

Analyzing the HERBS File

What is the HERBS File?

The HERBS file describes all known herbicide applications that were carried out by the US military during the Vietnam War. It is the database that contains all of the information on herbicide applications in Vietnam.

The HERBS file is organized by mission, where a mission is defined as a sequence of records that describes a single application of a given quantity of a specific type of herbicide along a specified route on a single day. This version of the HERBS file includes data on herbicide spraying by the Air Force (Operation Ranch Hand) as well as other service branches. The great majority of missions were flown by the Air Force as part of Operation Ranch Hand. A Ranch Hand mission consisted of one or more aircraft (each known as a sortie) dispersing a specified amount of herbicide along a specified route on a specified day. The HERBS file also contains non-Ranch Hand data that are derived from the so-called "Services HERBS file," and includes missions that describe ground applications carried out by truck or backpack spraying. The same format is used for missions from both sources.

The HERBS file provides the actual flight paths taken by Ranch Hand aircraft as they carried out their spray missions. Alphanumeric indicators show the locations at which the aircraft switched directions or turned off and on their spray nozzles. The data are thus structured in a way that emphasizes the continuity of flight of the fixed-wing aircraft that carried out most of the Operation Ranch Hand missions. (Connectivity may not apply to ground perimeter spraying which generally went from guard post to guard post around the base camp). To convey this information, each mission within the HERBS file is organized as a sequence of "vertices" which were the starting, turning, and stopping points of spray aircraft as they carried out a mission. The figure below illustrates defoliation along a roadway. The flight path consists of four connected segments in which the plane begins spraying at point 1A and continues spraying until it reaches point 1E. Points 1B, 1C, and 1D are intermediate "turning" points at which the plane changes direction, while continuing to spray. The dotted line represents a 1 km envelope about the spray path. Planes frequently flew multiple paths in a single mission; additional vertices would be designated by 2A, 2B, 3A, 3B, etc. Spray nozzles would be turned off between ending one path and beginning another.

HERBS file data analysis

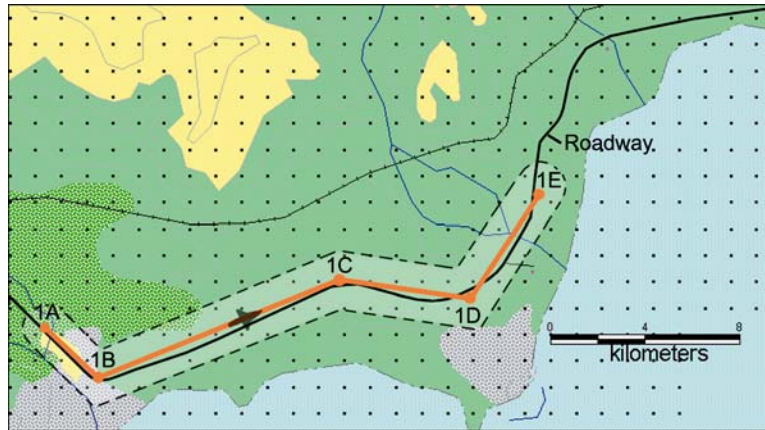


Figure 1. This illustrates the flight path of an aircraft that sprayed Agent Orange defoliant continuously along the roadway (orange line) from 1A → 1B → 1C → 1D → 1E. The dashed line is a 1 km envelope around the spray path. Dots are grid points spaced at 0.01° in longitude and latitude.

What data in the HERBS file can I use?

The HERBS file contains detailed information about each of its 9,141 missions. In addition to the geographical coordinates of the starting, stopping, and turning points of the spray, there are eleven variables which may be used to set up a HERBS analysis:

Agent	UTM Grid	Source
Date	Corps Tactical Zone	Incident
Mission number	FWAC	Method
Gallons	Type	

A complete description of these variables and a list of the values they can take is given in the Appendix.

HERBS file data analysis

Performing the Analysis

Specifying Selection Criteria

To analyze the HERBS file, press the "Analyze HERBS File" button. This will bring up the Analyze HERBS File pop-up window.

Analyze HERBS File

Agent	Type	Corps Tactical Zone	Method	Restrictions
☒ Orange	☒ Perimeter Spraying	☒ I Corps ☒ II Corps	☐ F	(blank = no restriction)
☒ Purple	☒ Crop Destruction	☒ III Corps ☒ IV Corps	☐ G	Gallons to
☐ Blue	☒ Defoliation	☒ Outside Vietnam	☐ H	Date to
☐ Dinoxol	☒ Unknown	Incident	☐ S	FWAC
☐ Pink	Source	☐ Mission/Aircraft Aborted	☐ U	
☐ Trinoxol	☐ Ranch Hand (C-123 aircraft)	☐ Aircraft with herbicide load crashed		
☐ Unknown	☐ Services	☐ Herbicide Leak		
☐ White	☐ Added by NAS contractor	☐ Wrong Target Sprayed		
		☐ Emergency Herbicide Dump		

(for Source, Incident and Method: all boxes unchecked = no restriction)

Restrict Missions: Restrict to UTM Grids:

+ Mission - Mission + UTM - UTM

Specify Aggregation

Level 1	Level 2	Level 3	Level 4

Counts will be returned for all non-aggregated columns. If no aggregation is specified, all matching values will be returned.

Analysis Execution

Run Analysis # Records Returned Preview Results Save Results Close

Press F1 for Help

Figure 2: The Analyze HERBS File pop-up window allows you to extract data from the HERBS file based on criteria which you specify and save the data to a file

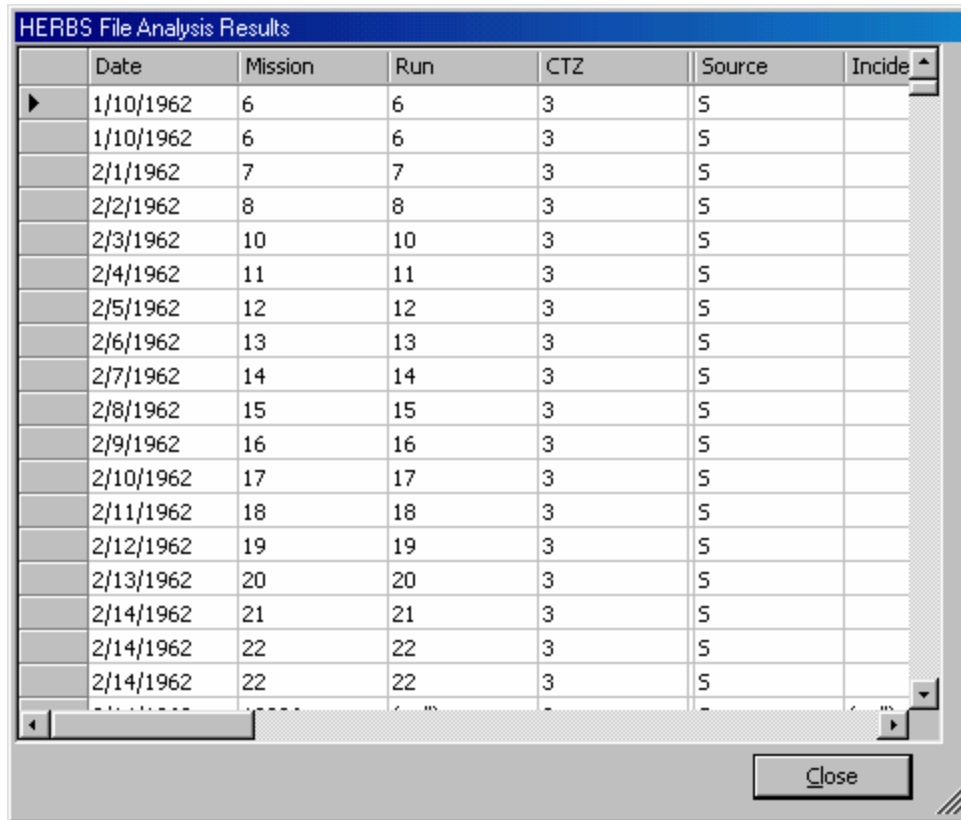
The software allows you to analyze the HERBS file by specifying criteria, extracting all rows from the HERBS file which match the specified criteria.

You can specify the HERBS file criteria using the various inputs on the pop-up window. Once you are satisfied with the criteria, press the "Run Analysis" button to retrieve the specified rows from the HERBS file. The number of rows found in the HERBS file that match your criteria will be displayed in the "# Records Returned" box.

HERBS file data analysis

Viewing and Saving the Results

Once you are satisfied with your criteria and have run the analysis, you may preview or save the results. To preview the results, press the "Preview Results" button. The HERBS File Analysis Results pop-up window will be displayed.



	Date	Mission	Run	CTZ	Source	Incide
▶	1/10/1962	6	6	3	S	
	1/10/1962	6	6	3	S	
	2/1/1962	7	7	3	S	
	2/2/1962	8	8	3	S	
	2/3/1962	10	10	3	S	
	2/4/1962	11	11	3	S	
	2/5/1962	12	12	3	S	
	2/6/1962	13	13	3	S	
	2/7/1962	14	14	3	S	
	2/8/1962	15	15	3	S	
	2/9/1962	16	16	3	S	
	2/10/1962	17	17	3	S	
	2/11/1962	18	18	3	S	
	2/12/1962	19	19	3	S	
	2/13/1962	20	20	3	S	
	2/14/1962	21	21	3	S	
	2/14/1962	22	22	3	S	
	2/14/1962	22	22	3	S	

Figure 3. You can preview the HERBS file data before saving it.

Press the "Close" button to dismiss the window. To save the results to a comma-delimited (CSV) text file, press the "Save Results" button.

HERBS file data analysis

Working with Aggregation

You may aggregate the HERBS file analysis results on up to four columns using the "Specify Aggregation" box. To use the aggregation, specify the aggregation levels along with the criteria before pressing the "Run Analysis" button. The results will reflect your aggregation choices.

The screenshot shows the 'Analyze HERBS File' dialog box. It is divided into several sections:

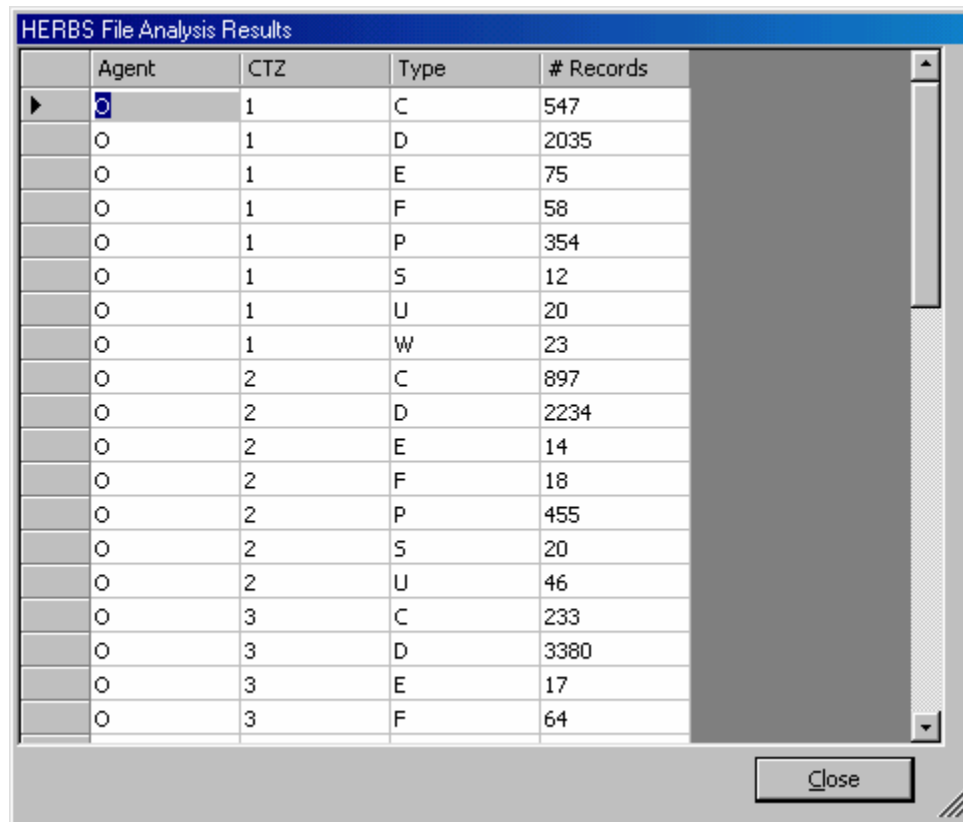
- Agent:** Checkboxes for Orange, Purple, Blue, Dinoxol, Pink, Trinoxol, Unknown, and White. Orange and Purple are checked.
- Type:** Checkboxes for Perimeter Spraying, Crop Destruction, Defoliation, and Unknown. Perimeter Spraying, Crop Destruction, and Defoliation are checked. There is also a 'Source' section with checkboxes for Ranch Hand (C-123 aircraft), Services, and Added by NAS contractor.
- Corps Tactical Zone:** Checkboxes for I Corps, II Corps, III Corps, IV Corps, and Outside Vietnam. I Corps, II Corps, III Corps, and IV Corps are checked.
- Method:** Checkboxes for F, G, H, S, and U. None are checked.
- Restrictions:** A section with fields for Gallons, Date, and FWAC. Below this are two large empty boxes labeled 'Restrict Missions' and 'Restrict to UTM Grids'.
- Buttons:** '+ Mission', '- Mission', '+ UTM', and '- UTM'.
- Specify Aggregation:** Four dropdown menus labeled Level 1, Level 2, Level 3, and Level 4. Level 1 is set to 'Agent', Level 2 is set to 'CTZ', and Level 3 is set to 'Type'. Level 4 is empty.
- Analysis Execution:** A 'Run Analysis' button, a '# Records Returned' field showing '53', a 'Preview Results' button, a 'Save Results' button, and a 'Close' button.

At the bottom left, it says 'Press F1 for Help'.

Figure 4: The same HERBS file analysis as above, aggregated by Agent, CTZ and Type

If you specify aggregation, the results will be grouped by the columns that you specify. The results contain one column per level of aggregation and an additional column containing the number of records per group.

HERBS file data analysis



	Agent	CTZ	Type	# Records
▶	O	1	C	547
	O	1	D	2035
	O	1	E	75
	O	1	F	58
	O	1	P	354
	O	1	S	12
	O	1	U	20
	O	1	W	23
	O	2	C	897
	O	2	D	2234
	O	2	E	14
	O	2	F	18
	O	2	P	455
	O	2	S	20
	O	2	U	46
	O	3	C	233
	O	3	D	3380
	O	3	E	17
	O	3	F	64

Close

Figure 5: The results of the above aggregated analysis