Amount
Precipitation amount is the amount of atmospheric moisture that reached the ground within the previous 24-hour period.

User-Estimated Weather Checkbox
If the planner enters an estimated value for any field in the weather record for the observation date, check this box. To have the edits saved in the PCHA database, click **Save**.

Bottom of Edit Weather Screen
All of these buttons are usable from any of the tabs to enter a new record or a search (Figure 46).

Figure 46



Save Button
The **Save** button saves the information for the active date to the PCHA database. Until this button is clicked, any changes made in fields are not permanently saved to the PCHA database.

Clear Button
The **Clear** button resets all data fields to blank.

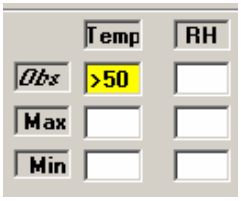
Delete Button
This button deletes the current record from the database. If there are no weather observation records in the database or displayed on the screen, this button will be light gray and inoperative.

Begin Search Button
Click **Begin Search** to find the first weather observation record in the database or the first record that meets the defined search criteria.

Search Criteria Button

Click **Search Criteria** to clear the screen and define the fields that will control which weather observation records to find in the database. Fields with their names written in italic text are available for searches. Station, Observation Date, Precipitation Amount, Wind Speed, Observed Temperature, and Observed Relative Humidity are search fields. After the criteria are entered, click **Begin Search**.

Figure 47



For example, a planner may search for all observations with temperatures greater than 50. Click **Search Criteria** then click in the Obs Temp field. Enter the criterion >50 and click **Begin Search**.

To find precipitation events between 2 inches and 10 inches, click **Search Criteria** . Click in the Precipitation Amount field and enter >=2.0 and <=10.0. Click **Begin Search**. This search will find all weather observations that have 2.0 inches through 10.0 inches of precipitation for the day.

First, Previous, Next, and Last Buttons

The **First** button displays the first weather observation record in the database or the search list. The **Previous** and **Next** buttons display the weather observation before or after the current observation. The **Last** button displays the last observation in the database or search list. These buttons show light gray if there are no weather observation records in the database or displayed on the screen.

Find Button

Unlike the **Search Criteria** and **Begin Search** buttons, which retrieve a set of records for viewing, the **Find** button is used to jump to desired records within those already retrieved with **Begin Search**. Click **Find** and then select **Clear** from the pop-up menu. This will clear all fields. Enter the values to determine which record is desired, then click **Find** and select **Find** from the pop-up menu. To move from record to another similar record after a **Find** command, click **Find** and then select **Next** or **Previous** from the pop-up menu.

To have the edits saved in the PCHA database, click **Save**.

Exit Button

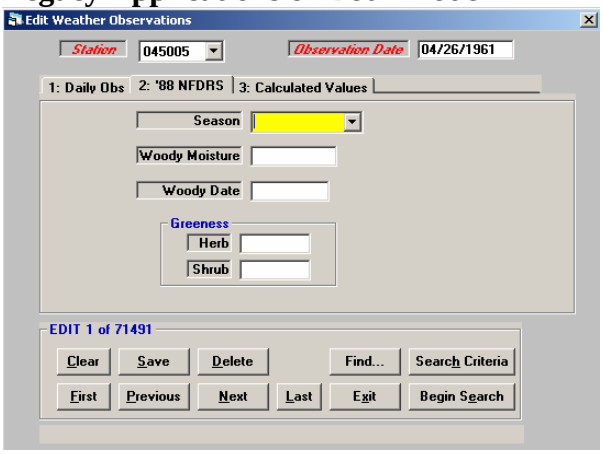
The **Exit** button closes the weather observation edit screen and returns to the main PCHA screen.

1988 NFDRS Tab

The data on the NFDRS tab shows the additional data required to support the 1988 version of NFDRS when PCHA is operating in the Legacy Applications or Both mode (Figure 44) (See the File > Planning Unit Setup screen). Although 88 NFDRS is shown as an option in PCHA in theses two modes, the daily data required in order to facilitate it are not available to PCHA users. At this time, selecting the use of 88NFDRS on the File > Weather Station screen for a weather station has no effect on the NFDRS calculations.

Figure 44 – '88 NFDRS Tab

Legacy Applications or Both Mode



FPA Mode

Season

This field identifies one of the four seasons of the year. Options are Unknown, Winter, Spring, Summer or Fall.

Woody Moisture

This is the moisture content of woody (shrub) fuels. Values may range up to 250 percent.

Woody Date

This field is the observation date of the woody fuel moisture at the season start date.

Greenness

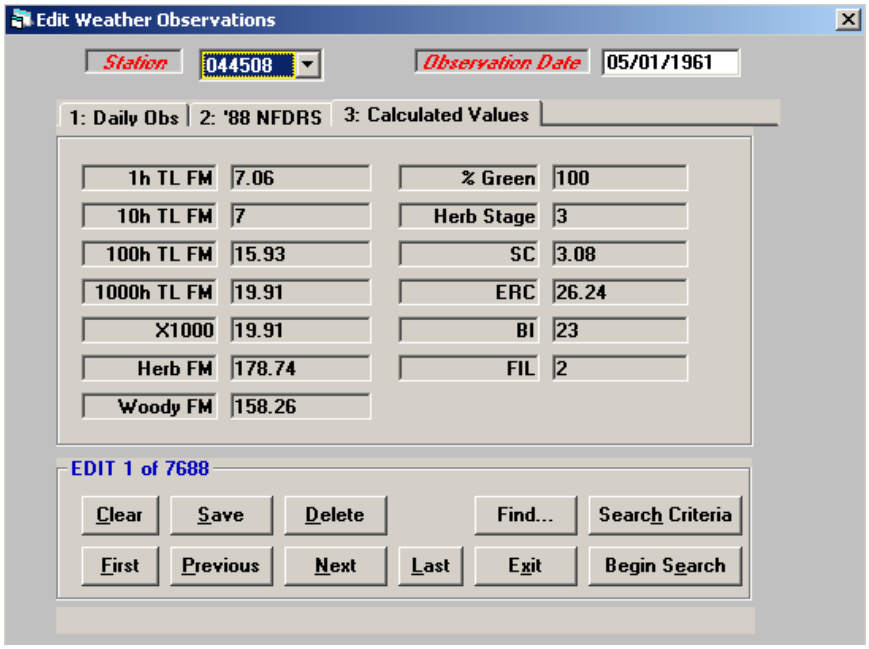
This is the greenness factor from 0 through 20 that indicates the relative level of shrub greenness. Zero indicates that all leaves have fallen off deciduous shrubs or that evergreen shrubs are dormant. Twenty indicates fully developed shrub leaves that are not under moisture stress. Use intermediate values during spring greenup, fall curing, or during drought conditions. Value can be determined by viewing the station catalog in the Internet or in FireFamily Plus. There are separate entries for herbaceous greenness and shrub greenness.

To have the edits saved in the PCHA database, click **Save**.

Calculated Values Tab

The data on this tab shows the calculated values for the National Fire Danger Rating System based on the weather observation. The calculations use the 1978 NFDRS formulas unless the Use 88 NFDRS box on the weather station definition screen was checked (Figure 45).

Figure 45 – '88 NFDRS Tab



1-h Timelag Fuel Moisture (1-h TH FM)

Observation time, relative humidity, and temperature measured at 4.5-feet above the ground are the weather values used to calculate the 1-h timelag fuel moisture. Observed weather values are adjusted from the 4.5-foot observation to an estimated condition at ground level using factors determined by the State of Weather codes.

10-h Timelag Fuel Moisture (10-h TH FM)

The 10-h fuel moisture can be obtained by measuring the 10-h timelag fuel moisture sticks at the weather station. When fuel sticks are not measured, the 10-h timelag fuel moisture is calculated in a manner similar to that for the 1-h timelag fuel moisture.

100-h Timelag Fuel Moisture (100-h TH FM)

The 100-h timelag fuel moisture is determined from the weather observation values of precipitation duration, maximum and minimum temperature and relative humidity. The maximum and minimum values are for the 24-hour period that begins at observation time yesterday (in relation to the weather record date) and ending at observation time today.

1000-h Timelag Fuel Moisture (1000-h TH FM)

The 1000-h timelag fuel moisture calculation uses the same basic methodology as the 100-hour timelag fuel moisture but bases calculations on conditions over a seven-day period.

X1000 Value (X1000)
The X1000 value limits the increase in herbaceous fuel moisture due to precipitation. The 1000-h timelag fuel moisture controls the drying rate of herbaceous fuel moisture and the X1000 value controls the rate of increase of herbaceous fuel moisture content due to precipitation.

Herbaceous Fuel Moisture (Herb FM)
Plants that do not develop persistent woody tissues such as grasses, forbs and ferns are live herbaceous fuels. These fuels are further subdivided into annual and perennial vegetation types. The herbaceous fuel moisture is estimated using National Fire Danger Rating System (NFDRS) calculations. When the herbaceous fuel moisture falls below 30 percent, these plants are considered cured, the moisture content defaults to that of the 1-h timelag fuels and the herbaceous fuel loading is added to the 1-h timelag dead fuel loading.

Woody Fuel Moisture (Woody FM)
Plants that develop persistent woody tissue such as shrubs are live woody fuels. These fuels are considered dormant when the moisture content falls to 50 percent. Maximum moisture content during the growing season is 250 percent.

Percent Green (% Green)
The 1988 NFDRS requires users to enter greenness factors that express actual greening and curing of both live herbaceous and live woody vegetation. Greenness factors represent a visual estimate of the current general greenness of herbs and shrubs in comparison to their maximum greenness. The greenness factors range from 0 to 20. Zero (0) represents fully dried herbaceous plants or dormant shrubs, and 20 represents a condition in which the herbs and/or shrubs are as green as they may ever get.

Herbaceous Stage (Herb Stage)
There are four herbaceous stages in the live moisture fuel model. These stages are Cured, Green Up, Green and Transition. Each stage is utilized in the model to determine fuel load transfer from live herbaceous to dead 1-hour timelag fuel moisture. The affect on live fuels is described below.

Cured
All live herbaceous fuel loading is transferred to 1-hour timelag fuel category (1-h TL FL).

Green Up
During this stage, the herbaceous fuel load that is 100% in the 1-h timelag dead category is transferred back to the live herbaceous category as the live fuel moisture. When the live fuel moisture reaches 125 percent, the entire herbaceous fuel load is in the live herbaceous category.

Green
All herbaceous fuel loading is in the live herbaceous category.

Transition
During transition, live fuel load is transferred progressively from the live category to the 1-h dead timelag fuel load category as the live herbaceous fuel moisture moves from 125% to 30%.

Spread Component (SC)

The Spread Component is a rating of the forward rate of spread of a headfire. Deeming, et al, (1977), states that "the spread component is numerically equal to the theoretical ideal rate of spread expressed in feet-per-minute. .". This carefully worded statement indicates both guidelines (it's theoretical) and cautions (it's ideal) that must be used when applying the Spread Component. Wind speed and slope are key inputs in the calculation of the spread component, thus accounting for a high variability from day to day. The Spread Component is expressed on an open-ended scale; thus it has no upper limit. The Spread Component is an index calculated in a manner very similar to the calculation of the rate of spread in the Fire Behavior Prediction System. It is expressed in feet per minute and is calculated using the NFDRS fuel model attribute of the weather station.

Energy Release Component (ERC)

The Energy Release Component is a number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. Daily variations in ERC are due to changes in moisture content of the various fuels present, both live and dead. Since this number represents the potential "heat release" per unit area in the flaming zone, it can provide guidance to several important fire activities. It may also be considered a composite fuel moisture value as it reflects the contribution that all live and dead fuels have to potential fire intensity. It should also be pointed out that the ERC is a cumulative or "build-up" type of index. As live fuels cure and dead fuels dry, the ERC values get higher thus providing a good reflection of drought conditions. The scale is open-ended or unlimited and, as with other NFDRS components, is relative. Conditions producing an ERC value of 24 represent a potential heat release twice that of conditions resulting in an ERC value of 12.

Burning Index (BI)

The Burning Index is a number related to the contribution of fire behavior to the effort of containing a fire. The BI is derived from a combination of Spread and Energy Release Components. It is expressed as a numeric value closely related to the flame length in feet multiplied by 10. The scale is open ended which allows the range of numbers to adequately define fire problems, even in time of low to moderate fire danger. Table 1, adapted from Deeming (1977) gives several cross references that relate BI to fireline intensity and flame length with narrative comments relative to the affects on prescribed burning and fire suppression activities. It's important to remember that computed

BI values represent the near upper limit to be expected on the rating area. In other words, if a fire occurs in the worst fuel, weather and topography conditions of the rating area, these numbers indicate its expected fireline intensities and flame length.

Studies have indicated that difficulty of containment is not directly proportional to flame length alone but rather to fireline intensity, the rate of heat release per unit length of fireline, (Byram 1959). The use of fireline intensity as a measure of difficulty shows that the containment job actually increases more than twice as fast as BI values increase. It is still safe to say that flame length is related to fireline intensity because BI is based on flame length.

Fire Intensity Level (FIL)

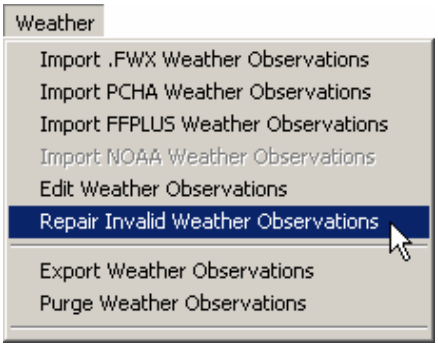
The Fire Intensity Level is a measure of fire intensity as it influences fire effects (rather than fire behavior) and is represented by flame length. The six FIL categories and their associated flame lengths are listed in Table 9.

Table 9 – FIL Definitions

FIL	Flame Length
1	0 – 2.0 feet
2	2.1 – 4.0 foot
3	4.1 – 6.0 feet
4	6.1 – 8.0 feet
5	8.1 – 12.0 feet
6	12.1+ feet

Repair Invalid Observations

Figure 48



This function will review all weather records and correct certain specified fields that certain incorrect information. A box will pop up and ask for confirmation of whether to proceed. The status bar across the bottom shows progress through the weather records.

After PCHA finishes the repairs, a display box will pop up with the message "xxx invalid weather observations were written to file INVWX.DAT." The INVWX.DAT is a text file saved in the folder where PCHA is installed. The report may be viewed by clicking **OK** . Clicking on **Print** will print the report.

The planner may scroll through the report by moving the scroll bars on the right and bottom. The report lists station number, observation date, field name affected, original value, new value, and a description of the problem.

Errors corrected include:

- Maximum humidity less than yesterday or today's observed relative humidity. Maximum relative humidity is set to the greater of yesterday or today's relative humidity.
- Minimum humidity greater than yesterday's or today's observed relative humidity. Minimum relative humidity is set to the lesser of yesterday or today's relative humidity.
- Maximum temperature is less than yesterday or today's observed temperature. Maximum temperature is set to the greater of yesterday or today's temperature.
- Minimum temperature is greater than yesterday or today's observed temperature. Minimum temperature is set to the lesser of yesterday or today's temperature.
- Maximum relative humidity is less than minimum relative humidity. Maximum and minimum relative humidity values are swapped.
- Maximum temperature is less than Minimum temperature. Maximum and minimum values are swapped.

Export Weather Observations

The user may desire to use the weather observation data in PCHA in another software program such as FireFamily Plus. This menu item allows the planner to export weather records in either .fwx or .fw9 format. Each weather station must be exported separately. Choose the station number, date range, and file type for each export.

Selecting **Weather > Export Weather Observations** opens a screen similar to the one shown in Figure 50 to be displayed.

Figure 49

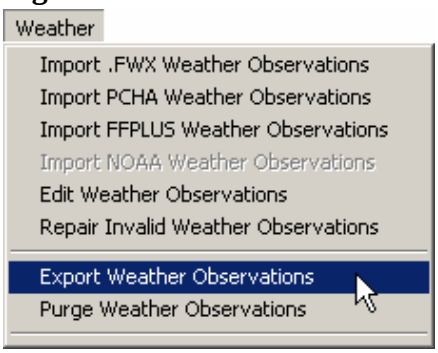
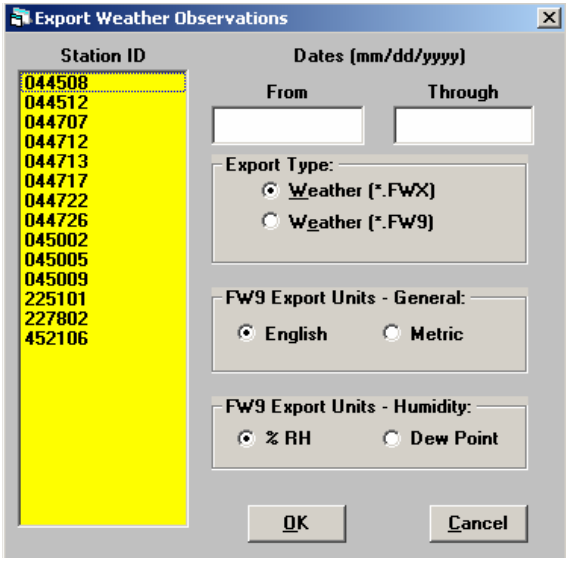


Figure 50



Station ID

PCHA will list the stations defined in the database. Choose the station desired to export.

Dates

Enter the beginning and ending dates to export in the **From** and **Through** boxes. Enter the dates in mm/dd/yyyy format. PCHA will export only the weather observations for the requested station whose observation date falls between the two dates.

Export Type

.fwx (Short observation)

This is the same format as the PCHA import file format.

.fw9 (WXOBS98)

This is the Y2K compliant format.

Purge Weather Observations

This option will remove selected sets of previously imported weather observations. Selecting the **Weather > Purge Weather Observations** opens the screen in Figure 52.

Figure 51

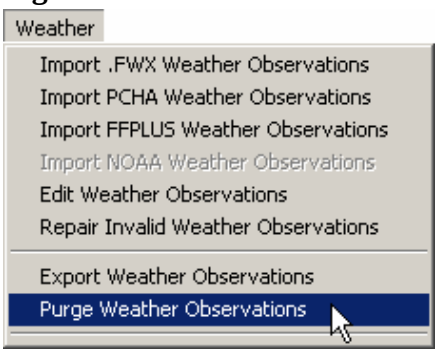
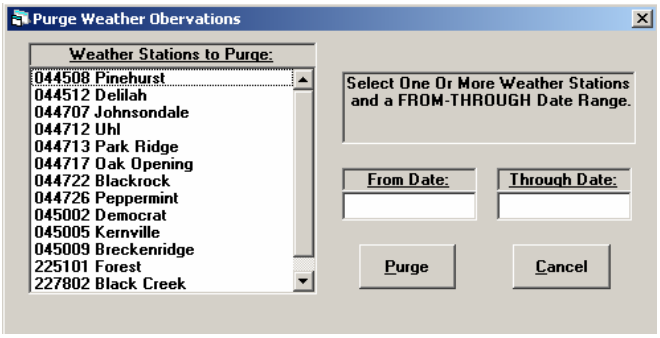


Figure 52



The user may select one or more weather stations and a range of weather observations to be deleted from the PCHA database. The **From Date** is the first weather observation (month, day and year) that is to be deleted and the **Through Date** (month, day and year) is the last weather observation that is to be deleted. All weather observations for the selected station(s) between the **From** and **Through** Dates will be deleted when the **Purge** button is selected. The **From** and **Through** date range format is mm/dd/yyyy. Clicking on the **Cancel** button will cause the screen to close.

The Fire Menu

Figure 53 – The Fire Menu

This menu item provides functions available to manage fire data. **Import Fires** loads fire data into the PCHA database. **Edit Fires** allows the planner to verify and modify fields in a fire occurrence record. A utility exists to calculate the latitude and the longitude for a fire from the legal location (Township, Range and Section). PCHA uses the historic fire's start location defined with its latitude and longitude to assign these fires to an FMU. Reports help to find problems in the data, and clean data can be exported for further use.

Obtaining Fire Occurrence Records

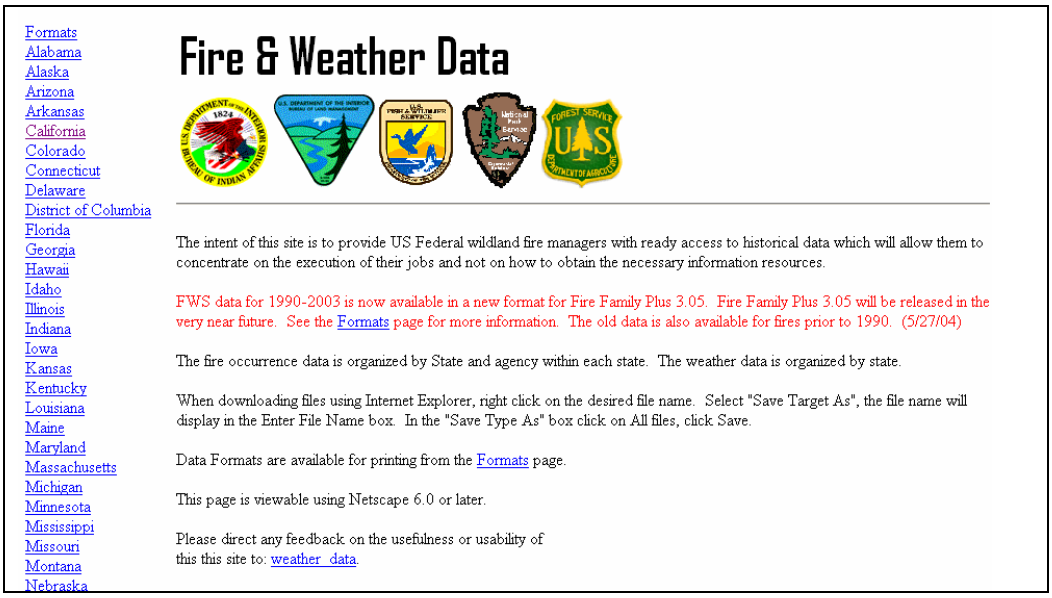
The fire planner must obtain fire occurrence records using sources described in this section.

Obtaining Federal Agency Fire Occurrence Records from the Internet

Historic fire occurrence records for the USDA Forest Service and the USDI Bureau of Land Management, Bureau of Indian Affairs, Fish and Wildlife Service and the National Park Service are available from the FAMWEB Internet site at the URL:

http://famweb.nwcg.gov/weatherfirecd/

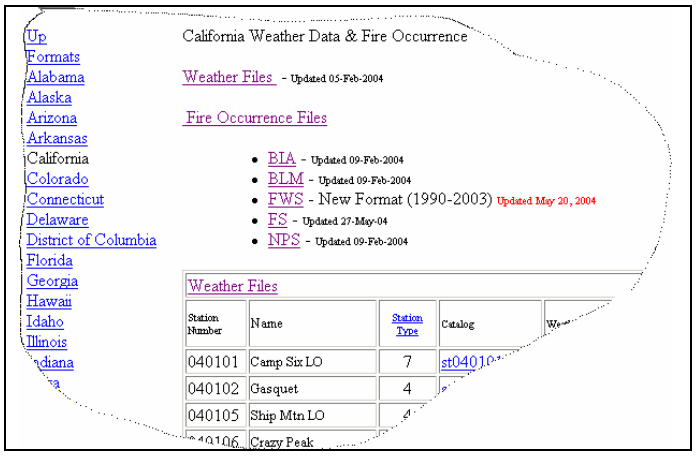
Figure 54



Data at this Internet site is updated periodically. As a minimum, data is updated annually with the previous year's weather observations and fire occurrence data by the end of February. Notices on the home page for this site tell the currency of updates.

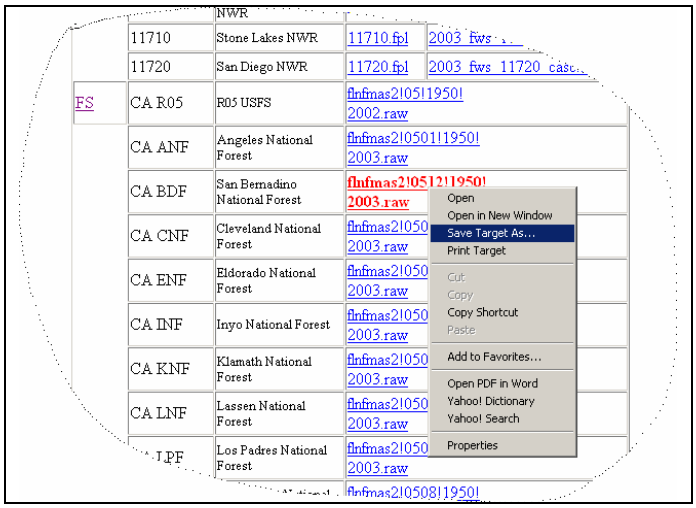
Select the appropriate state and then agency. These files include fire occurrence for each of the agency corporate fire occurrence databases. The time period that fire occurrence records are available varies by organization unit. The years available are noted on the Internet site.

Figure 55



When downloading a fire occurrence data file, do a right click on the file name and select **Save Target As** from the menu (Figure 56).

Figure 56



Using Windows Explorer, navigate to the folder the file will be downloaded to. Be sure to note the folder location.

Obtaining Other Agency Fire Occurrence Records

For other agencies participating in an analysis, consult with agency fire planning personnel for availability of historic fire occurrence records. Import of these records is possible if the records are available in an ASCII file format supported by PCHA. These formats are discussed in the following section.

There may be some agencies participating in the FPU that have entered fire occurrence data into the NFIRS fire report database system. The U. S. Fire Administration, an agency in FEMA, has developed this fire report system. Information about the wildland fire report module of NFIRS (NFIRS-8) is available at www.nfirs.fema.gov. The National Fire Information Council (NFIC) has developed NFIRS under contract from the U. S. Fire Administration. Information about the NFIC can be found at www.nfic.org. There may be an import menu selection built into PCHA for NFIRS fire report data at some future date. Any existing NFIRS fire occurrence data can be imported into PCHA using the PCHA Standard Fire Import Format process (See section that follows titled Importing Fires). The NFIRS wildland fire report module has only been operational for a few years. There may be some Eastern or Midwest state agencies, local fire departments, rural or volunteer fire departments that may have some fire occurrence data in NFIRS.

Import Fires

To import fire occurrence records to PCHA, select **Fire > Import Fires.** The fire occurrence records must be in one of the formats shown in Table 10. The required file name and extension for each file format is also shown in Table 10.

Figure 57

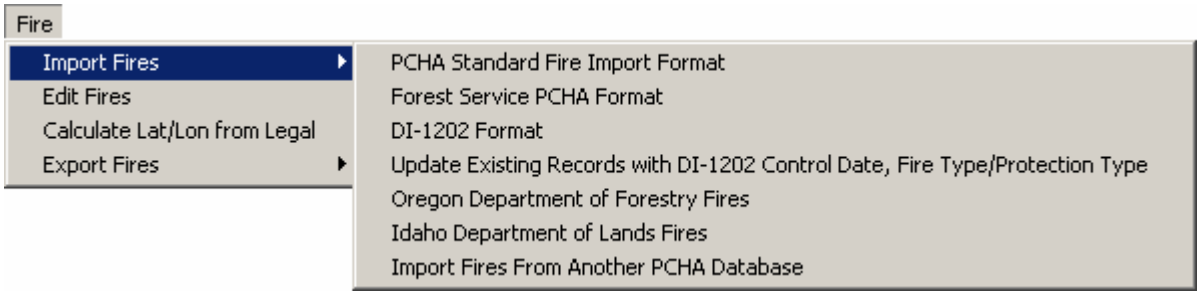


Table 10

File Formats	Required File Naming Convention
PCHA Standard Fire Import Format	*.PCHAFIRES
Forest Service PCHA Format	*.RAW
DI-1202 Format	*.fpl
Update Existing Records with DI-1202 Control Date, Init Date and FT/PT	*.fpl
Oregon Department of Forestry Fire	ODF*.FIRES
Idaho Department of Lands	ID*.RAW
PCHA Transfer Format	*.mdb
Import Fires from Another PCHA Database	PCHA*.mdb

Description of File Formats

A description of each of the fire occurrence file formats.

PCHA Standard Fire Import Format

States and local agencies may be participating in the analysis process and each agency will have its own fire report format. The historic data may exist in an electronic format. PCHA cannot support all possible import formats. It is recommended that the planner work with participating agencies to create an ASCII file with the data from fire occurrence records. This ASCII file should be in the PCHA Standard Fire Import Format. Table 11 contains a description of the fields in the comma-delimited ASCII PCHA standard file format. The ASCII file must have a *.PCHAFIRES file extension.

Table 11 – PCHA Standard Import Format File Definition						
Field ID	**Use**	**Req. For Import**	**Needed For FPA**	**Type**	**Width**	**Example**
1	Discovery Year	X	X	Integer	4	2004
2	Discovery Month	X	X	Integer	2	12
3	Discovery Day	X	X	Integer	2	30
4	Discovery Time		X	Integer	4	1552
5	Fire Name			Text	20	"HORSE THIEF #2"
6	Fire Number	X		Text	6	B072
7	Region Identifier			Text	2	SW
8	Unit Identifier			Text	3	13A
9	State			Text	2	CA
10	Statistical Cause Code		X	Integer	1	6
11	North Latitude Degrees		X	Integer	2	44
12	North Latitude Minutes		X	Integer	2	58
13	North Latitude Seconds		X	Real	2.4	21.8901
14	West Longitude Degrees		X	Integer	2	119
15	West Longitude Minutes		X	Integer	2	28
16	West Longitude Seconds		X	Real	2.4	14.7992
17	Control Year		X	Integer	4	2004
18	Control Month		X	Integer	2	12
19	Control Day		X	Integer	2	30
20	Control Time			Integer	4	1942
21	Slope Percent		X	Integer	2	20
22	Elevation (Feet)		X	Integer	6	5914
23	Aspect Code		X	Integer	1	3
24	NFDRS Fuel Model			Text	1	G
25	Total Acres Burned			Real	8.2	6129.25
26	Remarks			Text	240	"Report By John"

An example row from the comma-delimited ASCII file in the Standard PCHA Fire Format is shown in Figure 58. Notice that fields 5 and 26 contain spaces in the example entries. As such the data in these fields is contained in quotation marks.

Figure 58 – Example of a Fire Record in the Standard PCHA Fire Format

```
2004,12,30,1552,"Horse Thief 2",B072,SW,13A,CA,6,44,58,21.8901,119,28,14.7992,2004,12,30,1942,20,5914,3,G,6129.25,"Report by John"
```

The statistical fire cause on the fire report and the aspect codes to be used in fields 10 and 33 are shown in Tables 12 and Table 13.

Table 12 – Statistical Fire Causes

Code	Cause
1	Lightning
2	Equipment Use
3	Smoking
4	Campfire
5	Debris Burning
6	Railroad
7	Arson
8	Children
9	Miscellaneous

Table 13 – Aspect Codes

Code	Aspect
0	Flat
1	North
2	Northeast
3	East
4	Southeast
5	South
6	Southwest
7	West
8	Northwest
9	Ridgetop

Forest Service PCHA Format

Forest Service PCHA data files use the naming convention PCHArrff.RAW where rr is the region and ff is the forest number. The first four characters must be PCHA and the file extension must be RAW. For example, the input file for the Angeles NF in Region 5 would be PCHA0501.RAW.

Some fields contain data that is valid in the agency database, but is not valid in PCHA. One item in particular--NFDRS fuel model--may contain fuel model “X” in Forest Service data, but PCHA converts fuel model 'X' to a blank during the import process. The format for the Forest Service PCHA file is contained in the Appendix.

DI-1202 Format

The DI-1202 data files use the naming convention *.fpl where the * represents any series of legal file naming characters.

Update Existing Records with DI-1202 Control Date, Fire Type / Protection Type

Department of Interior (DOI) fire records may have been imported to a legacy PCHA database using the BLM and BIA import formats. These formats did not include import of the control date or fire type/protection type. This menu allows for updating of the DOI fire report records after they have been imported using the Import Fires From Another PCHA Database menu option.

Oregon Department of Forestry Fires

The Oregon Department of Forestry (ODF) data files use the naming convention ODF*.FIRES where the * represents any series of legal file naming characters.

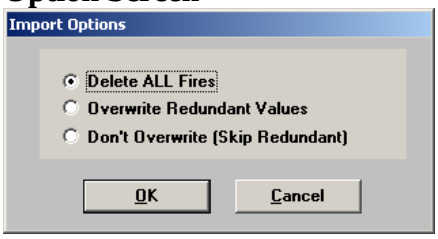
Idaho Department of Lands Fires
The Idaho Department of Forestry data files use the naming convention ID*.RAW where the * represents any series of legal file naming characters.

Import Fires From Another PCHA Database
PCHA database files are Microsoft Access® database files (*.mdb) and use the naming convention PCHA99*.mdb where * represents any series of legal file naming characters.

Importing Fire Occurrence Files into PCHA
To import fire occurrence records to PCHA, select **Fire > Import Fires**. Then select the format of the import file. For all file formats except the PCHA Transfer Format, the standard Windows Explorer file selection dialog will appear. The planner needs to navigate to the folder where the import file exists, select the file, and then click **Open**.

Next, a dialog box similar to the one in Figure 59 appears. The planner must choose one of the three options listed on the screen.

Figure 59 – Fires Import Option Screen



Delete ALL Fires
The default option deletes all fire records that currently exist in PCHA. Use this option to delete all existing records from the database and import a new fire record data set.

Overwrite Redundant Values
This option imports new fire records and replaces a fire record in the PCHA database with a new record if one exists in the ASCII fire record import file for the agency.

Don't Overwrite (Skip Redundant)
Use this option to add new records to the database, but keep all the existing records without changing them.

After an option is selected, click **OK** to start the import process. A progress bar will appear along the bottom of the screen. There is another **Cancel** button in case one wishes to stop the import part way through the process.

Edit Fires

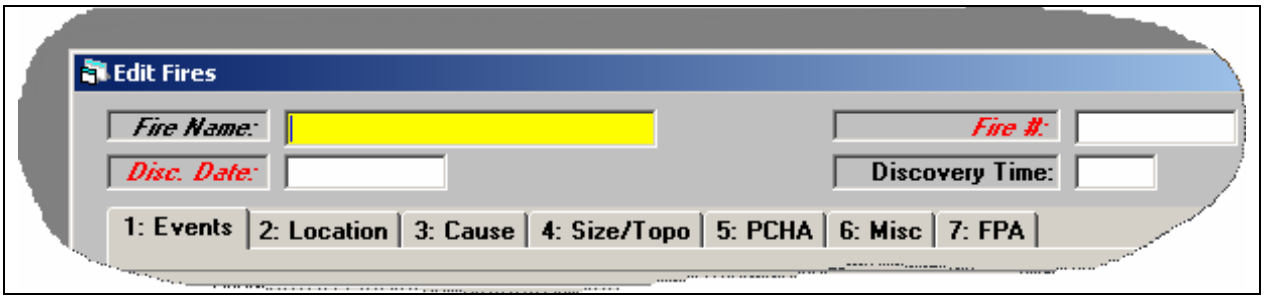
Figure 60 – The Edit Fires Menu

Now that fire occurrence records have been imported for the FPU, the records and data fields need to be examined for completeness and errors.

Figure 61 shows the seven tabs on the screen that appear when the **Fire > Edit Fires** menu is selected. The tabs contain fields with information contained in the historic fire record, fields with information calculated or assigned by PCHA, and fields that are manually assigned by the fire planner.

Each tab except the **Misc** tab displays a group of related data items. The **Misc** tab shows data fields that did not fit well elsewhere. Some agencies have procedures to let the planner send corrections back to the corporate agency fire records database so future data extracts will have the benefit of the corrections made.

Figure 61 – The Edit Fires Menu



Look closely at the fire records to ensure they accurately reflect the planning unit fire history. Are any fires missing? If so, find the reports and add them to the planning database. Also contact local agency support personnel for instructions on how to add the missing fire(s) to the corporate database.

Are there any fire records included in the database that should be excluded? Delete those selected from the PCHA database that should not be part of the historic base for planning. Examples of fires to exclude are fire associated with activities that are unlikely to recur. A series of small fires at a rock concert, slash fires associated with timber harvest where timber harvest no longer occurs or rail equipment-caused fires along a now abandoned railroad right of way may fit this criteria.

If interagency partners exist in the FPU, a historic fire reported by more than one agency needs to be identified. To begin this process, use the **FPA > Report Possible Duplicate Fires** menu to generate a report of fires with similar attributes.

Fire report records contain many fields. Fire planners should verify the accuracy of all of these data fields. Several fire report data fields are specifically used in the processes to develop fire event scenarios for FPA-PM. The planner should be sure these data fields are complete and accurate. A comparison of the electronic data to the hard copy fire report may be necessary.

Required information from the fire report for each historic fire to be used for the probability-based fire event scenario process includes:

- Fire Type/Protection Type code for DOI agency fires
- Fire location
- Discovery date

Some information from the fire report for each historic fire is used to develop frequency distributions. Random draws from these distributions are used in the probability-based fire event scenario generation process. Frequency distributions are developed for:

- Discovery time
- Fire control date
- Statistical cause

There needs to be an adequate number of fires with values for these fields so that valid frequency distributions can be developed.

Additional information from the fire report for each historic fire used for the fire event scenario process includes:

- Aspect
- Slope or slope class
- Elevation or elevation class
- Surface fuel model (used to assist in fuel type assignment)

Top of Fire Screen

The four fields on the top portion of the screen are visible regardless of which tab is selected (Figure 61).

Fire Name

Fire name is an optional but a very useful entry field. This is a searchable field allowing the planner to search the database for a specific fire by name. If fire names are added, do not include the word "Fire" as part of the name.

Fire Number

The fire number can be up to six characters long. The fire number and discovery date give each fire record a unique identity.

Discovery Date

This field is the date the fire was discovered. If a missing historic fire is added, the planner must define the date of discovery. Enter all dates as mm/dd/yyyy .

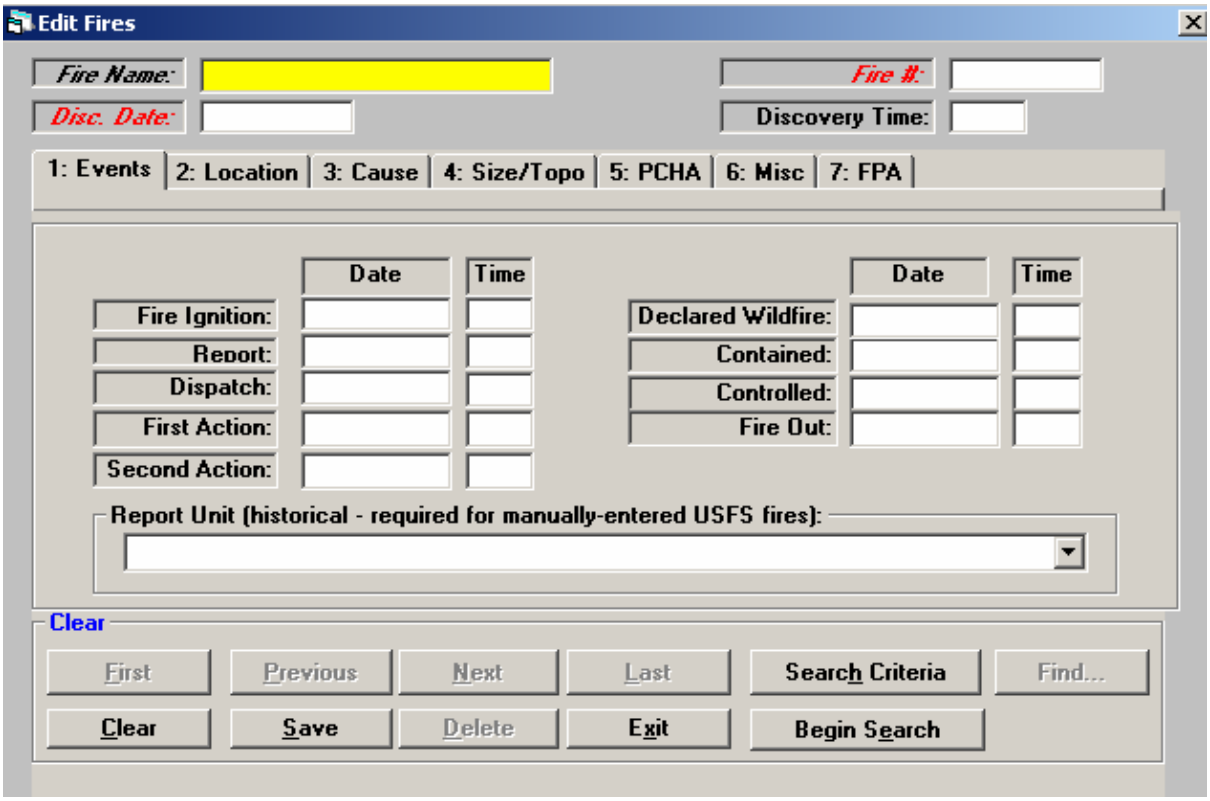
Discovery Time

This field is the time the fire was discovered. All times are shown in military time. Note that the Forest Service fire discovery time ranges from 0000 (midnight) to 2359. BLM, BIA, NPS and FWS units have a fire discovery time that ranges from 0001 to 2400 (midnight). PCHA does not accept times outside those ranges.

Events Tab

The screen in Figure 62 will appear when selecting **Fires > Edit Fires > Events** tab. This tab displays events recorded for the fire. Note that discovery date shows on the top portion of the screen. Not all events are necessarily known for any given fire. Events with no data will be blank. DOI agency fires generally include only discovery date and time in the imported data. Few (if any) Forest Service fires include Report, Dispatch, Declared Wildfire, or Contained events at this time. Events that are used by PCHA to support development of fire event scenarios should be examined for completeness and accuracy. Consult paper copies of fire records when necessary to verify or obtain event data. It is recommended that data should be entered only into blank data fields if the entered data can be verified as accurate.

Figure 62



Each event has a date and associated time. Enter dates in month, day, year format (e.g. 06/15/1995) and time in hours and minutes in military time format (e.g. 1425).

Fire Ignition

This event is the best estimate of the date and time the fire ignited. If the date and time are not known for certain (which is often the case), this should be the best estimate of the date and time.

Report

The report field records the date and time when the reporting suppression agency learned about the fire.

Dispatch
This field is the date and time when the first fire preparedness unit was dispatched to the fire.

First Action
This field is the date and time that initial suppression action began at the site of the fire. This time must be at least one minute after discovery.

The first action for a wildland fire use fire might be an aerial reconnaissance flight, or a determination by management on the type and kind of fire suppression or management activities.

Second Action
This field is the date and time that reinforcements arrived at the fire site. This field records when the first reinforcements arrived. These units must arrive at least five minutes after the initial resource(s) arrived.

Declared Wildfire
This field is the date and time when a fire manager declared that an escaped prescribed fire would be suppressed as a wildfire. This is applicable regardless of whether the ignition was from natural sources such as lightning or from a resource management decision to ignite the fire. Agency policy dictates the circumstances for the change in status. There are various management reasons this declaration or change in status may occur. Leave this field blank if the fire was not a prescribed fire at some point in its life.

Contained
This field is the date and time when the fire was declared contained.

Controlled
This is the date and time when the fire was declared controlled. Other terms in some records used include Suppression Strategy Attained or Suppression Strategy Met. This would also be the date and time when the strategy was met for a prescribed natural fire.

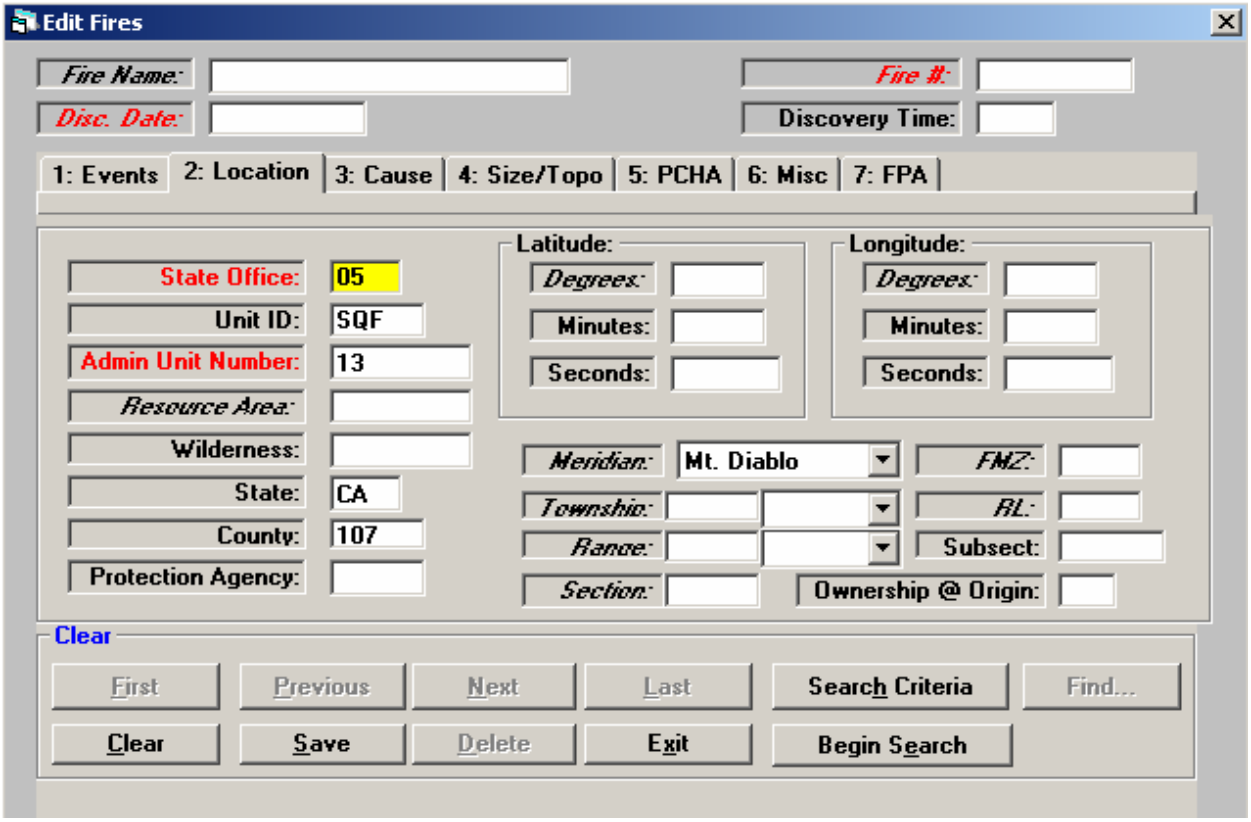
Fire Out
This is the date and time when the fire was declared out. At least one minute must elapse between the control date and time and fire out time.

Report Unit
This field only applies to Forest Service Units. For a manually added fire record, this field must be populated. For more information on this field, see the section that described the Utilities > NFMID menu.

Location Tab

The screen in Figure 63 will appear when selecting **Fires > Edit Fires > Location** tab. This tab displays the data recorded for the administrative and geographical location of the fire.

Figure 63 –



Region/State Office

This field is the two-digit Forest Service Region number or is the two-letter State Office code for DOI agencies. Other agencies should leave this field blank.

Unit ID

This field is the NWCG three-letter administrative agency unit designator. These identifiers are unique within a state.

Administrative Unit Number

This field is one of the following: two-digit Forest Service National Forest number, the BLM District identifier, the BIA Agency identifier, the NPS park identifier or the FWS refuge identifier.

Ranger District/Resource Area

This field is the two-digit Ranger District number within a National Forest or the Resource Area within a BLM District or BIA Agency. It will be blank for the NPS and FWS.

Wilderness
A three-digit wilderness code uniquely defines the wilderness area designated and set aside by Congress in which the fire began. By definition, only fires that occurred within wilderness boundaries after the congressional declaration are considered wilderness fires. If the fire did not occur in a designated wilderness, leave this field blank or zero.

State
The two-letter postal abbreviation identifies the state in which the fire started.

County
This three-digit county code identifies the county in which the fire started. The codes can be located on the Internet at http://geonames.usgs.gov/ and are defined by a Federal Information Processing System (FIPS) publication.

Protection Agency
This field identifies the agency legally responsible to provide primary protection for the land on which the fire started. For federal agencies, use the three-letter codes below. For state, local, private, or other protection agencies, use the standard two-letter state codes.

Table 14 – Protection Agency Codes

Codes	Federal Agency
USF	USDA Forest Service
BLM	USDI Bureau of Land Management
BIA	USDI Bureau of Indian Affairs
FWS	USDI Fish and Wildlife Service
NPS	USDI National Park Service
ARM	Department of Defense - Army
AFS	Department of Defense – Air Force
NAV	Department of Defense – Navy
OTH	Other Federal Agency

Latitude and Longitude
The latitude and longitude values locate the fire's point of origin. Report degrees, minutes, and seconds in whole numbers.

Legal Location (Meridian, Township, Range, Section, Subsection)
For fires in the 30 public land survey system states, enter township, range, section, subsection, and principal meridian to locate fire origin. The legal description should correspond very closely to the geographical coordinates (latitude and longitude). Fires in areas not covered by the public land survey system should leave these fields blank.

Meridian
The meridian field has a list of all the principal meridians defined in the US. Use the pull-down to select the principal meridian.

Township
Enter the township number and direction (N or S from the baseline). If a township is entered without a direction (N or S), an error message will not appear. If the township is a special township (such as a quarter, half, or three-quarter township), change the value in the box to the right of township to show that fact.

Range
Enter the range number and direction (E or W from the principal meridian). If a range is entered without a direction (W or E), an error message will not appear. If the range is a special range (such as a quarter, half, or three-quarter range), change the value in the box to the right of range to show that fact.

Section
Enter a section number from 1 to 36.

Subsection
The subsection can be shown to the nearest quarter section (160 acres) or quarter quarter section (40 acres). By convention, enter the smallest subdivision first. As an example, SWSE means the southwest quarter of the southeast quarter section.

FMZ
If a Fire Management Zone has been entered on the fire report, it will be displayed here. This field is not used in FPA.

Representative Location (RL)
This field is not used in FPA. Leave it blank.

Ownership at Origin
Only the Forest Service uses this field. It shows the one-digit code that corresponds to land ownership at the point of origin (Table 15).

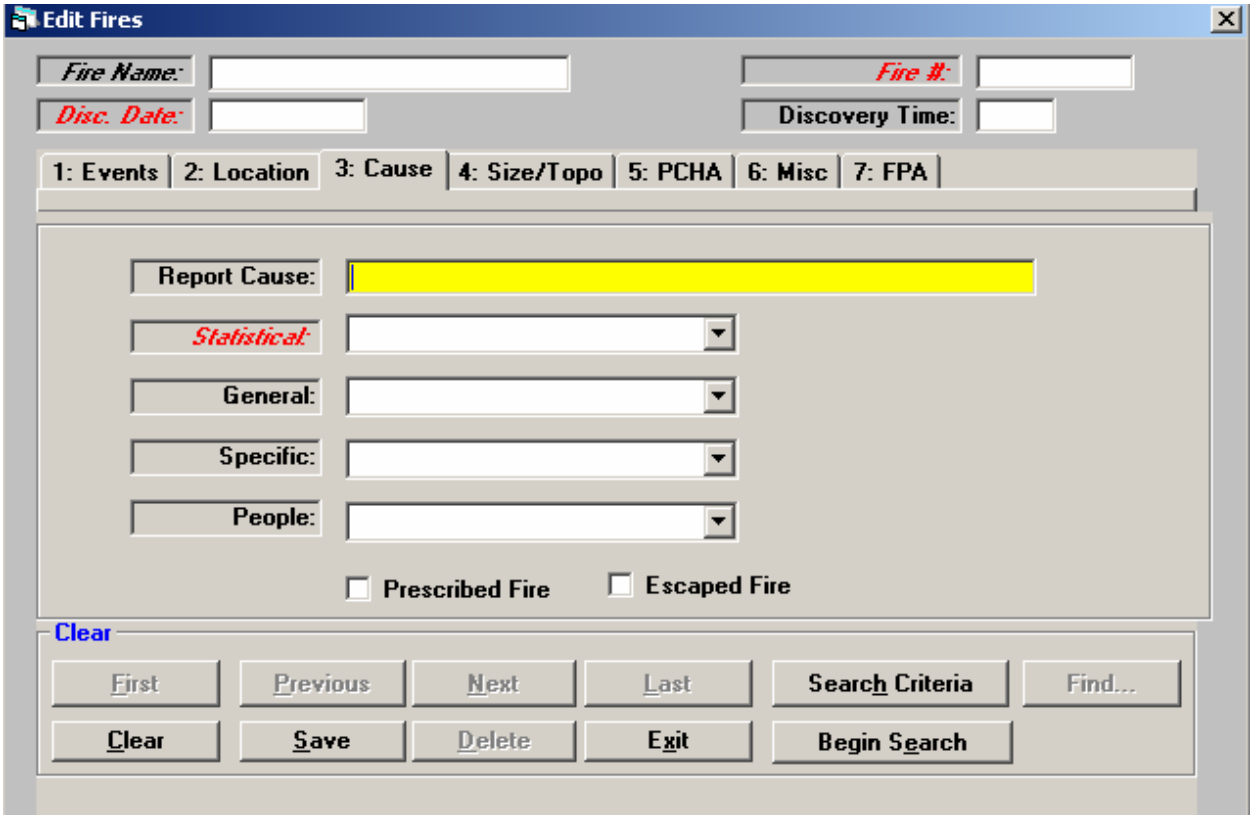
Table 15 – Ownership at Origin Codes

Code	Definition
1	National Forest, National Grassland, or Land Utilization Project.
2	State and private lands inside Forest Service protection boundary.
3	Lands outside Forest Service protection boundary.
4	Other Federal lands inside Forest Service protection boundary.

Cause Tab

The screen in Figure 64 will appear when selecting **Fires > Edit Fires > Cause** tab. This tab displays the fire cause codes for each fire. In addition, check boxes show whether the fire was an escaped fire and/or a prescribed fire (blanks mean no). For most fire planning purposes, statistical cause is very important, and the other cause codes further define the actual cause. Prevention planning relies heavily upon accurate fire causes.

Figure 64



Report Cause

This is an optional use field that allows entry of a brief description of the fire cause. This is a particularly useful field if the other fire causes do not adequately describe the actual fire cause. Many fires do not fit easily into the current fire cause coding system and this field allows for a better description of what really caused the fire.

Statistical (Cause)

This field identifies the broad statistical cause for the fire. Note that the code numbers are different between Forest Service and DOI-1202 codes, but the definitions are the same. PCHA translates from the external agency codes to the internal codes. PCHA uses the Forest Service statistical cause codes (Table 16).

Table 16 – Statistical Cause Codes

Code	Dept. of Interior	Forest Service
0	Not specified	N/A
1	Natural	Lightning
2	Campfire	Equipment use
3	Smoking	Smoking
4	Debris burning	Campfire
5	Incendiary	Debris burning
6	Equipment use	Railroad
7	Railroad	Arson
8	Children	Children
9	Miscellaneous	Miscellaneous

General (Cause)

General cause supplements statistical cause to better identify the human activity associated with the fire ignition. The list box shows the available categories. Code unknown activities and lightning fires into the Other category.

Specific (Cause)

Specific cause attempts to narrow down the exact fire cause. Group unknown causes into the Other category.

People (Class)

This field identifies the group or class of people associated with the fire ignition. Code lightning fires as Other. Code persons whose status cannot be determined as Other.

Prescribed Fire (Check Box)

If someone with authority decided to manage an unplanned ignition as a prescribed fire, then check the box. If the ignition was suppressed as a wildfire, leave the box unchecked.

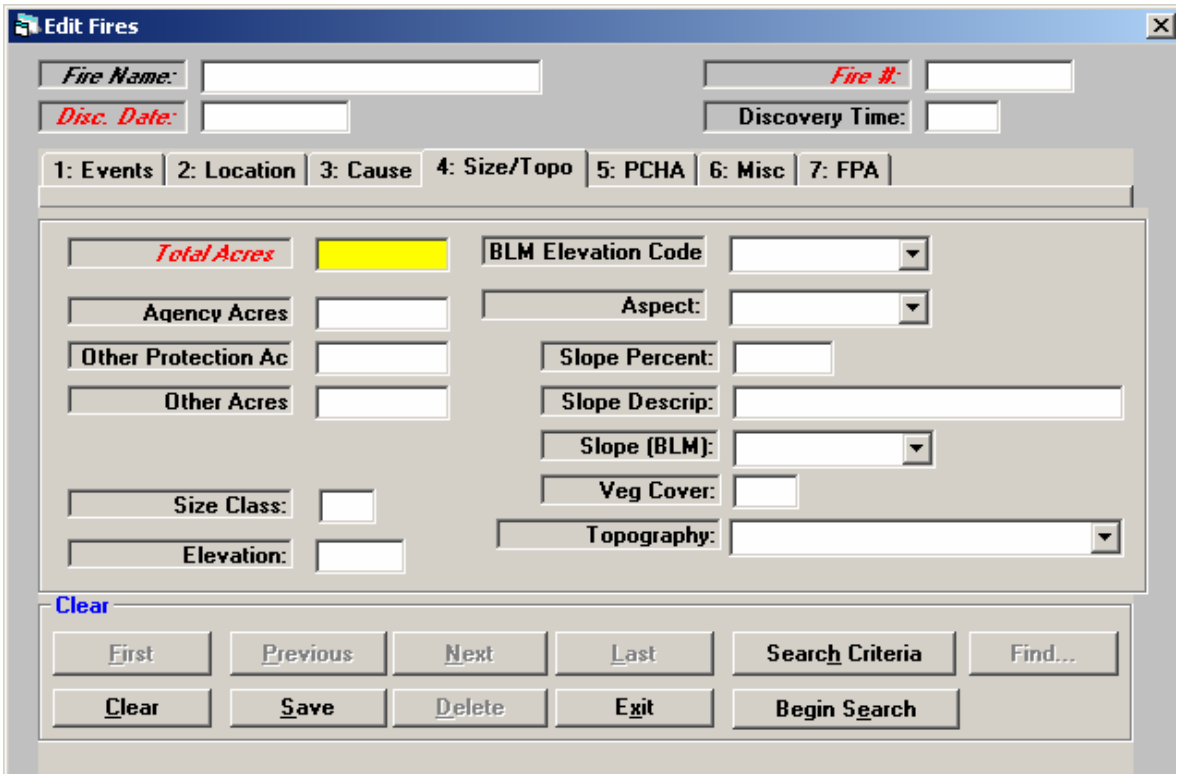
Escaped Fire (Check Box)

If the planned first action and first reinforcement forces achieved the suppression strategy for the fire, then leave the box unchecked. If the fire escaped fire suppression efforts of the planned response, check the box.

Size/Topo Tab

The screen in Figure 64 will appear when selecting the **Fires > Edit Fires > Size/Topo** tab. This tab displays the size and topographic attributes for each fire. Total acres must be entered for each fire.

Figure 64



Total Acres Burned

This field shows the total acres burned regardless of ownership. Code fires that burn less than an acre to the nearest 0.1 acres. Code fires that are larger than one acre in whole acres. If the data includes only size class, most size class "A" fires are less than 0.1 acre, enter 0.1 as the total acres for those fires. This is a required field for every fire.

Agency Acres

This is the number of acres that burned on the land of the reporting agency.

Other Protection Acres

Enter the acres burned of non-agency lands protected by the agency within the fire perimeter.

Other Acres

Enter the acres burned outside the agency protection boundary but within the fire perimeter.

Size Class
This one-letter code categorizes fires into size classes. Size class is based on the total acres burned, not just the area burned within the planning unit. Fires before 1970 only used codes A-E with E defined as 300 acres and larger. If fires that occurred before 1970 are entered, use the more recent codes. The current definition of each size class is contained in Table 17.

Table 17 – Size Class Definitions

Code	Definition (Acres)
A	0.0 – 0.24
B	0.25 – 9.9
C	10.0 – 99.9
D	100 – 299
E	300 – 999
F	1000 – 4999
G	5000+

Elevation
This is the elevation of the fire. It is entered to the nearest hundred feel.

BLM Elevation Code
The elevation class at the fire head at initial attack.

Aspect
This field is the general aspect (direction the land faces) on which the fire was burning at the time of initial attack.

Slope Percent
This field is the percent slope at fire origin.

Slope Description
This is an optional entry field to briefly describe the slope and topographic position of the fire (e.g., lower, middle, upper, or ridgetop).

Slope (BLM)
This field is the slope code at the fire origin used on BLM and BIA fire reports.

Vegetation Cover
This two-digit code identifies the general cover type in which the fire burned during the initial attack. Each Forest Service Region has defined the important cover types within the region and assigned a two-digit numerical code to each.

One complication to the coding scheme is that most Forest Service Regions change the definition of their codes about every decade. That means that a particular code on a 1970 fire may not mean the same as the same code in 1995. Generally the Regional codes identify both cover type and the conditions within a vegetation type that are significant to fire protection activities. Examples include cutover, seedling and saplings, bug-killed pole stands, thinning slash, and so forth.

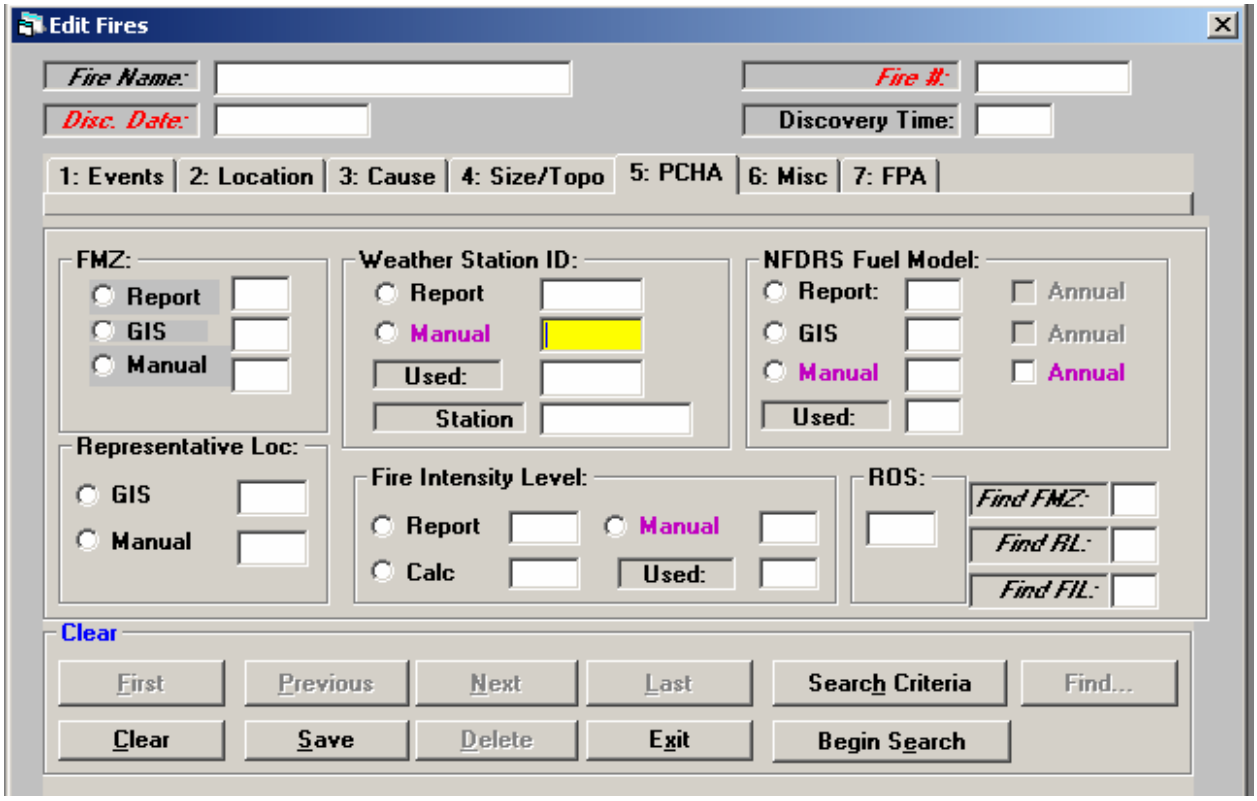
If the planner intends to rely heavily upon this data, the planner should obtain a copy of the applicable vegetation cover class codes for the period in the analysis so the codes can be interpreted correctly.

Topography
The general topography within the fire burned area.

PCHA Tab
The screen in Figure 66 will appear when selecting **Fires > Edit Fires > PCHA** tab. The PCHA screen displays the current values of selected fire information contained in the fire report, generated from GIS maps, calculated by PCHA, or entered manually. Only manual fields on this screen may have values entered.

All of the fields on this screen except rate of spread (ROS) contain values that come from agency fire reports (Report cell). If a fire report record was imported to PCHA from another PCHA database used to do fire planning, there might be an entry for a field in the GIS or Manual cells.

Figure 66



FMZ
This field displays the current Fire Management Zone (FMZ) information on the fire contained in the fire report, calculated from GIS maps, or entered manually. The FMZ provided by the fire report will be from a legacy planning system and has no application in FPA.

Representative Location
This field displays the representative locations assigned to fires calculated from GIS maps or entered manually. This field is not used in FPA.

Weather Station
This field displays the station number and observation date that could be used for the fire based on data from the fire report, assigned by the program, or entered manually. The Used field contains the weather observation date assigned to the fire. The used field entry can be different from the actual start fire date due to missing weather data or other factors driven by the assignment priorities.

NFDRS Fuel Model
This field shows the National Fire Danger Rating System (NFDRS) fuel models assigned to the fire based on data from the fire report, generated from GIS maps, or entered manually. Check the annual box if the herbaceous vegetation is annual. Leave it unchecked if perennial.

Fire Intensity Level
This field displays the fire intensity level assigned to the fire based on the fire report, calculated by the PCHA program or entered manually.

Rate of Spread (ROS)
This field shows the calculated rate of spread in chains (66 feet) per hour.

Table 18 – NFDRS Fuel Models

Fuel Group	NFDRS Fuel Model
Grass	A – Western Annual Grasses
	C – Open Pine with Grass
	L – Western Perennial Grasses
	N – Sawgrass
	S – Tundra
	T – Sage with Grass
Brush	B – Mature Brush (6 feet)
	D – Southern Rough
	F – Intermediate Brush
	O – High Pocosin
	Q – Alaska Black Spruce
Timber Litter	E – Hardwood Litter (Fall)
	G – Heavy Short Needle Timber Litter
	H – Normal Short Needle Timber Litter
	P – Southern Lone Needle Pine Litter
	R – Hardwood Litter – Spring/Summer
	U – Western Long Needle Litter
Slash	I – Heavy Slash
	J – Medium Slash
	K – Light Slash

Misc Tab

The screen in Figure 67 will appear when selecting **Fires > Edit Fires > Misc** tab. This tab shows fire data that did not easily fit anywhere else, but some planners wish to keep and use.

Fire Account

This field shows the fire cost account code. If this value is entered, enter the account code assigned to the fire without the leading "P" or "R" (FS units).

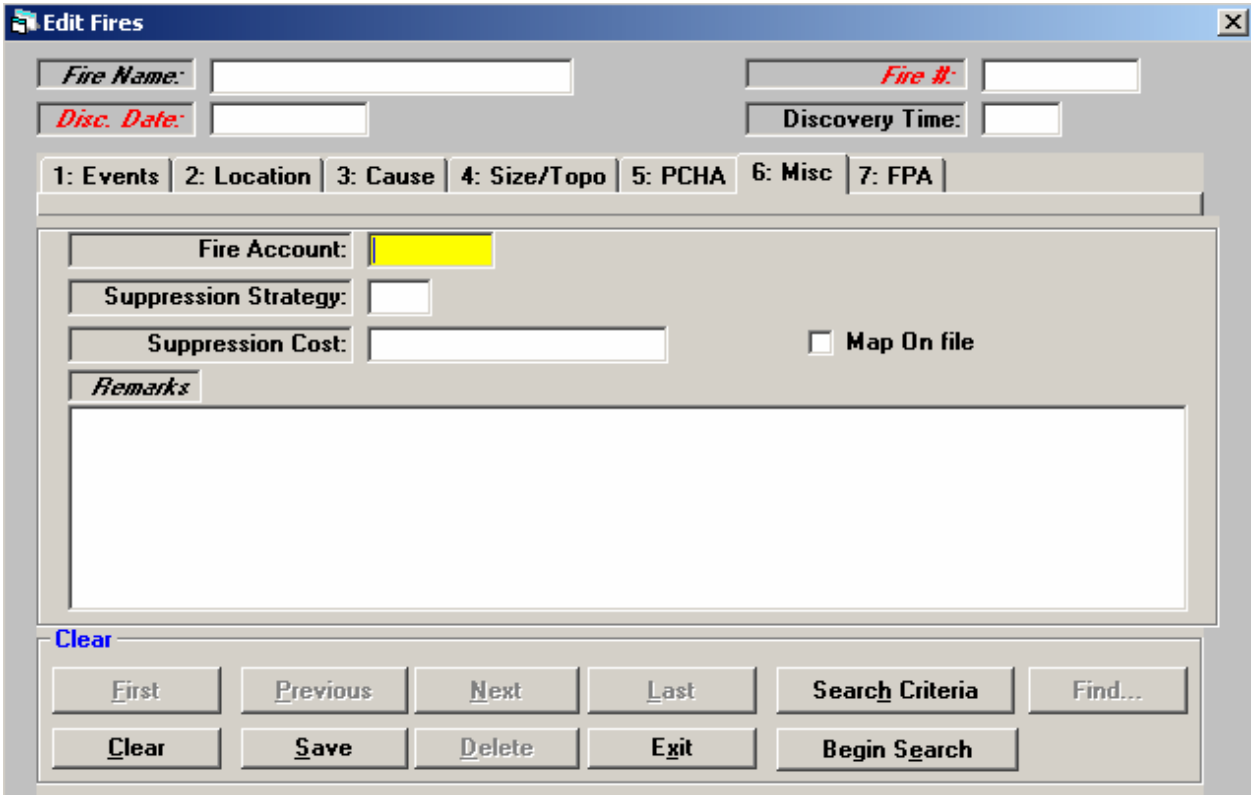
Suppression Strategy

This field is a Forest Service code that identifies the predominant strategy for the kind, amount, and timing of the initial dispatch and initial suppression action.

Table 19 – Suppression Strategy Codes

Code	Strategy
1	Confine
2	Contain
3	Control

Figure 67



Suppression Cost

This field stores the estimated total emergency fire fighting funds expended by the protection agency as a result of this fire.

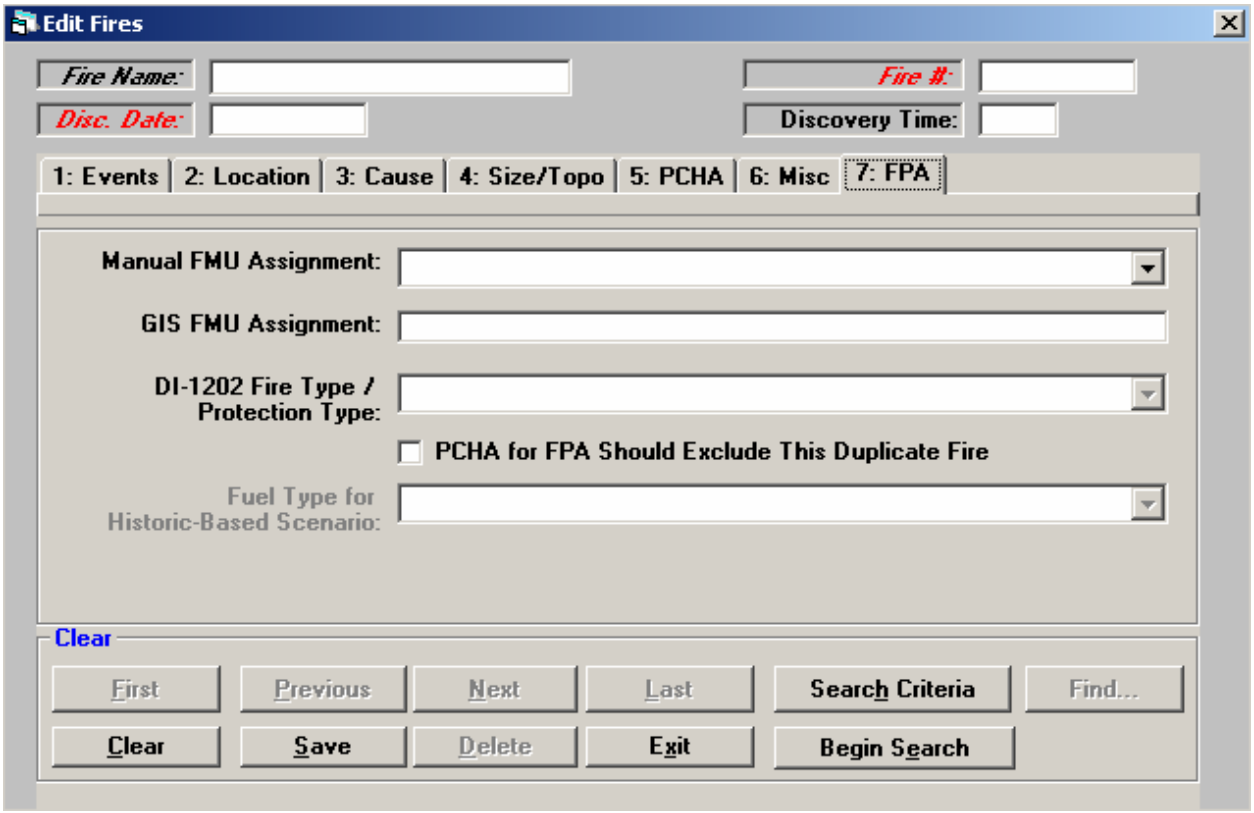
Map on File

Check this box if a map is attached to the report or if a map is on file. This can serve as a reminder that more detailed location and perimeter information is available locally.

Remarks
Enter remarks you may have.

FPA Tab
The screen in Figure 66 will appear when selecting **Fires > Edit Fires > FPA** tab. This tab contains cells specific to FPA.

Figure 68



Manual FMU Assignment

This entry allows the planner to manually assign an FMU for a historic fire. This may be needed if one is not assigned via the **FPA > Assign FMUs to Fires Using GIS** menu. If a fire is assigned incorrectly to an FMU, it is because the latitude/longitude assigned to the fire is not within the FMU. Instead of changing the FMU assignment here, edit the incorrect latitude and/or longitude assignment and then select **FPA > Assign FMUs to Fires Using GIS**.

GIS FMU Assignment

This is the FMU assigned to the fire via the **FPA > Assign FMUs to Fires Using GIS** menu.

DI-1202 Fire Type / Protection Type

Two fields, fire type and protection type, identify the types of incidents. Table 20 provides definitions for each. Use the pulldown to assign this attribute.

Table 20 – DOI Fire Type and Protection Type Definitions

Fire Types		Protection Types	
Code	**Description**	**Code**	**Description**
1	Suppressed Fire	1	For agency land under agency protection. The agency that has the fire suppression responsibility.
2	Natural Out	2	For agency lands protected by another Federal agency under an interagency mutual aid agreement. Another agency does the suppression work.
3	Support Action	3	For agency lands protected by a non-Federal agency (e.g. state, county, city) under a cooperative agreement, memo of understanding, or contract.
4	Prescribed Fire	4	For fires suppressed under confine or contain strategy under Fire Type 1.
5	False Alarm	5	For other lands not under agreement, memo of understanding or contract, but where agency suppression action was taken to prevent fire spread onto agency lands; i.e. private land adjacent to agency boundary.
		6	For other lands protected by agency under a memo of understanding, interagency agreement or contract.
		7	Support actions by agency resources under Fire Type code 3.
		8	Prescribed burns – management-ignited prescribed fires, ignited by or for park management under Fire Type code 4.
		9	Prescribed natural fires - ignited by lightning, volcanic activity, or other natural ignition sources under Fire Type code 4.

PCHA for FPA Should Exclude This Duplicate Fire

Within an FPU, there can be multiple agency partners that have responded historically to the same fires. Each agency might have completed an agency fire report for one or more of these fires. When all of these fires are imported to PCHA, duplicate fire reports can exist for the same fire. This check box allows for the designation of a fire as a duplicate fire record.

The identification of potential duplicate fires is possible using the **FPA > Report Possible Duplicate Fires** menu. This menu item produces a report of fires with similar fire report values.

Fuel Type for Historic-based Scenario

The fuel type assignment to a historic fire is used by the yet to be developed Historic-based Fire Event Scenario generation process. A fuel type in FPA is a unique combination of the following:

- Canopy cover
- Surface (FBPS) fuel model
- Canopy base height
- Canopy bulk density
- Stand height

Canopy cover

Canopy cover is normally measured as a percent. It is based on the linear length of crown within a canopy versus the length of open space.

Surface (FBPS) fuel model

These are the 13 1982 FBPS fuel models (Anderson 1982) (Table 21).

Table 21 1982 FBPS Fuel Models

Fuel Group	1982 FBPS Fuel Model
Grass	1 - Short Grass (1 foot)
	2 - Timber (Grass and understory)
	3 - Tall Grass (2.5 feet)
Brush	4 – Chaparral
	5 – Brush
	6 - Dormant Brush
	7 - Southern Rough
Timber Litter	8 - Closed Timber Litter
	9 - Hardwood (pine long needle litter)
	10 - Timber
Slash	11 - Light Slash
	12 - Medium Slash
	13 - Heavy Slash

Canopy base height

For an individual tree, the measurement of the height to the base of the crown can be made. The average of these values for all trees in a stand gives an estimate of the height of the canopy base height. Frequently, this is a measure of where the limbs of the canopy start vertically. This number can be skewed by the presence of small trees or occasional live limbs. A more meaningful value is the height above the ground of the first canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire.

Canopy bulk density
Mathematically, canopy bulk density (CBD) (lbs/ft^3) is canopy biomass divided by the volume occupied by canopy fuels. Canopy bulk density is hard to estimate in the field. Initially, it seems attractive to calculate this value by treating the canopy as a box with the depth of the stand height minus the canopy base height. Assuming this box covered an acre (43,560 ft^2), dividing the fuel loading in the canopy by the volume of box would provide an estimate of average canopy bulk density. Unfortunately, this estimate has a bias toward under estimation of the canopy bulk density due to the averaging of largely void areas in the top and bottom of the canopy with the more dense layers of foliage. A fire burning vertically within the crowns will most likely propagate through denser canopy layers.

To determine CBH and CBD values that are reasonable for the FPU, consult with fire behavior specialists familiar with defining these values for use in the *FARSITE* program. Also consult the publication Stereo Photo Guide for Estimating Canopy Fuel Characteristics in Conifer Stands (Scott and Reinhardt 2005). A utility exists in PCHA (FPA>FBPS Calculations), which calculates resultant fire behavior using all three attributes of a fuel type, and five attributes of a topographic type.

Stand height
For an individual tree, height is the measurement from the ground to the top of the tree tip. Averaging the heights for all trees in a stand would give an estimate of stand height.

This pull-down allows for the designation of a fuel type that existed at the point of origin of a historic fire. If a surface fuel model (FBPS or NFDRS) is designated on the fire report, that information should be used to determine an appropriate fuel type.

Bottom of Edit Fires Screen
All of these buttons are usable from any of the tabs or to enter a new record or a search.

Figure 69

Save Button
The **Save** button saves the information for the active date to the PCHA database. Until this button is clicked, any changes made in fields are not permanently saved to the PCHA database.

Clear Button
The **Clear** button resets all data fields to blank.

Delete Button
This button deletes the current record from the database. If there are no weather observation records in the database or displayed on the screen, this button will be light gray and inoperative.

Begin Search Button
Click **Begin Search** to find the first weather observation record in the database or the first record that meets the defined search criteria.

Search Criteria Button
Click **Search Criteria** to clear the screen and define the fields that will control which weather observation records to find in the database. Fields with their names written in italic text are available for searches. Station ID, observation date, precipitation, wind speed, precipitation amount, observed temperature, and observed relative humidity are search fields. After the criteria are entered, click **Begin Search**.

For example, the planner can search for all fires with a statistical cause of campfire. To do so, click **Search Criteria** , go to the **Cause** tab and select Campfire from the Statistical (Cause) pull-down. Then click **Begin Search**.

Figure 70

The First, Previous, Next, and Last Buttons
The **First** button displays the first weather observation record in the database or the search list. The **Previous** and **Next** buttons display the weather observation before or after the current observation. The **Last** button displays the last observation in the database or search list. These buttons show light gray if there are no weather observation records in the database or displayed on the screen.

Find Button
Unlike the **Search Criteria** and **Begin Search** buttons, which retrieve a set of records for viewing, the **Find** button is used to jump to desired records within those already retrieved with **Begin Search**. Click **Find** and then select **Clear** from the pop-up menu. This will clear all fields. Enter the values to determine which record is desired, then click **Find** and select **Find** from the pop-up menu. To move from record to another similar record after a **Find** command, click **Find** and then select **Next** or **Previous** from the pop-up menu.

Exit Button
The Exit button closes the weather observation edit screen and returns to the main PCHA screen.

Calculate Latitude and Longitude from Legal Locations

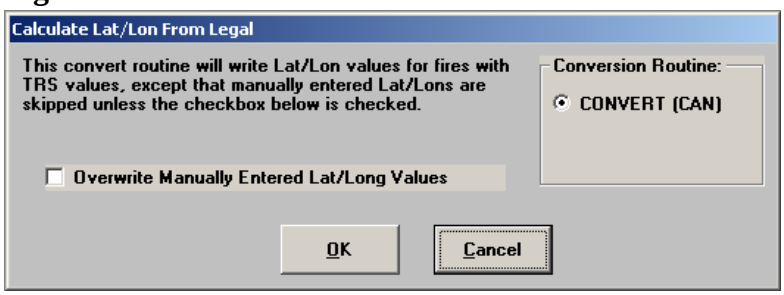
Latitude and longitude are required so GIS tools can assign each historic fire to a FMU. Some fire records have only legal description locations (township, range, and section). A utility within PCHA can be run that will calculate latitude and longitude values from legal (TRS) locations. This process works only for public land survey states, and only if the conversion factors exist for the area the FPU is in.

Figure 71 – The Edit Fires Menu

This menu item calculates latitude and longitude values at the center of the section. Since, in most cases, PCHA only knows the township, range, and section number, the section center is the point of least error. The convert routine generates some errors when assigning latitude and longitude values from legal descriptions (township, range, and section), particularly in areas with half townships. Therefore, it is wise for the planner to use topographic maps, unit maps, or other sources to manually assign latitude and longitude values.

Selecting the **Fire > Calculate Lat/Lon for Legal** menu yields the dialog shown in Figure 72.

Figure 72



Overwrite Manually Entered Lat/Long Values

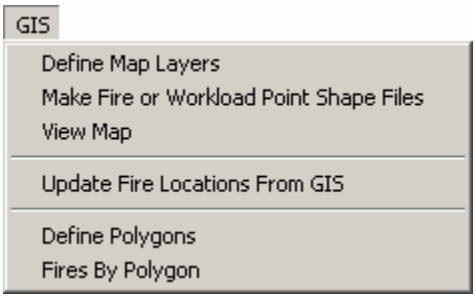
Check this box to replace the existing latitude and longitude values in the database with the new latitude and longitude values generated by the convert routine.

The GIS Menu

This GIS (Geographic Information Systems) chapter describes the capability of PCHA to display and manipulate spatial data.

The planner is able to list the GIS layers to be viewed, to prepare certain GIS layers for viewing, to view the maps, to define polygons, and to view reports of fires within these polygons.

Figure 73 – The GIS Menu



Define Map Layers

Use this screen to define the path to the GIS layers. Selecting this menu results in the display of the window shown in Figure 75.

Figure 74 – The GIS Menu, Define Map Layers Menu

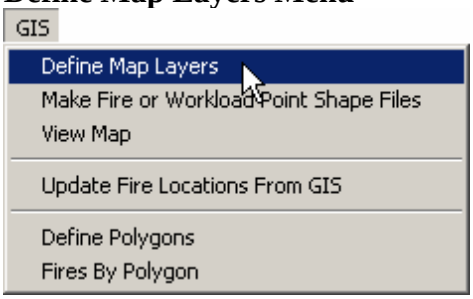
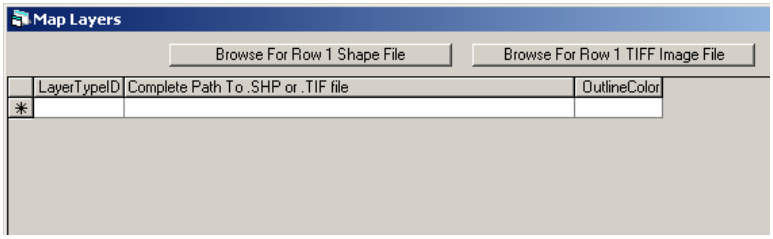


Figure 75



<u>Layer Type ID Column</u>

Clicking in the box below the column name will allow for display of a pull-down arrow. Use this pull-down to select either IMAGE or SHAPE. This defines the format of the GIS file used in PCHA.

An Image file must be in Tag Image File Format (TIFF). These image files have a .tif extension. The image file must be geo-referenced to appear in the correct area of the map display. A TIFF file, which has been geo-referenced, will have two files. One will have the extension .tif and the second will have the extension .tfw.

A Shape file is a GIS layer in the ArcView shape file format. It consists of three files with extensions .shp, .shx and .dbf. All three files must exist in the same folder.

Complete Path to .SHP or TIF file Column

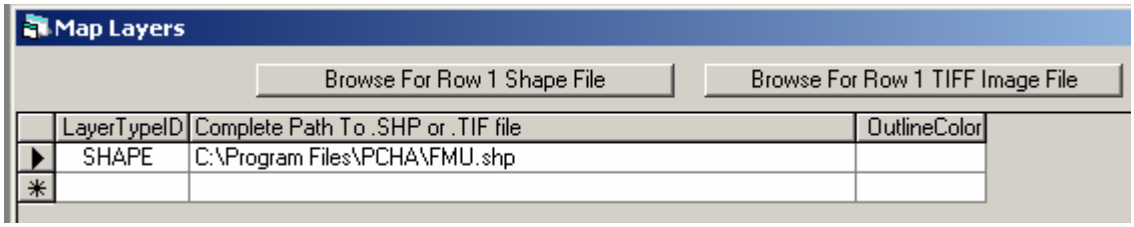
The planner has two options to complete this cell entry. One is to manually type the complete path to the .shp or .tif file, depending on which file type appears in the LayerTypeID column. The second is to use the appropriate Browse button to use the Windows File Manager dialog to select the .shp to .tif file. PCHA will expect the associated files (.trw, .shx, or .dbf) to have the same filenames and be in the same folder.

After selecting a layer using the Browse option, the planner MUST click on a different row or move to a different row using the arrow keys for the cell entries to be recorded in the PCHA database.

When using the Browse option, the entry in the Layer Type column will appear automatically.

After an FMU shape file is selected, the dialog in Figure75 may look similar to the one in Figure 76.

Figure 76 –



Outline Color Column

If the layer is a shape file, the planner may select an outline color for the layer when the data is displayed on the map. If the color is omitted, it will be shown in black. Use the pulldown list to select one of the listed colors. The available colors are in Table 20

Table 20 Available Data Colors

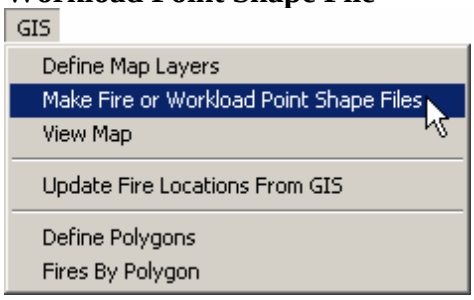
Black	Magenta
Red	Cyan
Green	White
Blue	

To save all information and close the window, click on the small "x" in the upper right corner of the window.

Make Fire or Workload Point Shape Files

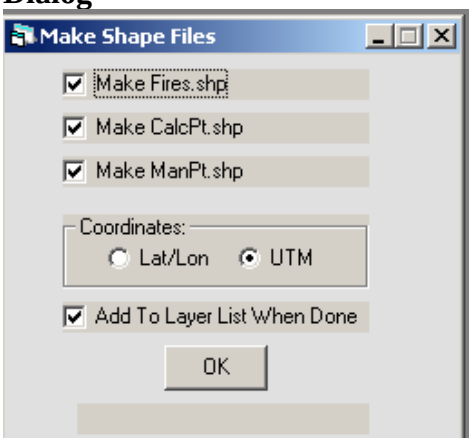
PCHA has the ability to create shape files showing the fire locations in the PCHA database. It can also create shape files with the calculated and manually entered workload points by FMU.

Figure 77 – The Make Fire or Workload Point Shape File



Selecting GIS > Make Fire or Workload Point Shape Files will result in the dialog box shown in Figure 78.

Figure 78 – Make Shape File Dialog



Make Fires.shp File Option

PCHA has the ability to create shape files showing the fire locations in the PCHA database. To create this shape file, click in the check box to the left of the Make Fires.shp option.

Make CalcPt.shp File Option

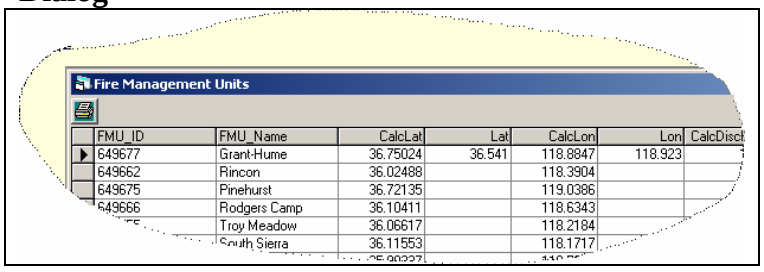
Before this shape file can be created, the planner needs to have selected the **FPA > Calculate/Edit FMU Workload Point** menu item. To create this shape file, click in the check box to the left of the Make CalcPt.shp option.

Make ManPt.shp File Option

Before this shape file can be created, the planner needs to have selected the **FPA > Calculate/Edit FMU Workload Point** menu item and then entered manually an override location for the workload point for an FMU (Figure 79). The location of the workload is entered using latitude and longitude in degree and decimal format.

To create this shape file, click in the check box to the left of the Make ManPt.shp option.

Figure 79 – Calculate/Edit FMU Workload Point Dialog



Coordinates

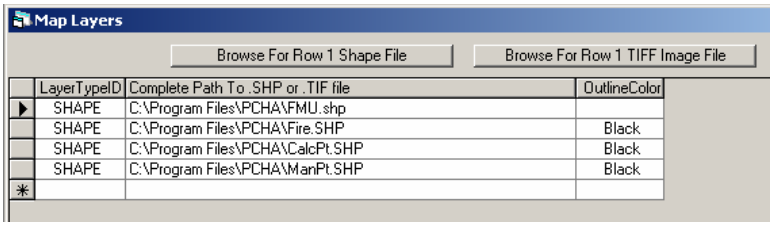
Select either “Lat/Lon” or “UTM” for the desired map coordinate attributes. If UTM is selected, the UTM Zone entered on the File-Planning Unit Setup screen will be used.

Add To Layer List When Done

Clicking this box will result in PCHA automatically adding this layer to the list of Map Layers in the dialog box shown in Figure 76.

Click **OK** to begin. PCHA may work for several minutes preparing the shape file(s). An example of the Display Map Layers dialog (once all four shape files have been created) is shown in Figure 80.

Figure 80



View Map

To view the map with the layers that are listed in the Map layers dialog (Figure 80), select **GIS > View Map**. A map with the data layers similar to the one in Figure 82 will appear. In the upper left of the screen, there are six icons that function as described in Table 23.

Figure 81 – The View Map From GIS Menu

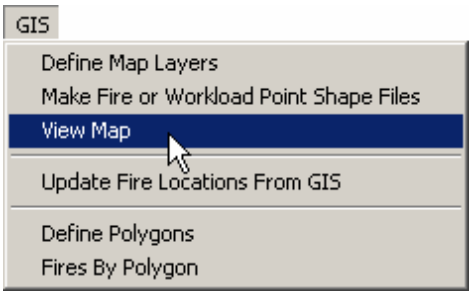


Figure 82

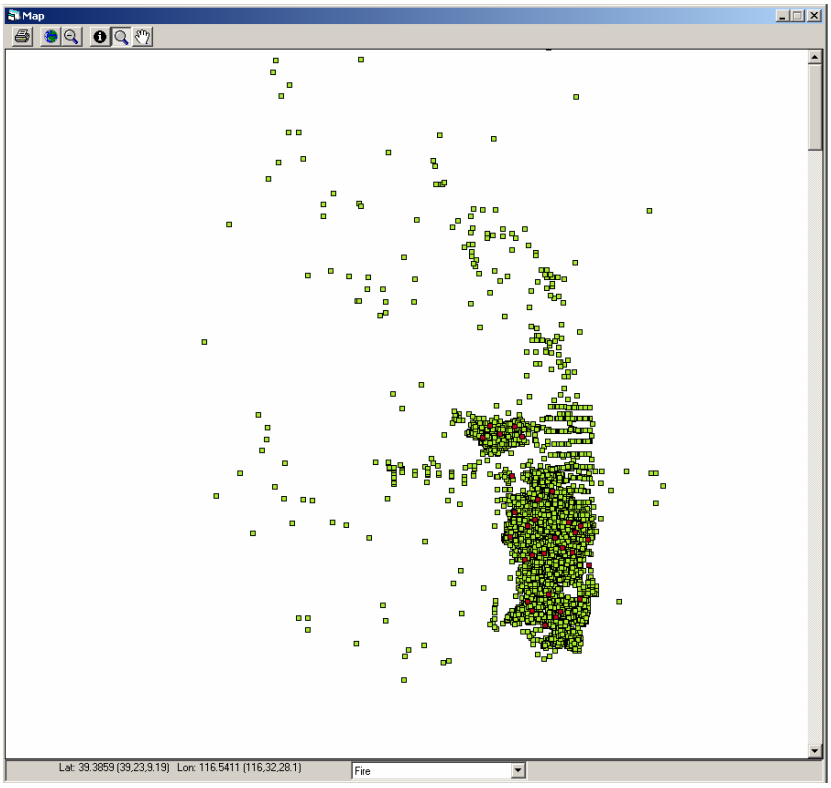


Table 23 Description of function of icons

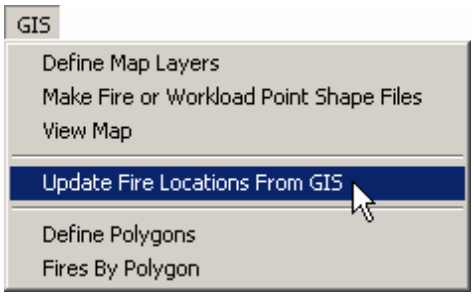
Icon	Function
	Print the map
	Return to Full Extent
	Zoom Out – The map will show twice as much area
	Identify the feature clicked on. First, select a map layer using the pull-down list at the bottom of the window. Second, click on the **Identify** icon. Third, click on a map feature and an Attributes box will appear listing the attributes of the map feature selected.
	Create a zoom area. After clicking, then place cursor at upper left corner of desired area. Hold left mouse button down and drag to create a rectangle around the area to be zoomed to. Release the left mouse button and PCHA will redisplay the map showing the area defined in the rectangle.
	Pan – Hold left mouse button down and move mouse to pan the map in any direction. Release the left mouse button to complete the panning operation.

Update Fire Locations from GIS

This menu item supports the update of the latitude and longitude assigned to fire records using a GIS shape file. The fires in the GIS shape file must have the fires identified by one of the following methods:

- Discovery date and fire number
- NIFMID identifiers
- PCHA record number

Figure 83 -The Update Fire Locations From GIS Menu



NIFMID stands for the National Interagency Fire Management Integrated Database and applies only to Forest Service fire records.

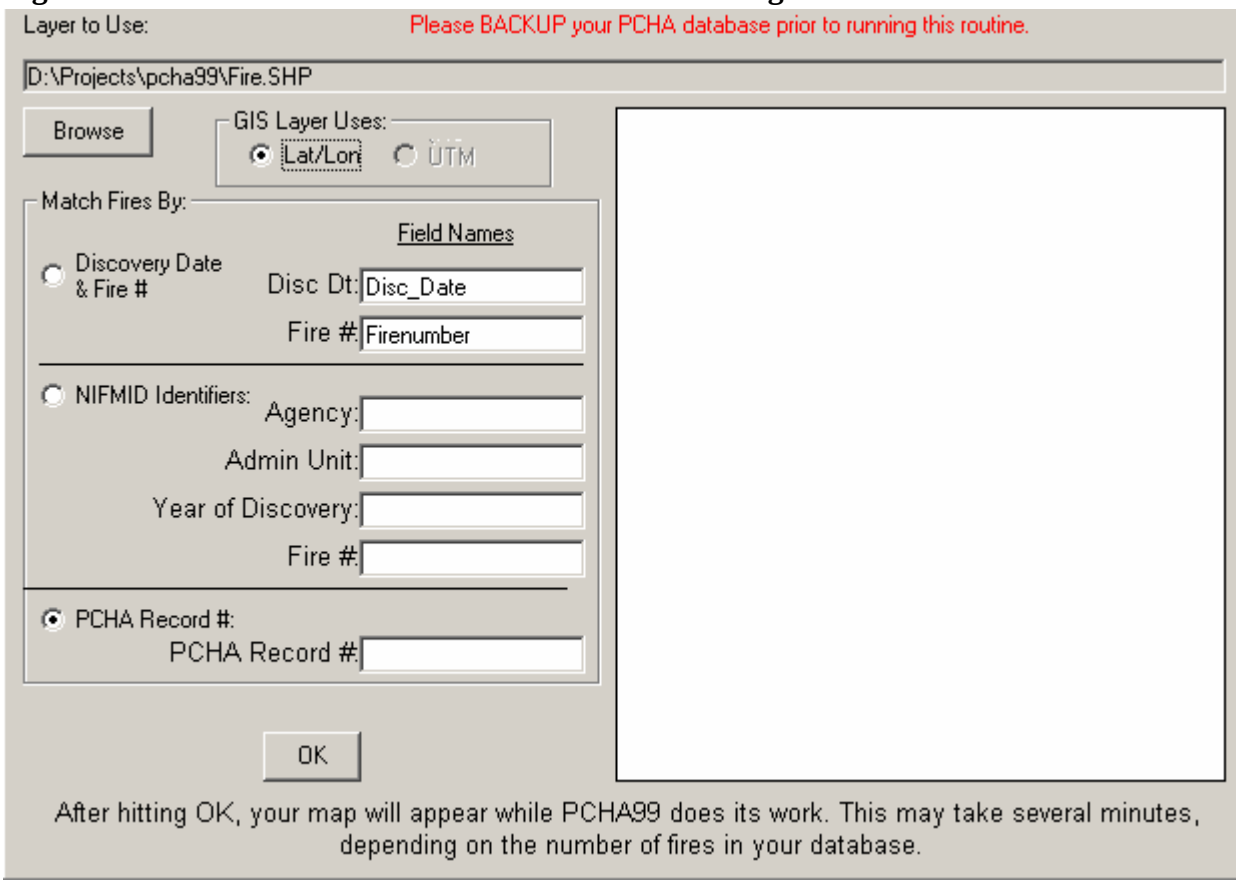
Selecting **GIS > Update Fire Locations From GIS** will display the screen in Figure 84.

Note the caution note at the top of the dialog advising the planner to backup the PCHA database file before implementing this menu process.

Identifying the GIS Shape File

Click **Browse**. Using the windows file manager dialog, navigate to the folder where the GIS shape file resides. Click on this file and then click **Open**. The path to the shape file's location will be displayed in the gray window above the **Browse** button.

Figure 84 - The Current Fire Locations from GIS Dialog



Discovery Date and Fire Number

In the cells provided, enter the field name for the fire Discovery Date and the Fire Number in the database that supports the GIS shape file.

NIFMID Identifier

In the cells provided, enter the information for: Agency, Administrative Unit, Year of Discovery and the Fire Number in the database that supports the GIS shape file.

PCHA Record Number

In the cell provided, enter the information for the fire PCHA Record Number in the database that supports the GIS shape file.

Define Polygons

PCHA has the ability to count the number of fires and acres within each polygon of a GIS shape file. For example, the planner could use a watershed polygon shape file to count the number of fires within each watershed.

Prior to preparing a report of fires and acres by polygon, PCHA must contain information about the polygons to use. Selecting the **GIS > Define Polygons** menu will yield the dialog box shown in Figure 86.

Figure 85 – The Define Polygons Menu

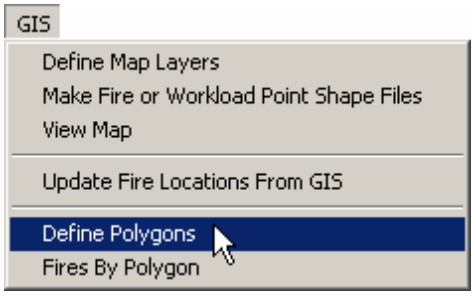
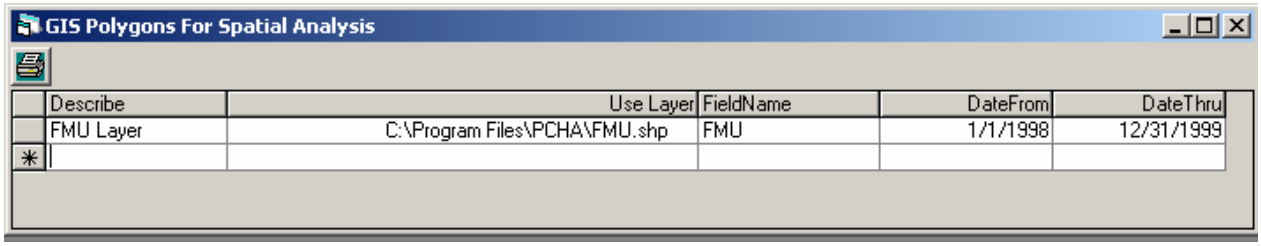


Figure 86



Describe Column

Enter a brief description of the polygons desired for use.

Use Layer Column

Use the pull-down list to select the desired GIS layer from the list of Map Layers.

Field Name Column

Enter the name of the field in this layer that is to be used to label the polygons inn this layer.

Date From Column

Enter the starting date for the fires you want to count. Complete this entry for all data layers even though it may not apply, i.e. FMU data layer.

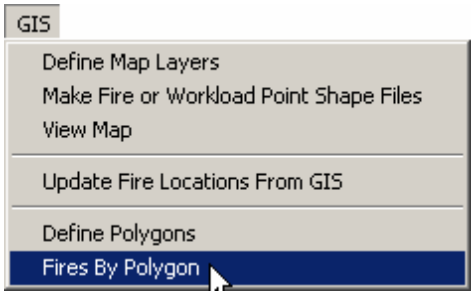
Date Thru Column

Enter the ending date for the fires you want to count. Complete this entry for all data layers even though it may not apply, i.e. FMU data layer. Click on the **X** in the upper right corner to save and exit.

Fires by Polygon

Use this menu item to count the number of fires and acres burned within each polygon of a layer you have already defined using the **GIS > Define Polygons** menu item. Selecting this menu item will produce a window similar to the one in Figure 88.

Figure 87 – The Fires by Polygon Menu



Previously-Defined Polygon Layer To Use

Select from the list of polygons you have created (Figure 88).

From Date

Enter the starting month, date and year for fires.

Thru Date

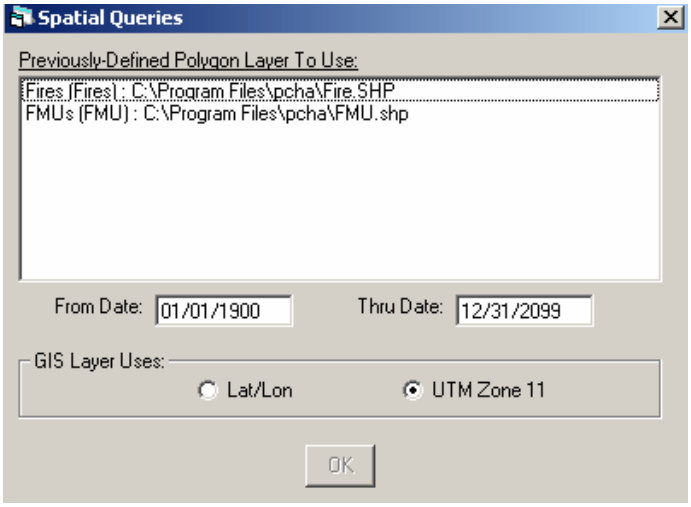
Enter the ending month, date and year for fires.

GIS Layer Uses

Select Lat/Lon or UTM.

Click **OK** and the process will begin, using the PCHA map display. When it has completed the process, the map will disappear, and a two-section report will be shown.

Figure 88



The first section, as shown in Figure 89, shows the number of fires listed by statistical cause for each of the polygons.

Figure 89

Sequoia National Forest
PCHA99
Fire History By GIS Polygon: 01/01/1900-12/31/2099
WildCAD
Part I: Fire Frequency

DATA	Unknown	Lightning	Equipment	Smoking	Campfire	Debris Bu	Railroad
12		1					
17		14		4	5		
18		89	4	11	32	3	
19		13			1		
20		11	1		1		

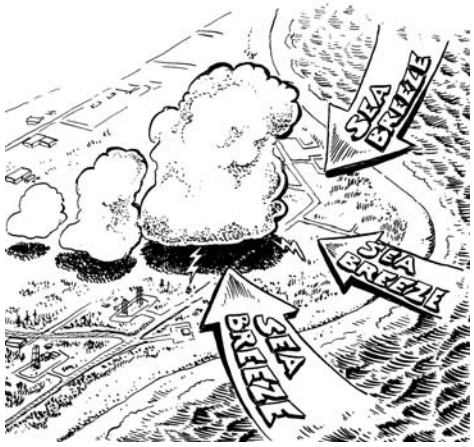
The second portion of the report shows acres burned, listed by statistical cause within each polygon (Figure 89).

Figure 90

PCHA99
Fire History By GIS Polygon: 01/01/1900-12/31/2099
WildCAD
Part II: Acres Burned

DATA	Unknown	Lightning	Equipment	Smoking	Campfire	Debris Bu	Railroad
12							
17		19		8	1		
18		32	1	1	60	5	
19		9					
20		53	4				
21		329		25	240		

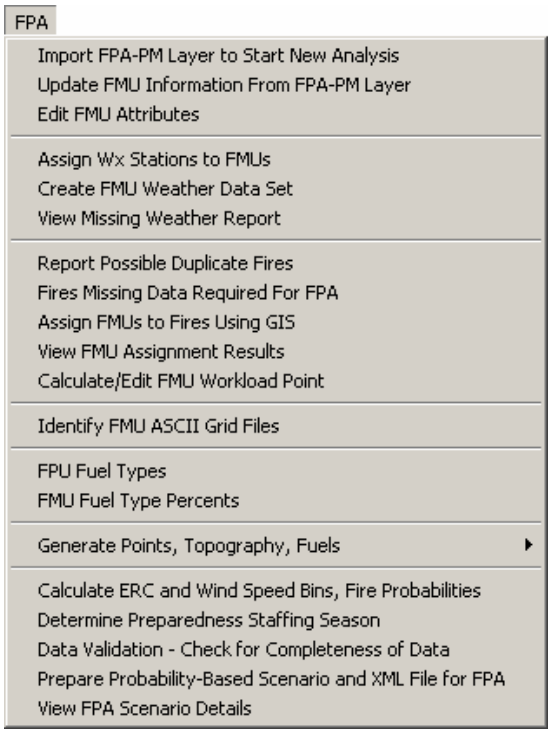
These reports can be printed by clicking on the printer icon in the upper left corner of the screen. The name of the file holding this text file is shown on the window title bar.



The FPA Menu

The items on the FPA menu facilitate the processes that are unique to the use of PCHA to support the creation of a fire event scenario in FPA.

Figure 91 – The FMA Menu



Fire Event

A fire event is a single wildland fire measured in time from its estimated ignition time through the time it is declared out. A fire event is a collection of attributes that describe the statistical and physical characteristics of the fire. The attributes assigned to a fire event are shown in Table 24

For additional information of the each of the attributes of a fire event, consult the FPA Reference Guide.

Fire Identifier

This is an internal identifier assigned by PCHA to the fire event that is used to track the fire event in FPA-PM..

Sensitivity Period

This is the time period, measured in two-week intervals throughout the calendar year, used for describing the resource/fire management objective.

Date Identifier

This the Julian date of the fire event ignition.

Table 24

• Fire Identifier • Sensitivity Period (26 in a year) • Date Identifier (Julian Date) • Fire Discovery Time • Fire Cause (Human or Natural) • Simultaneous Fire (Yes/No) • Fire Management Unit (FMU) • ERC for Ignition Date • BIg for Ignition Date • NFDRS Slope Class	• Elevation (feet) • FBPS Surface Fuel Model • Rate of Spread • Fire Intensity Level • Spread Minutes Until Civil Sunset • Final Fire Size (Wildfire) • WFU Fire Duration (Accepted WFU Fire) • Final Fire Size (Accepted WFU Fire) • Final Fire Size (Rejected WFU Fire)

Fire Discovery Time
This is the fire event discovery time expressed in military time.

Fire Cause
If the fire statistical cause is not lightning then it is human-caused. This fire event attribute is used in the decision process for possible assignment of a fire event as a candidate wildland fire use fire.

Simultaneous Fire (Yes/No)
If two more or fires occur on the same day in the FPU each of these fires is designated as a simultaneous fire.

Fire Management Unit (FMU)
This is the internal FMU identifier assigned to the FMU by the FPA-PM program.

ERC for Ignition Date
This is the NFDRS Energy Release Component (ERC) using the fuel model assigned to the FMU and is calculated using the weather data set for an FMU. This attribute of a fire event is used in the decision process for possible assignment of a fire event as a candidate wildland fire use fire.

BI for Date
This is the NFDRS Burning Index (BI) using the fuel model assigned to the FMU and is calculated using the weather data set for an FMU. This attribute of a fire event is used in the decision process for possible assignment of a fire event as a candidate wildland fire use fire.

NFDRS Slope Class
This is the NFDRS slope class at the ignition location for the fire. It is used in FPA-PM as one input to the determination of the fireline production rate for each fire preparedness resource.

Elevation (feet)
This is the elevation above sea level for the fire ignition point. It is used in FPA-PM to regulate helicopter use on the fire event.

FBPS Surface Fuel Model
This is the FBPS fuel model. It is used in the calculation of the fire event's rate of spread and fire intensity level. It is also used in FPA-PM as one input to the determination of the fireline production rate for each fire preparedness resource.

Rate of Spread
This is the forward rate of spread of the fire on the day of discovery.

Fire Intensity Level (FIL)
This is the fire intensity level of the fire on the day of discovery. The FIL is determined by the flame length (Table 25).

Table 25

FIL	Flame Length
1	0 – 2.0 feet
2	2.1 – 4.0 feet
3	4.1 – 6.0 feet
4	6.1 – 8.0 feet
5	8.1 – 12.0 feet
6	12.1+ feet

Spread Minutes Until Civil Sunset
This is the number of minutes from the fire discovery time to 30 minutes after sunset.

Final Fire Size (Wildfire)
This is the fire size if the fire event is not contained by FPA-PM.

WFU Fire Duration (Accepted WFU Fire)
This is the number of days from the WFU fire event discovery date until the date of the fire ending weather event.

Final Fire Size (Accepted WFU Fire)
This is the fire size for a fire event that FPA-PM accepts as a WFU fire.

Final Fire Size (Rejected WFU Fire)
This is the fire size for a fire event that is a candidate WFU fire that FPA-PM does not manage as a WFU fire.

Fire Event Scenario

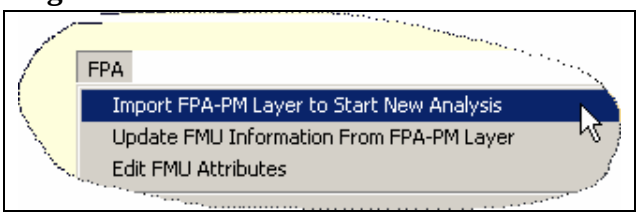
A fire event scenario is a representation of the annual fire activity initial response based on historic fire occurrence. The fire event scenario is a collection of fire events based on probabilities for use in FPA-PM.

Probability-based Fire Event Scenario
Random draws from fire occurrence distributions are used to generate the fire events in this fire event scenario. Historic fire frequency is one foundation of the process. Fuel moisture values and a wind speed are assigned to a fire event based on probability distributions generated using historic weather data. Topographic and fuel conditions are also determined by a random draw based on the occurrence of these attributes.

Import FPA-PM Layer to Start New Analysis

PCHA needs certain information regarding the FPU. PCHA needs the unique FPA-PM assigned identifier for each the FMU in the FPU. These identifiers are necessary so that the two programs, FPA-PM and PCHA, are able to merge their respective data. PCHA needs to know the FPU name. PCHA needs a GIS shape file of the FMUs in the FPU. The attributes of the shape file provide information on a unique FMU identifier and FMU name.

Figure 92

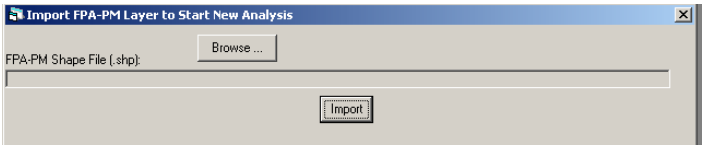


Before this menu item can be implemented, the user must download the GIS shape file created by FPA-PM. The file created will be a zip file. Extracting that file will yield three files:

- fpu.dbf
- fpu.shp
- fpu.shx

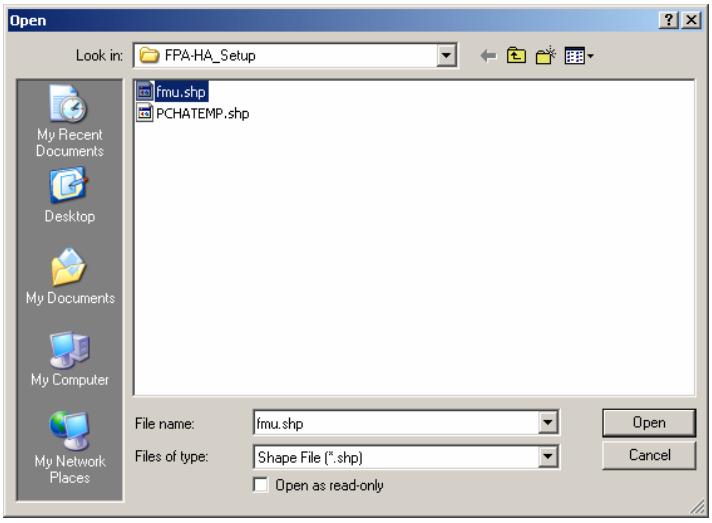
Selecting the **FPA = > Import FPA-PM Layer to Start New Analysis** menu will bring up the screen in Figure 93.

Figure 93



Click **Browse** to open the Windows File Manager dialog box. Navigate to the folder where the GIS shape files have been download to from FPA-PM (Figure 94).

Figure 94



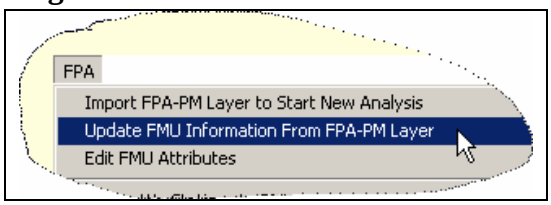
Click on the fpu.shp file and then click **Open**. The screen in Figure 93 will reappear with the path to the file displayed in the gray window.

Click **Import** to complete the activity.

Update FMU Information from FPA-PM Layer

Use this menu only if FMUs have already been imported to PCHA from FPA-PM.

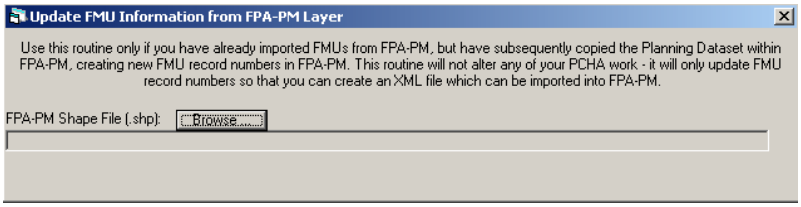
Figure 95



If the planner has copied the Planning Dataset within FPA-PM creating new FMU record numbers in FPA-PM, then the FMU record number in PCHA need to be updated. Use of this menu item will not alter any values in the PCHA database other than the FMU record numbers.

Selecting the **FPA = > Update FMU Layer from FPA-PM Layer** menu will bring up the screen in Figure 96.

Figure 96



Click **Browse** to open the Windows File Manager dialog box. Navigate to the folder where the GIS shape files have been download to from FPA-PM (Figure 94).

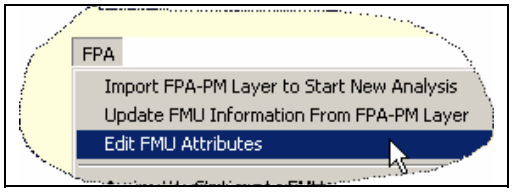
Click on the fpu.shp file and then click **Open**. The screen in Figure 96 will reappear with the path to the file displayed in the gray window.

Click **Import** to complete the activity.

Edit FMU Attributes

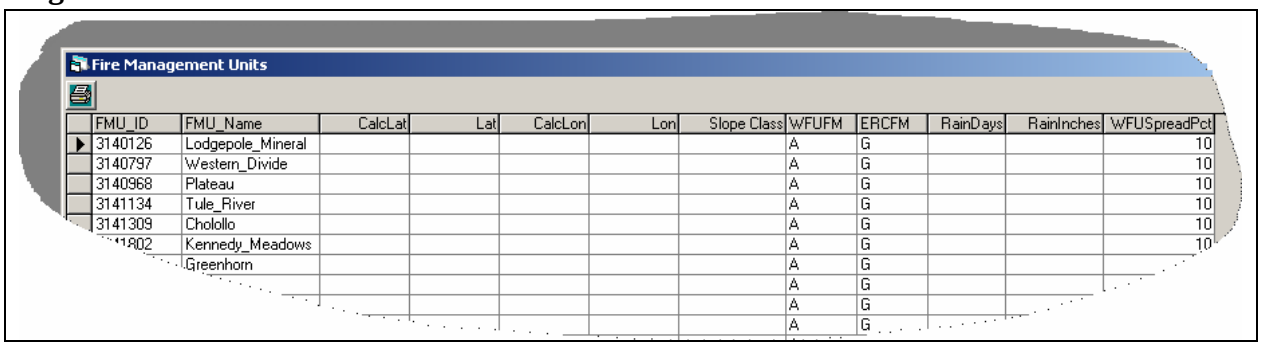
An average NFDRS slope class (Table 26) must be assigned to each FMU. Selecting the **FPA > Edit FMU Attributes** menu will result in the display of the screen shown in Figure 98. The screen in Figure 98 is displayed as it would appear immediately following import of the FPU's shape file from FPA-PM using the **FPA = > Import FPA-PM Layer to Start New Analysis** menu.

Figure 97



Note there are field entries for the FMU_ID and the FMU_Name. All of the remaining columns have a blank field value or a value defined in FPA-PM since processes within PCHA to populate this field have not occurred.

Figure 98



	FMU_ID	FMU_Name	CalcLat	Lat	CalcLon	Lon	Slope Class	WFUFM	ERCFM	RainDays	RainInches	WFUSpreadPct
▶	3140126	Lodgepole_Mineral						A	G			10
	3140797	Western_Divide						A	G			10
	3140968	Plateau						A	G			10
	3141134	Tule_River						A	G			10
	3141309	Chololllo						A	G			10
	11802	Kennedy_Meadows						A	G			10
		Greenhorn						A	G			
								A	G			
								A	G			
								A	G			

Below are sections that describe the fields that appear in the dialog when the **FPA > Edit FMU Attributes** menu is selected. Each fields is described below.

FMU_ID Field

This is a non-editable field. This field is populated during Step 2b of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2). It contains the FMU identifier assigned by FPA-PM prior to import of the FMUs to PCHA.

FMU_Name Field

This is a non-editable field. This field is populated during Step 2b of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2). It contains the FMU identifier assigned by FPA-PM prior to import of the FMUs to PCHA.

CalcLat Field

This is a non-editable field. This field is populated during Step 8d of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2) when the **FPA > Calculate/Edit Fire Workload Point** menu is implemented**.** It contains the calculated latitude for the Fire Workload Point for the FMU. It is calculated as the average of the latitude values for all historic fires that occurred during the analysis period.

Lat Field

This is a user-entered value for the latitude of the Fire Workload Point for the FMU. This field is populated during Step 8d of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2). If a value is entered in this field, it will override the value entered in the CalcLat field.

To assign different latitude that was calculated, click in the cell on the row with the FMU_Name in the Lat column. Enter the desired latitude. To enter the value in degrees, minutes and seconds, enter the values separated by commas. The entry for 36 degrees, 23 minutes and 45 seconds would be 36,23,45. PCHA will convert the entry to decimal degrees (36.23 degrees). The user can also enter the latitude in decimal degrees.

CalcLon Field

This is a non-editable field. This field is populated during Step 8d of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2) when the **FPA > Calculate/Edit Fire Workload Point** menu is implemented**.** It contains the calculated longitude for the Fire Workload Point for the FMU. It is calculated as the average of the longitude values for all historic fires that occurred during the analysis period.

Lon Field

This is a user-entered value for the longitude of the Fire Workload Point for the FMU. This field is populated during Step 8d of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2). If a value is entered in this field, it will override the value entered in the CalcLat field.

To assign a different longitude that was calculated, click in the cell on the row with the FMU_Name in the Lan column. Enter the desired longitude. To enter the value in degrees, minutes and seconds, enter the values separated by commas. The entry for 118 degrees, 12 minutes and 30 seconds would be 118,12,30. PCHA will convert the entry to decimal degrees (118.12 degrees). The user can also enter the longitude in decimal degrees.

Slope Class Field

This field is populated initially by PCHA as a slope class 2. During Step 2c of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2), the planner verified and edits this field entry. An average NFDRS slope class (Table 26) needs to be assigned to each FMU. To determine the slope class to use, consider obtaining from the GIS specialist the number of acres in the FMU within each slope class. Also consider the historic fire occurrence locations to see if they tend to occur within certain slope classes.

Table 26

NFDRS Slope Class	Slope Breaks	Slope Used
1	0 - 25%	22.5%
2	26 - 40%	31.8%
3	41 – 55%	44.5%
4	56 – 75%	63.6%
5	76+%	90%

To assign a representative average NFDRS slope class to each FMU, click in the cell on the row with the FMU_Name in the Slope Class column. The five slope class options shown in Table 26 will appear. Click on the desired slope class.

WFUFM Field

This field is populated initially by PCHA with a NFDRS fuel model G (Table 27). During Step 13 of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2), the planner verified and edits this field entry. This is the NFDRS fuel model that was used to determine WFU management complexity, critical fire danger indices for the Burning Index (BI) and/or Energy Release Component (ERC). These critical indices are used in the decision criteria to determine if a candidate WFU fire can be accepted as a WFU fire or will be managed as a wildfire in FPA-PM.

Table 27 – NFDRS Fuel Models			
Fuel Model	**Description**	**Fuel Model**	**Description**
A	Western annual grass	K	Light logging slash
B	California mixed chaparral	L	Western perennial grass
C	Pine grass savannah	N	Sawgrass
D	Southern rough	O	High pocosin
E	Hardwoods (winter)	P	Southern pine plantation
F	Intermediate brush	Q	Alaska black spruce
G	Closed short needle conifer (heavy)	R	Hardwoods (summer)
H	Closed short needle conifer (light)	S	Alaska tundra
I	Heavy logging slash	T	Sagebrush grass
J	Medium logging slash	U	Western long needle conifer

To assign a different NFDRS fuel model than the default to an FMU, click in the cell on the row with the FMU_Name in the WFUFM column. Enter the desired NFDRS fuel model. To have the new field value read to the database, click on a different FMU row or use the up or down arrow keys on the keyboard to move the cursor to a different row.

ERCFM Field

This field is populated initially by PCHA with a NFDRS fuel model G (Table 27). During Step 13 of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2), the planner verified and edits this field entry. The NFDRS fuel model assigned for the Energy Release Component (ERC) calculation is used to assign an ERC value to each day in the year during the Analysis Period using the weather data set developed for the FMU in Step 6b (Table 2).

To assign a different NFDRS fuel model than the default to an FMU, click in the cell on the row with the FMU_Name in the WFUFM column. Enter the desired NFDRS fuel model. To have the new field value read to the database, click on a different FMU row or use the up or down arrow keys on the keyboard to move the cursor to a different row.

RainDays Field and RainInches Field

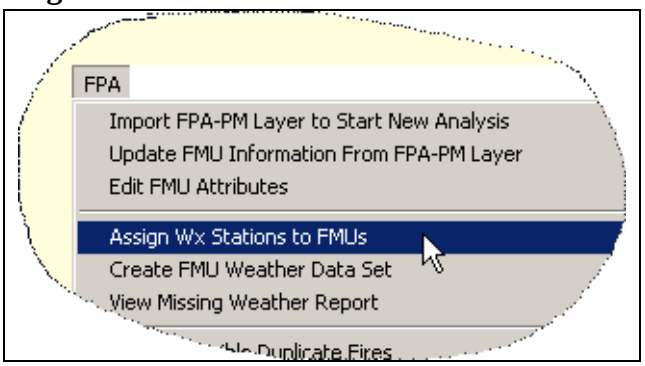
This field is populated initially by PCHA 3 in the RainDays column and 2 in the RainInches column. The default values indicate a fire-ending weather event has occurred when a total of two inches or more are measured over three days. The weather data set for each FMU is used to determine this occurrence. During Step 13 of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2), the planner verified and edits this field entry.

WFUSpreadPct Field

This field is populated initially by PCHA 30 percent. During Step 13 of the Process Steps to Completion of Historic Analysis Using PCHA (Table 2), the planner verified and edits this field entry. This is the percent of the days during the life of a WFU fire that the fire has a measurable forward spread.

Assign Weather Station to FMUs

Figure 99

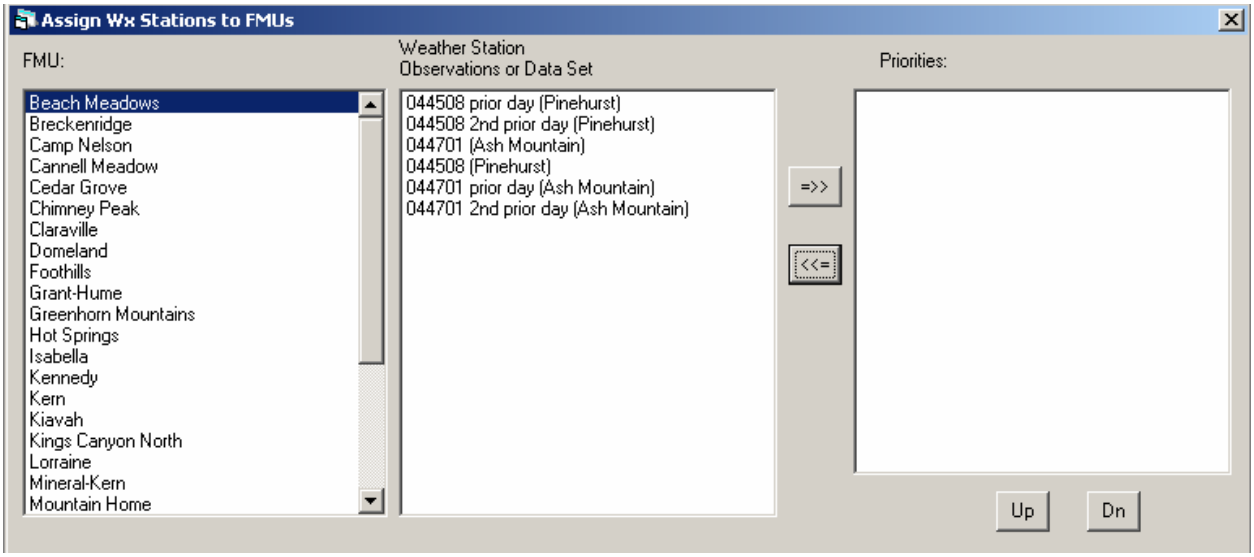


This menu item will facilitate the assigning, in priority order, of the weather station and the observation used to assign a weather observation to each day within the analysis period. Once completed, PCHA creates a weather data set for each FMU using the **FPA > Create FMU Weather Data Set** menu**.**

Before this menu activity can be completed, the planner needs to have defined a weather station(s) using the **File > Weather Stations** menu.

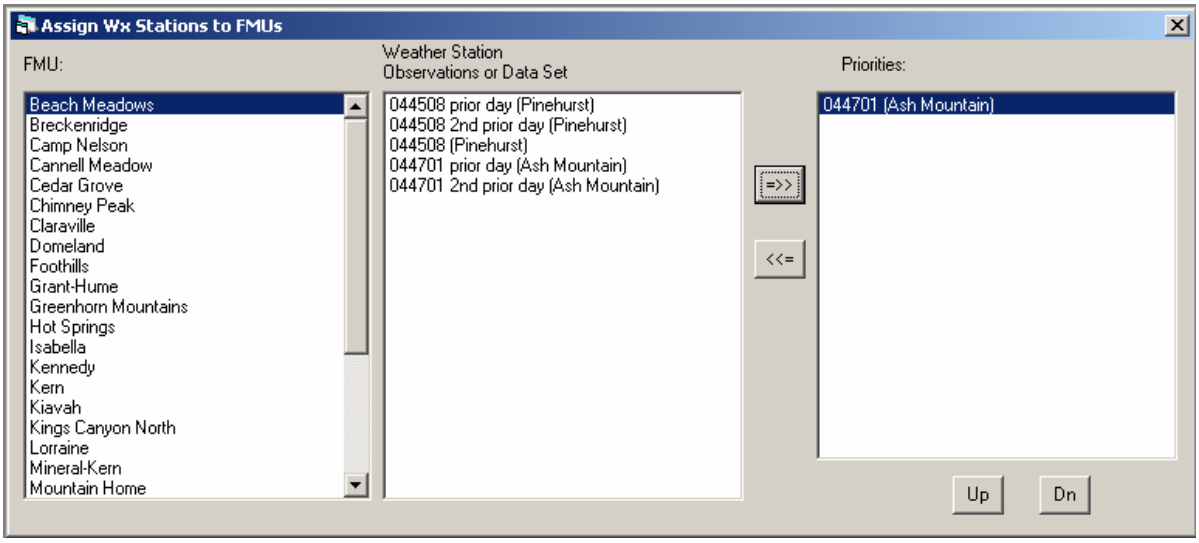
Selecting the **FPA > Assign Weather Station to FMUs** menu will display a dialog box similar to the one shown in Figure 100. As initially displayed, the FMU list will appear in the window on the left and the other two windows will be blank. Clicking on an FMU name will cause the weather stations defined in the **File > Weather Stations** menu to be displayed. Note that for each weather station, there are three options provided for a weather observation: the day of interest, the day prior to the day of interest, and two days prior to the day of interest. These will be referred to as weather station/observation day combinations.

Figure 100



To assign the primary weather station/observation day combination to the FMU, click on it in the center window and then click >>. In the example in Figure 100, selecting the weather station 044701 (Ash Mountain) as the primary weather station/observation day combination would result in a screen as shown in Figure 101.

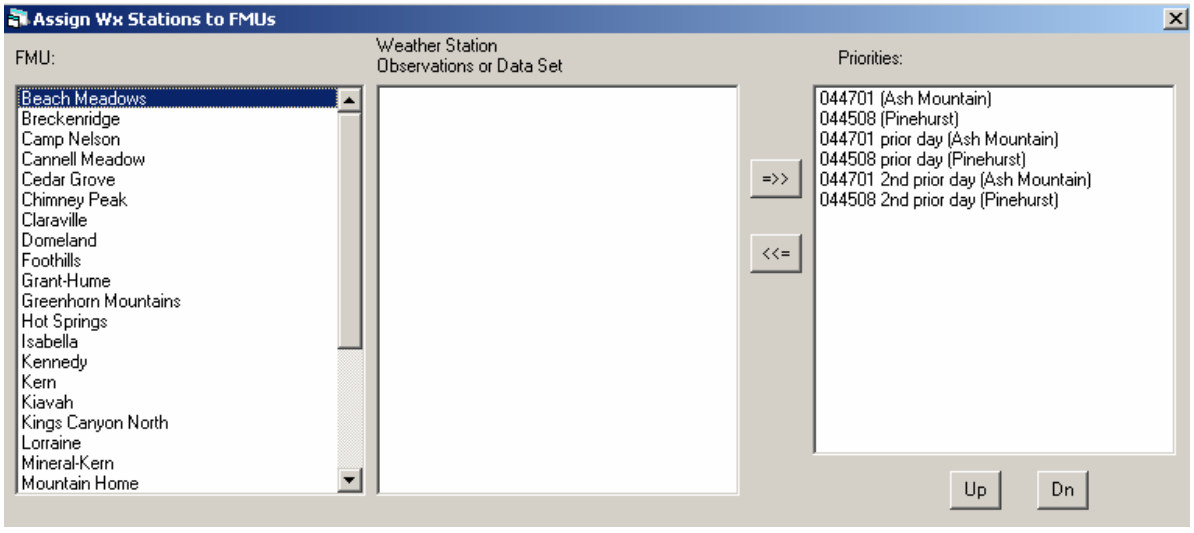
Figure 101



Assigning weather station/observation day combinations might result in a priority listing as shown in Figure 102. The planner should continue this process for each FMU.

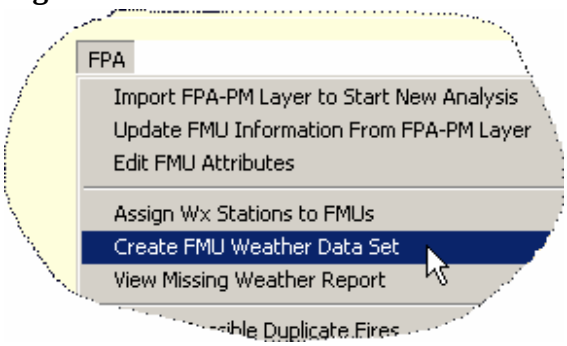
To adjust the priority listing for a weather station/observation day combination in the right window, the planner can move that weather station/observation day combination up or down in the priority listing by clicking **Up** or **Down**.

Figure 102



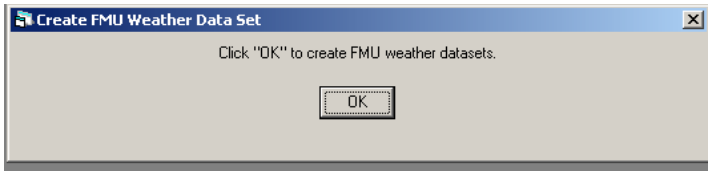
Create FMU Weather Data Set

Figure 103



This menu item facilitates the assignment of a weather observation to each day within the analysis period. This must be done for each FMU. The assignments provide the definition of a weather data set for the FMU. The weather observations assigned to a day for each FMU is based on the prioritization of weather station/observation day combinations accomplished using the **FPA > Assign Weather Station to FMUs** menu. The **FPA > Assign Weather Station to FMUs** menu activity must be completed before this activity.

Figure 104



Selecting the **FPA > Create FMU Weather Data Set** menu will result in the display of the dialog box in Figure 104. To proceed, click **OK**. PCHA will display the FMU names as it works, finally displaying a Done message. To complete the activity, click **OK** in the Done dialog box.

View Missing Weather Report

Selecting this menu will result in the preparation of a report similar to the one shown in Figure 107.

Select the **FPA > View Missing Weather Report** menu and the dialog in Figure 106 will appear. Check the box if you desire to see a list of FMU/date combinations with no weather observation assignment within the Fire Preparedness Staffing Season. If this box is unchecked, a list for the entire year will be created.

Figure 105

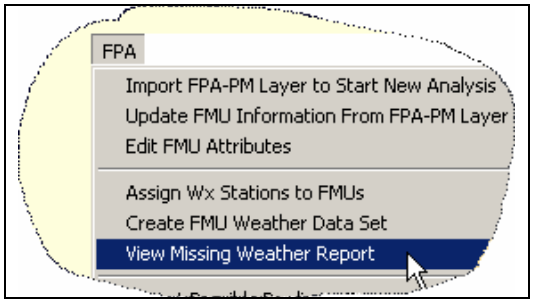
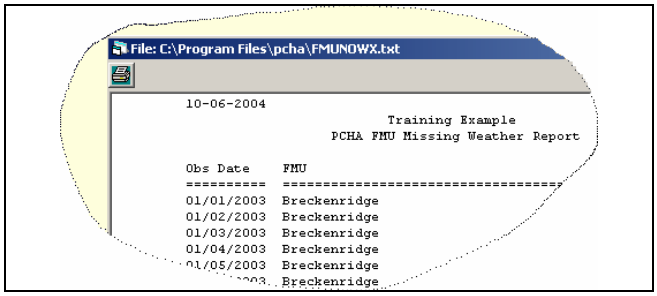


Figure 106

Figure 107



Report Possible Duplicate Fires

With interagency partners participating in an FPU, it is possible for a historic fire to have a duplicate fire report record for each agency in the database. This can happen if each agency that responded to the fire completed its own agency's fire report.

Selecting **FPA > Report Possible Duplicate Fires** will result in the display of the dialog in Figure 109. Click **OK** to have PCHA prepare the report.

This menu item will produce a report that contains possible duplicate fire report records. An example report is shown in Figure 110. Note that the Paradise fire has a fire report record from both the Forest Service and the BLM.

Figure 108

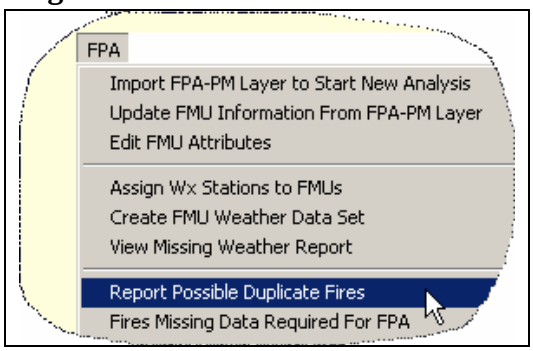
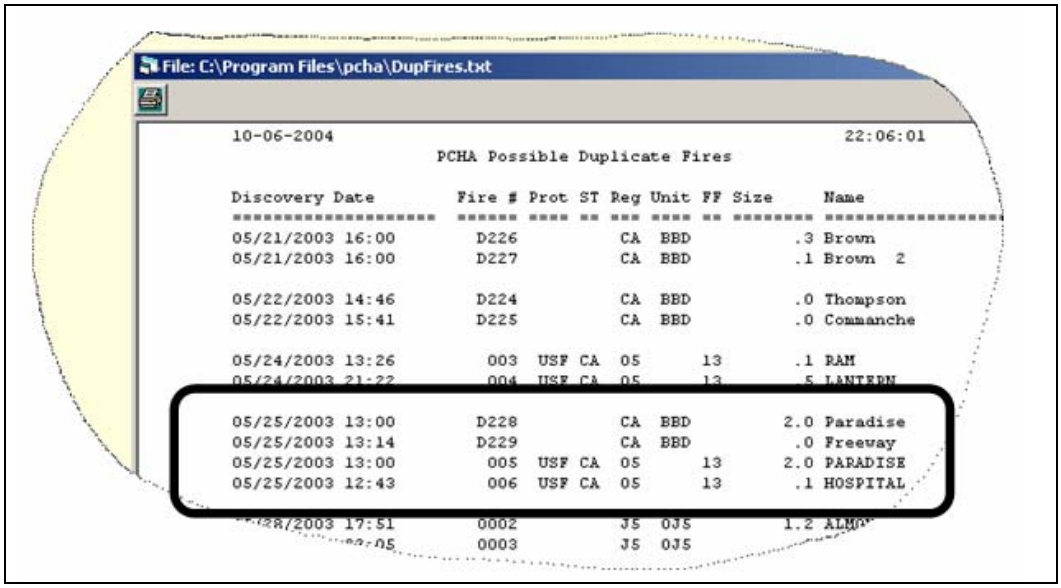


Figure 109

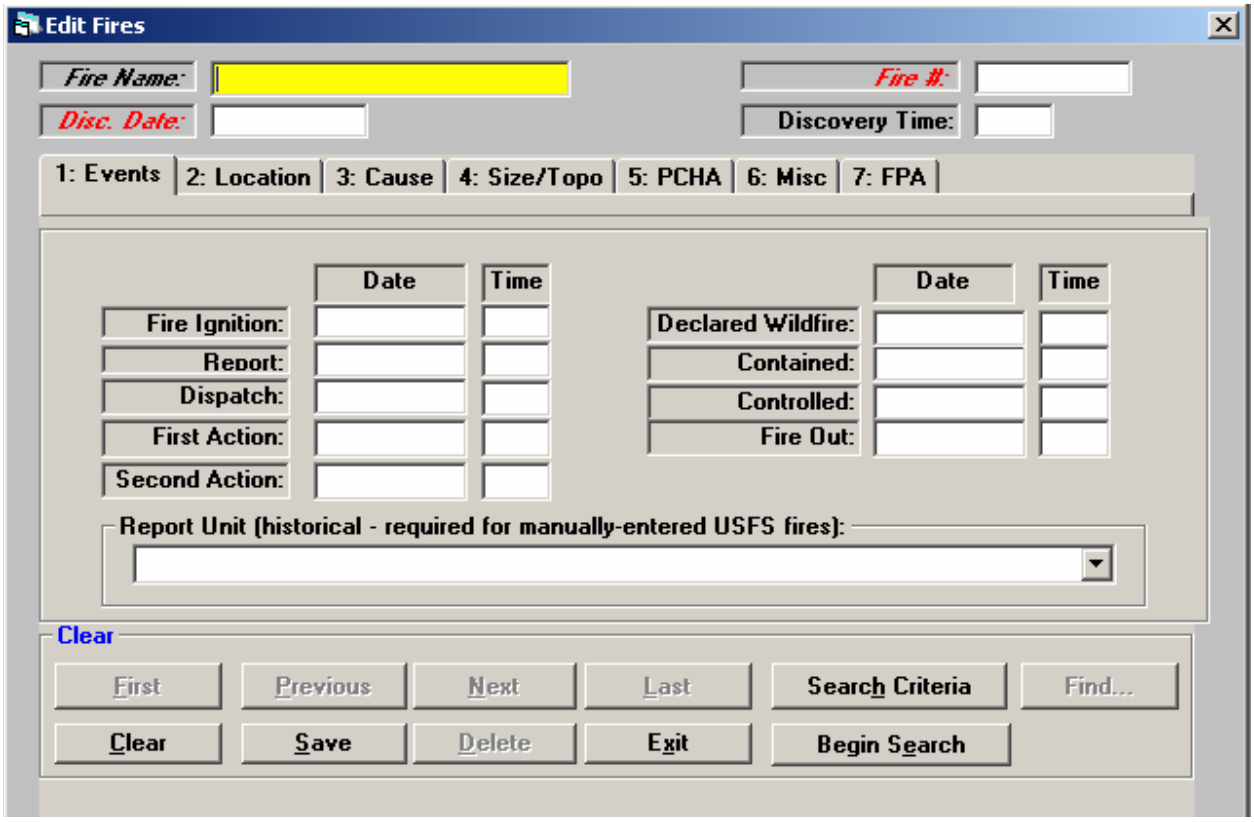
Figure 110



It is recommended that the fire record from the agency that manages the land be the fire record retained. The fire that is the duplicate record must be removed from the analysis by checking the box on the FPA tab to exclude duplicate fires. To designate a fire record as a duplicate record, select **Fire > Edit Fires > FPA** tab.

To aid understand, an example will be presented. Selecting the **Fire > Edit Fires menu**, the screen in Figure 100 will be displayed. The **Event** tab will be displayed by default.

Figure 110



In Figure 110, it was noted that the Paradise fire appears to have two fire report records. To locate these records in the PCHA database, click **Search Criteria**. Enter Paradise in the ***Fire Name*** cell and 5/23/2003 in the ***Discovery Date*** cell. Click **Begin Search**.

The dialog in Figure 111 will appear if the user clicking on the **Location** Tab.. Note the text in the lower left "EDIT 1 of 2." This indicates two fire records have been selected.

The fire record in Figure 111 is from a BLM unit. The fire record in Figure 112 is from a Forest Service unit. The Paradise fire was located on Forest Service land so the Forest Service fire record should be the one used in PCHA.

Select the BLM fire record and click on the **FPA** (Figure 113). Click in the box titled PCHA for FPA Should Exclude This Duplicate Fire. Then click **Save**. This action will leave the BLM fire report in the PCHA database but the Forest Service fire report will used for historic analysis purposes.

Figure 111

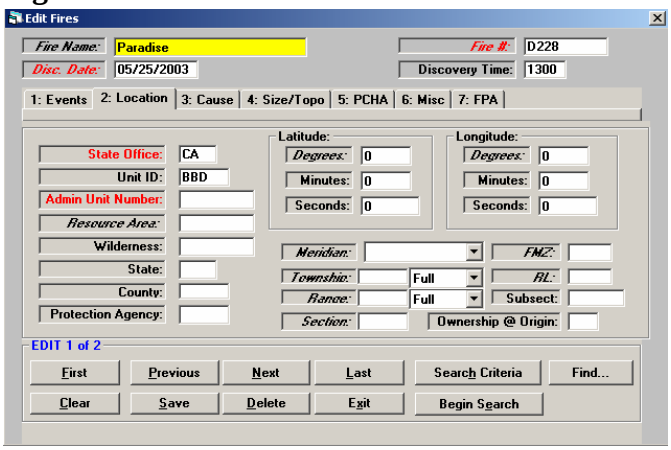


Figure 112

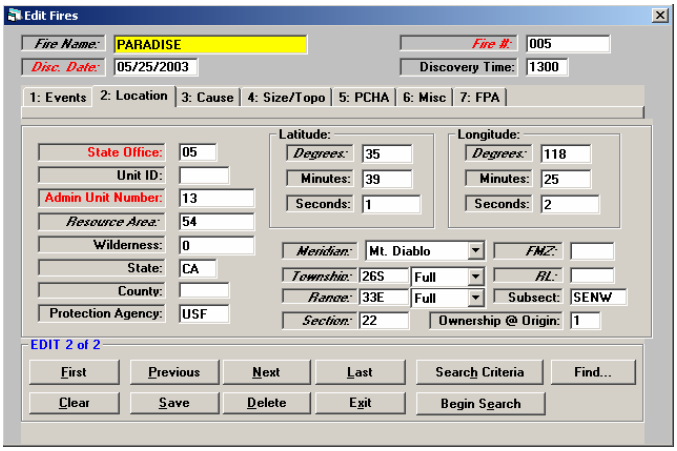
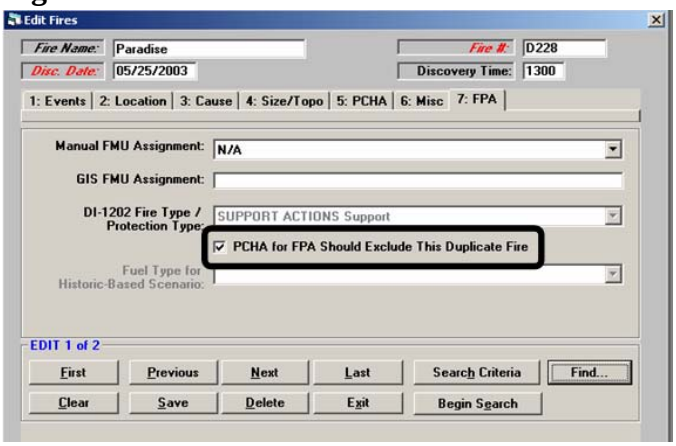


Figure 113



Fires Missing Data Required for FPA

Required information from the fire report for each historic fire to be used for the probability-based fire event scenario process includes:

- Fire Type/Protection Type code for DOI agency fires
- Fire location
- Discovery date

Some information from the fire report for each historic fire is used to develop frequency distributions. Random draws from these distributions are used in the probability-based fire event scenario generation process. Frequency distributions are developed for:

- Discovery time
- Fire control date
- Statistical cause

These are desired data fields. There must be an adequate number of fires with values for the desired fields so reliable frequency distributions can be developed.

Figure 114

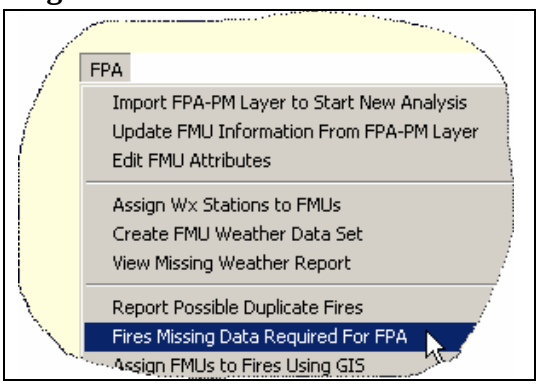
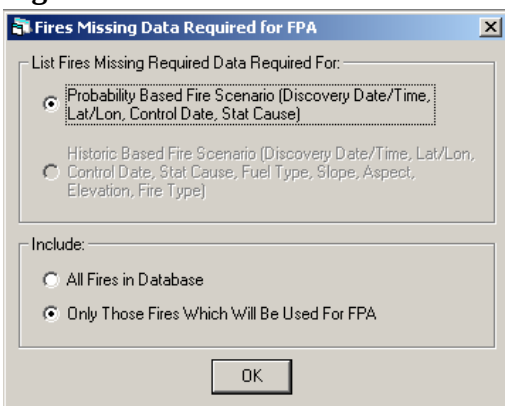
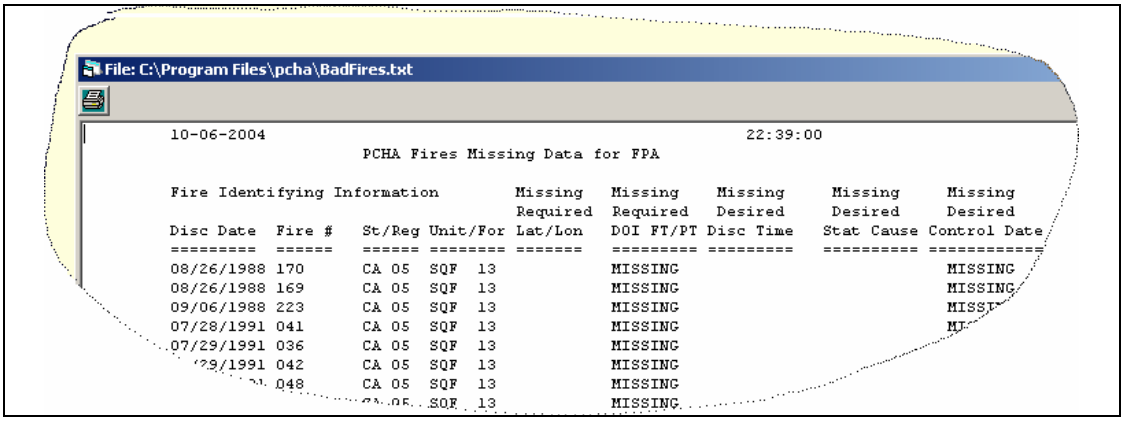


Figure 115



Selecting **FPA > Fires Missing Data Required for FPA** will result in the display of the dialog in Figure 113. Select the fires you desire to include and then click **OK** to have PCHA prepare the report. This menu item will produce a report that lists fire records with missing, required, and/or desirable data fields. An example report is shown in Figure 116.

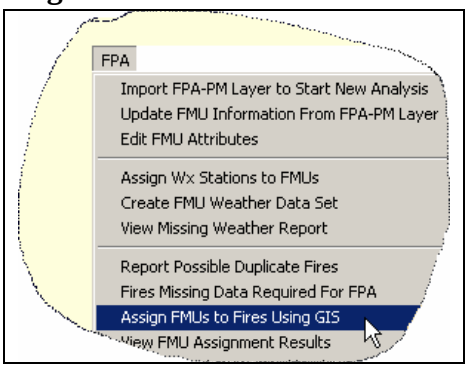
Figure 116



Assign Fires to FMU Using GIS

This menu item facilitates the assignment of each historic fire to an FMU. This is done using the GIS capability within PCHA. All fires must have a location expressed in latitude and longitude. In addition, this location must be checked for accuracy.

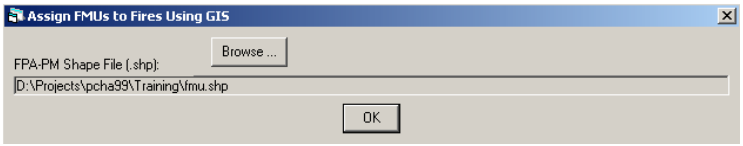
Figure 117



Selecting the **FPA >Import FPA-PM Layer to Start New Analysis** menu opens the screen in Figure 118.

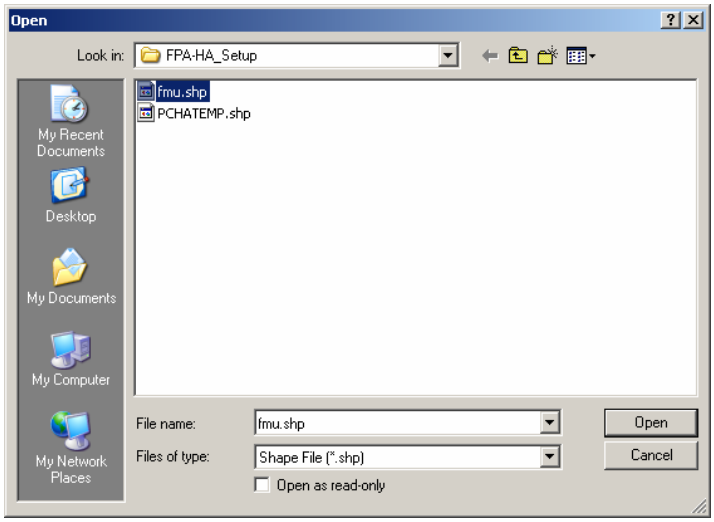
If the path to the FMU shape file is not displayed or is incorrect, click **Browse** to open the Windows File Manager dialog box allowing the planner to navigate to the folder where the GIS shape files have been downloaded from FPA-PM (Figure 119).

Figure 118



Click on the desired fpu.shp file and then click **Open**. The screen in Figure 118 will reappear with the path to the file displayed in the gray window.

Figure 119



Click **OK** to complete the activity. PCHA will complete the assignments. When the program is finished, a dialog will appear indicating Fires have been Assigned. Click **OK**.

View FMU Assignment Results

This menu item produces a report showing the assignment of fires to FMUs and a list of fires that have not been assigned to an FMU. The most likely reason a fire would not be assigned to an FMU is because the location of the fire is outside of the FPU boundary.

Selecting the **FPA = > View FMU Assignment Results** menu will produce the screen in Figure 121. Click **OK** and a report similar to the excerpt shown in Figures 122 and 123 will appear. Figure 122 shows the first part of the report with the number of fires assigned to each FMU. Figure 123 shows the second part of the report, which is a list of fires that have not been assigned to an FMU.

Figure 120

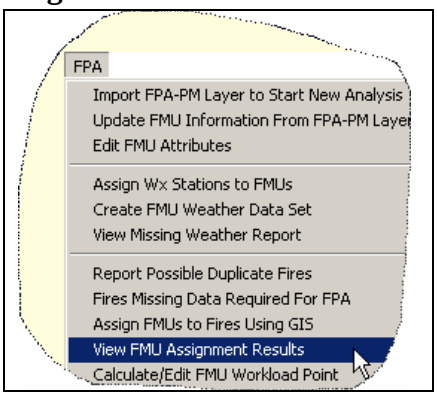


Figure 121

Figure 122

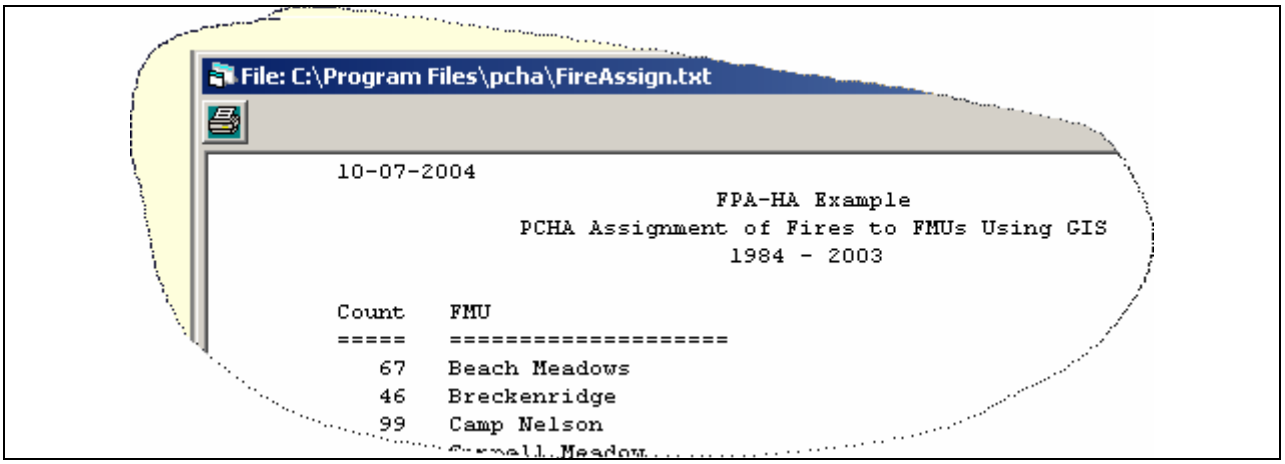
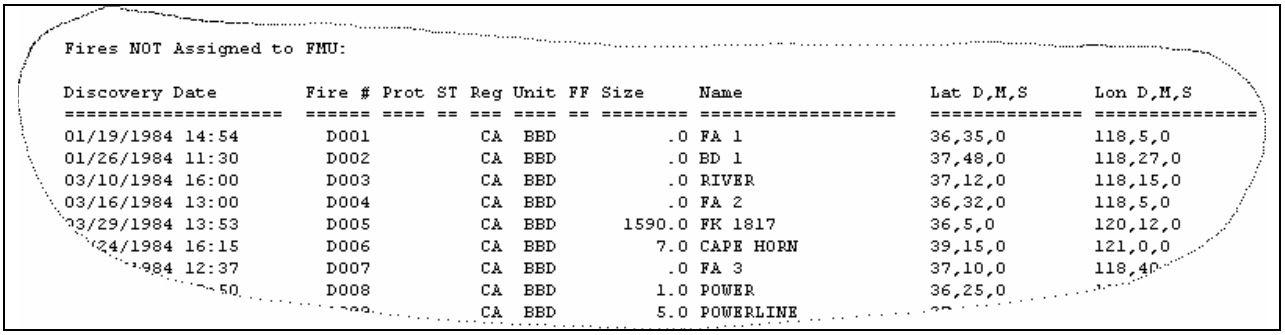
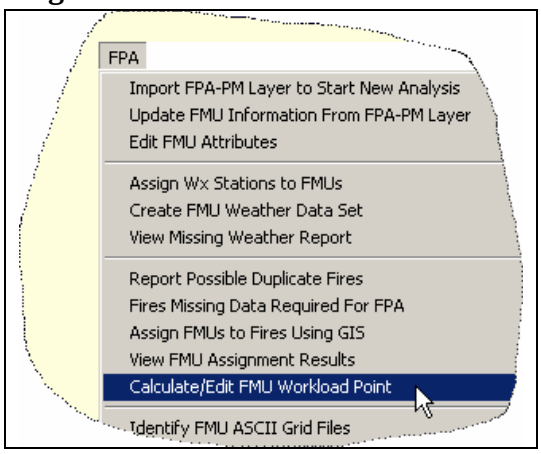


Figure 123



Calculate/Edit FMU Workload Point

Figure 124



The FPA-PM model requires a fire workload point for each FMU. PCHA will determine this point by obtaining an average of all latitude and longitude locations for each fire included in each FMU. This menu item facilitates the calculation of a workload point for each FMU.

Selecting the **FPA >Calculate/Edit FMU Workload Point** will implement this activity and a screen similar to the one in Figure 125 will appear. The PCHA calculated latitude and longitude are in the Calc Lat and Calc Lon columns respectively. If the planner feels that the calculated workload point does not adequately represent the general area where fries are most likely to occur within the FMU, the planner can override this calculated value by entering a latitude and longitude in the Man Lat and Man Log columns respectively. The workload point locations that are determined can be reviewed by using the features found in the GIS menu. The points can be displayed and mapped on the FMU polygons along with the fire locations.

Figure 125

Fire Management Units

FMU_ID	FMU_Name	CalcLat	Man Lat	CalcLon	Man Lon	CalcDiscHour	DiscHour	SlopeCls
649677	Grant-Hume	36.75024		118.8847		1406		2
649662	Rincon	36.02461		118.3906		1426		
649675	Pinehurst	36.72135		119.0386		1401		
649666	Rodgers Camp	36.10411		118.6343		1324		
649655	Troy Meadow	36.06617		118.2184		1357		
	South Sierra	36.11543		118.1717		1302		
	Tobias	35.90337		118.5897		1326		
		35.60376		118.3346				

Identify FMU ASCII Grid Files

An ASCII Grid file is a file containing alphanumeric values for landscape features such as slope, aspect and elevation. Digital Elevation Models (DEMs) are digital files consisting of points of elevations, sampled systematically at equally spaced intervals. DEM files are available for the entire United States from the U. S. Geological Service (USGS). The spatial relationship of these points is used to derive the slope and aspect values by referencing adjacent elevation points.

The fire planner needs to work with local GIS specialists to develop ASCII Grid files. Refer to the FPA Reference Guide for guidelines on how to obtain and prepare these files. Each FMU must be totally enclosed within only one set of grid files. In other words, one grid file may include numerous FMUs (or the entire FPU), but an FMU may not be split, requiring two different grid files. FMU polygons may be discontinuous.

Grid File Naming

FPA-PM requires matched sets of Grid files. The files in each set must exactly cover the spatial area. Each ASCII Grid file for an FMU must have a file name formatted as follows:

BaseFileName_DataLayer.asc,

- BaseFileName is an identifier such as CenOrEastside.
- DataLayer is the data in the Grid file.
- Each file in the set must have the file extension of .asc and a second file with an extension of .prj.

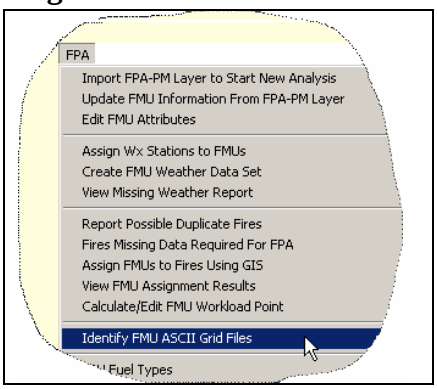
Table 28 provides a summary of the requirements.

Table 28

Attribute	Data Layer ID	Example
Slope	slope	southsierra_slope.asc
Aspect	aspect	southsierra_aspect.asc
Elevation	elev	southsierra_elev.asc
FBPS Fuel Model	fuel	southsierra_fuel.asc
Canopy Cover	canopy	southsierra_canopy.asc
Canopy Base Height	cbh	southsierra_cbh.asc
Canopy Bulk Density	cbd	southsierra_cbd.asc
Stand Height	height	southsierra_height.asc

Once prepared, these files must be imported into PCHA. Selecting **FPA > Identify FMU ASCII Grid Files** will facilitate this process (Figure 126).

Figure 126



The dialog in Figure 127 will be displayed. The dialog is used to identify to PCHA the folder location where the ASCII Grid files reside as well as the units of each of the Grid Files.

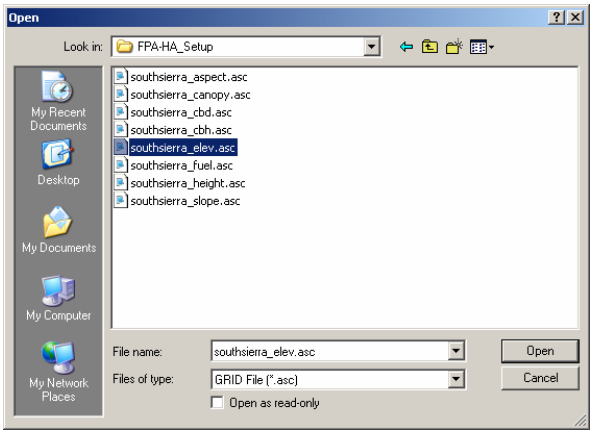
FMU

Use the pull-down to select the FMU Grid file cover.

Units

Click the radio button on the Units area to designate the units the grid is in.

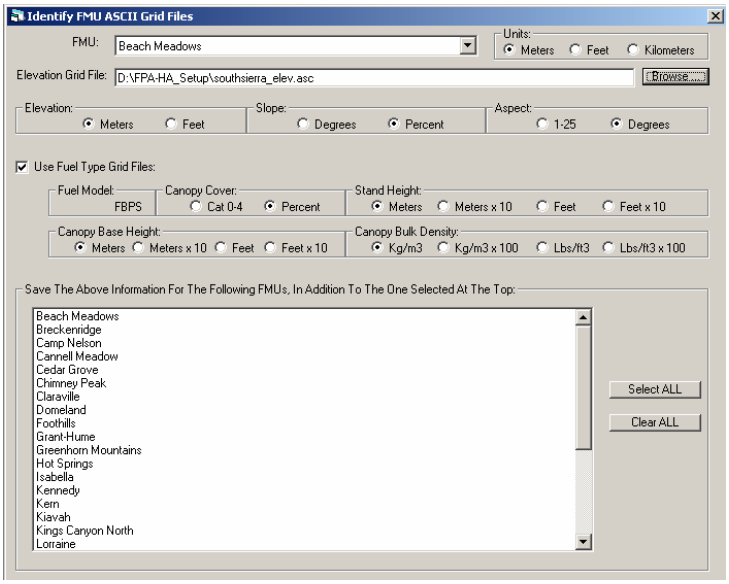
Figure 127



Elevation Grid File

Click **Browse** and use the Windows dialog to navigate to the file location where the BaseFileName_elev.asc file is located. In the example in Figure 127, the file location is displayed in the "Look in"cell and the file name is southernsierra_elev.asc. Note that all of the ASCII Grid files must reside in the same folder as the ASCII Grid elevation file. Click **Open** and the file path should appear in the cell to the right of the Elevation Grid File title (Figure 128).

Figure 128



Units of the Slope, Aspect and Elevation Grid Files

Select the appropriate units for each of the topographic ASCII Grid data layers (Figure 129).

Figure 129

Elevation

Use the radio button to select either feet or meters.

Slope

Use the radio button to select either degrees or percent.

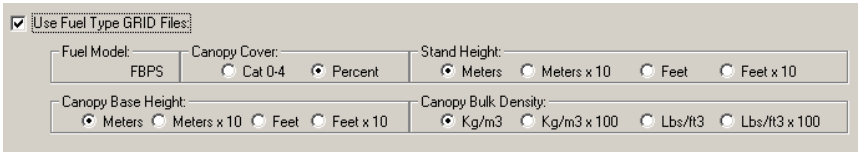
Aspect

Use the radio button to select either aspect category (1-25) or degrees. Aspect 25 is flat and 1 is North with the numbers assigned to aspects going in a clockwise direction.

Using Spatial Fuel Type Attribute Data Layers

If an ASCII Grid file will be used to define fuel types for an FMU, check the **Use Fuel Type GRID Files** box and select the appropriate units for each of the fuel type ASCII Grid data layers (Figure 130).

Figure 130



Fuel Model

The fuel models must be from the Fire Behavior Prediction System (FBPS) (Anderson 1982). No custom fuel models are allowed. Use fuel model 98 to designate water and fuel model 99 to designate unburnable.

Canopy Cover

Canopy cover is normally measured as a percent. It is based on the linear length of canopy versus the length of open space. Click the appropriate radio button to specify the units as either Category (0-4) (Table 28) or the percent.

Table 28 – Definition of Canopy Cover Categories

Category	Range	Used in Calculations
0	0%	0%
1	1 – 20%	10%
2	21–50%	35%
3	51-80%	65%
4	81-100%	90%

Stand Height

For an individual tree, height is the measurement from ground level to the tree tip. Averaging the heights for all trees in a stand gives an estimate of the stand height. Click the appropriate radio button to specify either meters, meters * 10, feet or feet * 10.

Canopy Base Height (1-299 feet)

For an individual tree, a measurement of the height from the base of the crown to the tree tip can be made. The average of these values for all trees in a stand gives an estimate of the level of the stand canopy base height. Frequently, this is a measure of where the limbs of the canopy start vertically, but the number can be skewed by the presence of small trees or occasional live limbs. A more meaningful value is the height above the ground of the first canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire. Click the appropriate radio button to specify either meters, meters * 10, feet or feet * 10.

Canopy Bulk Density (kg/m3)

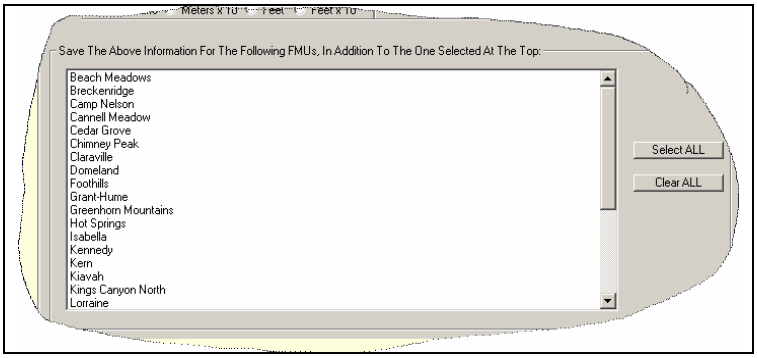
Mathematically, canopy bulk density (CBD) (kg/m^3) is canopy biomass divided by the volume occupied by crown fuels. Canopy bulk density is hard to estimate in the field. Initially, it seems attractive to calculate this value by treating the canopy as a box with the depth, the stand height, minus the canopy base height. Assuming this box covered an acre (43,560 ft^2), dividing the fuel loading in the canopy by the volume of box would provide an estimate of average canopy bulk density. Unfortunately, this estimate has a bias toward underestimation of canopy bulk density due to the averaging of largely void areas in the top and bottom of the canopy with the more dense layers of foliage. A fire burning vertically within the crowns will most likely propagate through denser canopy layers. Click the appropriate radio button to specify either kg/m3, kg/m3 * 100, lbs/ft3 or lbs/ft3 * 100. For information on how to determine CBD, refer to the FPA Reference Guide.

To determine CBH and CBD values that are reasonable for the FPU, consult with fire behavior specialists familiar with defining these values for use in the *FARSITE* program. Also consult the publication Stereo Photo Guide for Estimating Canopy Fuel Characteristics in Conifer Stands (Scott and Reinhardt 2005). A utility exists in PCHA (FPA>FBPS Calculations), which calculates resultant fire behavior using all three attributes of a fuel type, and five attributes of a topographic type.

Assigning More Than one FMU to a Set of Grid Files

At the bottom of the dialog shown in Figure 131 is an area where the planner may identify additional FMUs that have the same set of GRID files as the one shown in the Elevation Grid File cell.

Figure 131



Click on an FMU to identify it as an FMU with the same set of GRID files as the one shown in the Elevation Grid File cell. Click **Select ALL** to identify all of the FMUs in the FPU to have the same set of GRID files as the FMU shown in the Elevation Grid File cell. Click **Clear ALL** to reverse the action from **Select ALL**.

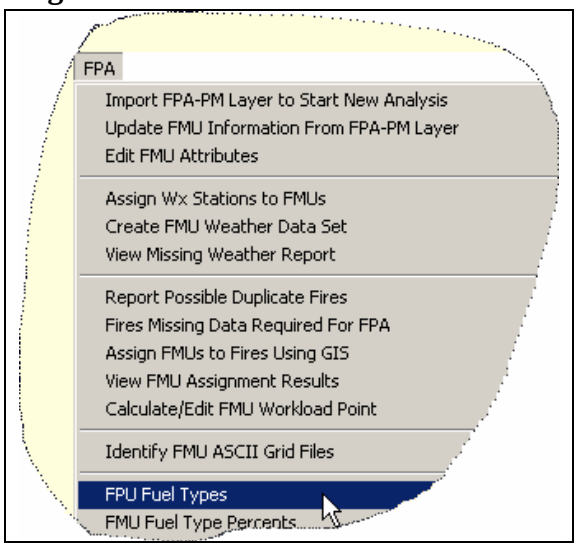
FPU Fuel Types

In review, a fuel type is a unique combination of the following:

- Canopy cover
- Surface (FBPS) fuel model
- Canopy base height
- Canopy bulk density
- Stand height

If at least one FMU in the FPU will have fuel types defined non-spatially, the planner must define each of the possible fuel types. All fuel types that exist in an FMU that will have fuel types defined non-spatially must to be defined.

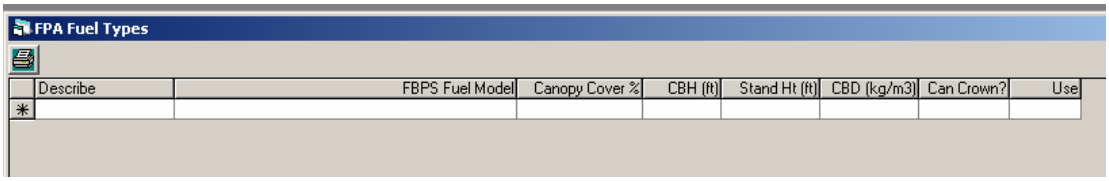
Figure 132



The information for fuel layers may be developed from existing vegetation data layers in administrative unit GIS files. The fire planner can determine the specific attributes needed for defining a fuel type with the assistance of other fire personnel having fuels expertise and a local silviculturist.

To define fuel types for the FPU, select **FPA > FPU Fuel Types** menu (Figure 132). The window shown in Figure 133 will appear.

Figure 133



The planner should complete the cell entries for all fuel types that are in FMUs that will have fuel types defined non-spatially. An example is shown in Figure 134.

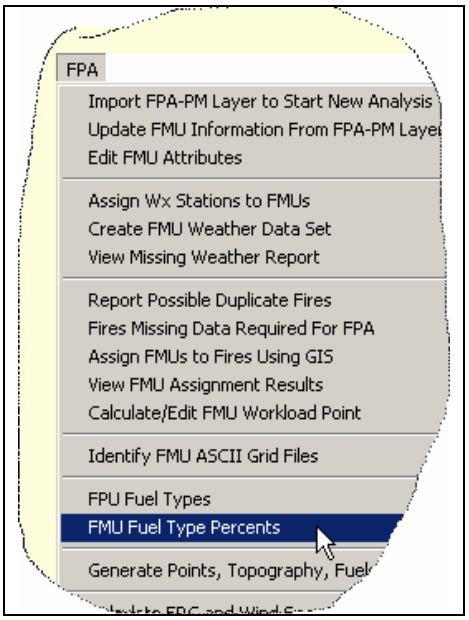
Figure 134

FPA Fuel Types

Describe	FBPS Fuel Model	Canopy Cover %	CBH (ft)	Stand Ht (ft)	CBD (kg/m3)	Can Crown?	Use
Small Pond. Pine	FBPS 2: Timber (grass and understory)	21-50	4	12	0.012	Yes	Yes
Pole Pond. Pine	FBPS 9: Hardwood (long-needle pine) litter	21-50	10	25	0.143	Yes	Yes
Mature Pond. Pine	FBPS 6: Dormant brush - hardwood slash	1-20	21	59	0.121	Yes	Yes
Meadow	FBPS 1: Short grass (1 ft.)	0	0	0	0	No	Yes

FMU Fuel Type Percents

Figure 135

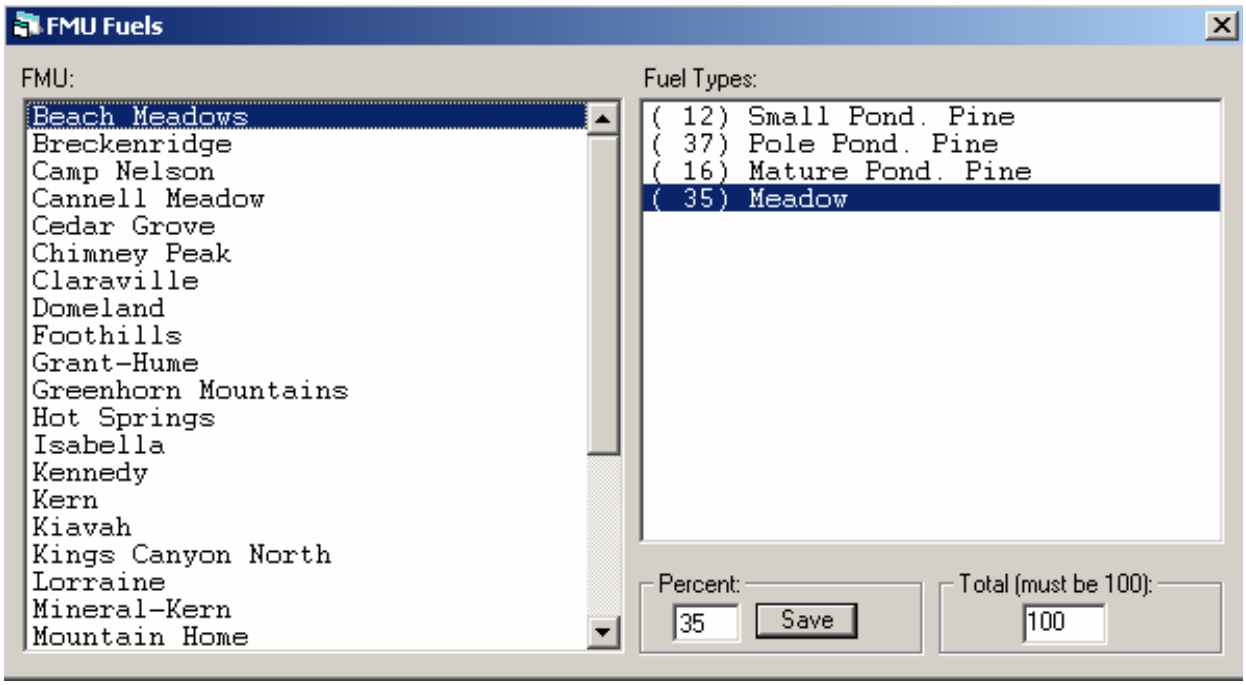


The planner must manually enter the proportion of each fuel type in each FMU that will have fuel types defined non-spatially. These proportions can be determined by using a GIS or by using professional judgment to estimate from remote sensing images.

Select **FPA > FMU Fuel Type Percents**. Click on an FMU to select it and a dialog similar to Figure 136 will appear. Click on the fuel type desired in the right window. Enter the percent of the FMU that is covered by the fuel type in the box labeled Percent and then click **Save**. Do this for each fuel type in the FMU. Note that the sum of the percentages in an FMU must be 100%.

Note that the entered values are not saved until the user clicks on another FMU name different from the one being defined.

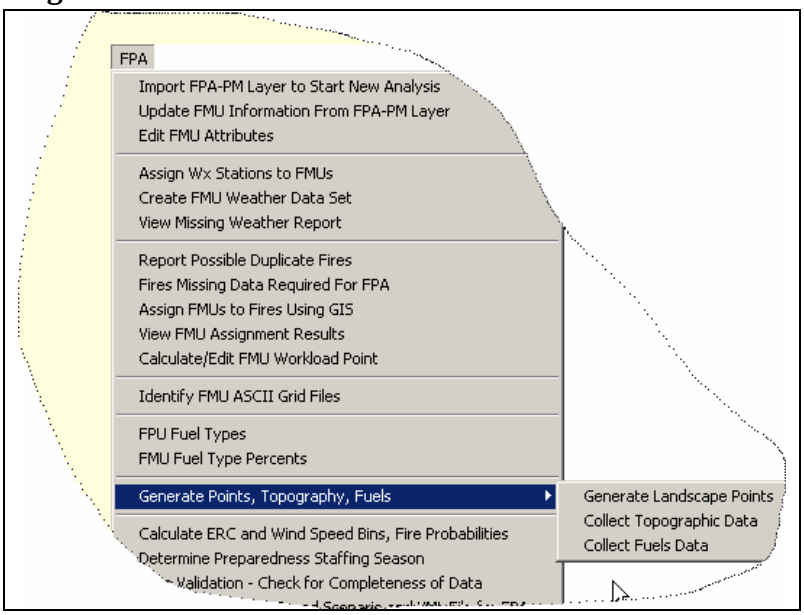
Figure 136



Generate Points, Topography and Fuels

This menu item supports the generation of landscape points, the collection of topographic data and fuels data.

Figure 132



<u>Generate Landscape Points</u>

This menu facilitates the generation of the random locations within each FMU. These locations are called landscape points and are defined by a latitude and longitude. Each landscape point further defines unique combinations of the topographic type and the fuel type assigned. These unique combinations are determined by the topographic attributes and fuel type attributes at the latitude and longitude defined by the landscape point.

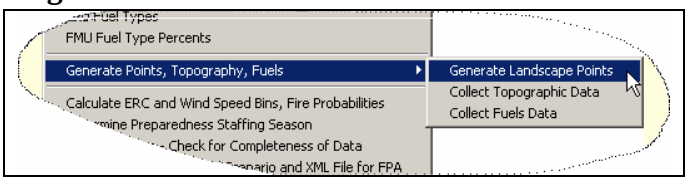
Landscape points are used for two purposes:

- Definition of the start location for a fire event
- Definition of the topographic type and fuel type for each day that an accepted WFU fire exhibits forward fire movement

As such, PCHA generates many more landscape points than the number of fire events in a fire event scenario. The additional landscape points are available to facilitate the modeling of the total fire event spread distance for an accepted WFU fire event.

To generate landscape points, select the **FPA>Generate Points, Topography and Fuels>Generate Landscape Points** menu (Figure 133).

Figure 133



The dialog shown in Figure 134 will appear. Click on the **Browse** button and navigate to the file location for the fpu shape file (fpu.shp) (Figure 135).

Figure 134

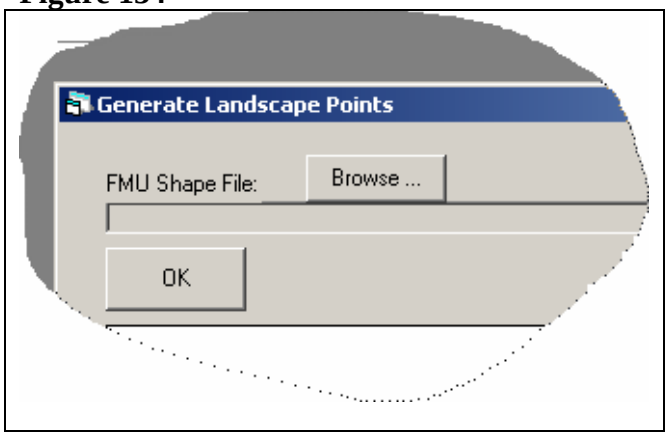
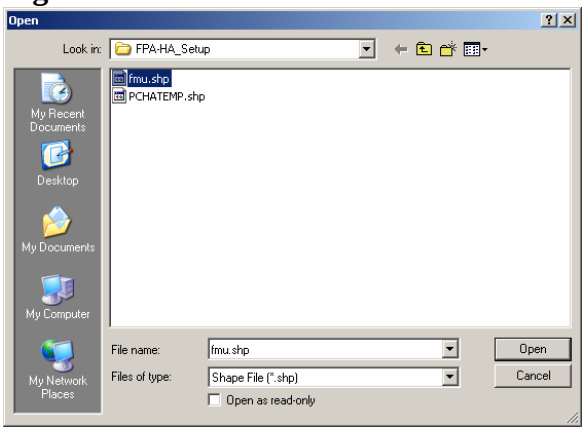


Figure 135



Click on the **Open** button and a dialog similar to the one in Figure 136 will appear. Check to be sure the path to the FMU shape file is correct and then click the **OK** button. When PCHA completes the generation of landscape points, the number of landscape points generated will be displayed along with a Done dialog (Figure 137). To complete the activity, click **OK**.

Figure 136

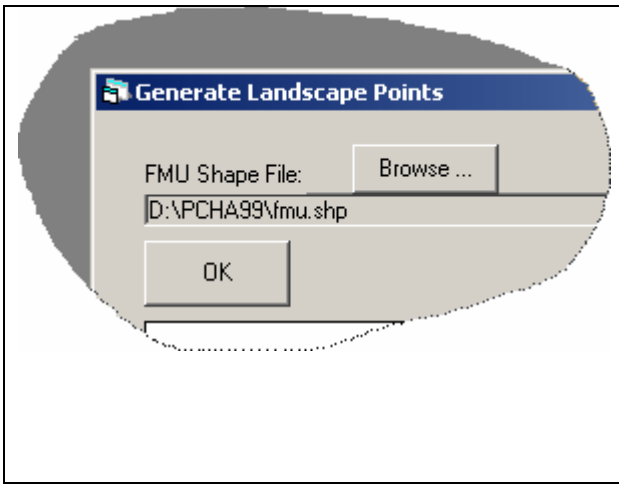
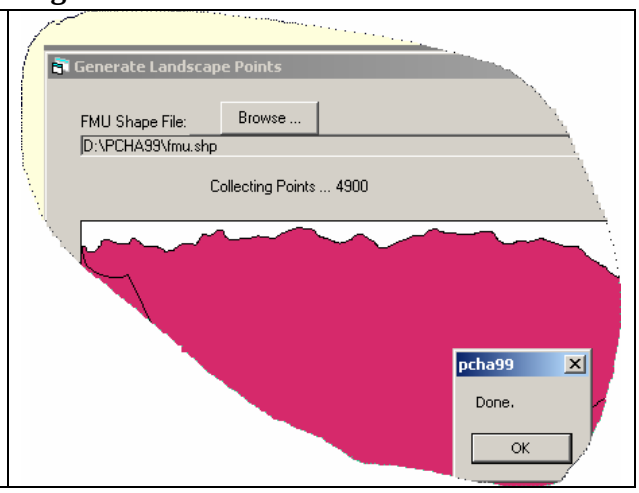


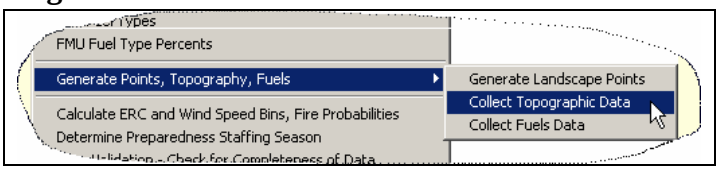
Figure 137



Collect Topographic Data

This menu item facilitates the assigning of topographic attributes (slope, aspect and elevation) to each of the landscape points. Using one of the following two methods can retrieve these topographic attributes for the latitude and longitude of the landscape point:

Figure 138



- Internet and a National Topographic Database: Sending the latitude and longitude location via the Internet to a computer with a program that will retrieve the topographic attributes for the location and send these attributes back to PCHA via the Internet

- Local Grid Files - Locating the latitude and longitude location on the slope aspect and elevation ASCII Grid files and retrieving the topographic attributes from these Grid Files

The planners must decide which method will be used.

Internet and a National Topographic Database

This method requires a active high speed Internet connection to the computer being used. PCHA will send the latitude and longitude of a landscape point to an Internet server and the slope, aspect and elevation of the landscape point will be returned to PCHA. Although this process is time intensive, it is recommended because the data comes from a known and maintained source.

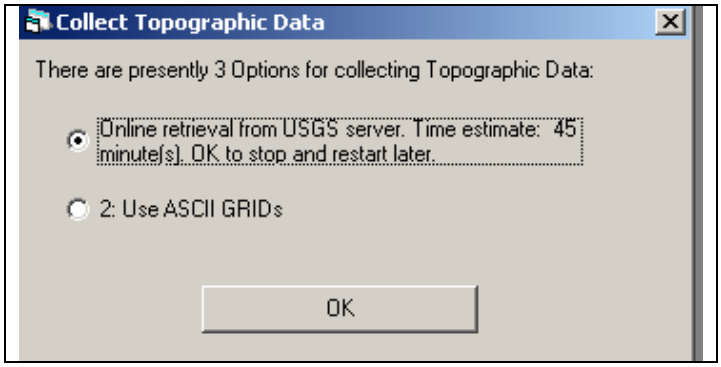
Local Grid Files

If this method will be used, planner must implement Step 9 in Table 2 (Process Steps to Completion of Historic Analysis Using PCHA). In the step, the planner gathers the ASCII topographic grid files for import into PCHA. The import is performed using the **FPA > Identify FMU ASCII Files** menu. If the fuel types in the FMU will also be assigned using ASCII grid files, then both of these activities can be accomplished at the same time. Refer to the FPA Reference Guide for specific information on how to attain and develop the topographic ASCII grid files.

To assign topographic attributes to landscape points, select the **FPA > Generate Points, Topography and Fuels > Collect Topographic Data** menu (Figure 138). The dialog shown in Figure 139 will appear.

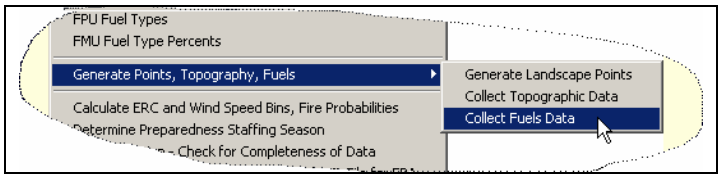
Click on the desired method and click **OK**.

Figure 139



Collect Fuels Data

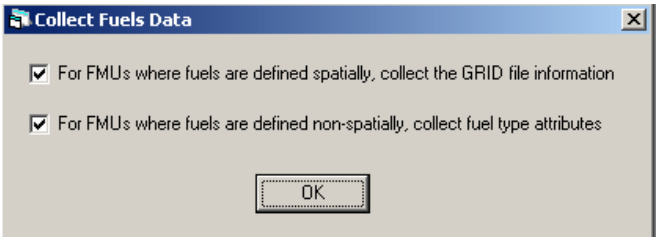
Figure 140



This menu item facilitates the assigning of fuel type attributes (canopy cover, surface fuel model, canopy base height, canopy bulk density and stand height) to each of the landscape points. Theis fuel type definition process was defined for each FMU in Steps 10 and 12 of Table 2 (Process Steps to Completion of Historic Analysis Using PCHA).

To assign topographic attributes to landscape points, select the **FPA > Generate Points, Topography and Fuels > Collect Fuels Data** menu (Figure 140). The dialog shown in Figure 141 will appear.

Figure 141



Select the two options based on how fuel types are defined for the FMUs in the FPU and click **OK**.

Calculate ERC and Wind Speed Bins, Fire Probabilities

PCHA automates the creation of several necessary probability distributions and tables required for the creation of fire event scenarios. A detailed description of the process used by PCHA is contained in the FPA-PM Reference Guide.

To perform this activity, select **FPA > Calculate ERC and Wind Speed Bins, Fire Probabilities.** The dialog shown in Figure 143 will appear. Click **OK**.

Figure 142

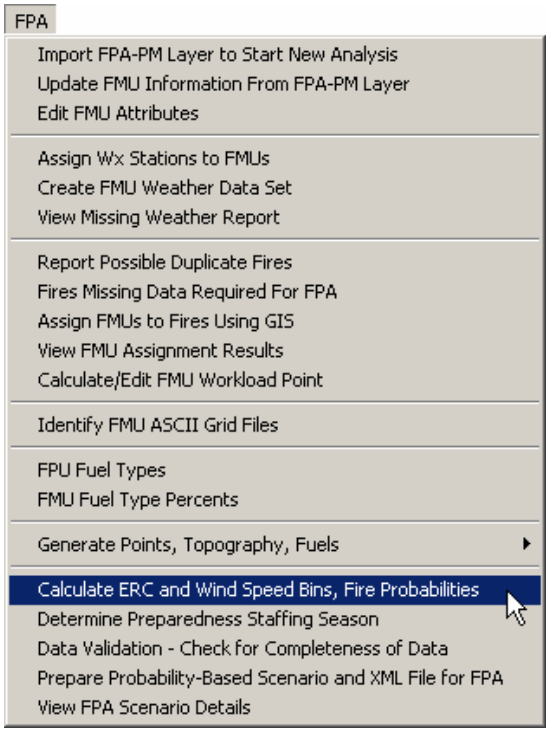
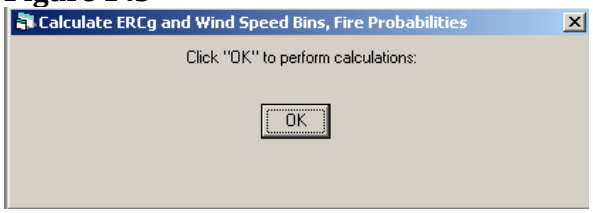


Figure 143



When done, a Calculations Complete dialog will appear. Click **OK** to close that dialog screen.

Determine Preparedness Staffing Season

PCHA contains a screen that shows fire danger variables and a distribution of fire occurrence in a calendar year. To access this screen, select **FPA** > **Determine Preparedness Staffing Season** (Figure 144)**.** The screen in Figure 145 will be displayed. At the top, the planner can view a bar graph of ERC, SC or BI through the year for the FPU. At the bottom of the screen, the planner can view average fire occurrence per day for the Analysis Period.

The Preparedness Season is then defined by PCHA as the period(s) containing 90% of the fires in the Analysis Period. Note that multiple discontinuous periods can be designated. In Figure 146, there is a display of the time of the year when 90% of the fires happen.

Figure 144

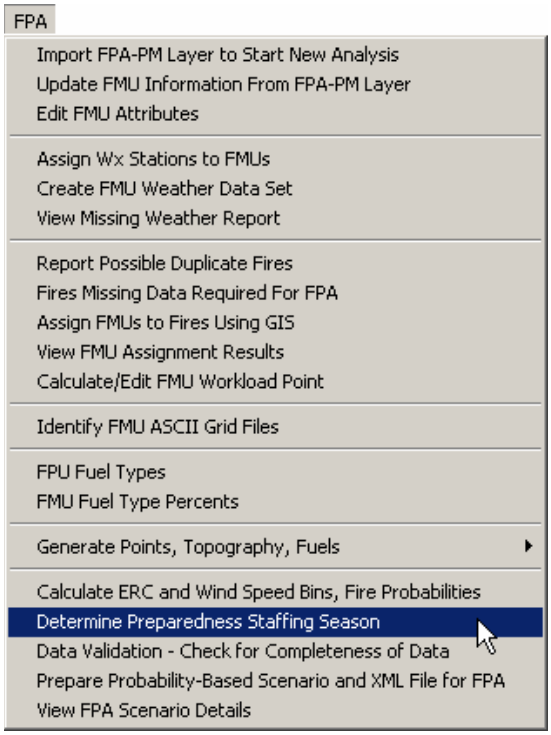


Figure 145

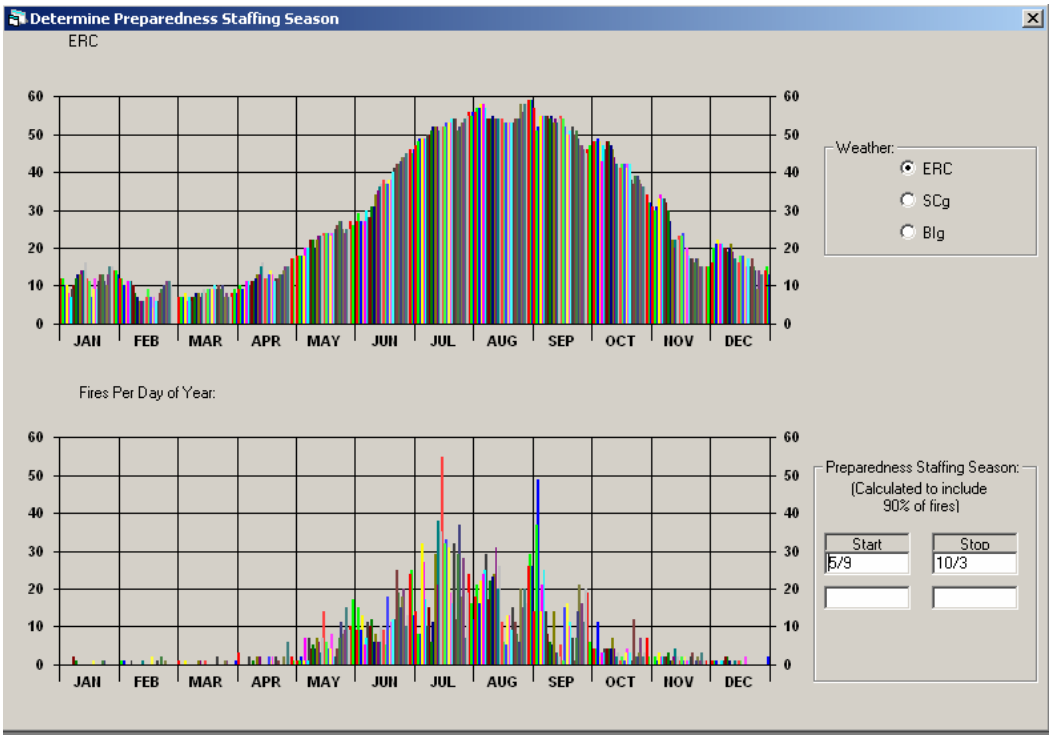
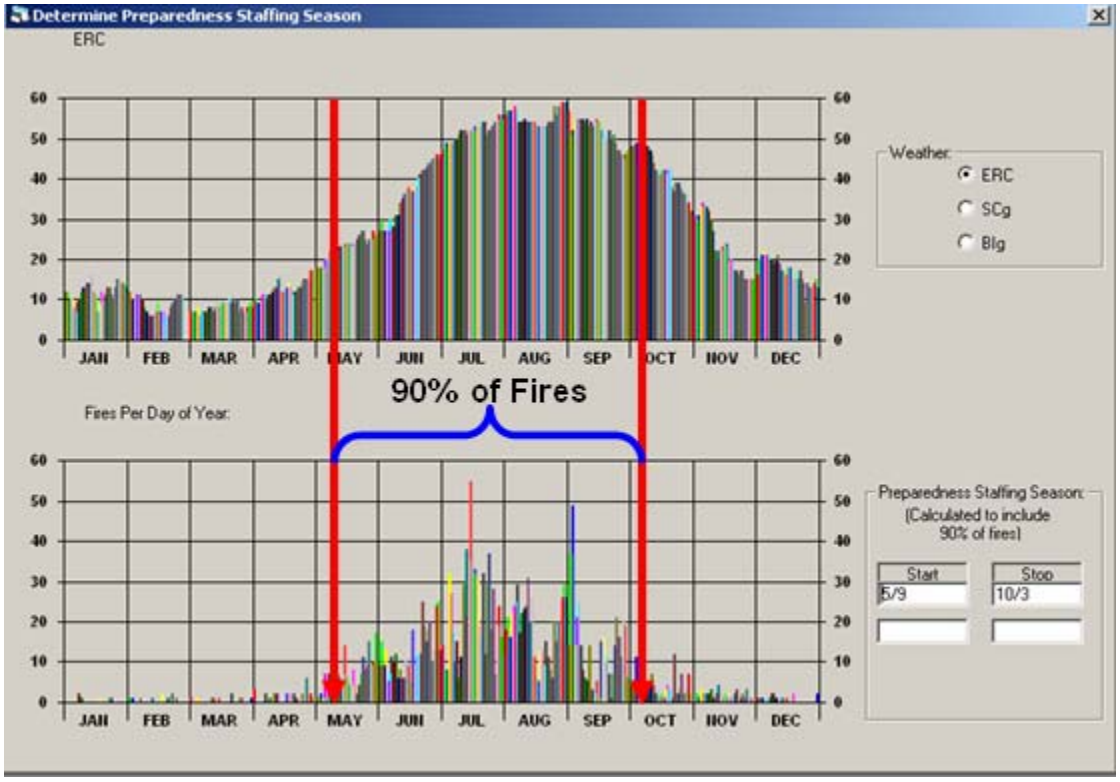


Figure 146



Data Validation – Check for Completeness of Data

This menu item will generate a report displaying information on any incomplete processes or missing data, which are needed before PCHA can prepare a probability-based fire event scenario.

Selecting the **FPA > Data Validation – Check for Completeness of Data** menu (Figure 147) will result in the display of the screen in Figure 148. Clicking Ok will produce a report similar to the one shown in Figure 149.

Figure 147

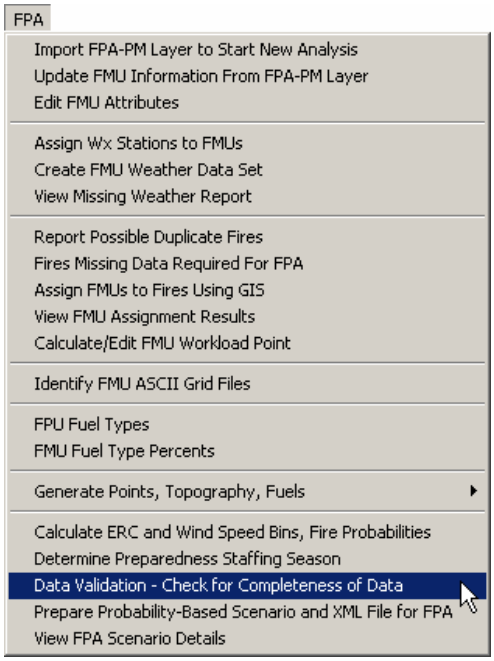
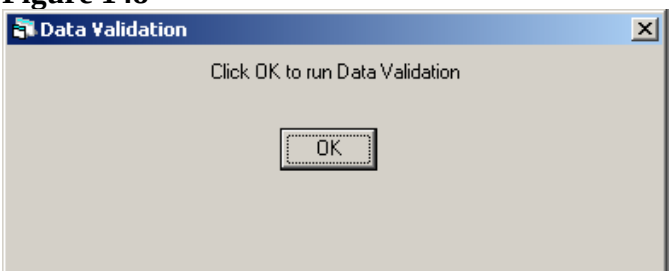


Figure 148



The planner must correct the described problems before attempting to generate a probability-based fire event scenario.

Figure 149

```
     03-16-2005
                                        FPU: Southern Sierra FPU
                                PCHA Database: D:\PCHA99\PCHA99Example.mdb

                                          Analysis Years:
================================================================================================
         Analysis Years OK: 1984-2003

                                          FMU Data Missing:
================================================================================================
         FMU Data OK.

                                          FMU GRID Files:
================================================================================================
                   Cannot locate C:\Program Files\pcha\southsierra_aspect.asc
                   Cannot locate C:\Program Files\pcha\southsierra_aspect.prj
                   Cannot locate C:\Program Files\pcha\southsierra_elev.asc
                   Cannot locate C:\Program Files\pcha\southsierra_elev.prj
                   Cannot locate C:\Program Files\pcha\southsierra_slope.asc
                   Cannot locate C:\Program Files\pcha\southsierra_slope.prj
                   Cannot locate C:\Program Files\pcha\southsierra_canopy.asc
                   Cannot locate C:\Program Files\pcha\southsierra_canopy.prj
                   Cannot locate C:\Program Files\pcha\southsierra_cbd.asc
                   Cannot locate C:\Program Files\pcha\southsierra_cbd.prj
                   Cannot locate C:\Program Files\pcha\southsierra_cbh.asc
                   Cannot locate C:\Program Files\pcha\southsierra_cbh.prj
                   Cannot locate C:\Program Files\pcha\southsierra_fuel.asc
                   Cannot locate C:\Program Files\pcha\southsierra_fuel.prj
                   Cannot locate C:\Program Files\pcha\southsierra_height.asc
                   Cannot locate C:\Program Files\pcha\southsierra_height.prj

                                          Weather Data:
================================================================================================
         No Weather errors found.

                                          Fuels/Topography Data:
================================================================================================
                   Breckenridge: ERROR - no random points with fuels and topography found.
                   Claraville: ERROR - no random points with fuels and topography found.
                   Isabella: ERROR - no random points with fuels and topography found.
                   Piute Mountains: ERROR - no random points with fuels and topography found.

                                          Fire Data:
================================================================================================
                                            Total fire records during Analysis Years: 2462
                                         Fires with wrong Fire Type/Protection Type: 0
                                                              Fires outside any FMU: 9
                                                   Counted fires during Analysis Years: 2453
               Fires which cannot be included in probabilities due to no matching weather: 55
                                         Number of fires utilized for FPA probabilities: 2398
                     Approximate annual number of fires expected to be drawn for FPA: 120
```

A “clean” run showing now problems is shown in Figure 150.

Figure 150

```
03-16-2005
23:34:21
                                                    FPU:
                                  PCHA Database: D:\PCHA99\PCHA99Example.mdb

                                                Analysis Years:
================================================================================================
         Analysis Years OK: 1984-2003

                                                FMU Data Missing:
================================================================================================
         FMU Data OK.

                                                FMU GRID Files:
================================================================================================
         No problems locating GRID files.

                                                Weather Data:
================================================================================================
         No Weather errors found.

                                                Fuels/Topography Data:
================================================================================================
         Topo and Fuels data have been collected.

                                                Fire Data:
================================================================================================
                                           Total fire records during Analysis Years: 2462
                                        Fires with wrong Fire Type/Protection Type: 0
                                                        Fires outside any FMU: 9
                                              Counted fires during Analysis Years: 2453
                  Fires which cannot be included in probabilities due to no matching weather: 55
                                          Number of fires utilized for FPA probabilities: 2398
                              Approximate annual number of fires expected to be drawn for FPA: 120
```

Prepare Probability-Based Fire Event Scenario and XML File for FPA

A probability-based fire event scenario is a collection of fires that represents one year of fire occurrence within an FPU. The fires are randomly created and attributed using probability matrices created from the historic data for the FPU. To perform this activity, click **FPA > Prepare Probability-based Fire Event Scenario** (Figure 151). The dialog in Figure 152 will appear. Click **OK** to proceed.

Figure 151

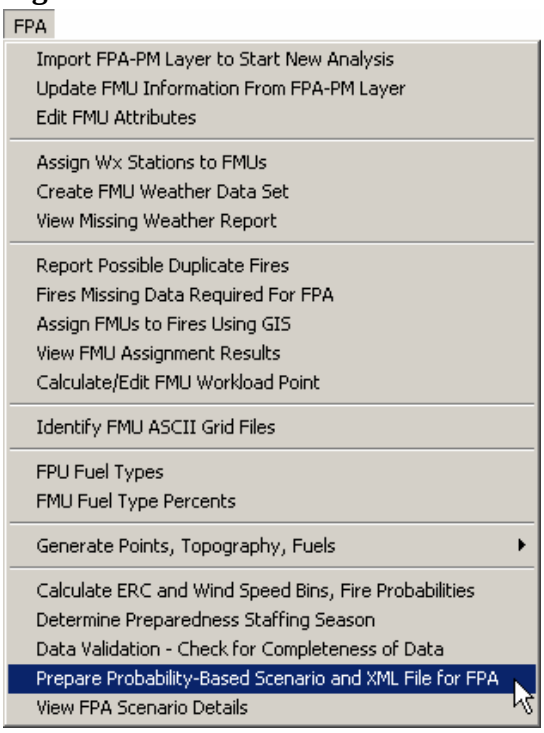
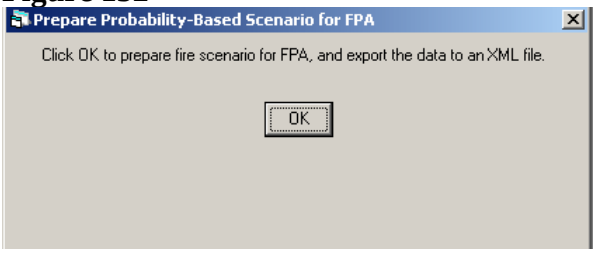
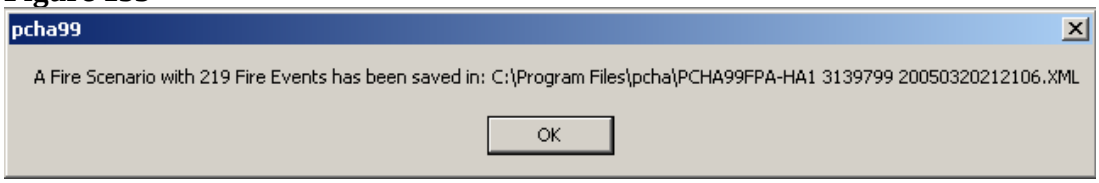


Figure 152



After **OK** is clicked in response to the prompt, PCHA will run for a while preparing the fire event scenario. When it is finished, it will automatically prepare the XML file (Figure 153). Click **OK** to complete the activity.

Figure 153



View FPA Scenario Details

The planner can now view a series of reports about the fire event scenario. The reports can be accessed using the FPA menu in PCHA. Select **FPA > View Scenario Details** and the dialog in Figure 155 will appear.

Figure 154

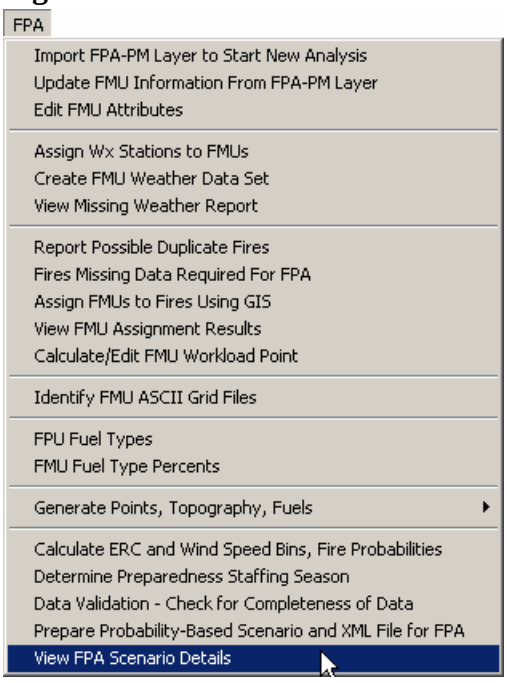
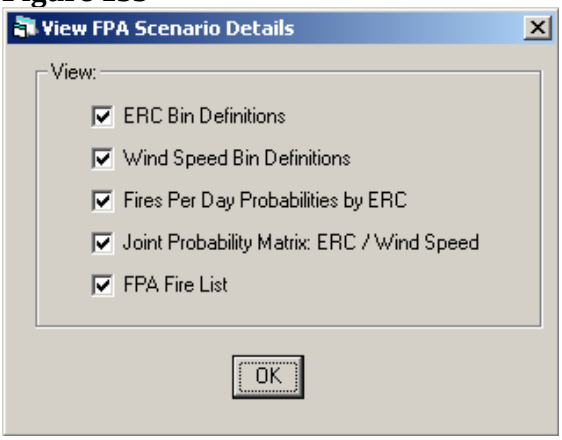


Figure 155

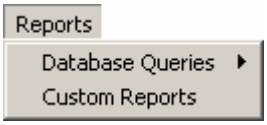


Select the reports that are desired for viewing.

The Reports Menu

PCHA can generate and print a variety of reports and graphs.

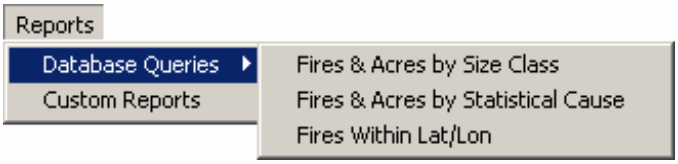
Figure 156 – The Reports Menu



Database Queries

Each of these reports allows the planner to enter the period of years of data to be included in the report. The planner can customize the title of a report (Figure 159).

Figure 157 – The Database Queries Menu



Database Queries Reports Available

Figure 150 shows the reports available under the **Reports > Database Queries** menu item. To create a report, select the menu item desired. Enter the beginning and ending years for the data period desired and click **OK**. Enter a title (Figure 159) and click **OK** to generate the report. To close the Report window, click on the **X** in the upper right corner of the display window.

Figure 158 – Database Queries Reports Available

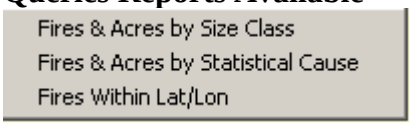
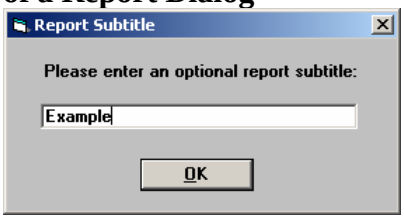


Figure 159 – Custom Naming of a Report Dialog



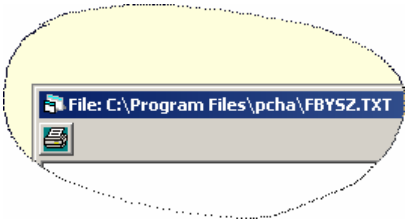
Printing a Report

When the report is displayed on the screen, click on the **Print** icon in the upper left corner to print the report.

Report Text Files

When PCHA creates a report, it saves that report as an ASCII text file in the folder where PCHA is installed. The path to the file and the file name appear at the top of the report display window (Figure 160). These report files can be viewed in any word processing program. Note that a Courier font must be used for this text. Assigning a proportional font to the text will cause the report to appear incorrectly.

Figure 160 – Location of Path and File Name



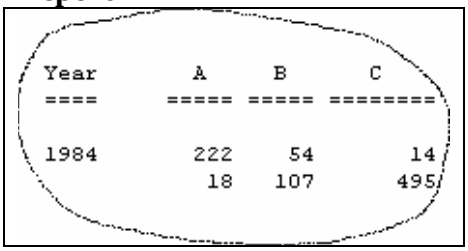
Description of Reports

A description of each report follows.

Fires and Acres by Size Class Report

PCHA will create a report named FBYSZ.TXT that lists the number of fires and acres burned by year and size class. The setup screen allows the planner to select any combination of fires by statistical cause. The top line of each pair shows the number of fires and the lower line shows acres burned (Figure 161). The setup screen allows the planner to select only lightning fires, only human caused fires, or any combination of fires by statistical cause.

Figure 161 – Example from the Fires and Acres by Size Class Report



Year	A	B	C
1984	222	54	14
	18	107	495

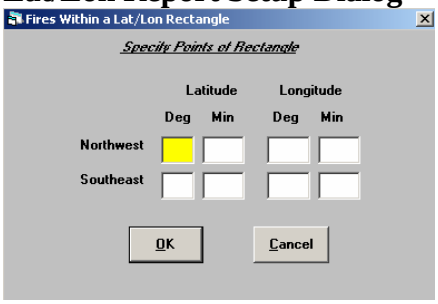
Fires and Acres by Statistical Cause Report

PCHA will create a report named FBYSTAT.TXT that shows the number of fires by statistical cause.

Fires Within Lat/Lon Report

PCHA will create a report named REPLL.TXT that lists fires within a rectangle defined by the planner. The planner will need to enter the latitude and longitude in degrees and minutes for the northwest and southeast corners (Figure 162). After entering the northwest and southeast coordinates, click **OK**. The report lists the boundaries entered as well as the discovery date, fire number, township, range, section, subsection, meridian, latitude, and longitude for each fire located within the rectangle defined.

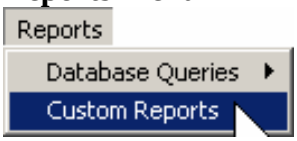
Figure 162 – The Fires Within Lat/Lon Report Setup Dialog



Custom Reports

With this menu, the user can generate custom queries of the database and display these queries as reports.

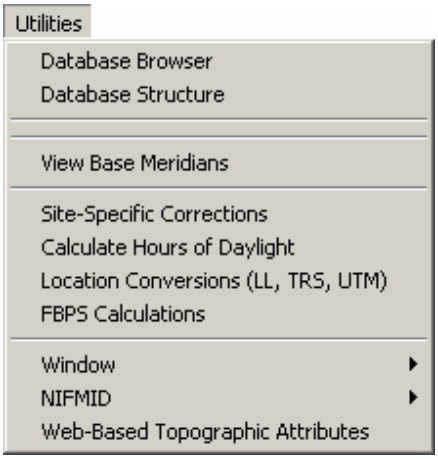
Figure 163 – The Custom Reports Menu



The Utilities Menu

The Utilities menu has many tools and aids to support work by the fire planner. The Utilities menu is shown in Figure 164.

Figure 164 – The Utilities Menu



Database Browser

This menu allows the planner to view the information in the data tables in the PCHA database. An example of the Database Browser menu screen is shown in Figure 165.

In the example in Figure 166, the Fire data table has been selected. To view any database table, click on the table name in the column on the left side of the screen. Click on the scroll bar along the bottom to move the viewing window right or left. To move up or down, use the scroll bar on the right side of the window. To exit the window, click **X** in the upper right corner of the window.

Figure 165 – The Database Browser Menu

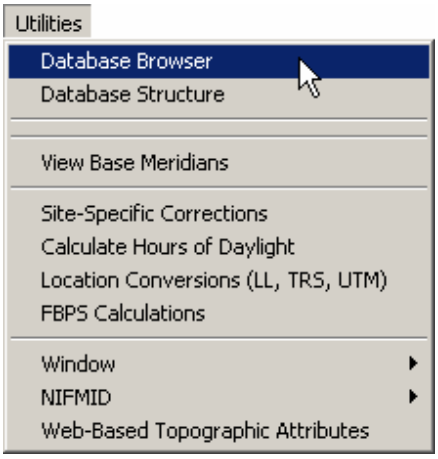
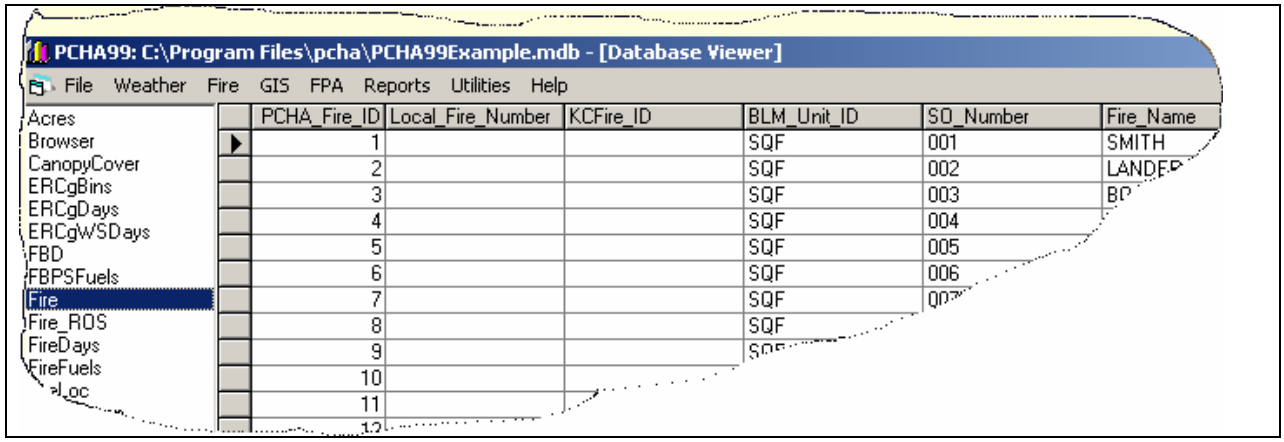


Figure 166 – Example of Database Browser Screen



This window allows the planner the opportunity to view but not change information contained in the data tables of the PCHA database. PCHA displays the internal representation of the data hence some of the entries may appear confusing. For example, township -3 means 3S. Values in the Herb_Annual field are 0 and –1, which are binary numerical representations for Yes and No.

Displays can be sorted by the value in a column. To do this, click on the column header. It will sort the complete set of records based on the values in the selected column. Clicking again will sort the records in reverse order. It is not possible to drag and drop columns in the display.

Database Structure

This menu allows the planner to view the structure of the PCHA database. Selecting this menu will result in a report. An excerpt of this report is shown in Figure 168. The report lists the tables in the database together with each field and the field data type. To move up or down, use the scroll bar on the right side of the window. To exit the window, click **X** in the upper right corner of the window. The report is saved in the folder where PCHA is installed with a file name of DBSTRUCT.REP.

Figure 167 – The Database Structure Menu

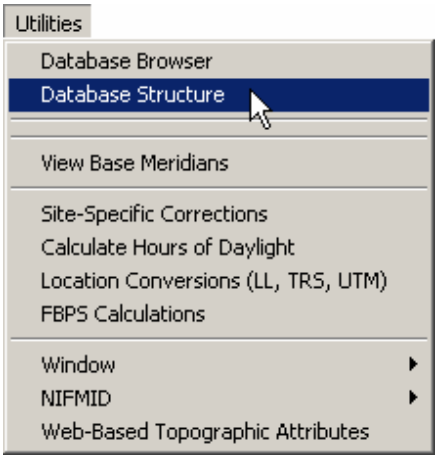
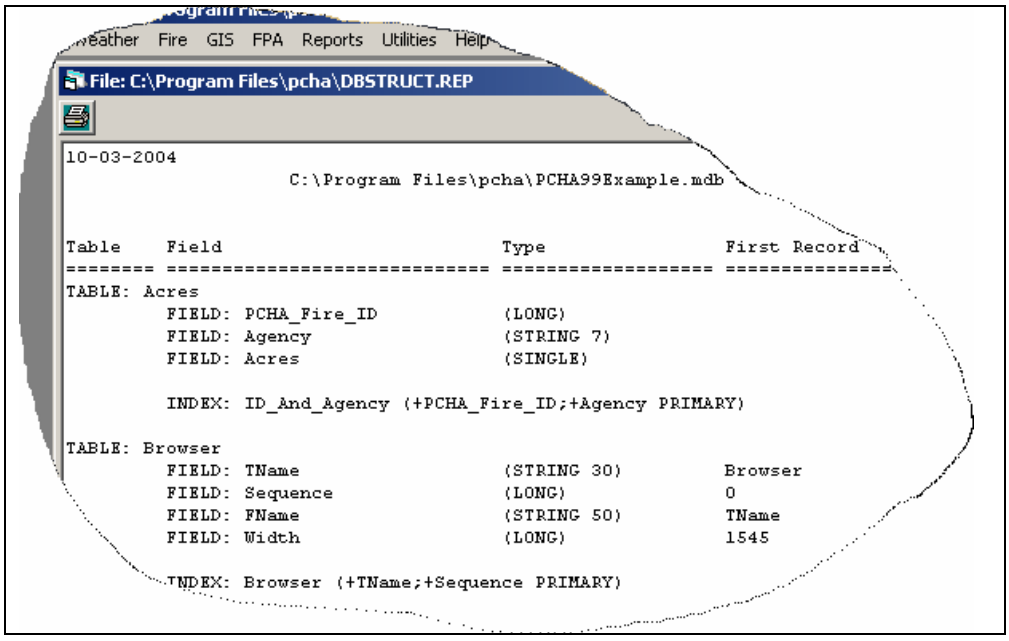


Figure 168 – Example of Database Structure Screen



View Base Meridians

This menu item allows the planner to view the codes for the principal meridian. Selecting this menu will yield a blank version of the dialog in Figure 170. Click **Search** to see the first principal meridian in the database. An explanation of each field and button follows.

Figure 169 – The View Base Meridians Menu

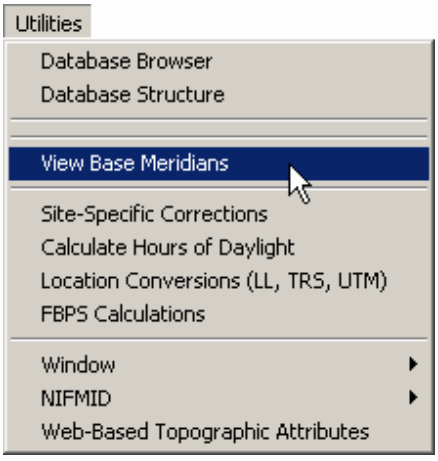
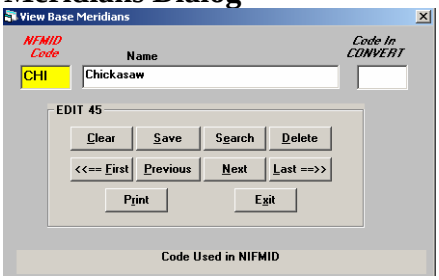


Figure 170 – The View Base Meridians Dialog



NIFMID Code

This is the alpha code used in NIFMID to identify the Principal Meridian. The Planner can search for records with this field. The principal meridian name will be displayed.

Code in CONVERT

The CONVERT program uses a different set of abbreviations to identify principal meridians. This field displays the code used in CONVERT.

Clear Button

The **Clear** button deletes entries in the screen boxes to facilitate the start of a new search.

Save Button

The **Save** button is academic as an edit cannot be saved. This is a view only screen.

Search Button

Press **Search** to find the first meridian record in the database. Once a record is displayed, the **First**, **Previous**, **Next**, and **Last** buttons can be used to move through the meridians.

Delete Button

The **Delete** button is academic, as an edit cannot be saved. This is a view only screen.

First, Previous, Next, and Last Buttons

The **First** button displays the first meridian record in the database. The **Previous** and **Next** buttons display the meridian record before or after the current meridian record. The **Last** button displays the last meridian record in the database. These buttons show light gray if there are no meridian records in the database.

Print Button

The **Print** button tells the computer to generate a page that looks like the meridian screen.

Exit Button

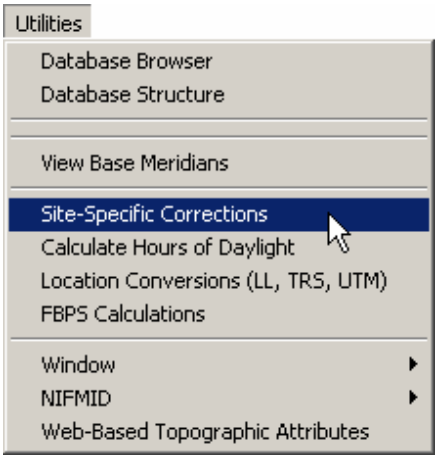
The **Exit** button closes the meridian entry screen and returns to the main PCHA screen.

Site-Specific Corrections

This function enables the planner to define various site-specific values that will display additions or subtractions to fuel moisture values. The calculations are developed to make changes to the 1-h timelag fuel moisture from weather observation site to a fire location site. The variables used include:

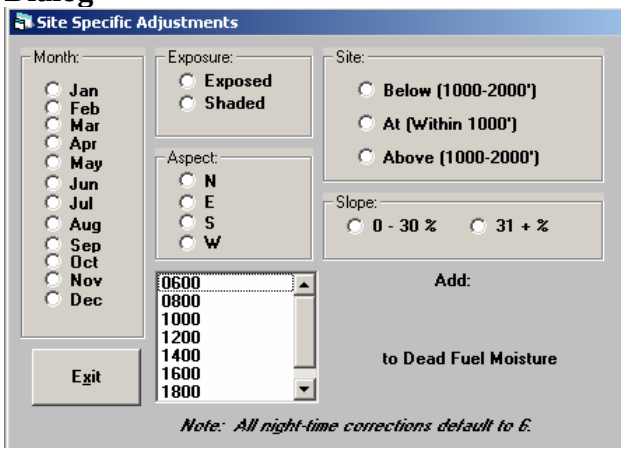
- The month of the year,
- The time of day
- The elevation difference between the weather observation site and the fire location site
- The aspect at the fire location site
- The shading at the fire location site
- The slope at the fire location site

Figure 171 – The Site-Specific Corrections Menu



This utility uses the same process used in PCHA to assign 1-h timelag fuel moisture to a historic fire during the calculation that assigns a rate of spread and flame length to a historic fire.

Figure 172 – The Site-Specific Corrections Dialog



Month

Click on the month. Note this sets the defaults to: Exposure defaults to Shaded, Site defaults to Below, Aspect defaults to North, Slope to 31+%, and Time to 0800. These defaults must be reset if other values are desired.

Shading

Choose unshaded for areas with 0-50% canopy cover/cloud cover and shaded for areas with a canopy cover/cloud cover of 51-100%.

Aspect

Choose one of the four cardinal directions.

Time

Only daylight hours are included, in two-hour bands, since the calculations show only the effects of solar radiation on the fuels.

Site
Click on the choice that represents the difference in elevation between the weather observation site and the fire location site. Note that if this difference is greater than 2000 feet, it is advised that a correction be made. A new weather observation site needs to be established that is within 2000 feet of elevation of the fire location site.

Slope
Choose one of the slope options.

Add to Dead Fuel Moisture
The red value shows the increase (or decrease) in 1-h timelag fuel moisture value from the weather station calculated 1-h timelag fuel moisture value.

Exit Button
The **Exit** button closes the site-specific corrections entry screen and returns the user to the PCHA main menu.

Calculate Hours of Daylight

This routine displays the number of daylight hours per day for a given latitude and date (Figure 174). Enter the latitude in degrees, the date (mm/dd or mm/dd/yyyy are both acceptable), and then **Calculate**. The hours and minutes of daylight will appear.

Figure 173 – The Calculate Hours of Daylight Menu

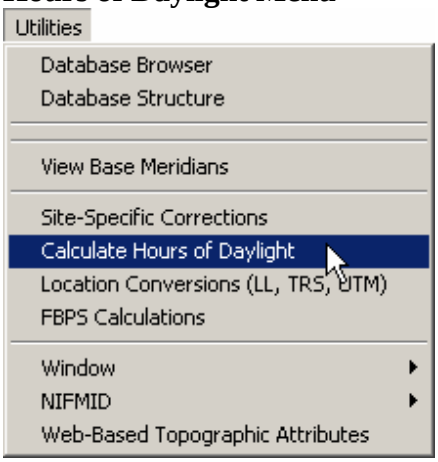
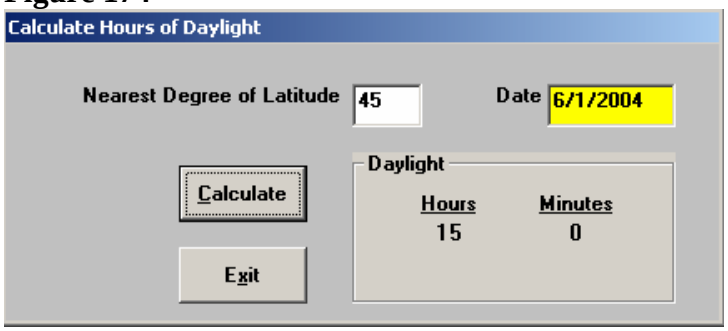


Figure 174



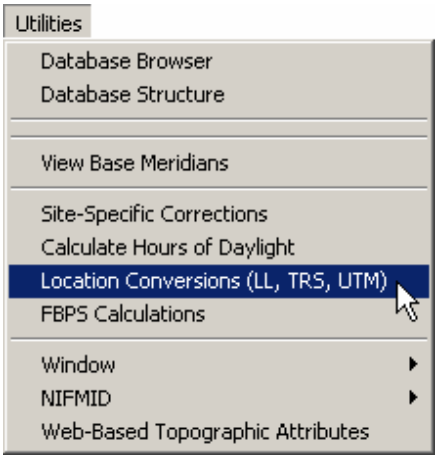
Location Conversion (LL, TRS, UTNM)

This utility converts any one of the following formats to the other three. The four formats are:

- Township, Range and Section (TRS)
- Latitude and Longitude in Decimal Format
- Latitude and Longitude in Degrees, Minutes and Seconds Format
- UTM

This standalone utility can be used by the planner for incidental conversions between the formats.

Figure 175 – The Location Conversion Menu



Step 1

Determine the location format that is to be converted.

Step 2

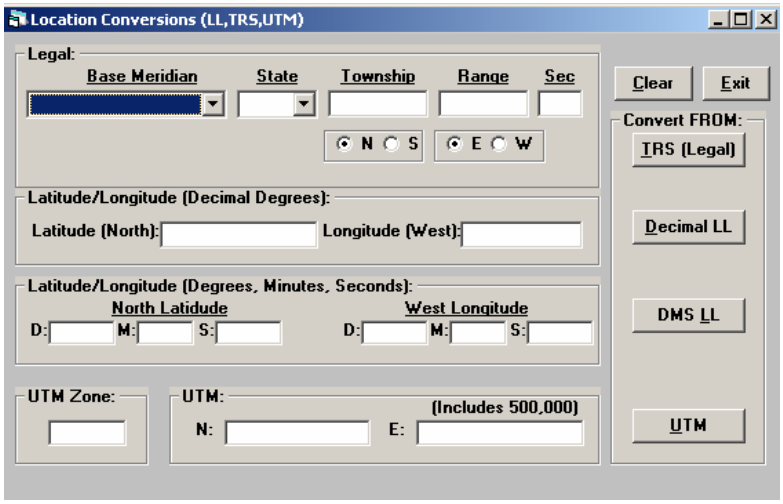
Enter the required information for the location to be converted in the appropriate area.

Step 3

Click on the appropriate button in the Convert FROM section.

The location value will appear in the other three formats.

Figure 176 – The Location Conversion Menu



Thus utility uses the same equations that are used in the **Fire > Calculate Lat/Lon From Lega**l menu function. This menu facilitates the conversion of Township, Range, and Section to Latitude and Longitude.

FBPS Calculations

This utility uses the same equations that calculate rate of spread and flame length for a fire event. It is provided so that a planner can test the expected fire behavior in a fuel type under a defined set of weather and topographic conditions. Selecting **Utilities > FBPS Calculations** will yield the dialog shown in Figure 178.

A description of the inputs and outputs follows. In parenthesis following each is the range of acceptable values.

Figure 177 – The FBPS Calculations Menu

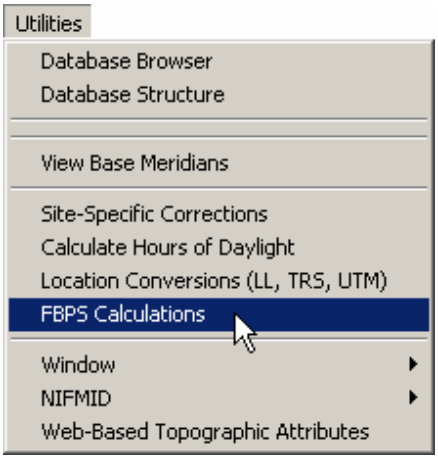
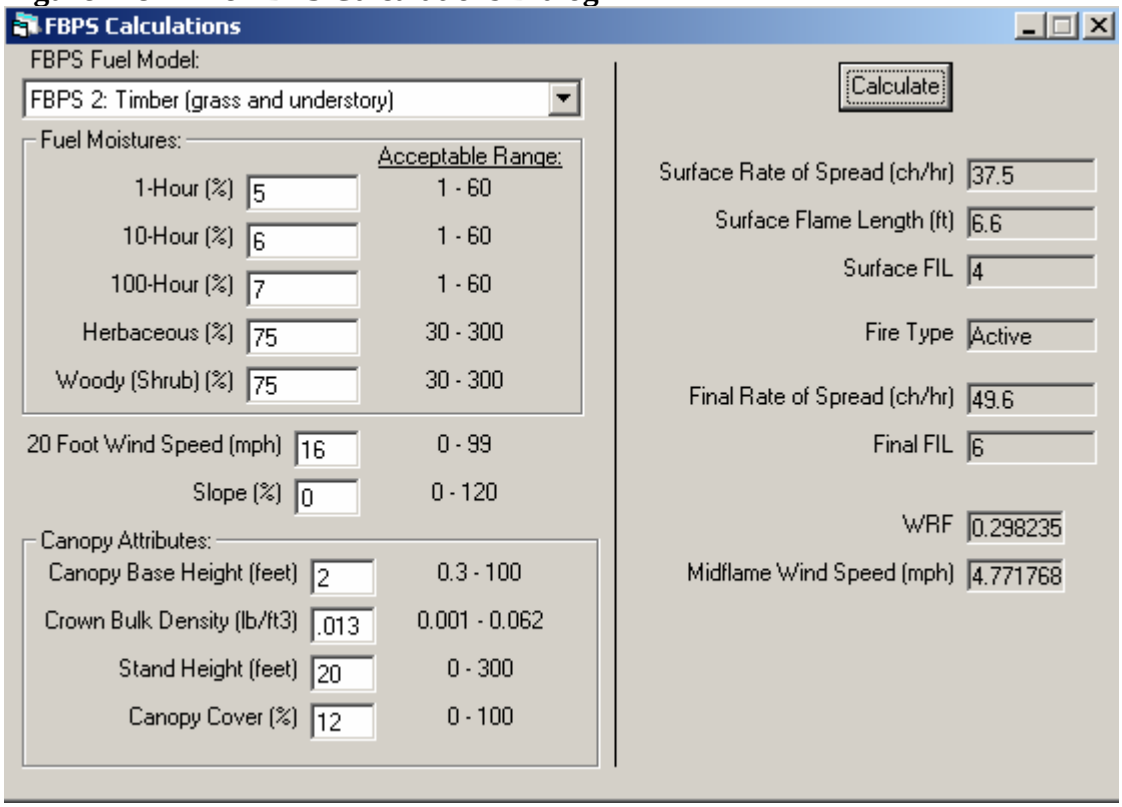


Figure 178 – The FBPS Calculations Dialog



FBPS Fuel Model (1-13)
Enter the number of the FBPS fuel model. Table 29 contains a list of these fuel models.

1-h Fuel Moisture (1-60%)
The 1-hour timelag reference fuel moisture can be estimated using the air temperature and the relative humidity.

10-h Fuel Moisture (1-60%)
It is suggested the 10-h fuel moisture be set as 1% more than the 1-h fuel moisture.

Table 29 – FBPS Fuel Models

Fuel Group	FBPS Fuel Model
Grass	1 - Short Grass (1 foot)
	2 - Timber (Grass and understory)
	3 - Tall Grass (2.5 feet)
Brush	4 – Chaparral
	5 – Brush
	6 - Dormant Brush
	7 - Southern Rough
Timber Litter	8 - Closed Timber Litter
	9 - Hardwood (pine long needle litter)
	10 - Timber
Slash	11 - Light Slash
	12 - Medium Slash
	13 - Heavy Slash

100-h Fuel Moisture (1-60%)
It is suggested the 100-h fuel moisture be set as 2% more than the 1-h fuel moisture.

Herb Fuel Moisture (30-300%)
Enter the moisture content of the grass and forb fuels.

Table 30 – Guidelines for Live Fuel Moisture

State of Vegetation Development	Moisture Content
Fresh foliage, annual developing, early in growing cycle	300%
Mature foliage, still maturing with full turgor	200%
Mature foliage, new growth complete and comparable to older perennial foliage	100%
Entering dormancy, coloration started, some leaves may have dropped from stem	50%
Cured	30%

Woody (Shrub) Fuel Moisture (30-300%)
Enter the moisture content of the shrub fuels. See Table 30 for estimates of this value.

Foliar Moisture Content (30-200%)
The foliar moisture content is the percent of moisture in the foliage, needles, and leaves. In PCHA, this value is held constant at 100% since there are no reliable methods to use current fuel and weather inputs to model change throughout the year.

20-ft. Wind Speed (0-99mph)

The wind speed is frequently taken at a National Fire Danger Rating System weather station. The National Fire Weathers Observers Handbook provides the standards for gathering weather at stations designated to provide data for the National Fire Danger Rating System (Deeming et. al, 1972). The wind speed measurement is taken at 20 feet above the vegetation and is measured based on a 10-minute average. The wind speed values used should be the average expected values for the projection period. Enter the 20-foot wind speed in the cell.

Canopy Base Height (1-299 feet)

For an individual tree, the measurement of the height to the base of the crown can be made. The average of these values for all trees in a stand gives an estimate of the stand canopy base height. Frequently, this is a measure of the point where the limbs of the canopy start vertically but the number can be skewed by the presence of small trees or occasional live limbs. A more meaningful value is the height above the ground of the first canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire.

Canopy Bulk Density (kg/m3)

Mathematically, canopy bulk density (CBD) (kg/m^3) is canopy biomass divided by the volume occupied by crown fuels. Canopy bulk density is hard to estimate in the field. Initially, it seems attractive to calculate this value by treating the canopy as a box with the depth the stand height minus the canopy base height. Assuming this box covered an acre (43,560 ft^2), dividing the fuel loading in the canopy by the volume of box would provide an estimate of average canopy bulk density. Unfortunately, this estimate has a bias toward underestimation of the canopy bulk density due to the averaging of largely void areas in the top and bottom of the canopy with the more dense layers of foliage. A fire burning vertically within the crowns will most likely propagate through denser canopy layers.

To determine CBH and CBD values that are reasonable for the FPU, consult with fire behavior specialists familiar with defining these values for use in the *FARSITE* program. Also consult the publication Stereo Photo Guide for Estimating Canopy Fuel Characteristics in Conifer Stands (Scott and Reinhardt 2005). A utility exists in PCHA (FPA>FBPS Calculations), which calculates resultant fire behavior using all three attributes of a fuel type, and five attributes of a topographic type.

Stand Height (5-300 feet)

For an individual tree, the measurement of the tree height made. The average of these values for all trees in a stand gives an estimate of the stand height.

Canopy Cover Percentage (0-100%)

Canopy cover is normally measured as a percent. It is based on the linear length of canopy versus the length of open space. Canopy cover values are defined via the categories shown in Table 31.

Table 31 – Definition of Canopy Cover Categories

Category	Range	Used in Calculations
0	0%	0%
1	1 – 20%	10%
2	21–50%	35%
3	51-80%	65%
4	81-100%	90%

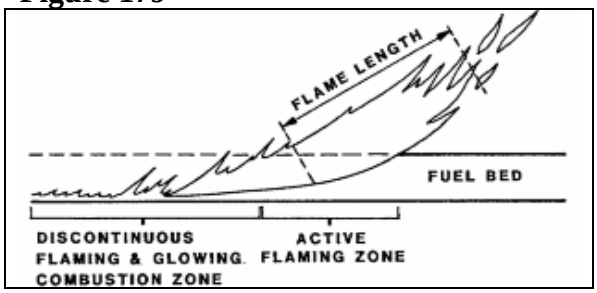
Slope (0-100%)
The slope steepness is expressed in percent and equal to the number of feet of elevation change per 100 feet of horizontal distance. The value is the steepness of the slope "straight uphill."

Midflame Wind Speed
The midflame wind speed is the wind speed that exists at midflame height above the fuel bed. Midflame is often called eye-level. Technically, midflame wind speed is the average wind speed measured from the top of the fuel bed to the height of the flame above the fuel (Albini and Baughman 1979).

Surface Rate of Spread (ch/hr)
Rate of spread is the "speed" the fire travels through the surface fuels. The rate of spread is the spread rate of the head fire spreading uphill with the wind blowing straight uphill. The rate of spread prediction uses the Rothermel (1972) surface fire spread model, which assumes the weather, topography and fuels remain uniform for the elapsed time of the projection.

Surface Flame Length (feet)
This is the length of the flame in a spreading surface fire within the flaming front. Flame length is measured from midway in the combustion zone to the average tip of the flames. "Flame length is an elusive parameter that exists in the eye of the beholder. It is a poor quantity to use in a scientific or engineering sense, but it is so readily apparent to fireline personnel and so readily conveys a sense of fire intensity that it is worth featuring as a primary fire variable." (Rothermel 1991)

Figure 179



Fire Type
There as three types of fires predicted:

- Surface Fire
- Passive Crown Fire
- Active Crown Fire

Surface Fire
A surface fire is one that burns only in the surface fuelbed.

Passive Crown Fire
A passive crown fire is traditionally called "torching." It is small scale, consuming single or small groups of trees or bushes. This stage of a crown fire reinforces the spread of the fire, but the main fire spread is still dependent upon surface fire behavior.

Active Crown Fire
An active crown fire is associated with a "pulsing" spread. The surface fire ignites crowns and the fire spread is able to propagate through the canopy. After a distance, the crown fire weakens

due to a lack of reinforcing surface fire heat. When the surface fire catches up to where the crown fire died, the surface fire intensity again initiates a crown fire "pulse."

Final (Resultant) Rate of Spread
This is the final calculated fire spread rate. If the fire type is passive then the estimated fire spread rate is the same as the surface fire behavior rate of spread. If the fire type is active, this value is calculated as the crown rate of spread (Rothermel 1991). If the fire type is passive, this value is scaled between the surface fire spread rate when passive crown starts and the maximum crown rate of spread based on the crown fraction burned (Scott and Reinhart 2000).

Final (Resultant) Flame Length (feet)
This is the length of the flame based fire intensity. This intensity is calculated based on the fuel consumption in the surface and aerial (canopy) fuels. The resultant flame length for a surface fire type is the same as surface flame length. For a passive or active crown fire, the resultant flame length will be longer due to the consumption of canopy fuels in addition to the surface fuels.

Final (Resultant) Fire Intensity Level
For FPA, the Fire Intensity Level (FIL) is defined using the flame length. Table 32 lists the correlations between FIL and flame length. In FPA, fire effects are defined by FIL.

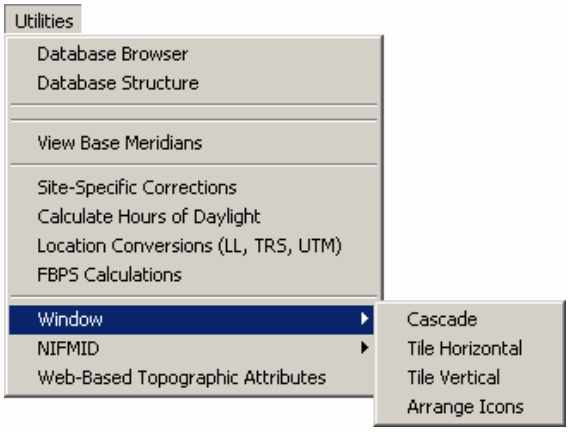
Table 32

Fire Intensity Level	Flame Length
1	0 – 2.0 feet
2	2.1 – 4.0 feet
3	4.1 – 6.0 feet
4	6.1 – 8.0 feet
5	8.1 – 12.0 feet
6	12.1+ feet

Window

In PCHA, the user may have multiple windows open at the same time. These commands allow the user to rearrange these windows. The choices include tiling or cascading the windows as well as aligning the icons of minimized windows.

Figure 180 – The Window Menu



Cascade
This option tells PCHA to stack multiple windows one atop one another if it is beneficial to have more than one window open at a time.

Tile Horizontal
With the horizontal tile option, PCHA attempts to place windows side by side. This can be useful as it allows the user to see information from different screens at the same time. The windows tend to be tall and skinny.

Tile Vertical
Tile vertical puts multiple windows one above another. The windows are short and wide. This option works for some windows, but is impossible to read for others.

Arrange Icons

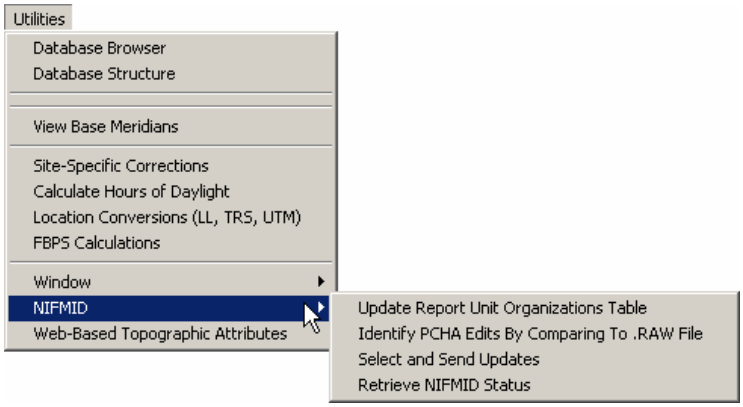
If the user has multiple windows open but minimized, the icons for each minimized window are arranged along the bottom of the screen.

NIFMID

February, 2004 enhancements to PCHA now allow Forest Service users to submit updated fire records directly to NIFMID. See the section under Utilities below.

Forest Service users of PCHA can submit updates to existing fires and manually-entered fires (prior to 1980) to the NIFMID database using the features on the NIFMID Utilities menu. This section is only applicable to Forest Service use of PCHA.

Figure 181 – The Window Menu



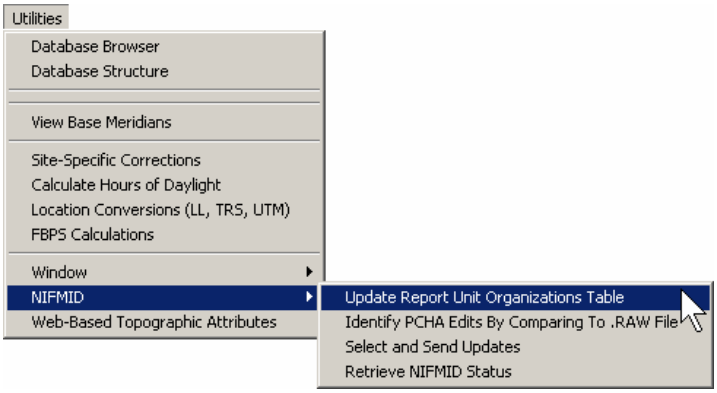
Prior to using any of the following items on the NIFMID menu, users must have Oracle drivers installed, and must establish an entry in their tnsnames.ora file. It is beyond the scope of this User Guide to describe how those steps are accomplished – check with your systems support staff.

Update Organizations Table

Fires which have been manually added into PCHA must have the correct Administrative Unit attached to them before they can be inserted into the NIFMID database.

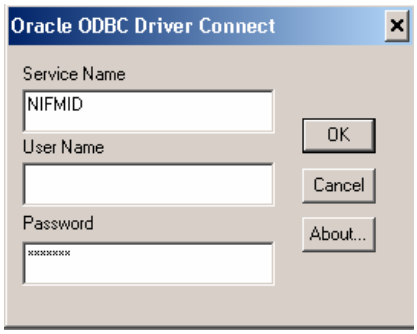
This menu item downloads to your PCHA database a list of all Forest Service Administrative Units and their applicable start and end dates. You will need to complete this step prior to assigning Admin Units to your manual fires.

Figure 181 – The Window Menu



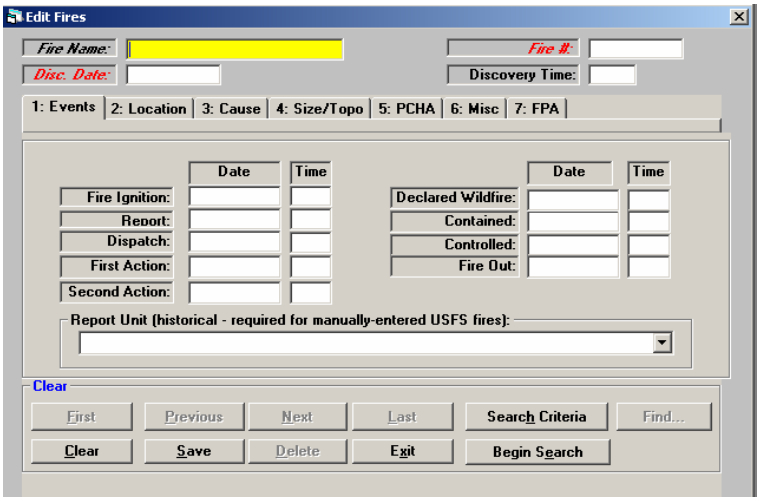
After selecting this menu item, if PCHA cannot login to the NIFMID Oracle database, it will prompt you to provide the information in Figure 182. Contact your systems support staff if you are unsure of what information to enter:

Figure 182



Once you have downloaded the Administrative Units, you may then assign an Administrative Unit to each manually-entered fire. Figure 182 contains the ***Events*** Tab displayed when the **Fires > Edit Fires** menu is selected.

Figure 183 – The Window Menu



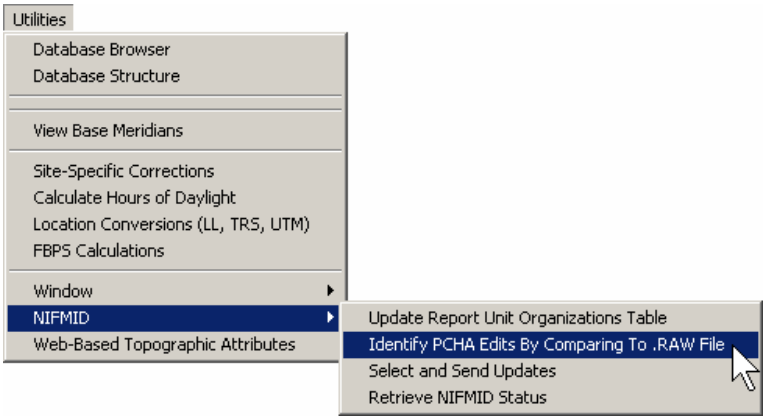
For all manually entered Forest Service fires discovered prior to January 1, 1980, select the appropriate Administrative Unit for the time the date was discovered.

Make sure you enter the Discovery Date prior to selecting the Admin Unit, since Admin Units change from year to year.

Identify PCHA Edits By Comparing To .Raw File

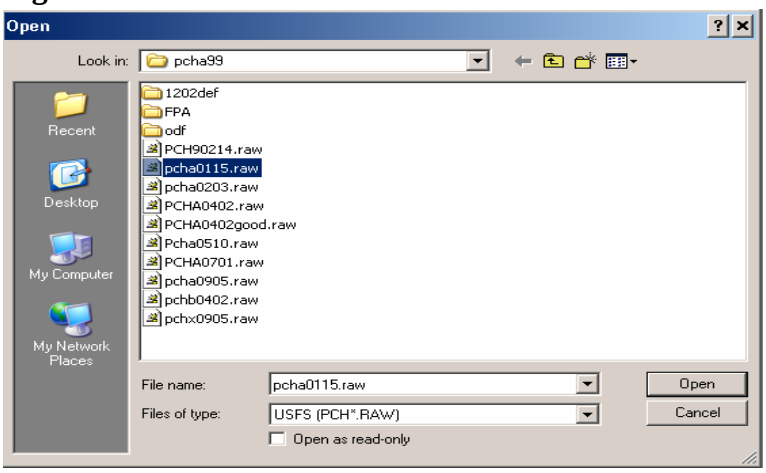
In order to determine which fires have either been manually entered into PCHA (and were discovered prior to 1980) or have been edited since downloading from NIFMID, PCHA compares fires in your database to fires in the "PCHA Format" .raw file exported from NIFMID. You should prepare a .raw file immediately before submitting your updates to NIFMID, so that the latest NIFMID information is used for the comparison.

Figure 184 – The Window Menu



PCHA will ask you to select the appropriate .raw file, and click **Open**. Once you click **Open**, PCHA will complete the comparison in order to identify new or updated fire records. When completed, PCHA will automatically display the screen in Figure 187.

Figure 185

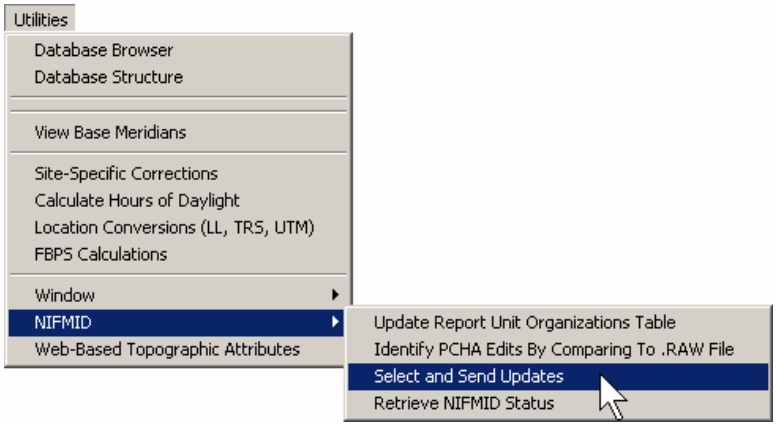


Select and Send Updates

This program displays three lists in one window, identifying your:

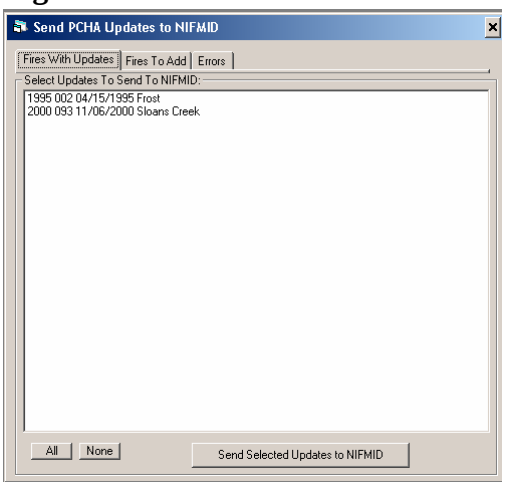
- Fires With Updates
- Fires To Add, and
- Errors

Figure 186



The ***Fires With Updates*** Tab (Figure 187) displays a list showing all fires which have been changed in PCHA. Select those fires you wish to send to NIFMID, or use the **All** button to select them all. Then hit the **Send Selected Updates to NIFMID** button. Doing so sends the updates across the Internet to NIFMID, and automatically takes you to the next menu item: **FPA > Utilities > NFMID > Retrieve NIFMID Status** (Figure 188).

Figure 187



Retrieve NIFMID Status

This program logs in to NIFMID and awaits results of your attempts to send fire updates and additions. Initially, you will see that it is waiting in a screen similar to the screen in Figure 189.

Figure 188

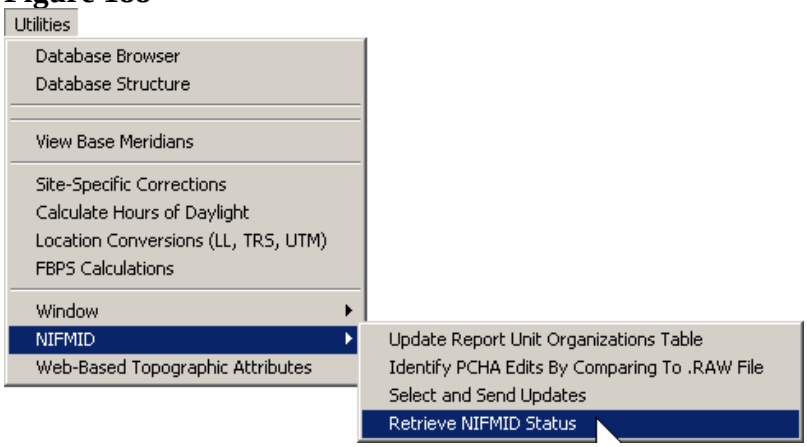
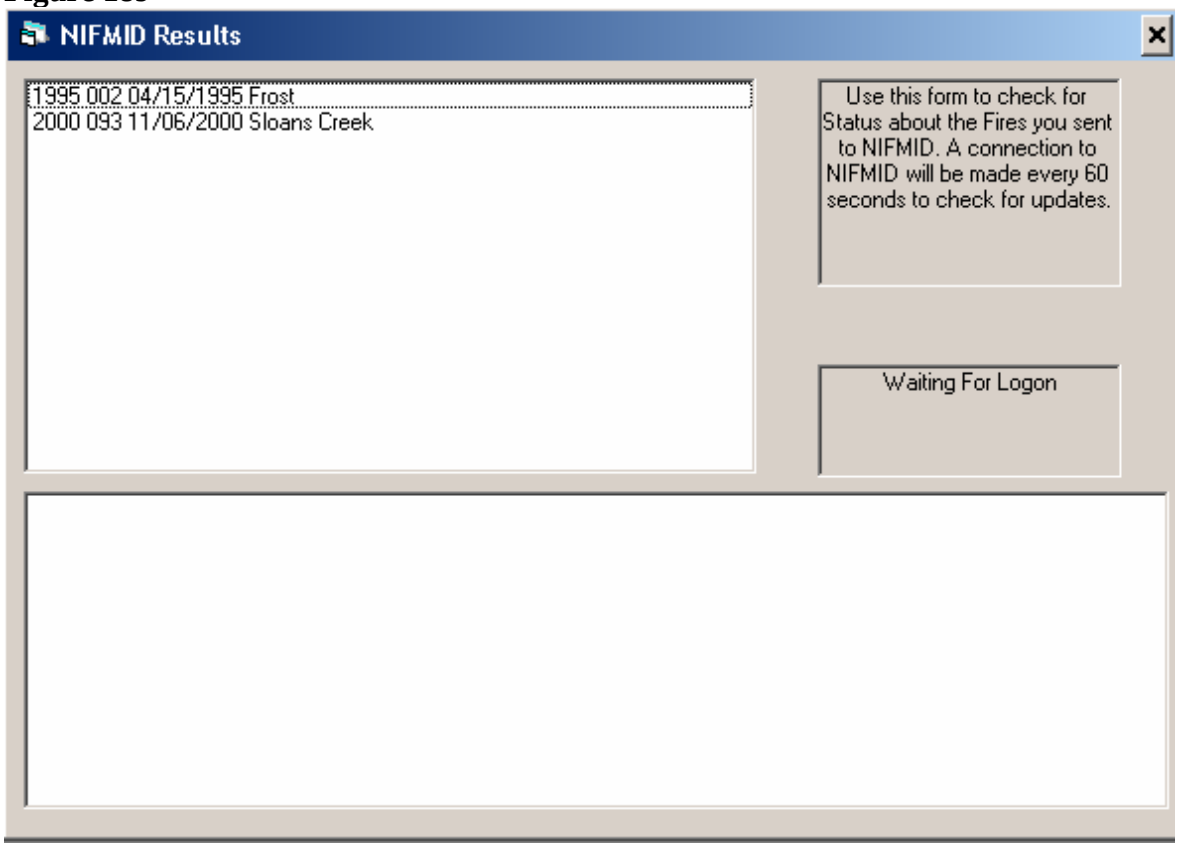
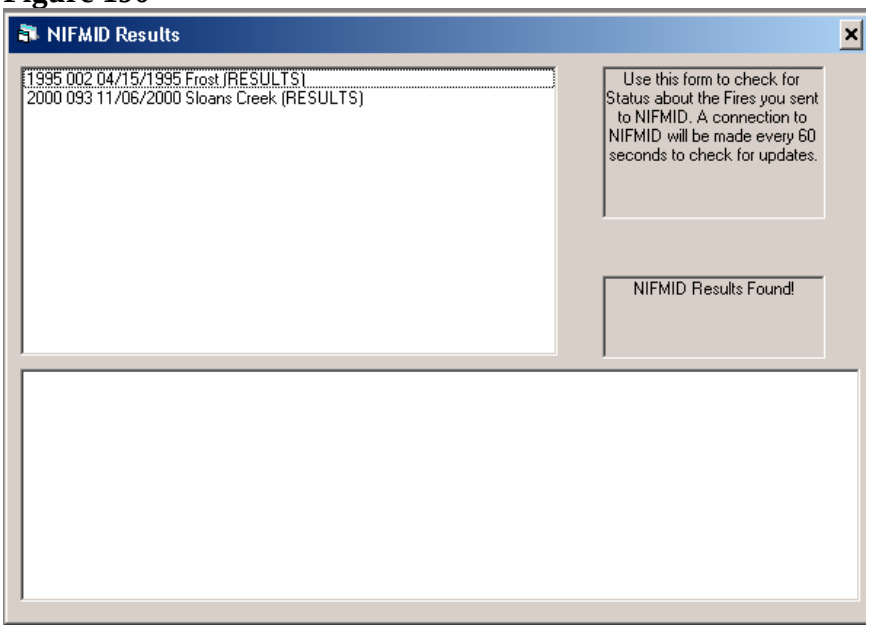


Figure 189



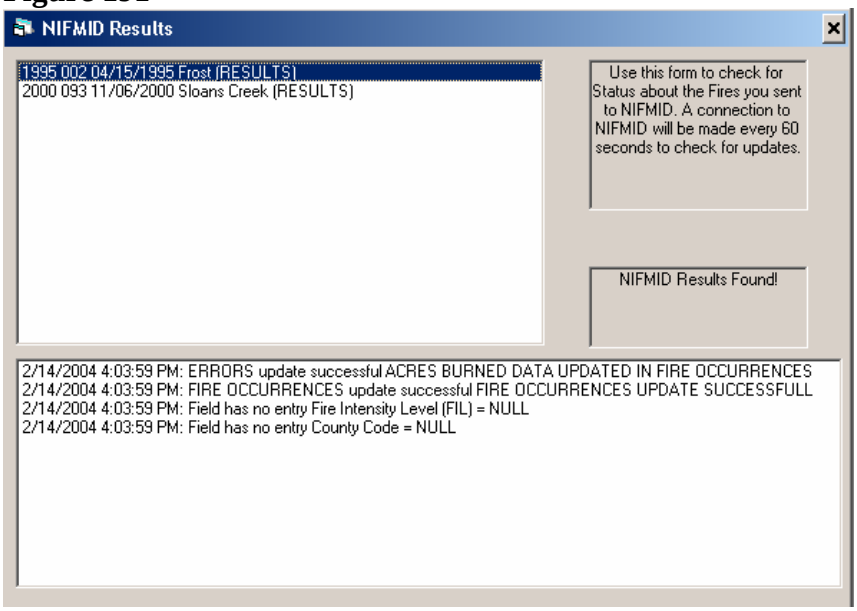
After successful logon, PCHA will inform you of any of your fires which have been processed by NIFMID and have results available (Figure 190).

Figure 190



Click on one of the fires showing Results and you will see feedback from NIFMID (Figure 191). In the case of the Frost Fire, updates were successful, but NIFMID also informed us that there was no FIL and no County.

Figure 191



NIFMID Update Summary

The steps Forest Service units can follow to update the NIFMID database are:

1. Install Oracle drivers (contact system support)
2. Update tnsnames.ora (contact system support)
3. Update Organizations Table (Utilities-NIFMID menu)
4. Assign Admin Unit to any pre-1980 manual fires (Fires-Edit Fires menu)
5. Identify PCHA Edits by Comparing to .RAW file (Utilities-NIFMID menu)
6. Select and Send Updates (automatically taken there from step 5, or use Utilities-NIFMID menu)
7. Fix errors or omissions listed on the Errors tab.
8. Retrieve NIFMID Status (automatically taken there from step 6, or use Utilities-NIFMID menu)
9. Repeat steps 6-8 if needed in order to send New Fires.

Web-Based Topographic Attributes

This standalone utility allows for termination topographic values for landscape point defined using latitude and longitude. (Figure 193)

Figure 192 – The Help Menu

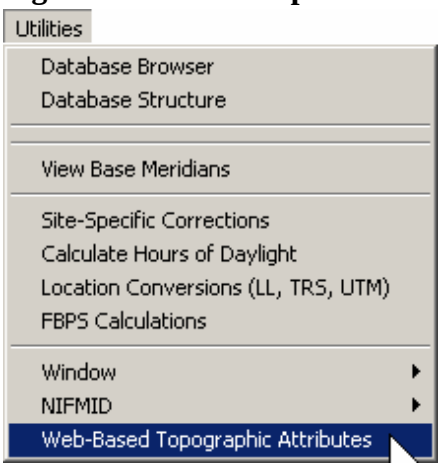
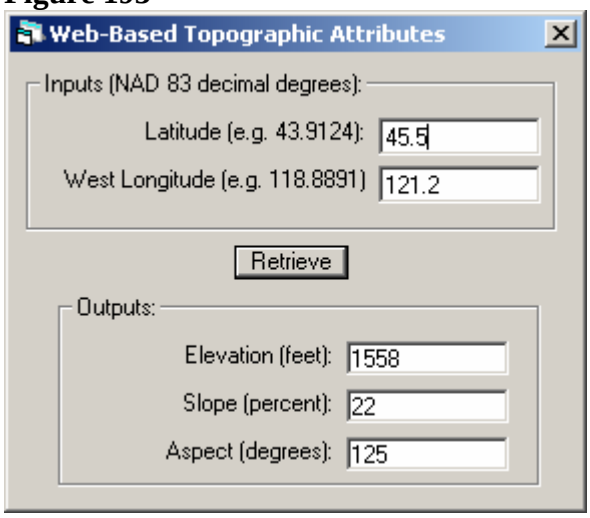


Figure 193



The Help Menu

Contents
Clicking on this menu will result in the online help system being displayed.

About
This screen displays the version and release date of the software.

Figure 194 – The Help Menu

References

Albini, Frank A. 1976. Computer-based models of wildland fire behavior: a user's manual. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 68 p.

Albini, Frank A. 1976. Estimating wildfire behavior and effects. General Technical Report INT-30. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 92 p.

Albini, Frank A.; Baughman, Robert G. 1979. Estimating windspeeds for predicting wildland fire behavior. USDA For. Ser. Res. Paper INT-221.12 p.

Alexander, M. E. 1988. Help with making crown fire hazard assessments. In: Protecting people and homes from wildfire in the Interior West: Proceedings of the Symposium and Workshop. USDA For. Serv. Gen. Tech. Rep. INT-251, pages 147-153.

Anderson, Hal E. 1982. Aids to determining fuel models for estimating fire behavior. USDA For. Serv. Gen. Tech. Rep. INT-122, 20 p.
Anderson 1982

Bradshaw, Larry S.; Deeming, John E.; Burgan, Robert E.; Cohen, Jack D., compilers. 1984. The 1978 national fire-danger rating system: technical documentation. General Technical Report INT-169. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 44 p.

Burgan, Robert E. 1988. Revisions to the 1978 national fire-danger rating system. Research Paper SE-273. Asheville, North Carolina: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 39 p.

Byram, G. M. 1959. Combustion of forest fuels. In Forest fire control and use, p. 82. Kenneth P. Davis, ed. McGraw-Hill Book Co., New York.

Deeming, John E., Burgan, Robert E., and Cohen, Jack D. 1977. The national fire-danger rating system-1978. General Technical Report INT-39. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 63 p.

Finney, Mark A. 1998. *FARSITE*: Fire Area Simulator -- model development and evaluation. USDA Forest Service, Research Paper RMRS-4, Rocky Mountain Research Station, Ft. Collins, CO. 45p.

Furman, R. William; and Brink, Glen E. 1975. The national fire weather data library: what it is and how to use it. General Technical Report RM-19. Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest Experiment Station. 8 p.

Keane, Robert E., Janice L. Garner, Kirsten M. Schmidt, Donald G. Long, James P. Menakis and Mark A Finney. 1998. Development og Input Data Layers fort he FARSITE Fire Growth Model for the Selway-Bitterroot Wilderness Complex, USA. USDA For. Serv. Gen. Tech. Rep.RMRS-GTR-3. 66 p.

Main, William A.; Paananen, Donna M., and Burgan, Robert E. 1990. FIREFAMILY 1988. General Technical Report NC-138. St. Paul, Minnesota: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 31 p.

Rothermel, Richard C. 1972. A mathematical model for predicting fire spread in wildland fuels. Research Paper INT-115. Ogden Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experimental Station. 40 p.

Rothermel, Richard C. 1991. Predicting behavior and size of crown fires in the northern Ricky Mountains. USDA For. Serv. Res. Pap. RP-INT-438, 46 p.

Scott, Joe H. and Elizabeth D. Reinhart 2000. Assessing Crown Fire Potential by Linking Models of Surface and Crown Fire Behavior. USDA For. Serv. Res. Pap. RMRS-RP-29, 59 p.

Scott, Joe H. and Elizabeth D. Reinhart 2005. Stereo Photo Guide for Estimating Canopy Fuel Characteristics in Conifer Stands. USDA For. Serv. Gen. Tech. Rep. RMRS-GTR-145, 49 p.

Yancik. Richard F.; and Roussopoulos, Peter J. 1982. User's guide to the national fire occurrence data library. Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 25 p.

US Forest Service, 1995. KCFAST user's guide. Boise, Idaho: U.S. Department of Agriculture, Forest Service, Fire and Aviation Management Staff. 156 p.

US Forest Service, 1995. Weather information management system (WIMS) user's guide. Boise, Idaho: U. S. Department of Agriculture, Forest Service, Fire and Aviation Management Staff. 80+ p.

Van Wagner, C. E. 1977. Conditions for the start and spread of crown fire. Canadian Journal of Forest Research 7:23-34.

Van Wagner, C. E. 1993. Prediction of crown fire behavior in two stands of jack pine. Canadian Journal of Forest Research 23:442-449

Appendix A

Forest Service PCHA Report Format

Forest Service PCHA Report Format

File names look like (PCHArrff.RAW) where rrff are the FS region and forest identified on the Planning Unit Setup screen. The file extension must be RAW.

Table 33

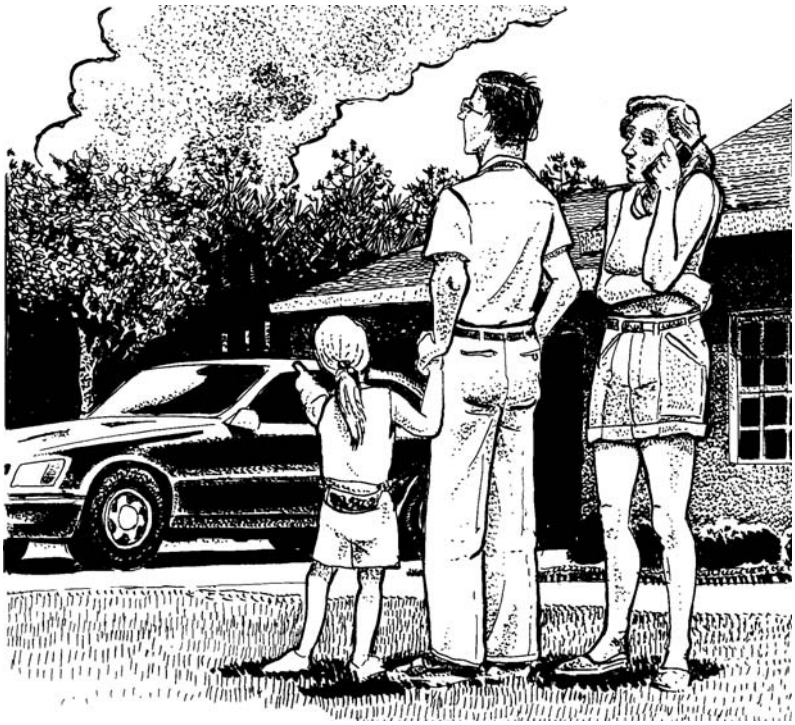
Item No.	Field Name	Field Width	Example
1	Reporting FS Region	1-2	5
2	Reporting FS Unit	3-4	16
3	Fire Number	5-7	23
4	District	8-9	52
5	Statistical Cause	10	1
6	General Cause	11	0
7	Specific Cause	12-13	1
8	Class of People	14	0
9	Fire Size Class	15	B
10	Total Acres Burned	16-24	0.3
11	FS Area Burned	25-33	0.2
12	Non-FS, FS Prot Acres Burned	34-42	0.1
13	Non-FS Acres Burned	43-51	0
14	Vegetation Cover Type	52-53	
15	NFMAS Aspect	54	
16	Topography Code	55	
17	Fire Management Zone (60 usually blank)	56-60	
18	Weather Station	61-66	41523
19	NFDRS Fuel Model	67	G
20	Fire Intensity Level (FIL)	68	2
21	Fire Intensity Source	69-70	FR
22	Latitude (DDMMSS)	71-76	360200
23	Longitude (DDMMSS)	77-83	1190612
24	Township	84-88	
25	Range	89-93	
26	Section	94-95	
27	Subsection	96-99	
28	Principal Meridian	100-101	
29	Slope Percent	102-104	
30	Aspect Code	105	

Table 33

Item No.	Field Name	Field Width	Example
31	Elevation	106-110	
32	State	111-112	CA
33	County	113-115	
34	Protection Agency	116-118	
35	Ownership at Origin	119	
36	Prescribed Fire	120	Y/N
37	Escaped Fire	121	Y/N
38	Initial Suppression Strategy	122	
39	Fire Cost in Dollars	123-131	
40	Ignition Date	132-139	
41	Ignition Time	140-143	
42	Discovery Date	144-151	19900714
43	Discovery Time	152-155	
44	First Action Date	156-163	
45	First Action Time	164-167	
46	Second Action Date	168-175	
47	Second Action Time	176-179	
48	Declared Wildfire Date	180-187	
49	Declared Wildfire Time	188-191	
50	Fire Contained Date	192-199	
51	Fire Contained Time	200-203	
52	Fire Controlled Date	204-211	
53	Fire Controlled Time	212-215	
54	Fire Out Date	216-223	
55	Fire Out Time	224-227	
56	Fire Name	228-247	Lost Loop
57	Fire ID	248-254	
58	Fire Account (PCode)	255-259	
59	Wilderness	260-262	

Appendix B

Department of Interior DI-1202 Format



File names on the FAMWEB site look like flnfmas2!rrff!1950!2002.raw. where rrff are the FS region and forest identified on the Planning Unit Setup screen. The file extension must be RAW.

Table 34 – DI-1202 Fire Record Format

Item No.	Item	Width	Start Col.	Stop Col.	Number of Decimals	Type
1	UNIT ID	8	1	8		CHARACTER
2	CALENDAR YEAR	4	10	13		NUMERIC
3	FIRE NUMBER	4	15	18		CHARACTER
4	FIRE TYPE	2	20	21		NUMERIC
5	GENERAL CAUSE	1	23	23		NUMERIC
6	SPECIFIC CAUSE	2	25	26		NUMERIC
7	PEOPLE	1	28	28		CHARACTER
8	NET CHANGE	8	30	37		CHARACTER
9	FIRE NAME	10	39	48		CHARACTER
10	AREA NAME	4	50	53		CHARACTER
11	LATITUDE	6	55	60		NUMERIC
12	LONGITUDE	7	62	68		NUMERIC
13	COST CODE	1	70	70		NUMERIC
14	OWNER	1	72	72		NUMERIC
15	FISCAL YEAR	2	74	75		NUMERIC
16	AGENCY FISCAL DATA 1	11	77	87		NUMERIC
17	AGENCY FISCAL DATA 2	11	89	99		NUMERIC
18	PROBLEM CLASS	1	101	101		CHARACTER
19	TOWNSHIP	4	103	106		CHARACTER
20	RANGE	4	108	111		CHARACTER
21	SECTION	2	113	114		CHARACTER
22	MERIDIAN	2	116	117		CHARACTER
23	UTM ZONE	2	119	120		CHARACTER
24	UTM EASTERN	6	122	127	2	NUMERIC
25	UTM NORTHERN	7	129	135	2	NUMERIC
26	DATE DISCOVERED	6	137	142		NUMERIC
27	TIME DISCOVERED	4	144	147		NUMERIC
28	TYPE DISCOVERED	1	149	149		CHARACTER
29	ACRES DISCOVERED	7	151	157	1	NUMERIC
30	DATE INIT ATTACK	6	159	164		NUMERIC
31	TIME INIT ATTACK	4	166	169		NUMERIC
32	TYPE INIT ATTACK 1	1	171	171		CHARACTER
33	TYPE INIT ATTACK 2	1	173	173		CHARACTER
34	TYPE INIT ATTACK 3	1	175	175		CHARACTER
35	TYPE INIT ATTACK 4	1	177	177		CHARACTER

Table 34 – DI-1202 Fire Record Format

Item No.	Item	Width	Start Col.	Stop Col.	Number of Decimals	Type
36	TYPE INIT ATTACK 5	1	179	179		CHARACTER
37	AMOUNT INIT ATTACK 1	2	181	182		NUMERIC
38	AMOUNT INIT ATTACK 2	2	184	185		NUMERIC
39	AMOUNT INIT ATTACK 3	2	187	188		NUMERIC
40	AMOUNT INIT ATTACK 4	2	190	191		NUMERIC
41	AMOUNT INIT ATTACK 5	2	193	194		NUMERIC
42	ACRES INIT ATTACK	7	196	202	1	NUMERIC
43	DATE CONTROLLED	6	204	209		NUMERIC
44	TIME CONTROLLED	4	211	214		NUMERIC
45	ACRES CONTROLLED	7	216	222	1	NUMERIC
46	DATE DECLARED OUT	6	224	229		NUMERIC
47	TOPOGRAPHY	1	231	231		NUMERIC
48	ASPECT	1	233	233		CHARACTER
49	SLOPE	1	235	235		NUMERIC
50	ELEVATION	1	237	237		CHARACTER
51	NFDRS STATION	6	239	244		NUMERIC
52	NFDRS FUEL STATION	4	246	249		CHARACTER
53	BEHAVIOR	1	251	251		NUMERIC
54	BURN INDEX	3	253	255		NUMERIC
55	ADJ CLASS	1	257	257		NUMERIC
56	RVC	1	259	259		CHARACTER
57	FORM OF HEAT	2	261	262		CHARACTER
58	CERTAINTY	1	264	264		NUMERIC
59	EQUIPMENT INVOLVED	3	266	268		NUMERIC
60	MATERIAL INVOLVED	2	270	271		CHARACTER
61	IGNITION FACTOR	2	273	274		CHARACTER
62	CLASS PEOPLE	1	276	276		CHARACTER
63	AGE	1	278	278		CHARACTER
64	SEX	1	280	280		CHARACTER
65	ACTIVITY INVOLVED	2	282	283		CHARACTER
66	ESTIMATED DAMAGE	7	285	291		NUMERIC
67	STATE	2	293	294		CHARACTER
68	LAND OWNER	1	296	296		NUMERIC
69	REF FIRE NBR	4	298	301		CHARACTER
70	VEG. TYPE	1	303	303		NUMERIC
71	ACRES	7	305	311	1	NUMERIC
72	STATE	2	313	314		CHARACTER

Table 34 – DI-1202 Fire Record Format

Item No.	Item	Width	Start Col.	Stop Col.	Number of Decimals	Type
73	LAND OWNER	1	316	316		NUMERIC
74	REF FIRE NBR	4	318	321		CHARACTER
75	VEG. TYPE	1	323	323		NUMERIC
76	ACRES	7	325	331	1	NUMERIC
77	STATE	2	333	334		CHARACTER
78	LAND OWNER	1	336	336		NUMERIC
79	REF FIRE NBR	4	338	341		CHARACTER
80	VEG. TYPE	1	343	343		NUMERIC
81	ACRES	7	345	351	1	NUMERIC
82	STATE	2	353	354		CHARACTER
83	LAND OWNER	1	356	356		NUMERIC
84	REF FIRE NBR	4	358	361		CHARACTER
85	VEG. TYPE	1	363	363		NUMERIC
86	ACRES	7	365	371	1	NUMERIC
87	STATE	2	373	374		CHARACTER
88	LAND OWNER	1	376	376		NUMERIC
89	REF FIRE NBR	4	378	381		CHARACTER
90	VEG. TYPE	1	383	383		NUMERIC
91	ACRES	7	385	391	1	NUMERIC
92	STATE	2	393	394		CHARACTER
93	LAND OWNER	1	396	396		NUMERIC
94	REF FIRE NBR	4	398	401		CHARACTER
95	VEG. TYPE	1	403	403		NUMERIC
96	ACRES	7	405	411	1	NUMERIC
97	STATE	2	413	414		CHARACTER
98	LAND OWNER	1	416	416		NUMERIC
99	REF FIRE NBR	4	418	421		CHARACTER
100	VEG. TYPE	1	423	423		NUMERIC
101	ACRES	7	425	431	1	NUMERIC
102	STATE	2	433	434		CHARACTER
103	LAND OWNER	1	436	436		NUMERIC
104	REF FIRE NBR	4	438	441		CHARACTER
105	VEG. TYPE	1	443	443		NUMERIC
106	ACRES	7	445	451	1	NUMERIC
107	UNIT NUMBERS	2	453	454		CHARACTER
108	PLOT NUMBER	2	456	457		CHARACTER
109	PLOT OBJECTIVE	2	459	460		NUMERIC

Table 34 – DI-1202 Fire Record Format

Item No.	Item	Width	Start Col.	Stop Col.	Number of Decimals	Type
110	FIRING STRATEGY	1	462	462		NUMERIC
111	FIRING METHOD	1	464	464		NUMERIC
112	COST PER ACRE	4	466	469	2	NUMERIC
113	NFFL FUEL MODEL	2	471	472		NUMERIC
114	TEMP MAX	3	474	476		NUMERIC
115	TEMP MIN	2	478	479		NUMERIC
116	REL. HUMIDITY MAX	2	481	482		
117	REL. HUMIDITY MIN	2	484	485	NUM	ERIC
118	WIND MAX	2	487	488		NUMERIC
119	WIND MIN	2	490	491		NUMERIC
120	FLAME MAX	3	493	495		NUMERIC
121	FLAME MIN	2	497	498		NUMERIC
122	ROS MAX	3	500	502		NUMERIC
123	ROS MIN	2	504	505		NUMERIC
124	NFFL FUEL MODEL	2	507	508		NUMERIC
125	TEMP MAX	3	510	512		NUMERIC
126	TEMP MIN	2	514	515		NUMERIC
127	REL. HUMIDITY MAX	2	517	518		NUMERIC
128	REL. HUMIDITY MIN	2	520	521		NUMERIC
129	WIND MAX	2	523	524		NUMERIC
130	WIND MIN	2	526	527		NUMERIC
131	FLAME MAX	3	529	531		NUMERIC
132	FLAME MIN	2	533	534		NUMERIC
133	ROS MAX	3	536	538		NUMERIC
134	ROS MIN	2	540	541		NUMERIC
135	PREBURN TONS/ACRE	3	543	545	1	NUMERIC
136	CONSUMPTION %	3	547	549		NUMERIC
137	PREBURN TONS/ACRE	3	551	553	1	NUMERIC
138	CONSUMPTION %	3	555	557		NUMERIC
139	PREBURN TONS/ACRE	3	559	561	1	NUMERIC
140	CONSUMPTION %	3	563	565		NUMERIC
141	PREBURN TONS/ACRE	3	567	569	1	NUMERIC
142	CONSUMPTION %	3	571	573		NUMERIC
143	PREBURN TONS/ACRE	3	575	577	1	NUMERIC
144	CONSUMPTION %	3	579	581		NUMERIC
145	PREBURN TONS/ACRE	3	583	585	1	NUMERIC
146	CONSUMPTION %	3	587	589		NUMERIC

Table 34 – DI-1202 Fire Record Format

Item No.	Item	Width	Start Col.	Stop Col.	Number of Decimals	Type
147	FIRE ESCAPE		591	590	1	CHARACTER
148	ESCAPE FIRE NUMBER	3	592	594	1	CHARACTER
149	DAY OF WEEK STARTED	1	596	596		CHARACTER
150	WAS FIRE INVESTIGATED	1	598	598		CHARACTER
151	WAS SUSPECT KNOWN	1	600	600		CHARACTER
152	TYPE OF SUSPECT	1	602	602		CHARACTER
153	REF PROJECT NUMBER	6	604	609		CHARACTER
154	PNF COMPLEX ESCAPE	1	611	611		CHARACTER
155	PNF COMPLEX VALUES	1	613	613		CHARACTER
156	PNF COMPLEX FUELS	1	615	615		CHARACTER
157	PNF COMPLEX DURATION	1	617	617		CHARACTER
158	PNF COMPLEX AIR QUALITY	1	619	619		CHARACTER
159	SUBMITTED NAME	30	621	650		CHARACTER
160	SUBMITTED TITLE	30	652	681		CHARACTER
161	SUBMITTED DATE	6	683	688		NUMERIC
162	APPROVED NAME	30	690	719		CHARACTER
163	APPROVED TITLE	30	721	750		CHARACTER
164	APPROVED DATE	6	752	757		NUMERIC


FIRE
CONTROL

Appendix C

Weather .fwx File Format

This file is also known as a "short obs" file. Weather observations must use the naming convention (WXnnnnnn.FWX) where nnnnnn is the weather station number. The prefix letters WX are optional. The file extension must be FWX.

Table 35 – Weather fwx File Format

Item No.	Item	Column Width
1	Weather Station Number	1-6
2	Observation Date (YYMMDD)	7-12
3	State of Weather Code	13
4	Dry Bulb Temperature	14-16
5	Relative Humidity (Percent)	17-19
6	blank	20-22
7	Herbaceous Vegetation Condition	23-24
8	Human-caused Risk	25-27
9	Wind Direction	28
10	Wind speed (mph)	29-31
11	blank	32
12	10-Hour timelag fuel moisture	33-35
13	blank	36-38
14	Maximum temperature (1F)	39-41
15	Minimum temperature (1F)	42-44
16	Maximum relative humidity (percent)	45-47
17	Minimum relative humidity (percent)	48-50
18	blank	51
19	Precipitation duration (hours)	52-53
20	Precipitation amount (inches nn.nn)	54-57
21	Lightning Activity Level	58-60
22	RH indicator (2)	61
23	blank	62-80

Appendix D

Weather Observation Data Transfer Format 1998 (.fw9)

Weather Observation Data Transfer Format 1998 (.fw9)

New data format adopted in May of 1998 intended to replace the Short weather observation file format.(.FWX). This format attempts to meet current and future needs and to remedy the shortcomings of the 1972 format.

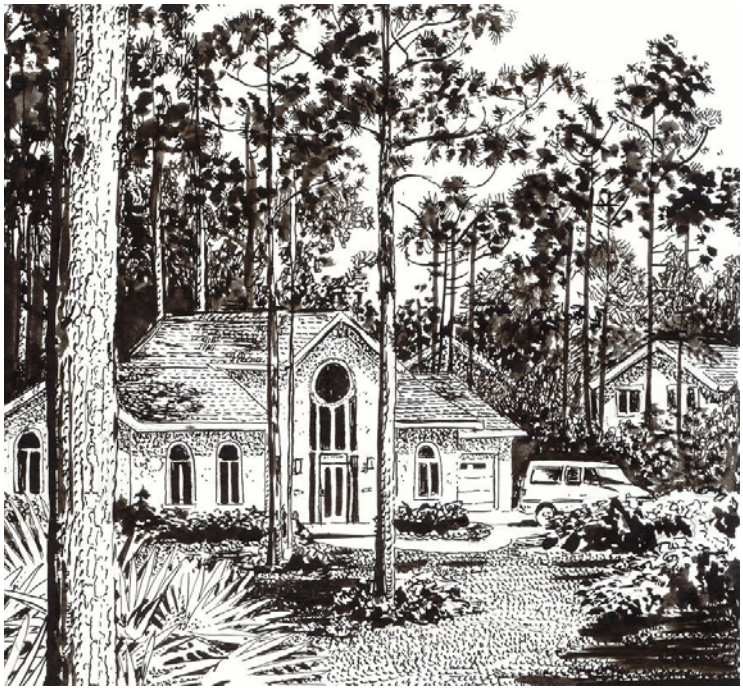
Table 36 – Weather .fw9 File Format

Item No.	Item	Column Width
1	Record type (W98). All records begin with this record type identifier code	01-03
2	Station Number	04-09
3	Observation date (YYYYMMDD)	10-17
4	Observation time (0000-2359)	18-21
5	Observation type (O=NFDRS, R=Raws other than at the standard NFDRS observation time, F=Forecast, X=Other)	22
6	State of weather code	23
7	Dry bulb temperature (degrees Fahrenheit or degrees Celsius based on Measurement Type code	24-26
8	Atmospheric moisture (wet bulb temperature, relative humidity (percent), or dew point temperature based on Moisture Type code	27-29
9	Wind direction azimuth measured from true north; 0 (zero) means no wind direction, 360 is north	30-32
10	Average wind speed over a ten-minute period (miles or kilometers per hour based on Measurement Type code	33-35
11	Measured 10-hour time lag fuel moisture	36-37
12	Maximum Temperature (degrees Fahrenheit or degrees Celsius base on Measurement Type code	38-40
13	Minimum Temperature (degrees Fahrenheit or degrees Celsius base on Measurement Type code	41-43
14	Maximum relative humidity (percent)	44-46
15	Minimum relative humidity (percent)	47-49
16	Precipitation duration (hours)	50-51
17	Precipitation amount based on Measurement Type code [col. 63]. Blanks=no precipitation. US measurement: inches with implied decimal nn.nnn format; trace shown as 00005. Metric measurement: in millimeters, no implied decimal; trace shown as 00001	52-56
18	Wet flag (Y/N)	57
19	Herbaceous greenness factor (0-20)	58-59
20	Shrub greenness factor (0-20)	60-61
21	Moisture Type code (1=Wet Bulb, 2=Relative humidity,3=Dew point)	62
22	Measurement Type code (1=U.S., 2=Metric, Affects temperature	63

Table 36 – Weather .fw9 File Format		
Item No.	**Item**	**Column Width**
	(Fahrenheit or Celsius), wind (miles or kilometers per hour), and precipitation (decimal inches or millimeters))	
23	Season code (1=Winter, 2=Spring, 3=Summer, 4=Fall)	64
24	Solar radiation (watts per square meter)	65-68

Appendix E

GIS Formats



GIS 1

The format for the GIS 1 file is in Table 34.

Table 37			
Item No.	**Item**	**Field Type**	**Example**
1	PCHA ID	N	23
2	PCHA latitude	N	35.1225
3	PCHA longitude	N	118.334

GIS 2

GIS type 2 output uses the naming convention (GISxxxxx.xxx) where xxxxx is .... Fields are comma delimited (separated by a comma) in the order listed below. Alpha fields (A) are enclosed within quotes (“”).

Table 38			
Item No.	**Item**	**Field Type**	**Example**
1	PCHA ID	N	23
2	Fire number	A	49
3	Fire name	A	Lost Loop
4	Discovery date	D	7/4/1985
5	Discovery year	N	1985
6	Discovery month	N	7
7	Discovery day in month	N	4
8	Julian day number	N	185
9	Weekday	N	3
10	PCHA latitude	N	35.1225
11	PCHA longitude	N	118.334
12	Statistical cause	N	1
13	Total acres burned	N	0.3
14	FMZ	A	0A
15	Representative location	N	1
16	NFDRS fuel model	A	G