

Users' Guide To Cheetah Version 4

**Computerized Harmonic Evaluation of Episodes and Tools
for Assessment and Help**



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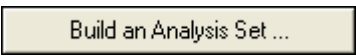
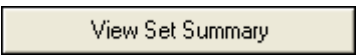


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Key Button Descriptions Summary		
	Next Step	Go to Next Step
	Previous Step	Go to Previous Step
	Check All	Select All Items
	Uncheck All	De-select All Items
	Collect	Gather Fire Occurrence Data from Database
	Build an Analysis Set	Create and Save and Analysis Set
	View Set Summary	
	Run	Generate Graphs or Reports
	View Data Availability	View Units That Meet Data Assumptions for Inclusion in an Analysis Set
	Exit	Close and Exit the Program
	Help	Open Online Help Document

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Welcome to Cheetah 4

Introduction

Cheetah 4 (Computerized Harmonic Evaluation of Episodes and Tools for Assessment of Help) was developed to support examination of fire occurrence patterns and fire suppression resource requirements at the National and Geographic Area level. Questions are frequently asked regarding the expected fire suppression resource needs by the National and Geographic Area decision-makers and managers need to assess fire occurrence patterns to predict future fire suppression resource requirements.

Program Installation

System Requirements

The following minimum system requirements are as follows:

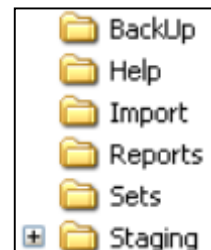
- Windows 98/2000/NT/XP/Vista
- Pentium class processor
- 64 mb of RAM
- 110 mb of free hard drive space

Installation

On the installation CD or from the web support site, locate the file named C4_Setup.exe. Double-click on the C4_setup.exe file and follow the menus that appear. Next, copy Fires database (Cheetah4Master.mdb) from the installation disk to the folder where Cheetah 4 is installed. This replaces the blank Fires database installed with the program. Be sure to restart the computer when installation is complete.

Installation Folder Structure

The default installation folder for the program is C:\Program Files\Cheetah4. The user can change this during installation. The graphic at the right shows the folders inside the Cheetah4 folder that are created.



Backup Folder

This folder contains backup fires database files.

Help Folder

This folder contains the online Help files.

Import Folder

This folder contains ASCII corporate fire occurrence files. It is not required that these files reside here, but it is recommended they do if disk space allows for this.

Reports Folder

This folder is the default folder to the saved Rich text format (rtf) reports.

Sets Folder

This folder contains fires database analysis sets created by the user.

Staging Folder

This folder contains the initial database files for an organizational unit with the initial import of the fire occurrence data from the corporate ASCII fire occurrence files. After import of unit fire occurrence to the fire database, this file will remain if there are fire occurrence records with errors.

Fire Occurrence Records

The fire occurrence data used by Cheetah 4 is contained in a Microsoft Access database (mdb). The mdb is located in the directory where the Cheetah 4 program is installed. The file name is Cheetah4Master.mdb. The database contains fire occurrence records downloaded from the FAMWEB Internet site for the contiguous United States from 1980 through 2008 for each of 5 federal land management agencies: USDA-Forest Service, USDI-Bureau of Land Management, USDI-National Park Service, USDI-Bureau of Indian Affairs and USDI-Fish and Wildlife Service. It also included for various time periods fire occurrence records from the state fire protection agencies in Alaska, Washington, Oregon, California, Arizona and New Mexico.

For the Forest Service, all fire records are included. The DOI 1202 and FWS fire report contains more incidents than the Forest Service fire report. The types of incidents are identified by two fields, fire type and protection type. The following table provides definitions of each.

Fire Types		Protection Types	
Code	Description	Code	Description
1	Suppressed Fire	1	For agency land under agency protection. The agency 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 (eg. 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; ie. 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 3.
		8	Prescribed burns – management-ignited prescribed fires, ignited by or for park management under Fire Type 4.

Fire Types		Protection Types	
Code	Description	Code	Description
		9	Prescribed natural fires – ignited by lightning, volcanic activity, or other natural ignition sources under Fire Type 4.

The Fire Types/Protection Type codes included for the lower 48 States are as follows: 11, 12, 13, 14, 21, 22, 23, 24 and 49. For Alaska, fires with these codes were also imported and in addition, fire type/protection type code 16 was imported for the Alaska Fire Service (AFS).

Cheetah 4 Programs

Two programs are used in Cheetah. These are Cheetah 4 Data Manager and Cheetah 4 Analyzer.

Cheetah 4 Data Manager

The purpose and function of the Cheetah 4 Data Manager program is to manage the organizational units and fire occurrence records in the fires database (Cheetah4Master.mdb). This function is normally performed at the National level with support from the Geographic Area Coordination Centers (GACCs).

Cheetah 4 Analyzer

The purpose and function of the Cheetah 4 Analyzer program is the analysis of fire occurrence data to support decision-making. Analysis is done on Analysis Sets containing fires by year, by agency and by GACC(s), state(s) or unit(s). Particular attention is available to analyze fire occurrence episodes as they relate to large fire occurrence.

Starting Cheetah 4 Programs

The Cheetah 4 programs can be started by:

- Selecting the Windows Start Menu, Programs, Cheetah Directory and either the Cheetah 4 Data Manager or Analyzer program icons.
- Doubling clicking either the Cheetah 4 Data Manager or Analyzer program icons on the Windows Desktop
- Double clicking on the C4Analyzer.exe or C4Manager.exe files from Windows Explorer



The Cheetah 4 Data Manager Program

The purpose and function of the Cheetah 4 Data Manager program is to manage the organizational units and fire occurrence records in the fires database (Cheetah4Master.mdb). This function is normally performed at the National level with support from the Geographic Area Coordination Centers (GACCs).



Databases

There are two databases, the parameters database and the fires database.

Cheetah4LU.mdb (parameters database)

This database contains non-fire record information including agencies identifiers, fire cause identifiers and correlations, GACC identifiers and assignments of organizational units to GACCs. Edits to these database tables is done via the Utilities Menu in the Data Manager program. A complete description of the fields in each of these tables is also contained in the Utilities Menu, Reference Table Maintenance section of this document.

Reference Table Maintenance	
Table	
List of States	
List of Organizational Units and Associated Codes	
List of Years	
List of Agencies	
List of Geographic Areas	
List of Fire Causes	

Cheetah4Master.mdb (fires database)

This database contains the fire occurrence records. The main purpose of the Data Manager program is to load and manage fire occurrence records into the fires database. Not all information from agency fire report records is loaded. The following information is loaded for each fire:

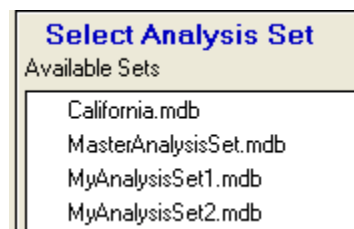
- Unit identifier
- Discovery date
- Fire number
- Fire size (acres to nearest tenth)
- Statistical cause code (DOI definitions)
- Datum
- Latitude (decimal degrees)
- Longitude (decimal degrees) (Note west longitude is indicated with a – to start the value)
- Fire Contain Date (MM/DD/YYYY)
- Fire Contain Time (military time i.e. 1900)
- Fire Control Date (MM/DD/YYYY)
- Fire Control Time (military time i.e. 1900)

The Data Manager program assigns the following attributes to each fire using the unit identifier and information in the Units table in the parameters database (Cheetah3LU.mdb).

- Agency
- GACC
- State

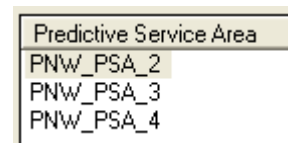
C4AnalysisSetTemplate.mdb (sets database)

This database is blank, but is the master for the creation of Analysis Sets. Analysis set databases contains the fire occurrence records that are a subset of the fire occurrence records in the fires database. An Analysis Set is a unique combination years, GACCs, states with GACCs selected and agencies. The reason for creation of an Analysis Set is to create smaller database in a defined format to facilitate local analysis in an efficient way. The creating of an Analysis Set will be covered later in this document. Analysis Set databases are contained in the Sets folder.



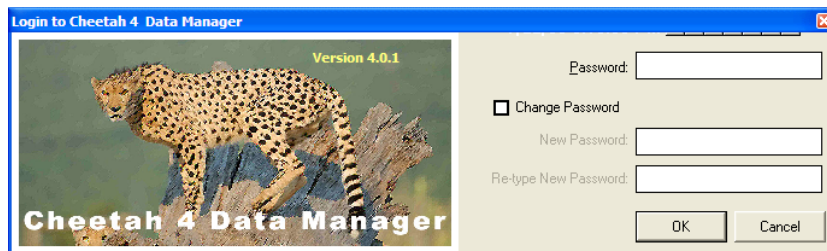
Cheetah4PSA.mdb (PSA database)

This database contains the fire occurrence records that are a subset of the fire occurrence records in the fires database. PSA stands for Predictive Service Area. A PSA Set is special version of an Analysis Set where the PSA fires database is specific for the organizational units in the PSA. PSA Analysis Sets will be covered later in this document. PSA Set databases are contained in the Sets folder.



Password

On the initial splash screen, a password must be entered to access the Data Manager program. The password can be changed from the startup screen.



Program Control

Program control is achieved by the use of menu buttons that appear in the upper left of the startup screen in addition to Exit and Help menus on the program's toolbar. There are five menu buttons: Summary, Edit Records, Reports and Graphs, Utilities and Import.



Obtaining Corporate Fire Occurrence Data

There are two fire report formats for the five federal agencies. One format exists for the USDA Forest Service and another format exists for the Department of Interior Agencies (Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service and National Park Service). ASCII fire occurrence files currently are available for download from the Internet. The current web site is as follows: <http://famweb.nwcg.gov/weatherfirecd/>. It is recommended these files be downloaded to user created folders in the Import folder. Any modifications to the CheetahMaster4.mdb need to be coordinated with NICC. This will facilitate the creation and maintenance of a single, National CheetahMaster4.mdb.

Adding Federal Fire Occurrence Data in the Fires Database

Follow the following steps to add fire occurrence records to the fires database.

Step 1

Obtain the corporate ASCII fire occurrence data file.

Step 2

Verify that the agency is defined in the Units table in the parameters database. To do this, go to the Utilities Menu, Reference Table Maintenance, List of Organizational Units and Associated Codes feature. Scan or search for the unit. If the unit is not in the table, add the unit. To add a unit, first uncheck the Read Only box at the bottom of the screen. Then click on the Add button, enter information and then click Close. It will be necessary to exit the Cheetah 4 Data Manager program and restart the program before adding fire occurrence data.

Step 3

Follow the steps in the section titled The Import Menu.

Adding an Organizational Unit and Fire Occurrence Data to the Fires Database

Non-federal fire occurrence data can be added to the fire database. This may be desirable at the GACC level where state protection agency fire occurrence data is available. Since there are many electronic state fire occurrence file formats and field definitions, a Standard Cheetah ASCII file format has been defined to facilitate inclusion of other agency fire occurrence data. The Standard Cheetah ASCII file format is as follows:

The Cheetah Standard format is a comma-delimited ASCII in the following order from left to right:

- Fire Discovery Date (MM/DD/YYYY)
- Unit Organizational Code (alpha-numeric)
- Fire Number (alpha-numeric)
- Fire Size (nearest tenth of an acre)
- Fire Cause Code (DOI Statistical Cause)
- Datum
- Latitude (decimal degrees)
- Longitude (decimal degrees) (Note west longitude is indicated with a – to start the value)

- Fire Contain Date (MM/DD/YYYY)
- Fire Contain Time (military time i.e. 1900)
- Fire Control Date (MM/DD/YYYY)
- Fire Control Time (military time i.e. 1900)

For the agency whose fire occurrence data is to be included, it will be necessary for a computer specialist to reformat the agency fire occurrence data record to the Cheetah Standard format.

To add an organizational unit and its fire occurrence data to the fires database, follow these steps.

Step 1

Obtain the corporate ASCII fire occurrence data file.

Step 2

Create a comma-delimited ASCII file with the agency fire occurrence records in Cheetah Standard format.

Step 3

Add the agency to the Agencies Table and the Unit to the Units table in the parameters database. To do this, go to the Utilities Menu, Reference Table Maintenance. Select the Agencies Table to add the agency. Go to List of Organizational Units and Associated Codes feature. Scan or search for the unit. If the unit is not in the table, add the unit. To add a unit, first uncheck the Read Only box at the bottom of the screen. Then click on the Add button, enter information and then click Close. It will be necessary to exit the Cheetah 4 Data Manager program and restart the program before adding fire occurrence data.

Step 4

Follow the steps in the section titled The Import Menu.

The Import Menu

The Import Menu yields a screen with two tabs: Import and Staging.

Import Tab

This tab is used to select a unit for import and to perform the import of corporate ASCII fire occurrence records to a unit specific staging database.

Step 1 – Type of Import Format

The import formats are as follows:

- Cheetah Standard
- Forest Service
- PCHA/FFP
- PCHA (Old)

For this unit, 175 fire records were imported but 3 fire records have an error in at least one of the data fields. Also note that for the years 1981, 1982 and 1991, there were no occurrence fire records.

Two actions are needed. The first is the correction of errors, if possible. The second is a decision on the three years with no fire records to determine if these records are missing or if there were zero fires for those years.

Edit Button

Select a unit and click on the Edit button to view problem fire occurrence records and to make changes. This Button takes the user to the edit records screen where reports with problems will be shown. Using this screen, the user can change a fire's attributes and save those changes to the staging database. The screen supports sort and query capabilities. For the example on the previous page, the Error screen appears as follows.

Data: FWS_Devils_Lake_WMD_62580									
	Record Number	Discovery Date	GACC Code	State Code	Agency Code	Fire Number	Organization Code	Fire Size	Fire Cause
▶	157	??/2002	NR	ND	FWS	6431	62580	0.0	5
	168	??/2002	NR	ND	FWS	6432	62580	0.0	5
	172	??/2002	NR	ND	FWS	6584	62580	0.0	5

View Problems Report Button

This button allows for the generation of a report of problem fire records.

Record Number

If the Record Number cell is red, this indicates that this fire already exists in the fire database. Adding another record with this record number would cause duplication. Any other cell highlighted in yellow is a cell with a problem needing attention.

Discovery Date

The most common error is the absence of a discovery date in the corporate ASCII fire occurrence file. When there is discovery date (month, day and year), a ??/2999 will be displayed. In the example above, a ??/2002 is shown because the year is in the data file, but the month and day are missing. Before fires can be added to the Cheetah3Master.mdb database, a valid month, day and year need to be defined for each fire.

GACC, State, and Agency Codes

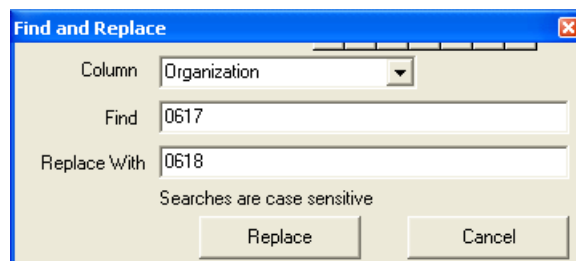
These are assigned based on the organizational unit ID. If any of these are missing, the most likely cause is the program could not find the organizational unit ID in the parameters table. Either the organizational unit has not been added to the Units table in the parameters database or there is a typographical error. Check for the inclusion of the organizational unit in the Unit table via the Utilities Menu, Reference Table Maintenance, List of Organizational Units and Associated Codes feature. Once the unit is defined correctly in the Units table, click the Reassign Codes button.

Assign Unique Button

Over time, two units may have merged. In some cases, the agency fire occurrence file for a unit may contain fire records for several units for overlapping years. Changing the unit identifier to a unique identifier can cause duplicate unit identifier / fire number combinations. Before making the unit identifier change, select all of the fire records with the incorrect unit identifier. Pressing the Assign Unique button will append an X to reach fire number.

Replace Button

Pressing the Replace button will cause the dialog at the right to appear. Select a column, the find string and the replace string.



The 'Find and Replace' dialog box has a title bar with a close button. It contains a 'Column' dropdown menu set to 'Organization'. Below it are 'Find' and 'Replace With' text boxes, both containing '0617'. A checkbox labeled 'Searches are case sensitive' is checked. At the bottom are 'Replace' and 'Cancel' buttons.

As was mentioned above, unit consolidation can cause an agency's fire occurrence file to have fire records with two unit identifiers. This functionality will allow for a global replacement of unit identifiers.

Reassign Codes Button

Some fire records do not have GACC, State and/or Agency codes assigned due to problems with a fire's record. Most common is a unit identifier that is not assigned to a unit and a GACC. This can occur when organizational units merge and the fire records are merged.

Display Only Records With Errors Checkbox

If checked, only problem fire records will be displayed. When unchecked, all fire records in a unit's staging database will be displayed.

Assigning Zero Fire per Year

If no fire records exist in the corporate comma-delimited ASCII fire occurrence file, these years are highlight in red on the Staging Tab.

To assign a year to have 0 fires for that year, click on the box to the left of the year. The year will become blue and a 0 will appear in the Records column. Note that all of these years can be set to 0 fires by clicking the Set Missing Years to Zero Fires button. The Undo button will reset all these to None, which means fire records are missing.

Include Year	Records
☒ 1980	4
☐ 1981	None
☐ 1982	None
☒ 1983	11

Include Year	Records
☒ 1980	4
☒ 1981	0
☐ 1982	None
☒ 1983	11

Since fire occurrence values in the Cheetah 4 Analyzer program are annualized, fire occurrence data must exist for a unit to be included in analysis using a defined set of years or range of years. In the example above, if any of the years without fire records were included in the years of the analysis, the unit's fire occurrence data would not be included in the analysis

Adding Fire Records to the Fires Database

Fires can be added by unit or for all units on the Staging Tab at one time.

Add to Master Library

Select the file to add by clicking (highlighting) it. Clicking this button will add the selected unit's fire records to the fires database. Problem records will not be added and will remain in the unit's staging database.

Add All to Master Library

Clicking this button will add all of the fire records for all of the units in staging to the fires database. Problem records will not be added and will remain in the unit's staging database.

A file on the Staging Tab with a blue question mark in front of the file's name indicates a database file with only problems records.

Imported Data
? _FWS_Devils_Lake_WMD_62580

The Summary Menu

The screen displayed shows the GACCs, number of records and years for which fire occurrence records exist in the fires database. Below is the screen for the current fires database, which has all five federal agency fire occurrence records Nationally loaded.

Fires Database Contents (Last Update: 7/22/2009 10:46:06 AM, Records: 714526)		
GACC	Records	Years
AK	14980	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
EA	34141	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
EB	44846	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
NO	75006	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
NR	63025	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
NW	111369	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
RM	59124	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
SA	57917	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
SO	104447	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
SW	129268	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
WB	20403	1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008

The Edit Records Menu

This menu takes the user to the edit records screen. Using this screen, the user can change a fire's attributes and save those changes to the fires database. The screen supports sort and query capabilities to assist the user in locating a fire record.

Fires Database, Records Selected: 620631																
	Discovery Date	Discovery Time	Contain Date	Contain Time	Control Date	Control Time	GACC Code	State Code	Agency Code	Fire Number	Organization Code	Fire Size	Fire Cause	Datum	Lat.	Long.
	7/11/1986	3:05:00 PM			7/11/1986	6:00:00 PM	NW	WA	BIA	46	WACOA	0.3	4	NAD27	48.245	-119.59
	7/12/1986	7:20:00 PM			7/13/1986	11:00:00 AM	NW	WA	BIA	47	WACOA	0.2	4	NAD27	48.3167	-118.2517
	7/13/1986	12:56:00 PM			7/13/1986	1:05:00 PM	NW	WA	BIA	48	WACOA	0.1	8	NAD27	48.1433	-118.9867
	7/14/1986	12:57:00 PM			7/14/1986	1:09:00 PM	NW	WA	BIA	49	WACOA	0.1	3	NAD27	48.1233	-118.9867
	7/15/1986	7:00:00 AM			7/15/1986	8:00:00 AM	NW	WA	BIA	50	WACOA	0.1	8	NAD27	48.085	-118.6833
	7/15/1986	7:30:00 PM			7/16/1986	8:30:00 AM	NW	WA	BIA	52	WACOA	0.1	1	NAD27	48.4767	-119.3317
	7/15/1986	8:00:00 PM			7/16/1986	8:00:00 AM	NW	WA	BIA	51	WACOA	0.1	1	NAD27	48.4767	-119.3533
	7/16/1986	2:56:00 PM			7/16/1986	3:48:00 PM	NW	WA	BIA	53	WACOA	5.0	6	NAD27	48.1133	-119.2667

Sort Capability

By clicking on the column header, the column will sort. This sort process may take a while since the master database can be quite large.

Query Capability

Entering a value in the cell below a column header will query the fires database based on the entry. Multiple queries can be done by entering values in more than one column; i.e. GACC Code and Agency Code columns. The records selected at any one time are called the “active records.”

Fires Database, Records Selected: 620631								
	Discovery Date	Discovery Time	Contain Date	Contain Time	Control Date	Control Time	GACC Code	State Code
							EB	UT
	7/3/1989	10:00:00 AM			7/20/1989	6:00:00 PM	EB	UT
	7/3/1989	12:00:00 PM			7/20/1989	6:00:00 PM	EB	UT
	7/4/1989	3:00:00 PM			7/4/1989	6:00:00 PM	EB	UT
	7/8/1989	8:00:00 PM			7/9/1989	2:00:00 AM	EB	UT
	7/9/1989	3:30:00 PM			7/9/1989	9:00:00 PM	EB	UT

Select All Button

Clicking on this button will cause all active records to be selected. The selected records will be colored blue.

Deselect All Button

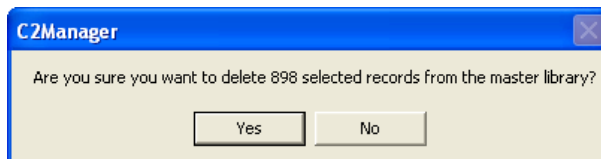
Clicking on this button will cause all active records to be deselected.

Clear Filter Button

Clicking on this button will cause the query filter to be cancelled and the entire fire database to become the active records.

Delete Button

Clicking on this button will cause all selected (active) records to be deleted. Use this functionality with care. A warning message similar to the one at the right will appear before records are deleted.



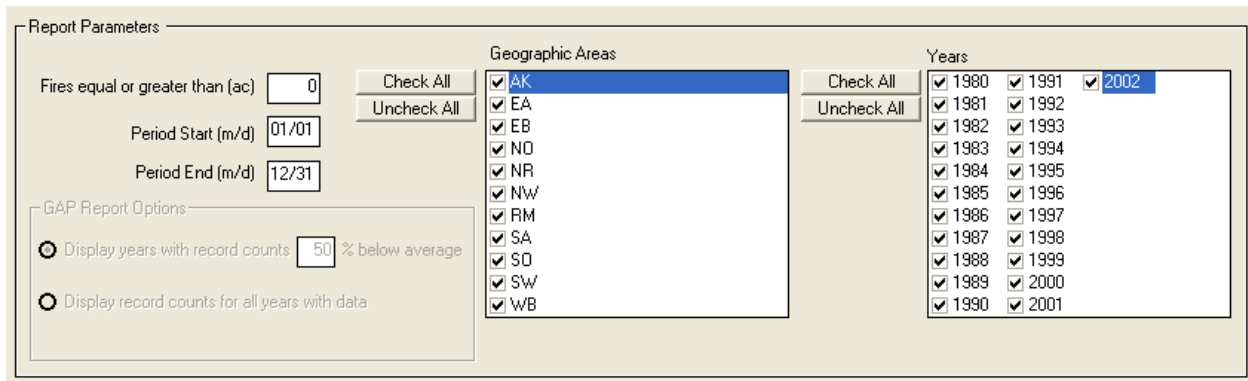
The Reports and Graphs Menu

To support the management of the fires database, several reports and graphs are available. The Cheetah 4 Analyzer has a full complement of graphs more detailed than those in the Data Manager program. The graphic below lists these reports and graphs along with a description of each. Once generated, reports and graphs can be saved in Rich text format (rtf) that can be opened by most word processing programs and Adobe pdf format.

Report	Description
 Organization Level Summary	Displays record counts by Geographic Area, Year, State, Agency and Organization
 Record Gap Analysis	Locate possible gaps in fire records
 Daily Fire Records	Plot total daily fire records over a range of dates
 Agency Fire Record Distribution	Display a pie chart of Agency record totals

Below is a graphic showing the selections the user can make when building a report or graph. These include a selection for:

- Fire size limit
- Period start and stop dates
- Geographic areas
- Years



Report Parameters

Fires equal or greater than (ac)

Period Start (m/d)

Period End (m/d)

GAP Report Options

☒ Display years with record counts % below average

☐ Display record counts for all years with data

Geographic Areas

☒ AK
☒ EA
☒ EB
☒ NO
☒ NR
☒ NW
☒ RM
☒ SA
☒ SO
☒ SW
☒ WB

Years

☒ 1980	☒ 1991	☒ 2002
☒ 1981	☒ 1992	
☒ 1982	☒ 1993	
☒ 1983	☒ 1994	
☒ 1984	☒ 1995	
☒ 1985	☒ 1996	
☒ 1986	☒ 1997	
☒ 1987	☒ 1998	
☒ 1988	☒ 1999	
☒ 1989	☒ 2000	
☒ 1990	☒ 2001	

Organizational Level Summary Report

This report provides a summary by:

- GACC
- State
- Agency
- Organization name (unit name)
- Years with fire records
- Number of fire records per year.

Organizational Level Record Summary
Date: 3/27/2004 12:30:50 PM

Total Records in Database: 434330
Last Update: 1/3/2004 5:06:24 AM
For fires greater or equal to: 0 acres
For period between 01/01 and 12/31
For years: 1980
For Geographic Areas: Northwest

Number of Existing Individual Fire Records					
GACC	State	Agency	Organization	Year	Nb. of Records
NW	OR	BIA	(P00F07) Umatilla Agency	1980	1
			(P00F09) Warm Springs Agency	1980	68
		BLM	(CRBLD) Burns District	1980	35
			(CRCBD) Coos Bay District	1980	4
			(CRELD) Eugene District	1980	4
			(CRLAD) Lakeview District	1980	64
			(CRMED) Medford District	1980	35

Record Gap Analysis Report

There are two options here.

The first report provides a summary by:

- GACC
- State
- Agency
- Organization name (unit name)
- Average number of fire records per year
- Years with no fire records
- Years with fire records X% below the average record count

GAP Report Options

☒ Display years with record counts % below average

☐ Display record counts for all years with data

An example of the report follows.

Fire Record Gap Analysis
Date: 3/27/2004 12:52:56 PM

Total Records in Database: 434330
Last Update: 1/3/2004 5:06:24 AM
For period between 01/01 and 12/31
For years: 1980, 1981, 1982, 1983
For Geographic Areas: Northwest
Total Records Used in this Report: 6623

Potential Gaps in Individual Fire Records						
GACC	State	Agency	Organization	Average Number Records per Year	Years With No Records	Years With Records 50% Below Average Record Count
NW	OR	BIA	Siletz Field Office	0.0	1980, 1981, 1982, 1983	
			Northwest Regional Office	0.0	1980, 1981, 1982, 1983	
			Grande Ronde Tribe	0.0	1980, 1981, 1982, 1983	
			Umatilla Agency	1.3	1982	
		BLM	Salem District	11.3		1981(5)
			Roseburg District	14.3		1983(5)
			Oregon State Office	0.0	1980, 1981, 1982, 1983	
		FS	Umpqua National Forest	45.3		1981(21)
			Siuslaw National Forest	13.3		1982(6)

The second report provides a summary by:

- GACC
- State
- Agency
- Organization name (unit name)
- Average number of fire records per year
- Years with no fire records
- Years with fire records and counts

GAP Report Options

☐ Display years with record counts 50 % below average

☒ Display record counts for all years with data

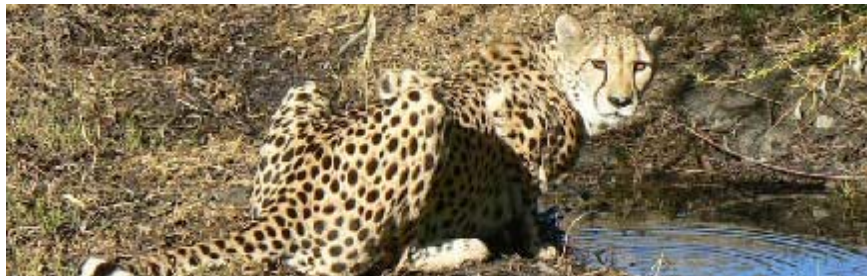
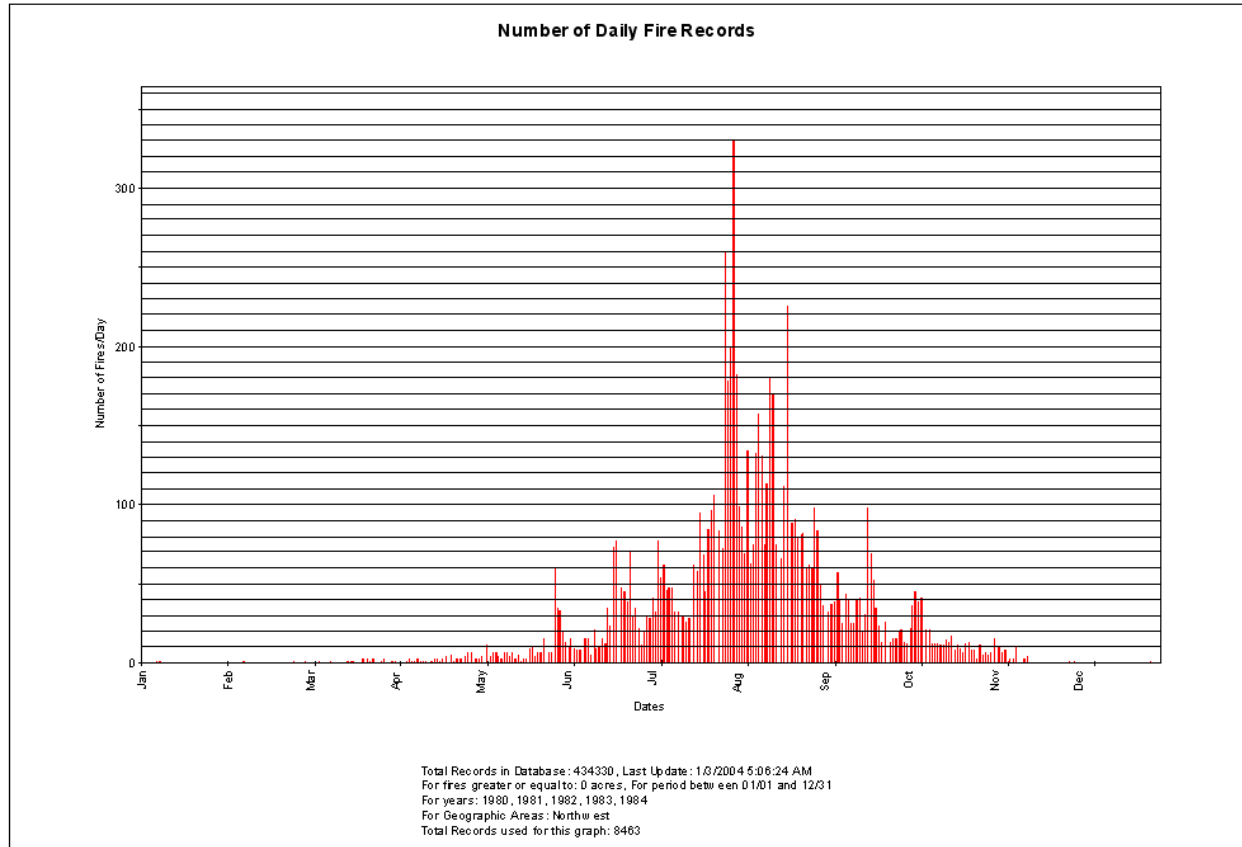
Fire Record Gap Analysis
Date: 3/27/2004 1:01:32 PM

Total Records in Database: 434330
Last Update: 1/3/2004 5:06:24 AM
For period between 01/01 and 12/31
For years: 1980, 1981, 1982, 1983, 1984
For Geographic Areas: Northwest
Total Records Used in this Report: 8463

Potential Gaps in Individual Fire Records						
GACC	State	Agency	Organization	Average Number Records per Year	Years With No Records	Years With Records and Counts
NW	OR	BIA	Siletz Field Office	0.0	1980, 1981, 1982, 1983, 1984	
			Northwest Regional Office	0.0	1980, 1981, 1982, 1983, 1984	
			Grande Ronde Tribe	0.0	1980, 1981, 1982, 1983, 1984	
			Umatilla Agency	1.3	1982, 1984	1980(1), 1981(2), 1983(1)
			Warm Springs Agency	57.2		1980(68), 1981(58), 1982(36), 1983(79), 1984(45)
		BLM	Burns District	65.0		1980(35), 1981(90), 1982(59), 1983(73), 1984(68)

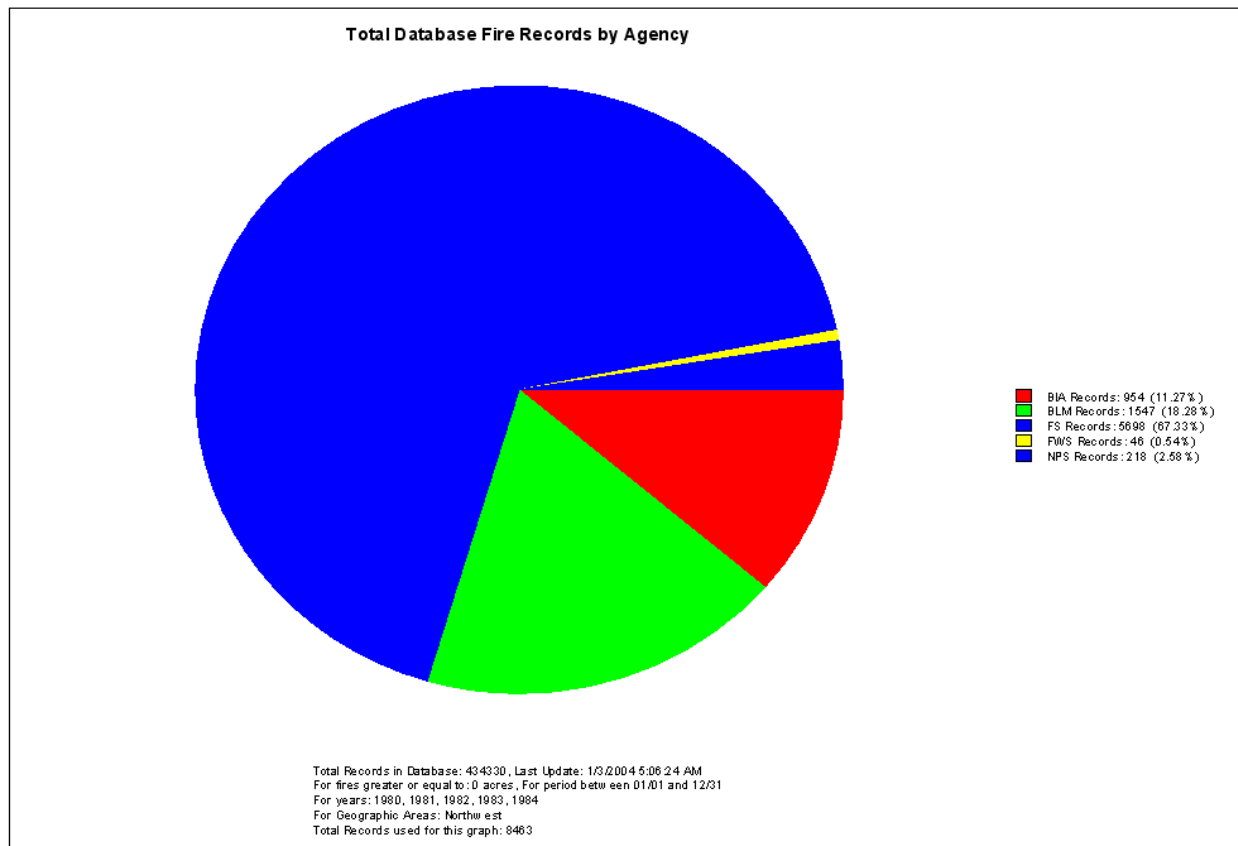
Daily Fire Records Graph

This graph displays the average number of fires per day for the years, GACCs and fire season selected. An example graph follows.



Agency Fire Record Distribution Graph

This graph displays a pie chart of years, GACCs and fire season selected showing the proportion of fires by agency. An example pie chart follows.



The Utilities Menu

The Utilities Menu contains areas where the user can:

- Create and manage backup file of the fires database
- Compact the fires database
- Manage reference tables in the parameters database
- Manage years where fire occurrence is zero

Master Library Backup

The user can create a backup of the current fires database.

Backup Current Fires Database Button

Clicking this button will produce a dialog screen where the user can name the backup file for the current fires database. Clicking on the OK button will cause the current fires database to be copied to the backup file.

Note there is no utility in Cheetah 4 to backup the parameters database. If this is desired, it is suggested the user use the standard file management copy and rename functions to do this.

Restore Backup Button

Clicking on this button will allow the user to replace the current fires database with a fire database in the Backup folder. To perform the operation, first click on a file to use in the restore process. Then click on the Restore Backup button. You will receive a warning dialog. Respond Yes or No to this warning dialog. By clicking on the Yes button, the selected fire database in the Backup folder will replace the current fire database.

Delete Backup Button

Clicking on this button will allow the user to delete the fires database in the Backup folder. To perform the operation, first click on a file to use in the delete process. Then click on the Delete Backup button. You will receive a warning dialog. Respond Yes or No to this warning dialog. By clicking on the Yes button, the selected fire database in the Backup folder will be deleted. Note this is a non-reversible process. The deleted fire database will not exist in the Windows Recycle folder.

Compact Fires Database

The fires database file size increases with use. It is recommended that the user compact this database after frequent use. This may take a few minutes based on the size of the database. To do this operation, click on the Compact Database button and be patient. When the operation is complete, the size of the compacted fires database will be shown on the screen.

Reference Table Maintenance

The tables in the parameters database that can be managed are shown in the graphic at the right. The tables are contained in the Cheetah3LU.mdb file in the Cheetah 4 folder.

Reference Table Maintenance	
Table	
List of States	
List of Organizational Units and Associated Codes	
List of Years	
List of Agencies	
List of Geographic Areas	
List of Fire Causes	

States Table

The State table contains the state name and state code. This table should not need to be edited.

Organizational Units and Associated Codes (Units Table)

The Units table contains the following fields:

- Unit Name
- Unit ID
- ICS ID
- GACC ID
- State ID
- Agency ID

Cheetah 4 uses this table to assign a GACC, state and agency to each fire record imported to the fires database. As organizational changes occur, there will be a periodic need to update this table.

A unique situation currently exists for the BLM in some states where reorganization has occurred but the corporate fire occurrence database has not been updated to reflect these changes. The table below provides information on the BLM units that are included in the unit defined in the fires database (Cheetah Unit).

State	Unit ID	Cheetah Unit	BLM Units and Comments
AZ	AZPHD	Phoenix District	From files obtained, it appears Kingman Field Office from 2001-2007 are still in this unit even though the Kingman FO is not part of the Colorado River District.
AZ	AZCRD	Colorado River District	Yuma-Lake Havasu and Kingman FOs. Does not appear to contain Kingman FO fires from 2002-2007 which appear to still be in the Phoenix District file.
AZ	AZSAD	Gila District	Renamed the Safford-Tucson Zone the Gila District.
CA	CANOD CABBD	Northern California Dist. Central California Dist.	The Ukiah FO was moved to the Central California District from the Northern California District.
CO	COMRD	Western Slope Center - Montrose	Western Slope Center – Montrose and San Juan Field Office
ID	IDBOD	Boise District	Birds of Prey NCA, Four Rivers Field Office, Bruneau Field Office and Owyhee Field Office. Note Jarbridge FO has been moved to the Twin Falls District..
ID	IDSID	Twin Falls District	Burley and Shoshone District; Burley and Shoshone Field Office, Jarbridge Field Office and Craters of the Moon NM. Include old Southern Idaho District.
ID	IDCOD	Coeur d’ Alene District	Coeur d’ Alene District, Coeur d’ Alene Field Office and Cottonwood Field Office
ID	IDIFD	Idaho Falls District	Salmon District, Salmon Field Office and Challis Field Office, Upper Snake Field Office and Pocatello Field Office Includes old Idaho Falls District and Idaho Falls Field Office.
MT	MTBUD	Butte District (Western Montana District)	Butte District, Butte Field Office, Dillon Field Office and Missoula Field Office
MT	MTMCD	Miles City District	Miles City District, Miles City Field Office, Billings Field Office, and South Dakota Field Office
MT	MTLED	Lewistown District	Lewistown District, Lewistown Field and Malta Field Office
MT	MTNDD	North Dakota Field Office	Dickenson District and North Dakota Field Office
NM	NMABD	Albuquerque District	Rio Puerico and Socorro Field Offices
NM	NMPVD	Pecos District	Renamed the Roswell District to the Pecos District. Roswell District, Roswell Field Office and Carlsbad Field Office

State	Unit ID	Cheetah Unit	BLM Units and Comments
NM	NMLCD	Las Cruces District	Las Cruces District
NM	NMFAD	Farmington District	Farmington and Taos Field Offices
NV	NVSVD	Southern Nevada District	This is a rename of the Las Vegas District
WY	WYCAD	High Plains District	Casper District, Casper Field Office, Buffalo Field Office and Newcastle Field Office
WY	WYWOD	Wind River/Bighorn Basin District	Worland District, Worland Field Office, Lander Field Office and Cody Field Office
WY	WYRSD	High Desert District	Rock Springs District, Rock Springs Field Office, Pinedale Field Office, Rawlins Field Office and Kremmerer Field Office

Years Table

The Years Table provides a correlation between the four-digit year ID and the two-digit year ID. This table will need to be updated as new years of data are added to the fires database.

Agencies Table

The Agency's table contains the following fields:

- Agency name
- Agency ID
- Fields for the default proportion of fires by fuel category

This table should not need to be updated.

Geographic Areas Table

The GACC's table contains the following fields:

- GACC name
- GACC ID
- Default episode parameters

This table should not need to be updated.

Fire Causes Table

The Fire Causes table contains the following fields:

- Fire cause code
- Fire cause name

This table should not need to be updated.

Manage Years With Zero Fire Occurrence

Select the button titled Manage Absent Unit Records. For an organizational unit, the fire occurrence records from the agency fire occurrence database might show no fire records for a year. Two situations might cause this situation.

- Situation 1 - There were zero fires that year.
- Situation 2 - There were fires that year but the fire records have not been posted to the corporate agency's fire occurrence file.

A graphic similar to the one at the right is shown when a unit is selected. For the example shown, there were no fire records in the unit's fire occurrence file for 1981, 1982, 1985, 1988 and 1989. As shown, the Analyzer program would assume Situation 2 for these years; i.e.-missing fire records. Instead of 23 years of fire occurrence data, this unit would only have 18 years as shown in black.

Since fire occurrence values in the Cheetah 4 Analyzer program are annualized, fire occurrence data must exist for a unit to be included in analysis using a defined set of years or range of years. In the example at the right, the unit's fire occurrence would be included if the years selected were 1994 – 2002. If any of the years without fire records were included in the years of the analysis such as 1980 – 1987, the unit's fire occurrence data would not be included in the analysis.

Personnel near the local level will need to determine if any of the years with no fire records fit into Situation 1.

Include Year	Records
☒ 1980	1
☐ 1981	None
☐ 1982	None
☒ 1983	4
☒ 1984	6
☐ 1985	None
☒ 1986	3
☒ 1987	2
☐ 1988	None
☐ 1989	None
☒ 1990	32
☒ 1991	40
☒ 1992	3
☒ 1993	7
☒ 1994	2
☒ 1995	6
☒ 1996	5
☒ 1997	3
☒ 1998	2
☒ 1999	1
☒ 2000	2
☒ 2001	2
☒ 2002	2

When fire records are loaded into the fires database, the user has the opportunity while the fires are in Staging to identify the years with no fires. In the example, the user can select the years in Situation 1 by checking the box in the Include Year column. For the example, the years 1981 and 1982 have been designated as years where the fire occurrence was zero. In the Cheetah 4 Analyzer program, it will be assumed that fire occurrence during these two years was zero and the unit's data will be included in analysis as long as the range of years does not include a year with missing data.

Include Year	Records
☒ 1980	1
☒ 1981	0
☒ 1982	0
☒ 1983	4
☒ 1984	6
☐ 1985	None

The Cheetah 4 Analyzer Program

The purpose and function of the Cheetah 4 Analyzer program is to support examination of fire occurrence patterns and fire suppression resource requirements at the National and Geographic Area level. Questions are frequently asked regarding the expected fire suppression resource needs by the National and Geographic Area decision-makers and managers have the need to assess fire occurrence patterns to predict future fire suppression resource requirements.



To analyze fire occurrence events, two terms are defined: Epi-Day and Episode. A description of each follows:

Definition of Epi-Day

In Cheetah, the term Epi-Day is used. Three criteria are defined to facilitate the definition of an Epi-Day. These criteria are:

- Criteria 1: The Minimum Number of Fires that Occurred in a Day
- Criteria 2: The Minimum Number of Fires that Occurred Over a 3 Day Period
- Criteria 3: The Previous Day Meets One of the Two Criteria Define Above

The first criterion is based on the number of fires that occurred on a given day. If fire occurrence on a day is greater than the number of fires defined in Criteria 1, then the day is classified as an Epi-Day. Frequently, fire occurrence may remain high for period of days. If a day is contained within a series of days with total fire occurrence for the series of days being greater than that defined in Criteria 2, then the day is classified as an Epi-Day. Particularly when lightning storms occur, fires are not discovered until a day following a storm. To account for this situation, Criteria 3 is defined.

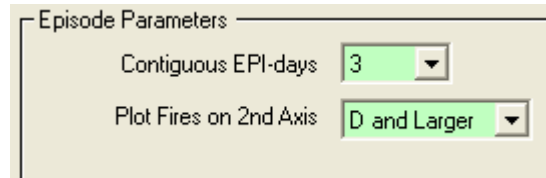
Criterion 3 classifies a day as an Epi-Day if it follows a day that qualifies as an Epi-Day based on Criteria 1 or 2.

The minimum number of fires per day for Criteria 1 is defined in this section. The minimum number of fires over a specified number of days is also defined here. The default time period for Criteria 2 is 3 days. The default number of fires per day for each Geographic Area is shown in the table at the right.

GACC	Min. Fires per Day for Criteria 1	Min. Fires over 3 Days for Criteria 2
Alaska	10	30
Eastern	14	42
Eastern Great Basin	15	45
Northern California	20	60
Northern Rockies	25	75
Northwest	50	150
Rocky Mountain	20	50
Southern	15	45
Southern California	20	60
Southwest	30	90
Western Great	15	45

Definition of Episode

In Cheetah 4, the term Fire Occurrence Episode (Episode) is used to define a contiguous series of Epi-Days. The user can define an Episode as a series of 3, 5 or 7 contiguous Epi-Days using the pulldown in this section.



Episode Parameters	
Contiguous EPI-days	3
Plot Fires on 2nd Axis	D and Larger

The ability to show correlations, if they exist, between daily fire occurrence and large fire occurrence is provided by Cheetah 4. Large fire occurrence will be defined as the number of fires per day that are equal to or larger than a defined fire size class; i.e. size class D and larger. The size class break for defining large fires is defined using the pulldown labeled Plot Fires on Second Axis.

Startup Menu

Analysis is performed to either:

- Analyze Fire Occurrence and Episodes
- Analyze Resource Needs

The initial Cheetah screen provides the opportunity to select which type of analysis is desired.

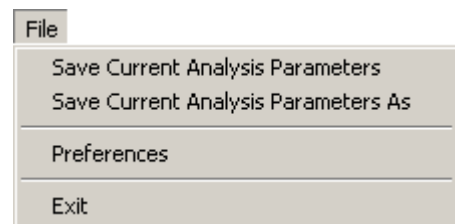


Program Control

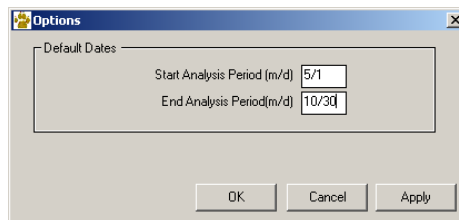
Program control is achieved by the use of menu buttons that appear in the upper left of the startup screen in addition to File, Database Maintenance and Help menus on the program's toolbar.

File Menu

The File menu is shown at the right. Analysis Parameter Set can be saved here as well as using buttons on the Analysis Setup screen.

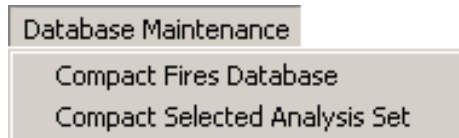


The Preferences menu is used to set the default dates for the analysis period.



Database Maintenance Menu

The Fires and Analysis Set database file size increases with use. It is recommended that the user compact the databases after frequent use. These menu items can be used to compact the fires database and Analysis Set databases.



Help Menu

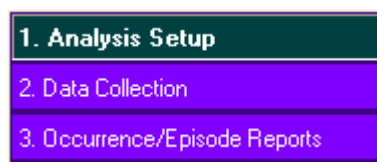
Click on this menu enables the display of the online Help system.

General Program Flow via Steps

Analysis is done in a sequential pattern defined by steps. For each type of analysis, the steps are as follows:

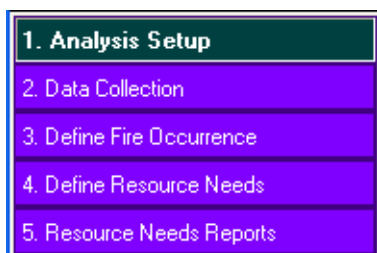
Analyzing Fire Occurrence and Episodes

- Step 1: Analysis Setup
- Step 2: Collect Fire Occurrence Records
- Step 3: Fire Occurrence and Episode Analysis and Reports



Analyzing Resource Needs

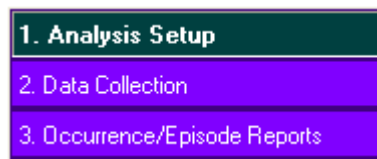
- Step 1: Analysis Setup
- Step 2: Collect Fire Occurrence Records
- Step 3: Define Fire Occurrence
- Step 4: Define Resource Needs
- Step 5: Resource Needs Reports



Details on each step follow.

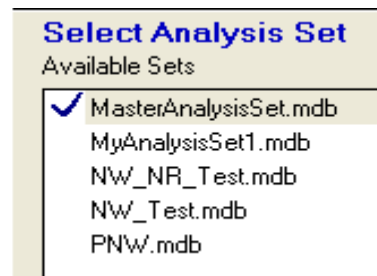
Analysis Setup - Analyzing Fire Occurrence and Episodes

Analysis setup is required for either program option. Create or select an Analysis Set.



Analysis Sets

The fires database contains one record for each fire. Cheetah 4 Analyzer uses a working database with one record per day by GACC, by State and by Agency. These working databases are called Analysis Sets. An Analysis Set is built based on a unique selection of years, GACCs, agencies and States. A unique type of Analysis Set is a Predictive Services Area (PSA), which contains a number of organizational units within a GACC.



To build an Analysis Set, click the Build Analysis Set button. Note that if the fires database is large, it may take a few moments for the Build Analysis Set screen to appear. The screen at the right shows fires database loaded with fire occurrence records for all GACCs in the United States.

The screenshot shows the 'Build Analysis Set' window with the following sections:

- Available Years:** A grid of years from 1980 to 2008, all checked.
- Selection by GACC/State/Agency:**
 - Geographic Areas:** Checkboxes for Eastern, Southern, Northern California, Southern California, Northern Rockies, Southwest, Northwest, and Western Great Basin. All are checked.
 - States:** Checkboxes for all 50 states and DC. All are checked.
- Agencies:** Checkboxes for various agencies including All of Alaska, Arizona State Forestry Department, Bureau of Indian Affairs, Bureau of Land Management, California Dept. of Forestry, Fish & Wildlife Service, and Forest Service. All are checked.
- Comments:** A text box containing 'GACC/State/Agency. Built on Jul-22-2009'.
- Buttons:** View Data Availability, Auto Comments (checked), Close, and Build Analysis Set.

Two types of Analysis Sets can be built. These two types are:

- Selection by GACC/State/Agency
- Selection by Predictive Service Area

This close-up shows the 'Selection by GACC/State/Agency' tab selected. It highlights the 'Available Organizations' section, which includes checkboxes for years 1983, 1984, 1988, 1989, 1993, and 1994, all of which are checked.

Clicking on the appropriate tab makes selection of the type.

Selection by GACC/State/Agency

Select the year(s), GACC(s) and Agency(s) to be included in the Analysis Set. Note that buttons are available to Check All and Uncheck All items in a group. Within a GACC, individual states can be selected also to further refine an Analysis Set.



Hot Tip

Note the check box titled Sync State Selection with Geographic Area.

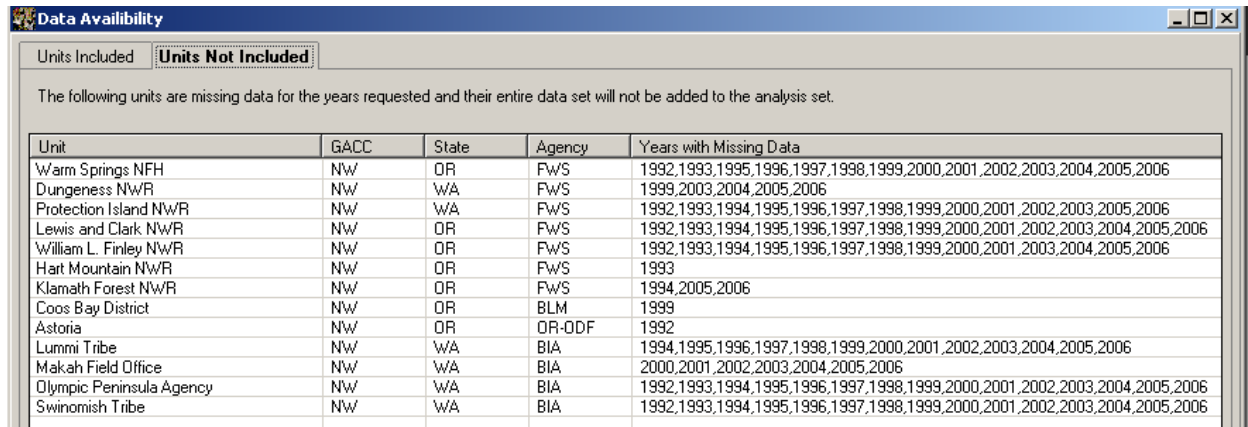
☒ Sync State Selection with Geographic Area

To perform correctly, all States that have an organizational unit in a GACC must be selected.

It is recommended this box remain checked.

View Data Availability Button

This button allows for generation of a screen showing the Units Included and Units Not Included in the Analysis Set. To be included in the Analysis Set, a unit must have fire occurrence data including years with 0 fires for every year selected. The screen below shows an example of some units that were not included in an Analysis Set with years 1997 – 2006.



The following units are missing data for the years requested and their entire data set will not be added to the analysis set.

Unit	GACC	State	Agency	Years with Missing Data
Warm Springs NFH	NW	OR	FW/S	1992,1993,1995,1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006
Dungeness NWR	NW	WA	FW/S	1999,2003,2004,2005,2006
Protection Island NWR	NW	WA	FW/S	1992,1993,1994,1995,1996,1997,1998,1999,2000,2001,2002,2003,2005,2006
Lewis and Clark NWR	NW	OR	FW/S	1992,1993,1994,1995,1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006
William L. Finley NWR	NW	OR	FW/S	1992,1993,1994,1995,1996,1997,1998,1999,2000,2001,2003,2004,2005,2006
Hart Mountain NWR	NW	OR	FW/S	1993
Klamath Forest NWR	NW	OR	FW/S	1994,2005,2006
Coos Bay District	NW	OR	BLM	1999
Astoria	NW	OR	OR-ODF	1992
Lummi Tribe	NW	WA	BIA	1994,1995,1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006
Makah Field Office	NW	WA	BIA	2000,2001,2002,2003,2004,2005,2006
Olympic Peninsula Agency	NW	WA	BIA	1992,1993,1994,1995,1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006
Swinomish Tribe	NW	WA	BIA	1992,1993,1994,1995,1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006

Unselect Years to Match Missing Year Button

For a unit's fire occurrence data to be included in an Analysis Set, there must be a complete fire data set for that unit for each of the years selected. This button allows the user to have the program change the years selected to coincide with the years of fire occurrence data for all of the units selected. Clicking on this button will change the years selected to be those years where fire occurrence data exists for all organizational units selected. Note that it is possible that no years will be selected. This can happen when there is no year when all of the units have fire occurrence data.

Build Analysis Set Button

To create the Analysis Set, click the Build Analysis Set button. Please note that if the fires database is large and many selections are made, it will take several minutes for the creation of the Analysis Set.

Selection by Predictive Service Area

Select the year(s) and the GACC PSA. Note that buttons are available to Check All and Uncheck All years.

Create PSA Button

To Create a PSA, click on the Create PSA button. The process of creating a PSA will be defined using steps as follows.

Step 1: Name the PSA

A dialog box will be displayed to allow for the naming of the PSA Analysis Set. It is suggested that the user include the letters PSA in the file name to assist the user in identifying Analysis Sets that have PSAs. After naming the PSA analysis, click OK.

Step 2: Select Organizational Units

Organizational units within the GACC will be displayed. An example is shown below.

PSA Member	Unit Name	GACC	State	Agency
☐	Adams County DNR	NW	WA	WA-DNR
☐	Ankeny NWR	NW	OR	FW/S
☐	Asotin County DNR	NW	WA	WA-DNR
☐	Astoria	NW	OR	OR-ODF
☐	Baskett Slough NWR	NW	OR	FW/S
☐	Bear Valley NWR	NW	OR	FW/S
☐	Benton County DNR	NW	WA	WA-DNR
☐	Burns District	NW	OR	BLM
☐	Cascade	NW	OR	OR-ODF
☒	Central Oregon	NW	OR	OR-ODF
☐	Chelan County DNR	NW	WA	WA-DNR
☐	Clallam County DNR	NW	WA	WA-DNR

To select an organizational unit to be a member of the PSA, click in the check box in the PSA Member column. For now, accept the default Epi-day parameters.

Step 3: Build and Save the PSA

To build the PSA, click on the Save and Close button. Next, click on the Build Analysis Set button in the lower left button of the screen.

Step 4: Determine Epi-Day Parameters

Next, the Epi-Day Parameters need to be defined for the PSA.

In Cheetah 4, the term Epi-Day is used. Three criteria are defined to facilitate the definition of an Epi-Day. These criteria are:

- Criteria 1: The Minimum Number of Fires that Occurred in a Day
- Criteria 2: The Minimum Number of Fires that Occurred Over a 3 Day Period
- Criteria 3: The Previous Day Meets One of the Two Criteria Define Above

The first criterion is based on the number of fires that occurred on a day. If fire occurrence on a day is greater than the number of fires defined in Criteria 1, then the day is classified as an Epi-Day. The Epi-Day Parameter defaults used in the Cheetah 4 program were developed to represent the entire GACC. Users establishing PSA Analysis Sets will need to evaluate these defaults and determine appropriate values to be used for the PSA selected. The following steps will guide you through this process.

Epi-Day Parameters	
Minimum of	5 Fires per Day
Minimum of	15 Fires in 3 days

Step 4a: Select the PSA to Be the Active Analysis Set

To define the Minimum Number of Fires that Occurred in a Day for a day to be an Epi-Day, Select the PSA as the Analysis Set on the Analysis Setup screen.

Step 4b: Perform Data Collection

Click on the Data Collection menu. Select all PSA data by clicking on the Collect button. The program will display the Occurrence/Episodes Reports menu.

Step 4c: Define Large Fires

On the Occurrence/Episodes Reports menu, select the minimum fire size class for the definition of a large fire for that PSA. The default is size class D and larger.

Episode Parameters

Contiguous EPI-days

Plot Fires on 2nd Axis

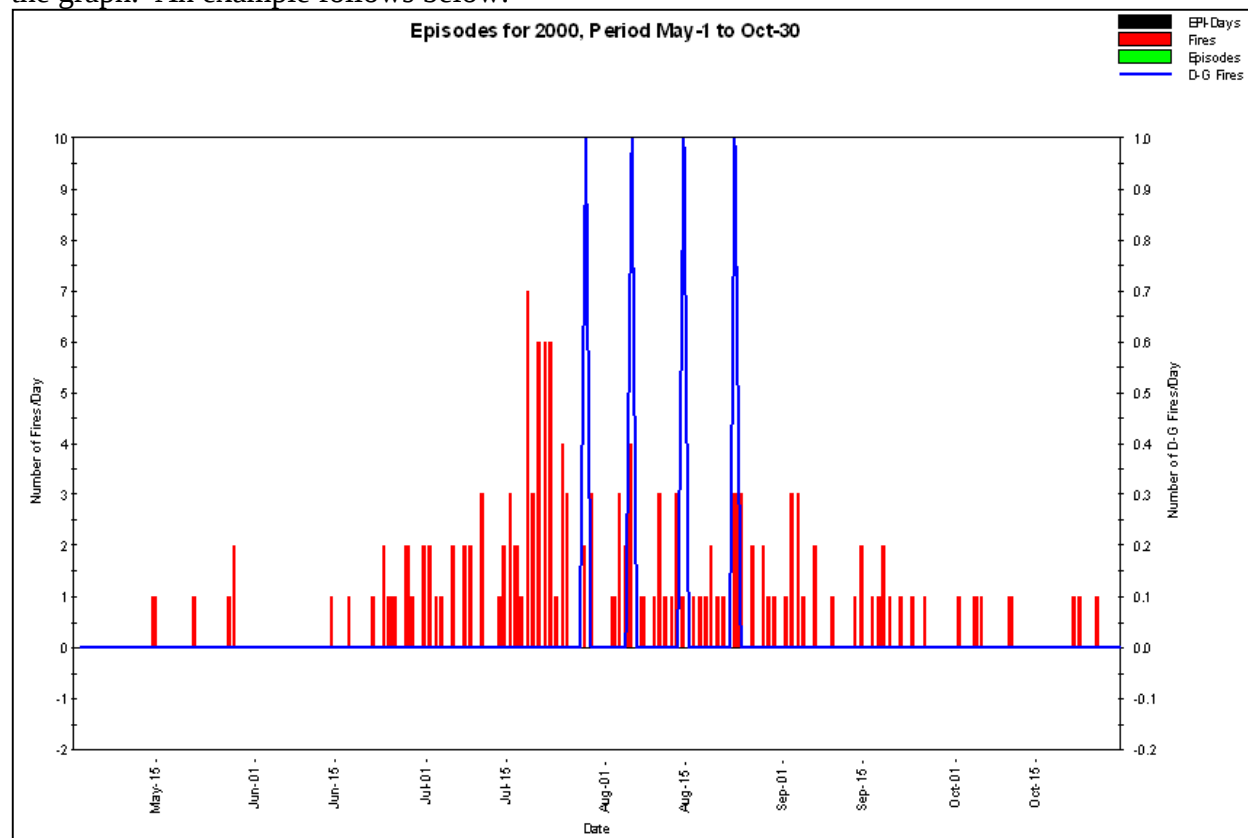
Step 4d: Review the Relationship Between Daily Fire Occurrence and Multiple Fire Occurrences

Select the GRAPH-Fire Occurrences and Episodes and a year. Then Click Run to see

Reports and Graphs

 GRAPH - Fire Occurrence and Episodes

the graph. An example follows below:



Observe the periods when multiple fire occurrences happen. When more than one fire occurs on a day, estimate the average of fires per day. In the example above, the number of daily fires on multiple fire days varies from 2 to 7 with a mean of about 3. This value is the Minimum Number of Fire per Day for a day to be an EpiDay.

Continue to do this for determination for a number of years to be comfortable with the determination of the Minimum Number of Fire per Day for a day to be defined as an Epi-day applies across a range of years.

The second criteria for a day to be an Epi-Day is:

- Criteria 2: The Minimum Number of Fires that Occurred Over a 3 Day Period

Epi-Day Parameters		
Minimum of	3	Fires per Day
Minimum of	9	Fires in 3 days

Define the Minimum Number of Fires over a 3-day period that are needed to qualify each of these 3 days as an Epi-Day. Cheetah 4 calculates for each day a 3-day running mean. If a day has its 3-day running mean greater than Minimum Number of Fires over a 3-day period, than that day is an Epi-Day. It is suggested that this number be approximately 3 times the Minimum Daily Number of Fire per Day.

Step 4e: Enter the Epi-Day Parameters for the PSA

Click on the Analysis Setup Menu. Select the PSA and the click on the Build Analysis Set button. Select the Selection by Predictive Service Area tab. Select the PSA of interest and click on the Edit PSA button. In the upper right corner of the screen, enter the Epi-Day parameters and click on the Save and Close button. On the next screen, click on the Close button. The Epi-Day parameters are now saved within the parameters set for the PSA.

To proceed with analysis in Cheetah 4 Analyzer, an Analysis Set must be selected in Step 1.

View Set Summary Button

Once an Analysis Set is built, a summary of the fire occurrence in the analysis set can be reviewed. Three tabs are available:

View Set Summary

- Summary of Available Records
- Yearly Record Total Graph
- Units Used in PSA

The last tab is only active if the Analysis Set is a PSA.

Summary of Available Records

Below is an example of what is displayed on this tab follows. Notice the fire occurrence is summarized by:

- Year
- GACC
- State
- Agency
- Fire Size Class

Summary of Available Records

Yearly Record Total Graph

Units Used in PSA

Analysis Set: C:\Cheetah2\Sets\California.mdb

Parameters used to build this set:

GACCs: NO, SO

States: CA

Agencies: BIA, BLM, FWS, FS, NPS

Years: 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002

Fire Records by Year, GACC, State, Agency, and Size Class

FireYear	GACC	State	Agency	A	B	C	D	E	F	G	Total
1980	NO	CA	BIA	344	21	0	0	0	0	0	365
1981	NO	CA	BIA	170	17	5	0	0	0	0	192
1982	NO	CA	BIA	68	14	0	0	0	0	0	82
1983	NO	CA	BIA	67	6	1	0	0	0	0	74
1984	NO	CA	BIA	46	16	3	1	0	0	0	66
1985	NO	CA	BIA	41	27	4	0	0	0	0	72
1986	NO	CA	BIA	55	30	3	0	0	0	0	88
1987	NO	CA	BIA	72	28	6	1	0	0	0	107
1988	NO	CA	BIA	35	20	3	0	0	0	0	58
1989	NO	CA	BIA	42	27	1	0	0	0	0	70
1990	NO	CA	BIA	53	50	2	1	0	0	0	106
1991	NO	CA	BIA	106	53	4	0	0	0	0	163
1992	NO	CA	BIA	93	76	1	0	0	0	0	170
1993	NO	CA	BIA	80	49	1	0	0	0	0	130
1994	NO	CA	BIA	66	45	3	1	0	0	0	115
1995	NO	CA	BIA	173	75	1	0	0	0	0	249
1996	NO	CA	BIA	51	34	2	1	0	0	0	88
1997	NO	CA	BIA	41	39	0	0	0	0	0	80
1998	NO	CA	BIA	70	65	4	0	0	0	0	139

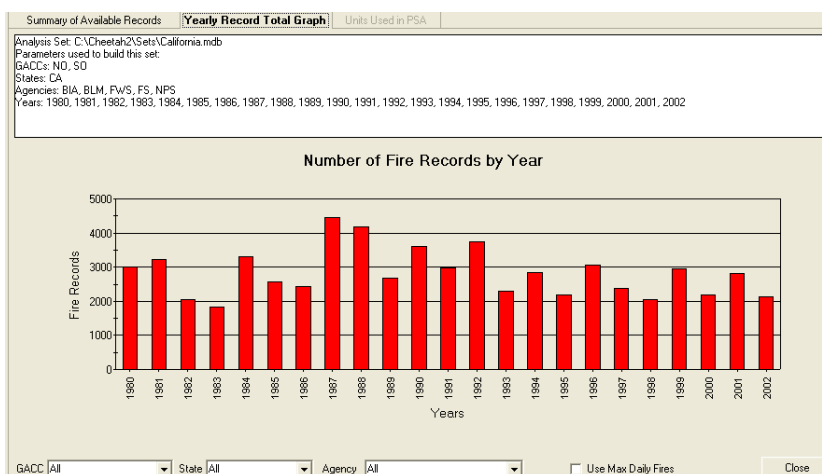
Close

Yearly Record Total Graph

At the right is an example of what is displayed on this tab. Notice the fire occurrence is summarized by:

- Year
- GACC
- State
- Agency

The last three items can be specified by the pulldowns at the bottom of the screen.



To compare graphs, it is often valuable to have the scale on the vertical axis remain constant. This can be done by checking the box to the left of the Use Max Daily Fires at the bottom of the screen.

☐ Use Max Daily Fires

Units Used in PSA

Below is an example of what is displayed on this tab. Notice the included units are summarized by:

- Unit Name
- GACC
- State
- Agency

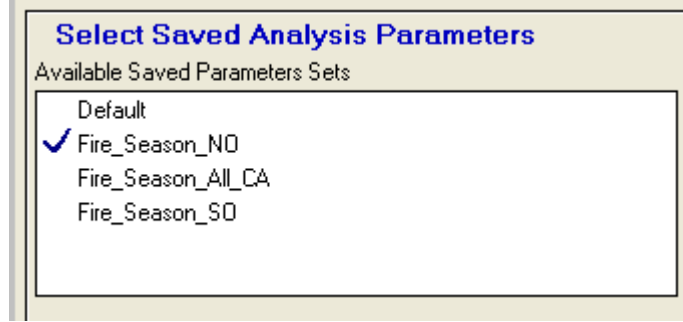
Units Used to Build this Analysis Set				
Unit Name	GACC	State	Agency	
Deschutes National Forest	NW	OR	FS	
Ochoco National Forest	NW	OR	FS	
Prineville District	NW	OR	BLM	
Central Oregon	NW	OR	OR-ODF	



Analysis Parameters

An Analysis Set's parameters includes the following:

- Years Selected
- Start Analysis Date
- End Analysis Date
- GACC(s) Selected
- Agencies Selected
- States Selected
- Percent of Fires by Fuel Type
- Resource Use Coefficients



Select Saved Analysis Parameters

Available Saved Parameters Sets

- Default
- ✓ Fire_Season_NO
- Fire_Season_All_CA
- Fire_Season_SO

An Analysis Parameters Set is associated with an Analysis Set. Multiple Analysis Parameters Sets can be saved for use with an Analysis Set. In the example above, three additional Parameter Sets have been defined in California. The one that is active (has the check by it) has a defined fire season (start and stop dates) and includes only the NO GACC. The Parameter Set below that has the same fire season but has both the NO and SO GACC's.

To create a Parameter set, select the Analysis Set on the Analysis Setup screen. Go to Data Collection and select the following:

- Years Selected
- Start Analysis Date
- End Analysis Date
- GACC(s) Selected
- Agencies Selected
- States Selected

See description on the following pages for the processes to select values for each.



Hot Tip

The following two sets of values are used in the Analyze Resource Needs section of the program:

- Percent of Fires by Fuel Type
- Resource Use Coefficients

These items are also defined in a Parameters Set and the process to do so is described in section of this Users' Guide where the Analyze Resource Needs is described.

Go back to the Analysis Setup screen and click on the Save Current Analysis Parameters As button. Name the Parameter Set and optionally, you can provide a narrative description.

Save Current Analysis Parameters As

Data Collection - Analyzing Fire Occurrence and Episodes

After completing Step 1: Analysis Set selected by the user, this option allows for the display of fire occurrence by day during an Analysis Period. This display can be for a series of years in the fires database. A variety of graphs and reports are available. Overlaid on the graph is a line showing the daily occurrence of fires greater than a user-defined fire size class. Analysis of correlations between total fire occurrence and large fire occurrence can be done.

Step 1: Analysis Setup

On the Analysis Setup screen, select an Analysis Set.



Step 2: Data Collection

On the menu, select Data Collection. After clicking on the Data Collection menu, a screen similar to the one below will appear.



Step 2. Collect Fire Occurrence Records for Analysis

Years and Analysis Period Date Ranges

Years

Check All Uncheck All

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

Start Analysis Period (m/d) 1/1

End Analysis Period (m/d) 12/31

Organizations

Geographic Areas

Check All Uncheck All

Northern California Southern California

Agencies

Check All Uncheck All

Bureau of Indian Affairs Bureau of Land Management California Dept. of Forestry Fish & Wildlife Service Forest Service National Park Service

States

Check All Uncheck All

California Hawaii

The user needs to define the fire occurrence records to be used in the analysis by specifying:

- The Year(s) to be Included
- The Analysis Period Date Range
- The Geographic Area(s) to be Included
- The Agency(s) to be Included
- The State(s) to be Included

The Year(s) to be Included

The Cheetah 4 fire occurrence database contains fire records by fire size class (A, B, C, D, E, F and G) for each day. To select a year, click in the box to the left of the year. One can also double click on the year to select a year. To select all of the years, click on the Check All button. To deselect all years, click on the Uncheck All button.

Size Class	Acres
A	0 – 0.24
B	0.25 - 9.9
C	10 - 99
D	100 – 299
E	300 - 999
F	1000 - 4999
G	5000+

The Analysis Period Date Range (The Start and Stop Dates)

Normally, analysis is desired for a specific range of calendar dates within a year. The start date and the ending day in date/month format are entered in the boxes provided for each. The dates between the start and stop date including the start and stop date is called the Analysis Period.

The Geographic Area(s) to be Included

The Cheetah 4 program analysis set database contains fire report data for the 11 geographic areas: Alaska, Eastern, Eastern Great Basin, Northern California, Northern Rockies, Northwest, Rocky Mountain, Southern, Southern California, Southwest and Western Great Basin.

To select Geographic Area(s), click in the box to the left of the Geographic Area name. One can also double click on the Geographic Area name to select a Geographic Area. To select all of the Geographic Areas, click on the Check All button. To deselect all Geographic Areas, click on the Uncheck All button.

The Agencies to be Included

Fire occurrence data from the following agencies is included in the database: USDA-Forest Service, USDI-Bureau of Land Management, USDI-National Park Service, USDI-Bureau of Indian Affairs and USDI-Fish and Wildlife Service. If additional agencies are added such as a state protection agency, that agency will also show up here.

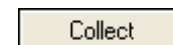
To include fire occurrence for an Agency, click in the box to the left of the Agency. One can also double click on the Agency Name to select an Agency. To select all of the Agencies, click on the Check All button. To de-select all Agencies, click on the Uncheck All button.

The States to be Included

Within the GACC(s) selected, the states will be shown in the State box. To restrict fire occurrence to selected states, click in the box to the left of each state to included and uncheck states that will not be included. One can also double click on the State name to select a State. To select all of the States, click on the Check All button. To deselect all States, click on the Uncheck All button.

Collecting Fire Records

Once the Years, Dates, Organizations and Agencies are selected, click on the Collect Button to allow Cheetah 4 to retrieve from the fire occurrence database the fire occurrence records that meet the defined criteria.



Step 3: Fire Occurrence and Episode Reports

Analysis is done via graphs and reports. There are six graphs and four reports available.

1. Analysis Setup
2. Data Collection
3. Occurrence/Episode Reports

Analysis of Fire Occurrence and Acres Burned

To analyze fire occurrence, two graphs and one report are provided.

One graph is by year and the other is by cause. The report is for all years selected.

GRAPH – Fire Occurrence Only

The Fire Occurrence Graph shows the number of fires per day for the Analysis Period selected in Step 2. From the pulldown in the upper center left part of the screen, select GRAPH – Fire Occurrence Only. Select the Year to be graphed or select All Years to see an average for the years selected in Step 2. The user needs to define the following information to produce a Fire Occurrence and Episode graph:

- Year or All Years
- Fire Occurrence Parameters

Year

Select the Year desired or select All Years.

Fire Occurrence and Acres Burned Parameters

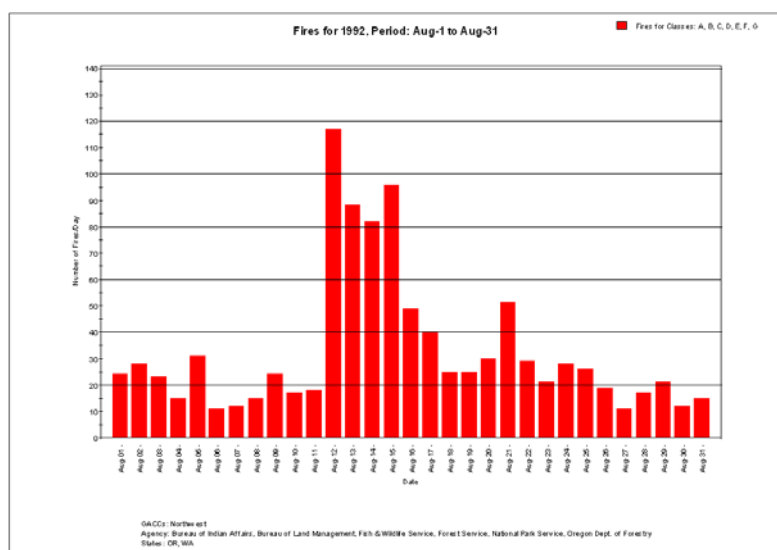
Select the size classes to be plotted. The size classes to be displayed are selected by clicking in the check boxes in the Fire Occurrence and Burned Acres Parameters section of the screen. The fire occurrence per day for the year selected or the average per day if all years is selected is graphed by fire size class. Checking the Plot Total Fires box will result in a stacked bar graph being plotted per day showing the total fires within the size classes selected and the total fire occurrence on that day.

Create Graph

Click on the Run Button to see the graph. Each graph is displayed in a standalone window. Each graph can be printed. The user can close a Graph Window by clicking on the Close Button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed. Graphs can be saved in rtf or pdf formats.

Export

The user can create a spreadsheet with the data from this graph using the Export – Fire Occurrence export function.



GRAPH – Fire Occurrence by Cause (Human and Natural)

The Fire Cause Graph shows the number of fires per day for the Analysis Period selected in Step 2. From the pulldown in the upper left part of the screen, select GRAPH – Fire Cause (Human and Natural). Select the Year to be graphed or All Years. The user needs to define the following information to produce a graph:

- Year or All Years
- Fire Cause Parameters (Both Human and Natural, Only Human, Only Natural)

Year

Select the Year Desired or All Years.

Fire Occurrence and Acres Burned Parameters

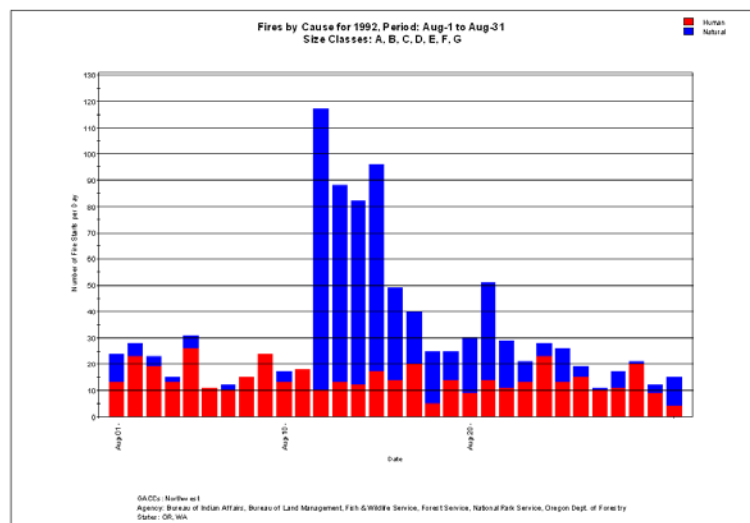
Select the size classes to be plotted. The size classes to be displayed are selected by clicking in the check boxes in the Fire Occurrence and Burned Acres Parameters section of the screen. The fire occurrence per day by cause(s) for the year selected or the average per day if all years is selected is graphed by fire size class. Checking the Plot Total Fires box will result in a stacked bar graph being plotted per day showing the total fires within the size classes selected and the total fire occurrence on that day.

Create Graph

Click on the Run button to see the graph. Each graph is displayed in a standalone window. Each graph can be printed. The user can close a Graph Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed. Graphs can be saved in rtf or pdf formats.

Export

The user can create a spreadsheet with the data from this graph using the Export – Fire Occurrence export function.



GRAPH – Fire Acres by Cause (Human and Natural)

The Fire Acres by Cause Graph shows the number of total acres burned for fires that started on the day noted on the graph. The range of dates is for the Analysis Period selected in Step 2. From the pulldown in the upper left part of the screen, select GRAPH – Fire Acres by Cause (Human and Natural). Select the Year to be graphed or All Years. The user needs to define the following information to produce a graph:

- Year or All Years
- Fire Cause Parameters (Both Human and Natural, Only Human, Only Natural)

Year

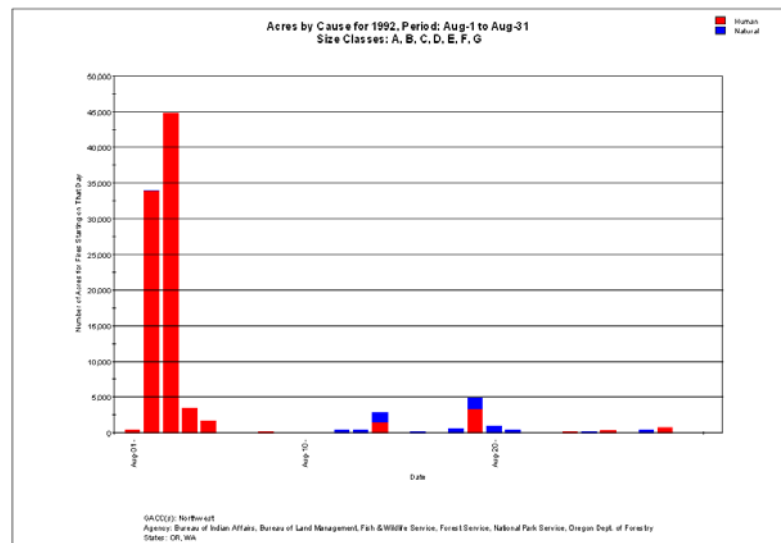
Select the Year Desired or All Years.

Fire Occurrence and Acres Burned Parameters

Select the size classes to be plotted. The size classes to be displayed are selected by clicking in the check boxes in the Fire Occurrence and Burned Acres Parameters section of the screen. The acres burned by cause(s) for the year selected or the average per day if all years is selected is graphed by fire size class. Checking the Plot Total Fires box will result in a stacked bar graph being plotted per day showing the total acres burned within the size classes selected and the total acres burn for fires that started on that day.

Create Graph

Click on the Run button to see the graph. Each graph is displayed in a standalone window. Each graph can be printed. The user can close a Graph Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed. Graphs can be saved in rtf or pdf formats.



REPORT – Fire Occurrence

From the pulldown in the center left part of the screen, select REPORT – Fire Occurrence. The Fire Occurrence Report shows the number of fires that started during the period by size class by year for the Analysis Period and Years selected in Step 2. The total, maximum, minimum and average daily number of fires by size class for the analysis period is shown by year. Also shown is the percent of fires for the period by size class. If multiple years are selected, the report has a summary at the bottom.

Create Report

Click on the Run button to see the report. Each report can be printed and saved in rtf file format. Each report is displayed in a standalone window. The user can close a Report Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed. An example fire occurrence report follows:

Years: 2004, 2005, 2006
 Period: 8/1 to 8/31
 Analysis Set: NW_GACC_DWC_1997-2006-C4.mdb
 GACC(s): Northwest
 States: OR, WA
 Agencies: Bureau of Indian Affairs, Bureau of Land Management, Fish & Wildlife Service, Forest Service, National Park Service, Oregon Dept. of Forestry, Washington Department of Natural Resources
 Fires: 4,612 fires selected from 42,645 fires in the Analysis Set (714,526 fires in the Master Database)

	Number of Fires by Size Class for Human and Natural Caused							
Year	A	B	C	D	E	F	G	Total
2004								
Total Fires	1,205	333	32	11	3	5	3	1,592
Daily Max. Fires	103	35	5	2	1	2	3	145
Daily Avg. Fires	38.9	10.7	1.0	0.4	0.1	0.2	0.1	51.4
Daily Min. Fires	3	0	0	0	0	0	0	4
Daily Standard Dev.	31.6	10.1	1.2	0.7	0.3	0.5	0.5	42.1
Daily Standard Error	5.7	1.8	0.2	0.1	0.1	0.1	0.1	7.6
Daily Percent Error	14.6%	17.0%	21.3%	33.4%	55.8%	50.6%	100.0%	14.7%
Percent of Fires by Size Class	75.7%	20.9%	2.0%	0.7%	0.2%	0.3%	0.2%	100.0%
2005								
Total Fires	826	292	46	14	12	14	7	1,211
Daily Max. Fires	60	24	6	2	2	2	2	84
Daily Avg. Fires	26.6	9.4	1.5	0.5	0.4	0.5	0.2	39.1
Daily Min. Fires	8	1	0	0	0	0	0	12
Daily Standard Dev.	12.2	6.6	1.8	0.6	0.6	0.7	0.6	19.5
Daily Standard Error	2.2	1.2	0.3	0.1	0.1	0.1	0.1	3.5
Daily Percent Error	8.3%	12.5%	21.6%	24.8%	28.5%	28.7%	49.1%	9.0%
Percent of Fires by Size Class	68.2%	24.1%	3.8%	1.2%	1.0%	1.2%	0.6%	100.0%
2006								
Total Fires	1,248	437	55	20	15	19	15	1,809
Daily Max. Fires	145	56	12	7	3	6	7	209
Daily Avg. Fires	40.3	14.1	1.8	0.6	0.5	0.6	0.5	58.4
Daily Min. Fires	14	0	0	0	0	0	0	15
Daily Standard Dev.	35.2	13.7	2.5	1.4	0.8	1.4	1.5	49.7
Daily Standard Error	6.3	2.5	0.5	0.3	0.1	0.2	0.3	8.9
Daily Percent Error	15.7%	17.5%	25.7%	39.7%	30.1%	40.5%	54.1%	15.3%
Percent of Fires by Size Class	69.0%	24.2%	3.0%	1.1%	0.8%	1.1%	0.8%	100.0%
Totals and Averages for the Selected Years								
All Years								
Total No. of Fires	3,279	1,062	133	45	30	38	25	4,612
Yearly Avg. Fires	1,093.0	354.0	44.3	15.0	10.0	12.7	8.3	1,537.3
Avg. Daily Max. Fires	103.0	38.0	12.0	4.0	2.0	3.0	4.0	146.0
Daily Avg. Fires	35.3	11.4	1.4	0.5	0.3	0.4	0.3	49.6
Avg. Daily Min. Fires	8.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
Daily Standard Dev.	28.5	10.6	1.9	1.0	0.6	0.9	1.0	39.6
Daily Standard Error	3.0	1.1	0.2	0.1	0.1	0.1	0.1	4.1
Daily Percent Error	8.4%	9.7%	14.0%	20.9%	20.2%	24.0%	37.4%	8.3%
Percent of Fires by Size Class	71.1%	23.0%	2.9%	1.0%	0.7%	0.8%	0.5%	100.0%

REPORT – Fire Acres

From the pulldown in the center left part of the screen, select REPORT – Fire Acres. The Fire Acres Report shows the number of acres burned for fires that started on during the period by size class by year for the Analysis Period and Years selected in Step 2. The total, maximum, minimum and daily average acres burned by size class for the analysis period is shown by year. Also shown is the percent of fires for the period by size class. If multiple years are selected, the report has a summary at the bottom.

Create Report

Click on the Run button to see the report. Each report can be printed and saved in rtf file format. Each report is displayed in a standalone window. The user can close a Report Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed. An example fire occurrence report follows:

Fire Acres Report for Human and Natural Caused Fires
Date: 7/27/2009 6:29:08 AM

Years: 2004, 2005
Period: 8/1 to 8/10
Analysis Set: NW_GACC_DWC_2004-2008-C4.mdb
GACC(s): Northwest
States: OR, WA
Agencies: Bureau of Indian Affairs, Bureau of Land Management, Fish & Wildlife Service, Forest Service, National Park Service, Oregon Dept. of Forestry, Washington Department of Natural Resources
Fires: 1,176 fires selected from 21,575 fires in the Analysis Set (714,526 fires in the Master Database)

Acres by Size Class for Human and Natural Caused								
Year	A	B	C	D	E	F	G	Total
2004								
Total Acres	37	175	632	1,583	300	4,000	45,824	52,551
Daily Max. Acres	10	42	318	505	300	4,000	45,824	45,890
Daily Avg. Acres	3.7	17.5	63.2	158.3	30.0	400.0	4,582.4	5,255.1
Daily Min. Acres	1	3	0	0	0	0	0	19
Daily Standard Dev.	2.9	12.0	97.3	166.0	94.9	1,264.9	14,490.8	14,325.8
Daily Standard Error	0.9	3.8	30.8	52.5	30.0	400.0	4,582.4	4,530.2
Daily Percent Error	24.6%	21.7%	48.7%	33.2%	100.0%	100.0%	100.0%	86.2%
Percent of Acres by Size Class	0.1%	0.3%	1.2%	3.0%	0.6%	7.6%	87.2%	100.0%
2005								
Total Acres	27	183	605	858	4,156	14,732	231,131	251,691
Daily Max. Acres	5	35	159	267	780	5,187	104,000	104,800
Daily Avg. Acres	2.7	18.3	60.5	85.8	415.6	1,473.2	23,113.1	25,169.1
Daily Min. Acres	1	10	0	0	0	0	0	172
Daily Standard Dev.	1.4	8.3	65.0	98.1	327.1	2,008.5	36,084.7	36,501.0
Daily Standard Error	0.4	2.6	20.6	31.0	103.4	635.1	11,411.0	11,542.6
Daily Percent Error	16.0%	14.4%	34.0%	36.2%	24.9%	43.1%	49.4%	45.9%
Percent of Acres by Size Class	0.0%	0.1%	0.2%	0.3%	1.7%	5.9%	91.8%	100.0%
Totals and Averages for the Selected Years								
All Years Total Acres	65	358	1,236	2,441	4,456	18,732	276,955	304,243
Yearly Avg. Acres	32.3	179.0	618.2	1,220.3	2,228.0	9,366.0	138,477.5	152,121.4
Avg. Daily Max. Acres	8.0	39.0	317.9	386.0	540.0	4,594.0	74,912.0	75,345.0
Daily Avg. Acres	3.2	17.9	61.8	122.0	222.8	936.6	13,847.8	15,212.1
Avg. Daily Min. Acres	1.0	6.0	0.0	0.0	0.0	0.0	0.0	96.0
Daily Standard Dev.	2.3	10.1	80.5	137.8	306.7	1,723.9	28,401.0	28,856.1
Daily Standard Error	0.5	2.3	18.0	30.8	68.6	385.5	6,350.7	6,452.4
Daily Percent Error	15.8%	12.6%	29.1%	25.2%	30.8%	41.2%	45.9%	0.4%
Percent of Acres by Size Class	0.0%	0.1%	0.4%	0.8%	1.5%	6.2%	91.0%	100.0%

Analysis of Fire Occurrence and Episodes

Earlier in this document, it was noted that three criteria are used to define an Epi-Day. These criteria are:

- Criteria 1: The Minimum Number of Fires that Occurred in a Day
- Criteria 2: The Minimum Number of Fires that Occurred Over a 3 Day Period
- Criteria 3: The Previous Day Meets One of the Two Criteria Define Above

The default number of fires per day for each Geographic Area is shown in the table at the right. These default values were established using the process described in the Analysis Setup section.

GACC	Min. Fires per Day for Criteria 1	Min. Fires over 3 Days for Criteria 2
Alaska	10	30
Eastern	14	42
Eastern Great Basin	15	45
Northern California	20	60
Northern Rockies	25	75
Northwest	50	150
Rocky Mountain	20	50
Southern	15	45
Southern California	20	60
Southwest	30	90
Western Great	15	45

When an Analysis Area is created, there is a selection of the following in addition to the start and stop dates and years:

- GACC(s)
- State(s)
- Agency(s)

Based on the selection of GACC(s), State(s) and Agency(s), the Minimum Number of Fires that Occurred in a Day and the Minimum Number of Fires that Occurred Over a 3 Day Period, the default values are prorated for the Analysis Area from the fire occurrence within the GACC(s), State(s) and Agency(s) selected.

For Example, assume an Analysis Set defined below. Both Northern California and Southern California GACCs, all Agencies and the state of California are selected.

Step 2. Collect Fire Occurrence Records for Analysis

Years and Analysis Period Date Ranges

Years

Check All Uncheck All

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

Start Analysis Period (m/d) 1/1

End Analysis Period (m/d) 12/31

Organizations

Geographic Areas

Check All Uncheck All

Northern California Southern California

Agencies

Check All Uncheck All

Bureau of Indian Affairs Bureau of Land Management California Dept. of Forestry Fish & Wildlife Service Forest Service National Park Service

States

Check All Uncheck All

California Hawaii

The Epi-Day parameters are shown at the right. The minimum Number of Fires per Day for the NO GACC is 20 and the number for the SO GACC is 20, hence the Minimum Number of Fires per Day for the Analysis Area is 40. The Minimum Number of Fires in 3 Days is 60 for each GACC so this value for the Analysis Area is a Minimum of 120 Fires in 3 Days. The default Parameter Set will always use the assigned Epi-Day and Episode parameters but the user can define different Epi-Day and Episode parameters in a custom Parameter Set.

Epi-Day Parameters

Minimum of Fires per Day

Minimum of Fires in Days

Note: These numbers were automatically populated from default GACC values.

To analyze fire occurrence and fire occurrence episodes, one report and two graphs are provided. The graphs are by year whereas the report is for all years selected.

GRAPH – Fire Occurrence and Episodes

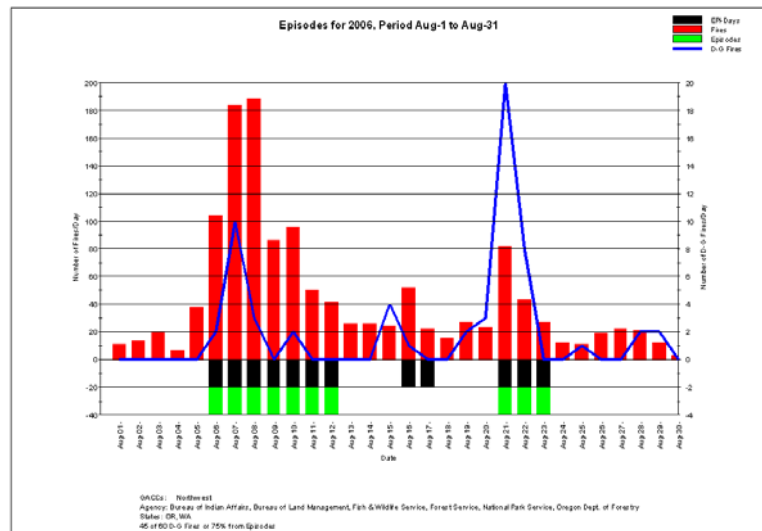
The Fire Occurrence and Episode Graph shows as a bar graph the number of fires per day for the Analysis Period selected in Step 2. In addition, the number of fires within and larger than a size class is shown with a line using the scale on the second y-axis. Shown for each day is a black bar at the bottom of the graph designating whether a day qualifies as an Epi-Day or is part of a fire occurrence Episode (green bar) or both.

From the pulldown in the center left part of the screen, select GRAPH – Fire Occurrence and Episodes. The user needs to define the following information to produce a Fire Occurrence and Episode graph:

- Year
- Epi-Day Parameters
- Episode Parameters

Create Graph

Click on the Run button to see the graph. Each graph is displayed in a standalone window. Each graph can be printed. The user can close a Graph Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed.



Export

The user can create a spreadsheet with the data from this graph using the Export – Fire Occurrence and Episodes export function.

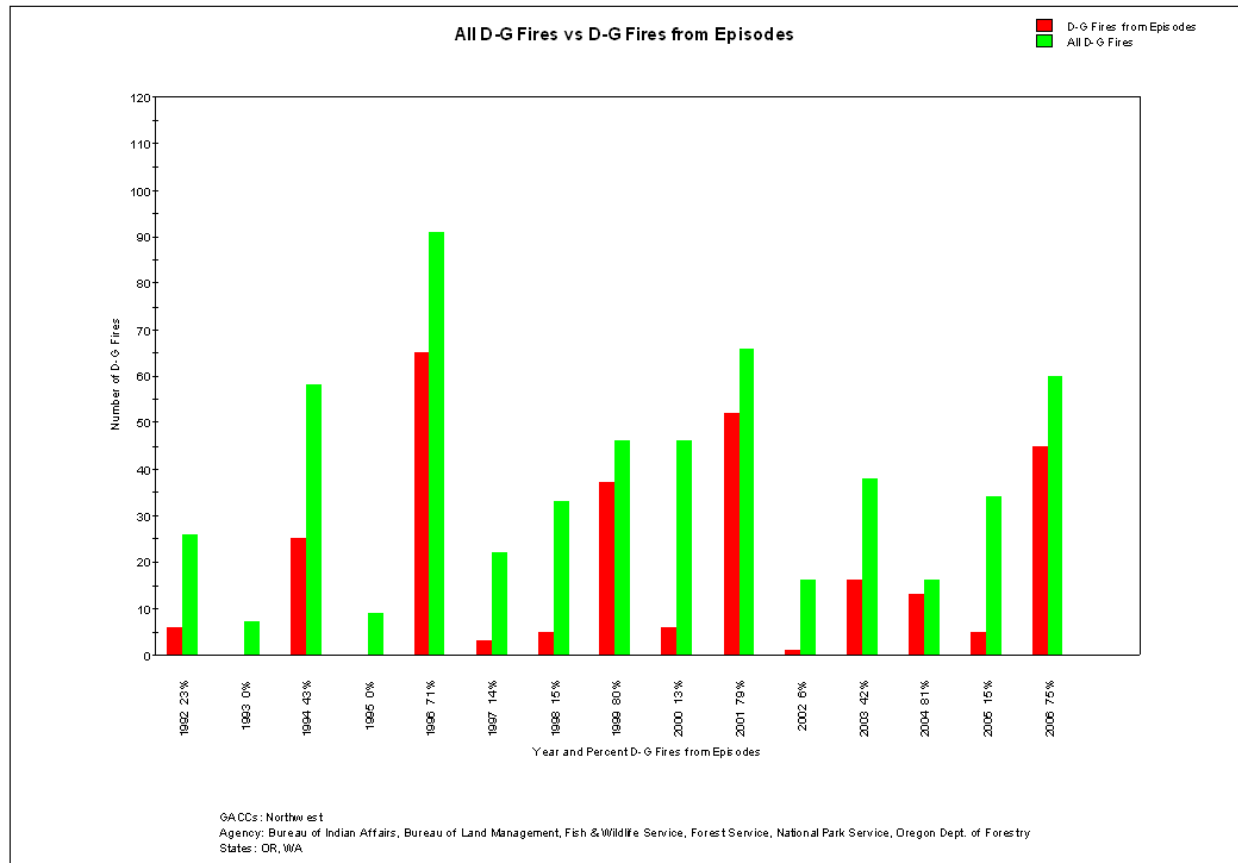
GRAPH – Yearly Episode Summary

First, the user needs to define the minimum size class of fires that will be plotted from episodes with the total fires for the time period with the minimum size class defined. In the example at the right, the minimum size class is D and larger. An example of the generated side-by-side bar graph follows.

Episode Parameters

Contiguous EPI-days

Plot Fires on 2nd Axis



In the example, the red bar represents the number of size class D and larger fires that occurred during episodes. The green bar represents the total number of size class D and larger fires that occurred during the time period. Also shown along the horizontal axis is the percent of all size class D and larger fires that occurred during the time period during episodes.

Export

The user can create a spreadsheet with the data from this graph using the Export – Yearly Episode Summary export function.

REPORT – Episodes

Use the pulldown in the upper left part of the screen to select REPORT – Episode. The fire occurrence Episode Report shows, by year, information for each fire occurrence Episode that occurred. Shown are the start date, the end date, number of days in length, total number of fires and total number of large fires. Before creating a fire occurrence Episode Report, the user needs to select the Epi-Day Parameters and Episode Parameters (see descriptions above).

Create Report

Click on the Run button to see the report. Each report is displayed in a standalone window. Each report can be printed and saved in rtf or pdf file format. Each report is displayed in a standalone. The user can close a Report Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed.

An example Episodes Report follows:

Years: 2004, 2005, 2006
Period: 8/1 to 8/31
Analysis Set: NW_GACC_1997-2006.mdb
GACCs: Northwest
States: OR, WA
Agencies: Bureau of Indian Affairs, Bureau of Land Management, Fish & Wildlife Service, Forest Service, National Park Service, Oregon Dept. of Forestry
Fires: 48,437 selected from 48,437 in the Analysis Set (637,168 in the Master Database)

Episodes					
Year	Episode Start Date	Episode End Date	No. Of Days	Total Fires	D-G Fires
2004	Aug-1	Aug-6	6	386	6
2004	Aug-13	Aug-21	9	601	7
2005	Aug-21	Aug-23	3	144	5
2006	Aug-6	Aug-12	7	750	17
2006	Aug-21	Aug-23	3	152	28

Summary			
Year	D-G Fires From Episodes	D-G Fires All	Percent
2004	13	16	81.3%
2005	5	34	14.7%
2006	45	60	75.0%
Total	63	110	57.3%

Statistics			
	Fires Per Episode	Days Per Episode	D-G Fires Per Episode
Maximum	750.0	9.0	28.0
Average	406.6	5.6	12.6
Minimum	144.0	3.0	5.0

Probability of one of more episodes: 100% (3 years with episodes in 3 years)

Average first episode date for years with episodes: Aug-10

Average last episode date for years with episodes: Aug-23

Analysis of Active Fires

The Active Fire Graph and Report are build to show the number of fires by size class that have been burning on a given date. This graph and report can only be generated for a specific year, not for an average based on a range of years.

Active Fire

Individual fire report data in the Cheetah 4 master fire database contain a fire discovery date for each fire. Few fires though have a fire contain date. Most fire reports have a fire control date.

In some cases though a fire's control date may be a long period of time from the fire discovery date creating the impression the fire is "active" when most likely it is contained. To mitigate this situation, the user can define by GACC and fire size class the maximum number of days for a fire to be considered active. The screen dialog at the right shows an example of this chart.

GACC Name	Max. Days Class A	Max. Days Class B	Max. Days Class C	Max. Days Class D	Max. Days Class E	Max. Days Class F	Max. Days Class G
Northwest	1	1	3	6	8	12	26

Below is a table with default values by GACC by size class. These default were developed by Predictive Services at NICC in Boise based on the fire records in the Cheetah 4 fires database. These defaults are meant to represent the approximate number of days by size class that fires tend to remain active and utilize the greatest number of suppression resources.

Cheetah 4 Default Days to Control by GACC and Size Class							
GACC	Fire Size Class						
	A	B	C	D	E	F	G
	Number of Days from Discovery to Control						
AK	1	1	4	14	18	26	58
EA	1	1	1	1	2	4	11
EB	1	1	3	4	6	11	27
NO	1	1	2	3	6	13	24
NR	1	1	3	8	22	36	52
NW	1	1	3	6	8	12	26
RM	1	1	2	3	5	8	18
SA	1	1	1	3	4	7	14
SO	1	1	1	2	4	6	12
SW	1	1	2	5	7	11	24
WB	1	1	1	2	3	5	7

The Cheetah 4 program will treat a fire as an active fire on a day if the fire is not controlled and the number of days between the fire discovery date and the display date is less than or equal to the value in the Maximum Days to Containment Values Table for the fire's size class. For example, assume a size class D fire started on August 1 and was controlled on August 4. The fire would be shown as active on August 1, 2, 3 and 4 if the maximum number of days to containment for a D fire was defined as 5 days. But assume the fire was not controlled until August 8. Then the fire would be considered active on August 1, 2, 3, 4 and 5 only.

To analyze active fires, one graph and one report are provided.

GRAPH – Active Fires

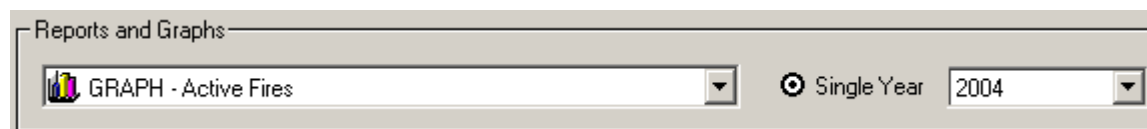
The Active Fire Graph shows as a graph the number of active fires per day for the Analysis Period selected in Step 2. It also shows the number of new fires that started on each days.

From the pulldown in the center left part of the screen, select GRAPH – Active Fires. The user needs to define the following information to produce an Active Fires graph:

- Year
- Stacked Bar Graph Parameters By Size Class If Desired (maximum of 3 groupings)
- Start and End Dates
- Any Changes to the Maximum Days to Containment Values
- Inclusion or Not of Fires That Have No Control Date

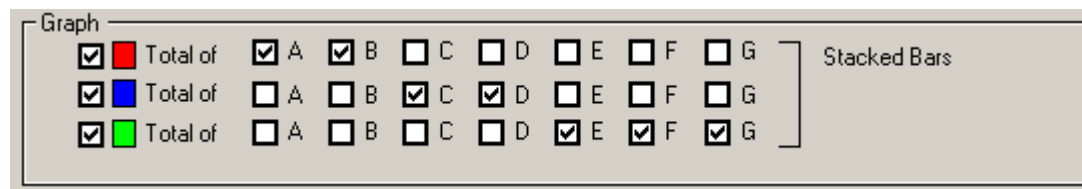
Year

Select the year for the graph using the pulldown.



Stacked Bar Graph Parameters By Size Class If Desired (maximum of 3 groupings)

If grouping of fire size classes into up to 3 groups is desired, click on the check on the box to the left side of the screen dialog (see below) for each group. Initially, only the top group will be selected and all of the size class A-G check boxes will be checked. The example below has three groups.



Start and End Dates

For the Start Date of the graph, the only active fires for that date are those fires that were discovered on that date. The Cheetah 4 program does “look” earlier than the Graph Start Date when it counts active fires. It only starts counting from the Graph Start Date. The Graph Start Date cannot be earlier in the year than the Analysis Start Date.

Start Date (m/d)	7/15	48 Days
End Date (m/d)	8/31	



Hot Tip

To get an accurate count of active fires for a period of time, set the Graph Start Date at a date that is earlier than the desired Graph Start Date minus the maximum number of days to containment from the Maximum Days to Containment Table.

For example, if the largest value for all GACCs listed in the Maximum Days to Containment Values was 15 and the graph is to show active fires starting on August 1, then the Graph Start Date should be set to July 16.

Any Changes to the Maximum Days to Containment Values

Click on the Max. Days to Containment Values button to change any of these values for a GACC from the default values. Any changes are saved for the Analysis Set.

Max Days to Containment Values ...

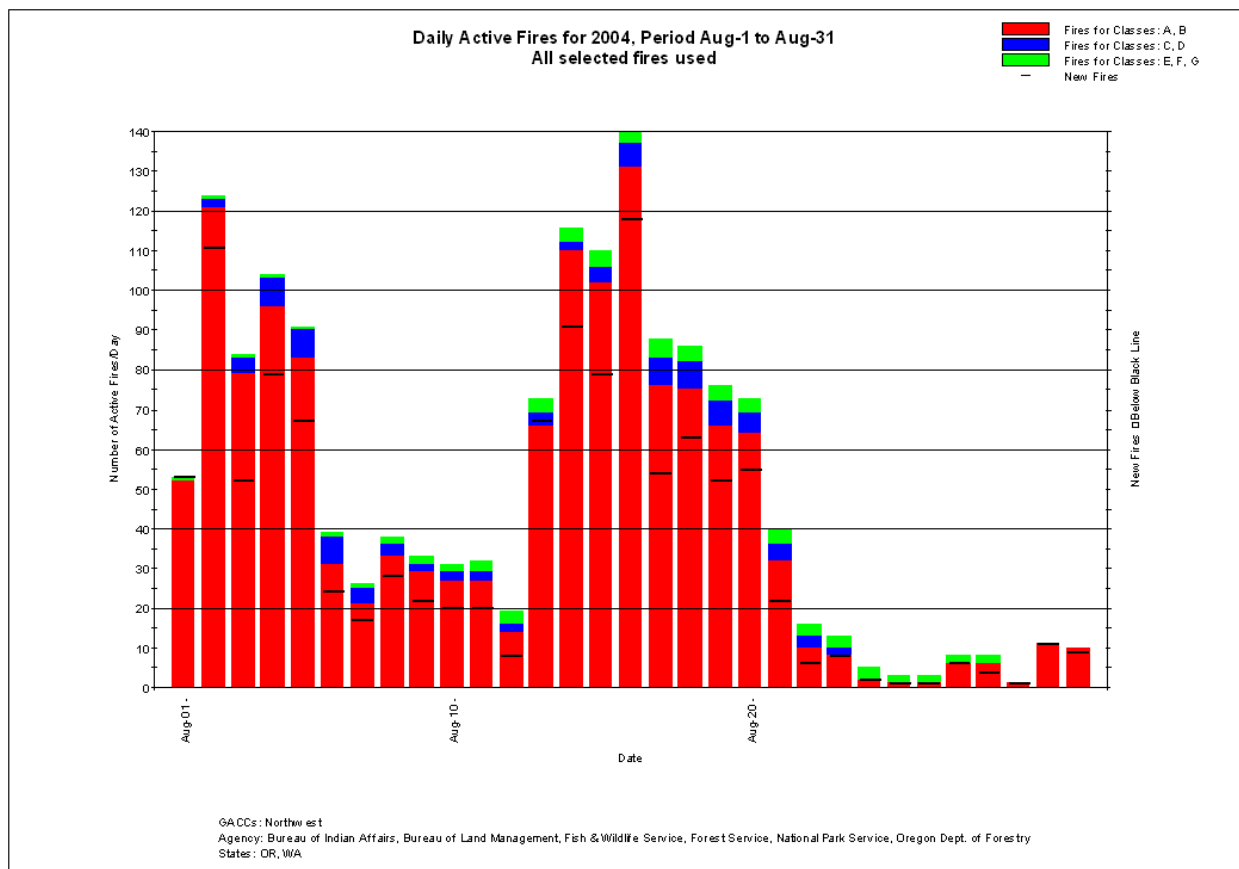
Inclusion or Not of Fires That Have No Control Date

Some fire reports do not have fire control dates. These fires by default are excluded from the active fire graph. If the user would like to include these, check the “Include fires with missing control dates” check box. The program will assume the fire is controlled in the number of days as defined in the Maximum Days to Containment Values table.

☐ Include fires with missing control dates

Create Graph

Click on the Run button to see the graph. Each graph is displayed in a standalone window. Each graph can be printed. The user can close a Graph Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed.



Export

The user can create a spreadsheet with the data from this graph using the Export – Average Daily Fire Occurrence by Cause export function.

REPORT – Active Fires

Use the pulldown in the center left part of the screen to select REPORT – Active Fires. The Active Fires Report shows, by date, the number of active fires by size class as well as the number of new starts on that date. Before creating a fire occurrence Episode Report, the user needs to select assumptions (see description in the section titled GRAPH – Active Fires).

Create Report

Click on the Run button to see the report. Each report is displayed in a standalone window. Each report can be printed and saved in rtf or pdf file format. Each report is displayed in a standalone. The user can close a Report Window by clicking on the Close button or by clicking on the X in the

upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed.

Years: 2004
 Period: 7/19 to 8/10
 Analysis Set: NW_GACC_1997-2006.mdb
 GACCs: Northwest
 States: OR, WA
 Agencies: Bureau of Indian Affairs, Bureau of Land Management, Fish & Wildlife Service, Forest Service, National Park Service, Oregon Dept. of Forestry
 Fires: 907 selected from 48,437 in the Analysis Set (637,168 in the Master Database)

Date	Daily Number of Active Fires							Total
	A	B	C	D	E	F	G	
7/19/2004	64	4			1		1	70
7/20/2004	30	6			1		1	38
7/21/2004	10	6	3		2		1	22
7/22/2004	6	8	5		2		1	22
7/23/2004	12	7	6	1	2		1	29
7/24/2004	35	13	3	3	1		1	56
7/25/2004	71	53	2	3	1		2	132
7/26/2004	25	54	2	3			1	85
7/27/2004	6	15	2	2			1	26
7/28/2004	10	11	2				1	24
7/29/2004	13	9	2			1	1	26
7/30/2004	14	3	2			1	1	21
7/31/2004	16	8	3			1	1	29
8/1/2004	40	19	2		1	1		63
8/2/2004	80	41	3	1	1	1		127
8/3/2004	30	49	2	2	1	1		85
8/4/2004	59	37	4	3	1			104
8/5/2004	58	25	3	4	1			91
8/6/2004	19	12	2	4				37
8/7/2004	10	11		3				24
8/8/2004	19	14		2			2	37
8/9/2004	14	15		1			2	32
8/10/2004	10	17	1				2	30
Statistics								
	A	B	C	D	E	F	G	Daily
Average Daily Active Fires	28.3	19.0	2.1	1.4	.7	.3	.9	52.6
Maximum Avg. Daily Active Fires	80	54	6	4	2	1	2	132
Minimum Avg. Daily Active Fires	6	3	1	1	1	1	1	21

Export

The user can create a spreadsheet with the data from this graph using the Export – Average Daily Fire Acres by Cause export function.

Analyzing Resource Needs

This option allows the user to gather the historic fire occurrence by agency for the analysis period. Adjustments can be made by the user to define the current fire occurrence by agency and hence for all agencies for the analysis period. Once current fire occurrence is defined, the resource needs per fire-by-fire size class can be entered. Resources types in Cheetah 4 are Wildland Engines, 20-Person Crews, Type-I Helicopters, T-II Helicopters and along with an “Other” category that can be used for resource types not listed above. The entering of the current fire occurrence allows for calibration of resource needs by adjusting the resource use per fire-by-fire size class based on current use data.

Adjustments to the model can then be made by the user to define the expected fire occurrence by agency and hence for all agencies for the analysis period. Using the calibrated resource use parameters allows for the projection of expected resource needs for the analysis period.

Analysis Flow

Analysis is performed using the following Steps:

- Step 1: Analysis Setup
- Step 2: Collect Fire Occurrence Records
- Step 3: Define Fire Occurrence
- Step 4: Define Resource Needs
- Step 5: Resource Needs Reports

Step 1: Analysis Setup

For information on Analysis Setup, refer to the Analysis Setup explanation in the section titled Analyzing Fire Occurrence and Episodes earlier in this document. Select an Analysis Set.

1. Analysis Setup
2. Data Collection
3. Define Fire Occurrence
4. Define Resource Needs
5. Resource Needs Reports

Step 2: Data Collection

For information on Data Collection, refer to the Data Collection explanation in the section titled Analyzing Fire Occurrence and Episodes earlier in this document.

1. Analysis Setup
2. Data Collection
3. Define Fire Occurrence
4. Define Resource Needs
5. Resource Needs Reports

Step 3: Define Fire Occurrence

The average fire occurrence by fire size class for each of the agencies can be displayed. The average is for the years selected in Step 2. Also displayed is the maximum and minimum number of fires by size class for the analysis period for each of the agencies. Two steps need action by the user. These are:

- Step 3a: Define fire occurrence by agency
- Step 3b: Define the percent of fire by fuel type by agency

1. Analysis Setup
2. Data Collection
3. Define Fire Occurrence
4. Define Resource Needs
5. Resource Needs Reports

Step 3a - Define fire occurrence by agency

This is done by agency using the pulldown at the top of the screen and making adjustments to the fire occurrence that appears in the top of the screen. Use the pulldown at the upper left to select an agency. For each agency, the user can select to use the maximum, minimum, average or their own set of values for the fire occurrence by fire size class. Clicking on the radio button to the left of the Use Minimum, Use Maximum or Use Mean will cause the selected values to be entered in the Use Own row. Clicking on the radio button to the left of the Use Own row will allow for user defined changes to the values in the cells.

Agency	BIA								
		A	B	C	D	E	F	G	Total
Use Minimum	☐	45.0	26.0	3.0	0.0	0.0	0.0	0.0	74.0
Use Maximum	☐	406.0	117.0	33.0	7.0	5.0	3.0	2.0	573.0
Use Mean	☐	117.5	67.9	8.4	1.4	1.0	0.8	0.3	197.3
Step 3a Use Own	☒	117.5	67.9	8.4	1.4	1.0	0.8	0.3	197.3

Step 3b - Define the percent of fire by fuel type by agency

Resource needs normally vary by resource type and number based on fuel type. In Cheetah 4, three fuel types are defined: Grass/Brush, Timber/Slash and Wildland Urban Interface (WUI). Once Step 3a has been completed, the user needs to distribute fires in size classes to fuel types. Default assignments are 100% of fires in the Timber/Slash fuel type for the Forest Service, National Park Service and Bureau of Land Management. Default assignments are 100% of fires in the Grass/Brush fuel type for the Bureau of Land Management and Fish and Wildlife Service.

		A	B	C	D	E	F	G
Step 3b	Percent Fires - Timber	100	100	100	100	100	100	100
	Percent Fires - Grass	0	0	0	0	0	0	0
	Percent Fires - WUI	0	0	0	0	0	0	0
	Percent Fires - Total	100	100	100	100	100	100	100

Step 4: Define Resource Needs

For each of the resources (Wildland Engines, 20-Person Crews, Type-I Helicopters and T-II Helicopters and Other), resource needs are defined here. The Other category is included to allow the planner to estimate needs for any other resource. Resource need is defined by fire size class and fuel type. Not all fire size classes need to have a defined resource need. For example, one may only be concerned in the resource need for fires in size class C and larger. In this case, entering of zeros for the resource need for size class A and B would be appropriate.

1. Analysis Setup
2. Data Collection
3. Define Fire Occurrence
4. Define Resource Needs
5. Resource Needs Reports

Resource-Days

The need for a given resource is calculated in resource-days. One resource-day is the use of one resource for one full day. If three resources days were needed on a fire, that could be filled with one resource for three days or three resources for one day.

Determining Resource-Days Needed

To estimate resource-days needed, the user needs to enter the number of resources needed and the number of days these resources are needed by fire size class by fuel type. This is accomplished during this step of the process.

Resource		Wildland Engines						
		A	B	C	D	E	F	G
Timber/Slash	Number of Days	0.5	1.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	1.0	1.0	5.0	8.8	10.0	12.2	21.9
Grass/Brush	Number of Days	0.5	1.0	2.0	2.6	3.0	3.8	7.8
	Quantity per Day	1.0	1.0	5.0	10.4	11.0	12.0	14.5
WUI	Number of Days	0.5	1.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	1.0	1.0	5.0	8.8	10.0	12.2	21.9
Avg. No. Res. Days / Fire		0.5	1.0	12.9	31.4	42.1	81.0	262.1
No. Res. Needed for Fires		213.8	84.4	40.0	24.8	36.0	38.8	48.1
Total Res. Days for Fires		106.9	84.4	103.2	81.6	143.1	259.2	681.5
								Total
								485.9

Current National default values in Cheetah 4 differ by fuel type and have been set based on a query of ICDS-209 records from 2001-2008. For all resources, the number of days has been set to be the same. Thus is the average time from start to containment by predominant fuel type. Quantity per day varies by fire size class and resource type. It is likely the next version of Cheetah will contain the ability to have GACC defaults. Defaults for the four resource types are given in the tables on the next page. The defaults for WUI are the same as Timber/Slash due to lack of data.

Resource Type	Timber/Slash	Class Fire Size						
		A	B	C	D	E	F	G
Wildland Engines	Number of Days	0.5	1.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	1.0	1.0	5.0	8.8	10.0	12.2	21.9
20-Person Crews	Number of Days	0.0	0.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	0.0	0.0	2.0	5.5	6.3	10.3	17.7
Type-I Helicopters	Number of Days	0.0	0.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	0.0	0.0	0.0	0.4	0.4	0.4	1.1
Type-II Helicopters	Number of Days	0.0	0.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	0.0	0.0	0.0	0.6	0.6	0.8	1.5
Other	Number of Days	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Quantity per Day	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Resource Type	Grass/Brush	Class Fire Size						
		A	B	C	D	E	F	G
Wildland Engines	Number of Days	0.5	1.0	2.0	2.6	3.0	3.8	7.8
	Quantity per Day	1.0	1.0	5.0	10.4	11.0	12.0	14.5
20-Person Crews	Number of Days	0.0	0.0	2.0	2.6	3.0	3.8	7.8
	Quantity per Day	0.0	0.0	2.0	3.6	4.0	6.0	9.1
Type-I Helicopters	Number of Days	0.0	0.0	0.0	2.6	3.0	3.8	7.8
	Quantity per Day	0.0	0.0	0.0	0.3	0.3	0.3	0.4
Type-II Helicopters	Number of Days	0.0	0.0	0.0	2.6	3.0	3.8	7.8
	Quantity per Day	0.0	0.0	0.0	0.6	0.6	0.6	0.7
Other	Number of Days	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Quantity per Day	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Resource Type	WUI (Same as Timber/Slash)	Class Fire Size						
		A	B	C	D	E	F	G
Wildland Engines	Number of Days	0.5	1.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	1.0	1.0	5.0	8.8	10.0	12.2	21.9
20-Person Crews	Number of Days	0.0	0.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	0.0	0.0	2.0	5.5	6.3	10.3	17.7
Type-I Helicopters	Number of Days	0.0	0.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	0.0	0.0	0.0	0.4	0.4	0.4	1.1
Type-II Helicopters	Number of Days	0.0	0.0	3.0	4.0	5.5	8.9	17.8
	Quantity per Day	0.0	0.0	0.0	0.6	0.6	0.8	1.5
Other	Number of Days	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Quantity per Day	0.0	0.0	0.0	0.0	0.0	0.0	0.0



Hot Tip

Local tracking of resource use (number of resources and number of days) by fire size class can highly improve the prediction of resource needs.

The cell in yellow provides an estimate of the quantity of a resource that needs to be staffed within the analysis period (start and stop dates) assuming the fire occurrence as defined in Steps 2 and 3. Below this row is an example display of the Total Wildland Engine Resource Days needed by size class and total for the fire occurrence defined in Steps 2 and 3.

Resource: Wildland Engines								
		A	B	C	D	E	F	G
Timber/Slash	Number of Days	0.5	1.0	3.0	5.0	7.0	8.0	11.0
	Quantity per Day	1.0	1.0	5.0	8.0	8.0	10.0	25.0
Grass/Brush	Number of Days	0.5	1.0	3.0	5.0	7.0	8.0	11.0
	Quantity per Day	1.0	1.0	5.0	8.0	8.0	10.0	25.0
WUI	Number of Days	0.5	1.0	3.0	5.0	7.0	8.0	11.0
	Quantity per Day	1.0	1.0	5.0	8.0	8.0	10.0	25.0
Avg. No. Res. Days / Fire		0.5	1.0	15.0	40.0	56.0	80.0	275.0
No. Res. Needed for Fires		1842.3	561.4	493.0	239.2	196.0	201.0	3812.9
Total Res. Days for Fires		921.2	561.4	1479.0	1196.0	1372.0	1608.0	10217.6

Step 5: Resource Needs Reports

There is only one Resource Needs Report. The report is organized by resource type. Select the resource types to be included in the report by clicking in the boxes to the left of the Resource name.

Create Report

Select the Resource Type(s) desired and then click on the Run button to see the report. Each report can be printed and saved in rtf file format. Each report is displayed in a standalone window. The user can close a Report Window by clicking on the Close button or by clicking on the X in the upper right corner. By clicking on the Close All button, all of the open windows with graphs and reports will be closed. An example of a Resource Needs Report follows.

1. Analysis Setup
 2. Data Collection
 3. Define Fire Occurrence
 4. Define Resource Needs
5. Resource Needs Reports

For Resource Type
☒ Wildland Engines
☐ 20 Person Crews
☐ Type I Helicopters
☐ Type II Helicopters
☐ Other

Period: 8/1 to 8/10
 GACCs: Northern California, Southern California
 States: CA
 Agencies: Bureau of Indian Affairs, Bureau of Land Management, Fish & Wildlife Service, Forest Service, National Park Service

		Fire Size Classes							Total
		A	B	C	D	E	F	G	
Fires									
	Timber/Slash	21.1	9.5	1.4	0.4	0.4	0.2	0.1	33.1
	Grass/Brush	151.2	40.8	6.7	2.5	1.9	1.9	0.9	205.9
	WUI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	172.3	50.3	8.1	2.9	2.3	2.1	1.0	239.0
Wildland Engines									
Timber/Slash									
	Days	0.5	1.0	3.0	5.0	7.0	8.0	11.0	
	Quantity Per Fire	1.0	1.0	5.0	8.0	8.0	10.0	25.0	
Grass/Brush									
	Days	0.5	1.0	3.0	5.0	7.0	8.0	11.0	
	Quantity Per Fire	1.0	1.0	5.0	8.0	8.0	10.0	25.0	
WUI									
	Days	0.5	1.0	3.0	5.0	7.0	8.0	11.0	
	Quantity Per Fire	1.0	1.0	5.0	8.0	8.0	10.0	25.0	
Total									
	Avg. No. Res. Days / Fire	0.5	1.0	15.0	40.0	56.0	80.0	275.0	
	No. Res. Needed for Fires	172.3	50.3	40.5	23.2	18.4	21.0	25.0	350.7
	Total Res. Days for Fires	86.2	50.3	121.5	116.0	128.8	168.0	275.0	945.8