

Topic FIA2FVS: Translate FIA data from the World Wide Web into FVS format

Concepts: Create FVS input database from FIA data available on the Web.

Forest Inventory and Analysis (FIA) data can be downloaded from the Internet in the form of a MS-Access database. The FIA2FVS program can be used to build an input database for the Forest Vegetation Simulator (FVS) from the FIADB database. As an example, FIA data from Colorado will be retrieved from the Web and set up for FVS.

Initial Steps:

- 1) Ensure that “**Administrative Privileges**” are invoked on personal computer.
- 2) Create a subfolder under the C:\Fvsdata folder called \FIA.
 - This folder will be used to store FIA data.
- 3) Create a State subfolder under the \FIA folder such as \Co. Use the State abbreviation code to name the folder.
 - This folder will be used to save the downloaded FIADB file for Colorado: C:\Fvsdata\FIA\Co.

FIA Data Retrieval Steps:

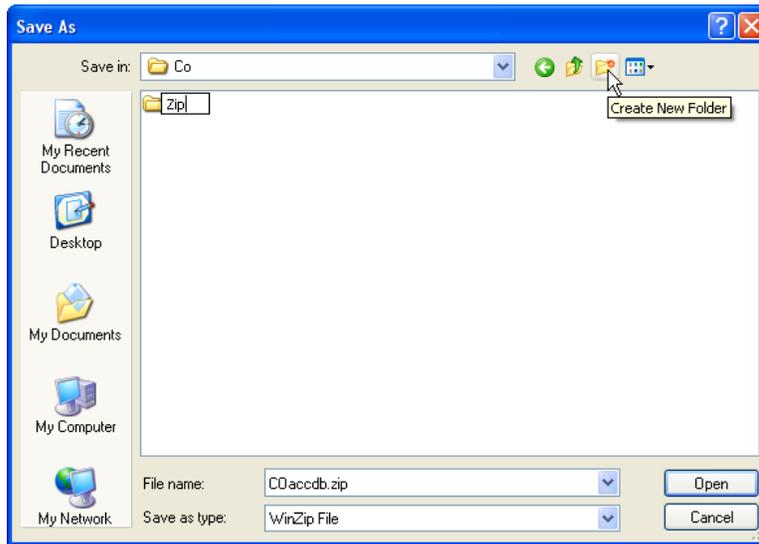
- 4) Key the following internet address into a Web browser.

<http://www.fia.fs.fed.us/tools-data/default.asp>

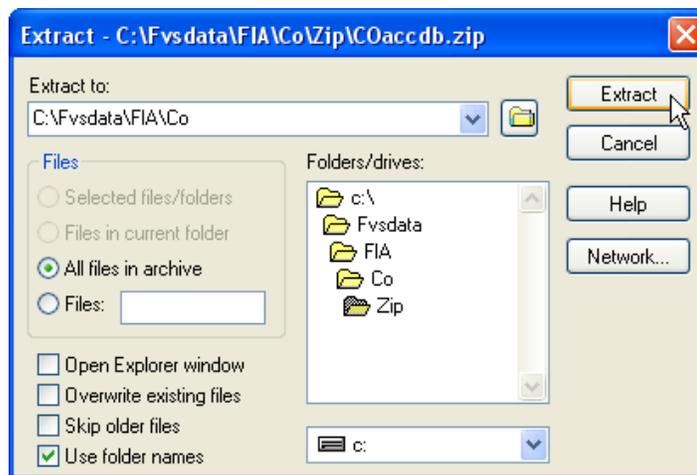
- 5) Click the “FIA Data Mart” button on the Web Page. The FIA Data Mart window should appear.
- 6) Using the U.S. map in the right window pane, select the State of interest.
 - Colorado will be selected for this example.

The screenshot shows the 'FIA DataMart' website interface. At the top, it says 'USDA FOREST SERVICE' and 'FIADB version 5.1'. Below this, there is a map of the United States with Colorado highlighted in red. To the left of the map, there is a sidebar with navigation links like 'FIA Data and Tools page', 'FIADB Documentation', and 'Recent load history'. To the right of the map, there is a text box that says 'Click on the map to download a FIADB version 5.1 Microsoft Access 2007 database containing all of the FIADB tables for a State, sample SQL queries, and EVALIDatorPC reporting tool. For the EVALIDatorPC reporting tool to work you will have to make the folder containing the MS Access2007 file a trusted location. Please see Trusted location information for information on making a folder a trusted location.' Below the map, there are links for 'Microsoft Access2007 Database file ready for loading all of the FIADB data (empty, pre-defined tables, ready to import data)', 'Microsoft Access2003 Database file ready for loading FIADB-Lite data (empty, pre-defined tables, ready to import data)', and 'FIADB-Lite documentation'. The browser's address bar shows 'http://apps.fs.fed.us/fiadb-downloads/databas/COaccdb.zip'.

- 7) When prompted by the “File Download” window, choose to “Save” the downloadable database.
 - Navigate to the FIA State folder using the “Save As” dialog box (i.e. C:\Fvsdata\FIA\Co).
- 8) Create an additional folder to store the downloaded zip file.
 - Use \Zip as the folder name.



- 9) Make sure to select and move into the \Zip folder prior to clicking the “Open” button.
- 10) Save the “COaccdb.zip” file to the C:\Fvsdata\FIA\Co\Zip folder.
 - The file may take several minutes to download depending on its size and your Internet browser capabilities.
- 11) Using Windows Explorer, navigate to the \Zip folder and click on the zip file.
- 12) Extract the database to the \{State} folder (i.e. C:\Fvsdata\FIA\Co).



FIA2FVS Program Steps:



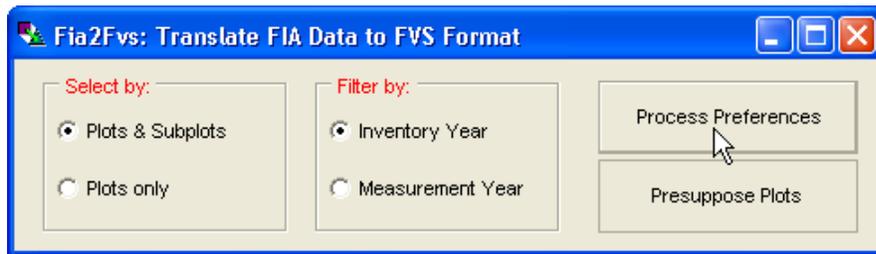
Fia2Fvs

The FIA2FVS program reads data from the tables stored within the downloaded FIADB MS-Access database and translates it into an input FVS database. Users can choose to convert either “Plots & Subplots” or “Plots only” into separate tables for FVS. Within FVS, FIA plots are considered stands. Subplots are referred to as plots. As such, FIA plot data is stored in the FVS_StandInit table. Subplot data resides in the FVS_PlotInit table. Individual tree measurements from FIA are housed in the FVS_TreeInit table. Additionally, there is an auxiliary table titled FVS_GroupAddfilesAndKeywords that contains SQL commands that connect the FVS_StandInit or FVS_PlotInit table to the FVS_TreeInit table. These are the base tables that comprise the FIA2FVS.mdb database file.

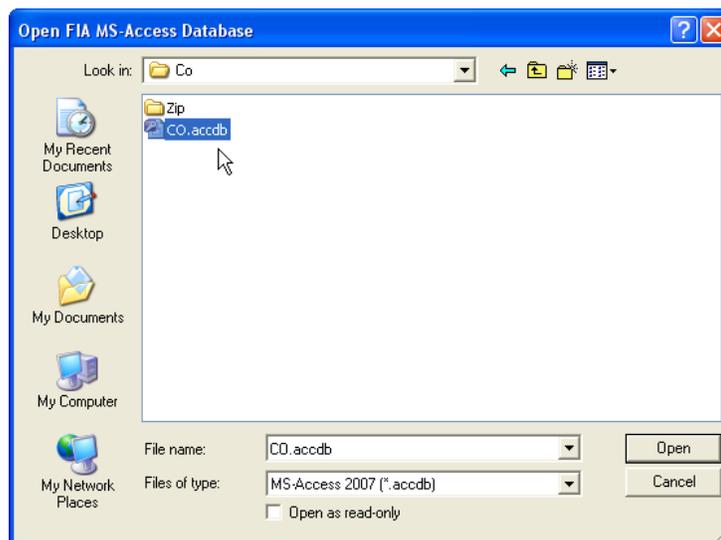
- 13) Retrieve the FIA2FVS setup package by keying the following Internet address into a Web browser {Forest Management Service Center (FMSC), Forest Vegetation Simulation (FVS) Web site}.

<http://www.fs.fed.us/fmsc/fvs/software/data.shtml>

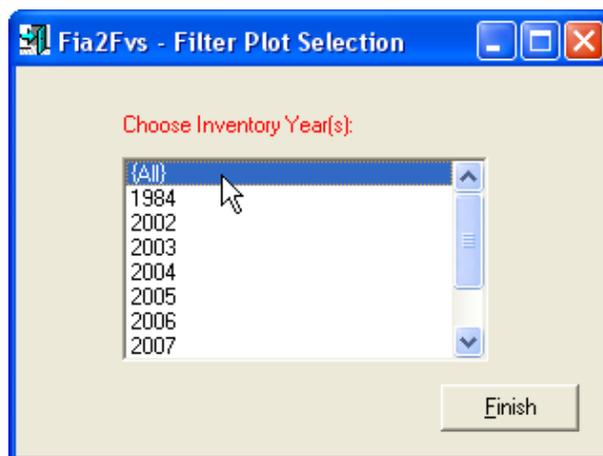
- 14) Download the “Fia2Fvs_Install.exe” file to the C:\Fvsbin folder and execute. Follow setup program prompts.
 - Ensure that the extracted files are directed to the C:\Fvsbin folder.
- 15) Execute the program by using the Start Menu, All Programs, FVS group, Fia2Fvs option.
 - Alternatively, create a Desktop shortcut by right mouse click and directing to the desktop.



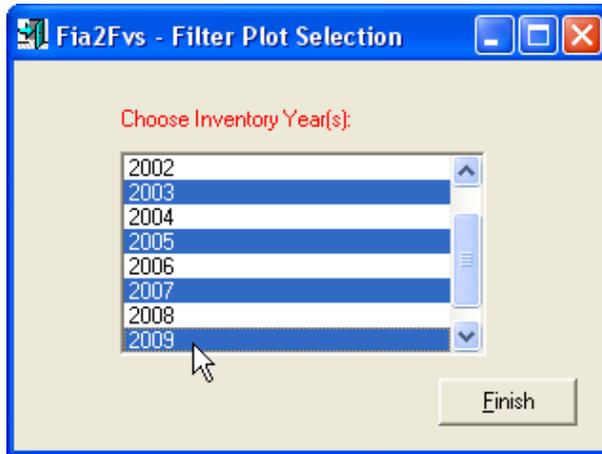
- 16) Select either the “Plots & Subplots” or “Plots only” option.
- 17) Plots can be filtered by “Inventory Year” or “Measurement Year”. Inventory year is the year that best represents when the majority of plots were collected. Measurement year is the year in which the plot was sampled.
- 18) Click the “Processing Preference” button to continue. If the Fia2Fvs.mdb file exists from a previous execution of the program, a message box will prompt whether to delete this file. Select “Yes” to proceed.
- 19) FIA2FVS will display the Open File dialogue box. Navigate to the working folder.
- (i.e. C:\Fvsdata\FIA\Co)



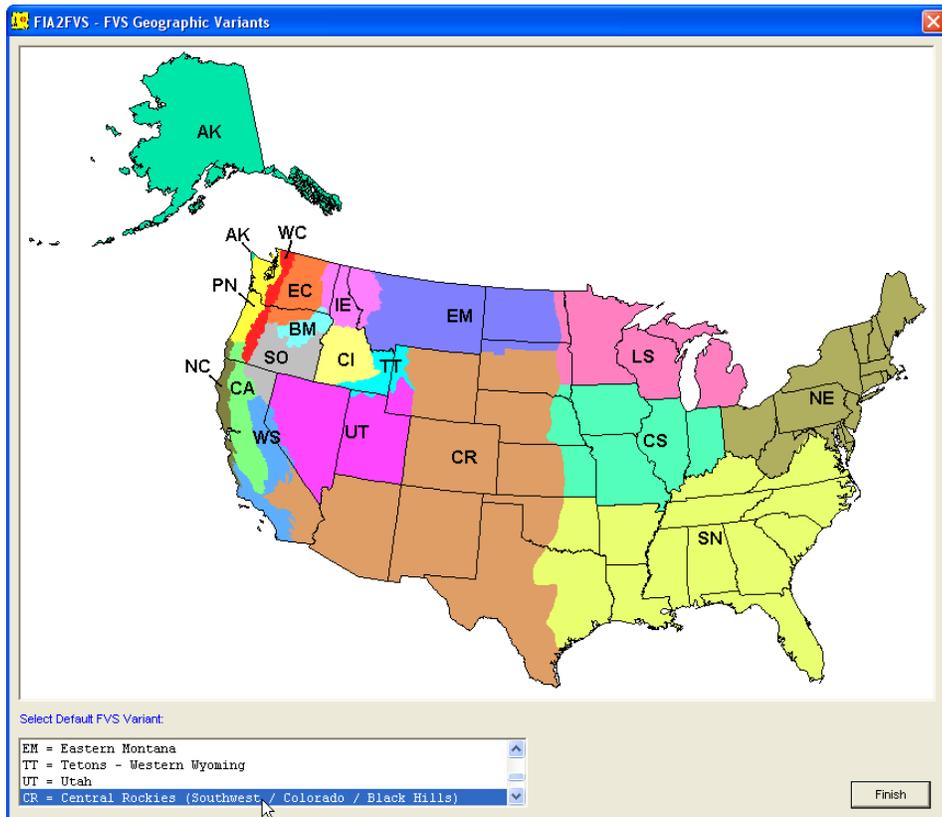
- 20) The “Filter Plot Selection” window will appear. Either the “Inventory Year(s)” or “Measurement Year(s)” will be displayed in the list box depending on prior selection. Choosing “{All}” will invoke the FIA2FVS program to translate the entire data set including Periodic and Annual measurements.



- 21) Individual years (select one), sequential series (Shift Key to select), or discontinuous series (Ctrl Key to select) of years can be chosen. The FIA2FVS program will process the subset of plots.
- 22) Click the “Finish” button to continue.

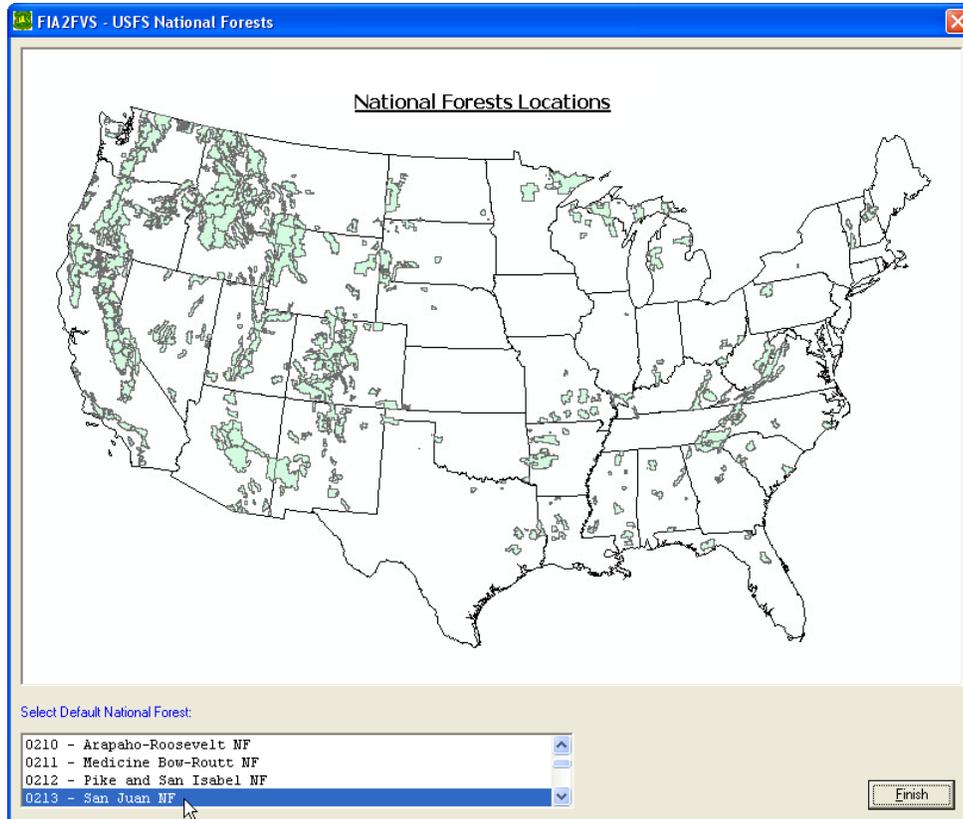


23) Next, FIA2FVS will prompt for the default FVS Geographic Variant.



- Note: Behind the scene, the FVS geographic variant map object is used to assign the variant code to plots as they are processed. The FVS geographic variants have been expanded to cover all lands in the continental U.S. and Alaska. Map utilities are embedded in the FIA2FVS program to directly extract the preferred FVS variant. The selected “Default FVS Variant” is only used in cases where open pockets may exist in the FVS geographic variant map (e.g. islands in the Puget Sound). This should be a rare occasion and should be reported to the FVS staff for identification and correction.

24) FIA2FVS will also prompt for the default National Forest Location to assign to plots that do not have Administrative National Forest assigned within the FIADB.



- Note: National Forest Location is used by FVS to set default site index, stand density maximums, and volume equations. Spatial selection of the National Forest Location is also accomplished using a map object referenced by the program. The selected “Default National Forest” serves as a fallback assignment in cases where location cannot be properly determined from the map object. Users should report these occasions for correction.

25) Click the “Finish” button to initiate processing.

- The FIA2FVS program will build a new database file that contains the FVS_GroupAddfilesAndKeywords, FVS_StandInit, FVS_PlotInit (if requested), and FVS_TreeInit tables.

NOTE: FIA data sets are quite large. Translating data fields from the FIA database into the FVS format often requires extended periods of time. Initially, the main FIA2FVS window is presented as a scrolling log of the various FVS tables as they are created. Generally, a listing of the State/County/Plot/{Subplot}/{Tree} records is displayed in the caption of the main FIA2FVS window as they are being processed. However, due to the computational demands of data translation, if another process is initiated on the PC, the main FIA2FVS window will stop displaying this information. FIA2FVS may appear to be “frozen”. Be assured that the program is indeed still processing data records. To confirm, check Windows Task Manager (i.e. Ctrl-Alt-Del: Task Manager) and look under the “Applications” tab for FIA2FVS program. The listing should reveal a scrolling sequence of State/County/Plot/{Subplot}/{Tree} records. Another method that will verify that the FIA2FVS program is running is to use Windows Explorer and navigate to the working folder. Be sure to view the file list box using “Details”. Observe the file size associated with the Fia2Fvs.mdb database. After a few moments, press the F5 key to refresh the Windows Explorer display. The Fia2Fvs.mdb file size should progressively increase. This indicates that the FIA2FVS program is working in the background to create the Fia2Fvs.mdb database. Also, the repetitive flashing light of the PC hard disk ensures activity. Terminal program errors will produce a message window that displays the apparent problem. At that point, report the error encountered to the FVS Staff.

Regardless whether the main FIA2FVS program presents record processing detail, a message window will always display “Fia2Fvs.mdb has been created!” upon successful completion of the translation process. Be patient; just wait for it.

Depending on the chosen State and the number of FIA measurement cycles, the FIA2FVS program may require significant time to process the input FIA database and build the output FVS database. Based on the prototype Colorado data set that contained one periodic measurement and seven panels of annual measurement (approximately 15,000 plot records), FIA2FVS took 10 hours to create the FVS database. It is recommended that users download the FIA database, install the FIA2FVS program, and execute just prior to departing for the evening. Without interruption, the newly built FVS files (Fia2Fvs.loc, Fia2Fvs.mdb) will be available the next morning in the work folder.

Presuppose Program

Presuppose is a user friendly front-end program that builds data queries prior to processing translation requests. Presuppose allows users greater ability to select subsets of plots within a given State. Input windows prompt for plot and tree level filters enabling finer selection detail. This feature significantly decrease FIA2FVS processing time for smaller data extracts. The Presuppose program is available upon request to the FVS staff.

Grouping Group Assignments

Execute the Suppose interface. Use the File menu/Select Location File option and proceed to the work folder. Pick the “Fia2Fvs.loc” file. Upon doing so, the Select Simulation Stands window will be displayed. Selecting the “FIA_to_FVS” label in the left window pane will prompt Suppose to populate the center window pane with “Grouping Codes”.

There are three global grouping codes:

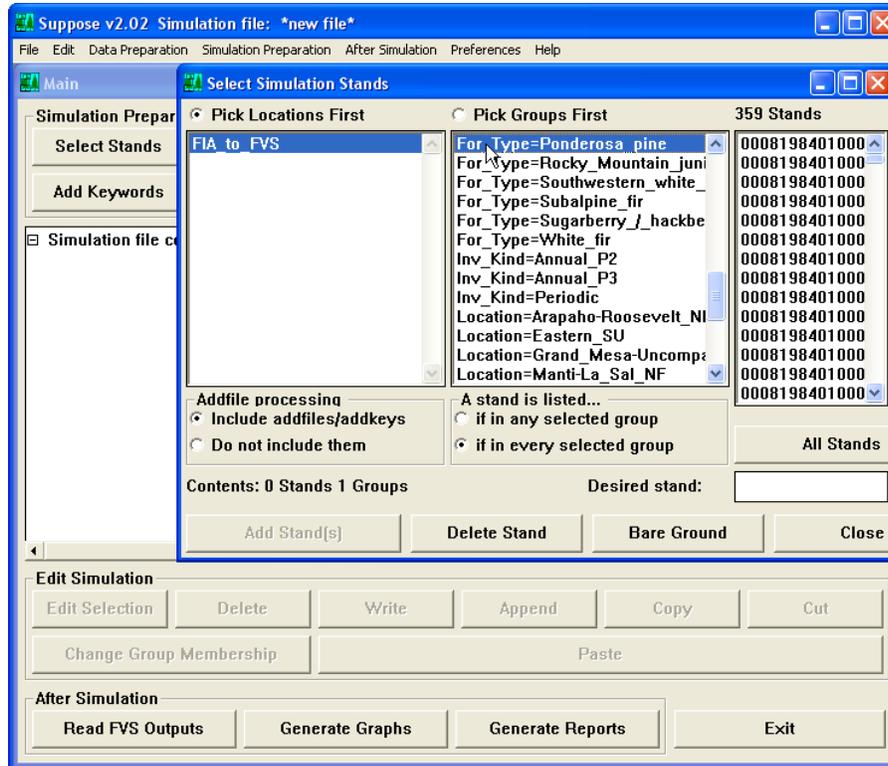
- All_Stands or All_Plots (i.e. Plot or Subplot, User Input)
- State (i.e. Survey Table: State Code)
- Variant (i.e. FVS Geographic Variant, User Input)

There are seven location specific grouping codes:

- FIA_Inv_Yr (i.e. Survey Table: Inventory Year)
- FIA_Meas_Yr (i.e. Plot Table: Measurement Year)
- For_Type (i.e. Condition Table: Forest Type)
- Inv_Kind (i.e. State Table: Notes - Annual or Periodic)
- Location (i.e. Condition Table: Administrative National Forest or FIA Survey Unit)
- Single/Multiple Plot Conditions (i.e. Condition Table: Condition Class Number)
- Forest/Nonforest Status (i.e. Condition Table: Condition Status Code)



Grouping Code labels provide utility to select plots with common attributes.



Follow standard FVS procedures to process the data. In order to run FIA subplots individually, users will first need to choose the Preferences Menu/Suppose Preferences and modify the “Process plots as stands” option to “Yes”. Click the “Apply” button, then “Close” prior to picking the “Select Locations File” choice from the File menu.

Fuel Load Data

Down Woody and Fine Materials collected on Phase 3 installations have been translated into Fuel Load information for FVS. Note that the sampling intensity for Phase 3 plots is sparse: 1 out of 16 Phase 2 plots.

FIA2FVS Future Developments

Users should not assume that site index values derived from FIA are those needed by FVS. In many case, they are not. For most FVS variants, site index is a primary predictive variable (for diameter, height, and crown development). The FVS model does not allow direct input of tree age and tree height in order to compute site index in accordance with its reference equations. Users have been responsible for supplying the proper site index value. An effort is under way to compute site index from the input data. A library of site index equations is being built to accommodate the entire country. This will be a gradual process and only progress as FVS staff time becomes available. Users should be aware of the source of the site index value and make adjustments within the database if needed.

Although not utilized by the FVS model presently, inclusion of understory vegetation in the input database is being considered. Grasses, herbs, forbs, and shrubs are important components of the complete vegetation profile. As FVS continues to evolve, these important features will be brought into the model. Storing data records with this information is a necessary starting point.

Decode Template for Stand(Plot) ID's

Use the following template to decode the Stand and StandPlot ID fields within the Fia2Fvs.mdb file:

		<u>Cumulative Position</u>		
		<u>Beginning</u>	<u>Ending</u>	
Stand	State	4	1	4
	InvYr	4	5	8
	Cycle	2	9	10
	Subcycle	2	11	12
	Unit	2	13	14
	County	3	15	17
	Plot	<u>5</u>	18	22
	22			
Plot	Underscore	1	23	23
	Subplot	<u>3</u>	24	26
		<u>4</u>		
		26		

FIADB Tables Accessed by the FIA2FVS Program

COND = Condition Table

DWM_COARSE_WOODY_DEBRIS = Down Woody Material Coarse Woody Debris Table

DWM_DUFF_LITTER_FUEL = Down Woody Material Duff, Litter, Fuel Table

DWM_FINE_WOODY_DEBRIS = Down Woody Material Fine Woody Debris Table

DWM_TRANSECT_SEGMENT = Down Woody Material Transect Segment Table

PLOT = Plot Table

PLOTSNAP = Plot Snapshot Table

REF_FOREST_TYPE = Reference Forest Type Table

REF_SPECIES = Reference Species Table

REF_UNIT = Reference Unit Table

SEEDLING = Seedling Table

SITETREE = Site Tree Table

SUBPLOT = Subplot Table

SUBP_COND = Subplot Condition Table

SURVEY = Survey Table

TREE = Tree Table

Notes: