1. Create Biosum project
2. Import FIA data into Biosum project
   1. Go to <https://apps.fs.usda.gov/fia/datamart/datamart_access.html> and download all data for the state of CA
   2. Unzip the downloaded file
   3. Open Biosum and go to **<Plot Data> <Add Plot Data>** and select the CA.accdbd file you just downloaded. Use default File Input assignments and press **<Next>**
   4. Uncheck “Non Forested” Plots option so only Forested Plots are brought in.
   5. Leave condition proportion percent less than 25 (default) and press **<Next>**
   6. Select the most recent FIADB Inventory Evaluation with Current Area, Current Volume (at the time of writing, CALIFORNIA 2016: 2005-2016, EvalID 61601) and press **<Append>**
3. Add variants
   1. Once the append process is completed, add in variant data by going to the **<FVS>** module and using the “Plot FVS Variants” option
4. Check Tree Species
   1. Run the Tree Species module in FVS
   2. Address any missing species by choosing “Edit” and adding that variant/spcd combo so it has a correlating FVS species/variant combo
   3. At the time of writing, WS 922 was added as 998
5. Open the “FVS Input Data” module in Biosum
   1. Don’t actually do anything
6. Close Biosum
7. Run the “project\_setup.R” R script according to the documentation within the script
8. Reopen Biosum and go to the **<FVS Module> <FVS Input Data>**
   1. Run the “Create FVS Input Database Files” once for each variant (it does not matter which package is selected)
   2. Run “Create FVS Output Database Files” for all packages
   3. Close Biosum
9. Run fixFVSIn.R according to the documentation within the script







1. Run the FVSout\_forBY.KCP file through FVS – Suppose
   1. Open FVS – Suppose
   2. On the top tool bar select **<File> <Select Locations File>.**
   3. Navigate to the BioSum project files folder. Then go to the “fvs\data\*variant*” folder and select the *variantname*.loc file (e.g. CA.loc)
   4. After selecting the locations file, the **Select Simulation Stand** window will open. By default, the **<Pick Locations First>** radio button is selected. Click on the two-letter variant code listed in the left window pane. A list of all available stands will appear in the right window pane, as in Figure 4.20. Add all stands to the simulation using the **<All Stands>** button on the lower right of the window or use pre-defined groups to filter which stands are added. Finalize selection by clicking **<Add {count} Stands>.** **<Close>** the window.
   5. Before proceeding, verify that the Fire and Fuels Extension (FFE) is turned on for the simulation. From the SUPPOSE toolbar menu, select **<Simulation Preparation>.** Click **<Select Variant and Extensions>**. From the list of FVS extensions, highlight **<Fire and Fuel Extension>** if not already selected. Click **<Close>** when done.
   6. Now that all stands have been selected, the next step is to add the package and related .kcp files to the current simulation. The **Simulation file contents** window lists all stands in the simulation. Clicking on any stand will expand the list to show all FVS keywords that will be applied to this stand during the simulation. This is where the .kcp file will be “attached” in the simulation.
   7. Click **<Insert from file>**. Browse to the folder where .kcp files have been saved and select the .kcp file you wish to include for this simulation (in this case, FVSOUT\_forBY.KCP). As soon as the .kcp file has been added, it should be displayed in the window. By default, FVS applies all keywords within the .kcp file to all plots selected for this simulation.
   8. FVS is now ready to run the simulation. From the **Main** window, click on **<Run Simulation>.**
   9. Name the .key file “FVSOUT\_forBY.key” and click **<Save>.** Click **<Run>** from the pop-up window to begin the simulation.
   10. When the simulation is complete, the DOS window will close and all output data will be exported to the Access database file defined in the .kcp file, assuming that a database of that name already exists and contains no FVS output tables (such as SUMMARY, POTFIRE, etc.) before the simulation executes.
   11. Check the *FVSOUT\_forBY.mdb* file
       1. Navigate to the variant folder within your project (this should be under *projectfolder*\fvs\data)
       2. Open the *FVSOUT\_forBY.mdb* file
       3. Four tables should appear:
          1. FVS\_Cases
          2. FVS\_PotFire
          3. FVS\_StrClass
          4. FVS\_Summary
   12. Repeat this procedure for each variant.
   13. When complete, the database files are stored in the corresponding “fvs\data\*variant*” folder
2. Import the *FVS\_StandInit* table from the *FVSIn.mdb* database to the *FVSOUT\_forBY.mdb* database
   1. Navigate to the variant folder within your project (this should be under *projectfolder*\fvs\data)
   2. Open the *FVSOUT\_forBY.mdb* file
   3. Right-click one of the tables in the file and select **<Import>**, **<Access Database>.**
   4. In the window that opens, navigate to the variant folder (this should be under *projectfolder*\fvs\data)
   5. Select the *FVSIn.mdb* file and select **<Open>**. In the next window, select “OK.”
   6. In the window that appears, select the *FVS\_StandInit* table and select **<OK>** from the buttons at the right. A window will appear saying the objects were imported successfully. Close the window.
   7. The *FVS\_StandInit* table should now appear in your database.

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| Figure X. Import *FVS\_StandInit* table |

1. Add a NUMBER field “FM\_BY” to the *FVSOUT\_forBY.mdb* *FVS\_StandInit* table
   1. Open the *FVS\_StandInit* table by double-clicking on the table name
   2. Navigate to the tool bar menu at the top and select **<Table Tools>**, **<Fields>**
   3. In the **<Add & Delete>** section, select **<Number>**. A new column will appear in the table with the column name “Field 1”

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| Figure X. Adding a number field to the *FVS\_StandInit* Table |

* 1. Change the field name to “FM\_BY”
     1. If the column header does not let you type in it, right click on the column header and select **<Rename Field>**
  2. Save the *FVSOUT\_forBY.mdb* file.

1. Run the “FM\_BY” module
   1. Navigate to the tool bar menu at the top and select **<Database Tools>**
   2. In the **<Macro>** section, click **<Visual Basic>**
   3. A new window should appear with the “FM\_BY” module listed. If this does not appear, see Section 3 above.
   4. In the toolbar menu in the **Microsoft Visual Basic for Applications** window, click **<Run>**, then select **<Run Sub/User Form>**
   5. A window will appear stating how many rows will be updated. Select **<OK>** on this window and any additional windows that appear.
      1. If all the windows show 0 rows being updated, there is an error in your KCP file.
   6. Save the new *FVSOUT\_forBY.mdb* file.
   7. Close the file.
2. Replace the *FVS\_StandInit* table in the FVSIn.mdb with the updated *FVS\_StandInit* table in the *FVSOUT\_forBY.mdb* file.
   1. Navigate to the variant folder within your project (this should be under *projectfolder*\fvs\data)
   2. Open the *FVSIn.mdb* file.
   3. Right-click the *FVS\_StandInit* table and select **<Delete>**. Select **<Yes>** in the window that appears (or rename the table to back it up within the same database).
   4. Right-click one of the remaining tables and select **<Import>**, **<Access Database>**
   5. In the window that opens, navigate to the variant folder (this should be under *projectfolder*\fvs\data)
   6. Select the *FVSOUT\_forBY.mdb* file and select **<Open>**. In the next window, select “OK.”
   7. In the window that appears, select the *FVS\_StandInit* table and select **<OK>** from the buttons at the right. A window will appear saying the objects were imported successfully. Close the window.
   8. The *FVS\_StandInit* table should now appear in your database with a column labeled “FM\_BY” that is populated with the assigned fuel model.
      1. Stands may have blank values if there are no non-zero Biomass or TPA values (this can be checked by looking up the Stand\_ID values for blank rows in the FVS\_Summary table in the *FVSOUT\_forBY.mdb* file).
   9. Save the *FVSIn.mdb* file.
   10. Close the file
3. Repeat steps 8-12 for each variant
4. Run the FVSOUT\_variant\_POTFIRE\_BaseYr.KCP file (created by BioSum) through FVS - Suppose.
   1. Open FVS – Suppose
   2. On the top tool bar select **<File> <Select Locations File>.**
   3. Navigate to the BioSum project files folder. Then go to the “fvs\data\*variant*” folder and select the *variantname.loc* file
   4. After selecting the locations file, the **Select Simulation Stand** window will open. By default, the **<Pick Locations First>** radio button is selected. Click on the two-letter variant code listed in the left window pane. A list of all available stands will appear in the right window pane, as in Figure 4.20. Add all stands to the simulation using the **<All Stands>** button on the lower right of the window or use pre-defined groups to filter which stands are added. Finalize selection by clicking **<Add {count} Stands>.** **<Close>** the window.
   5. Before proceeding, verify that the Fire and Fuels Extension (FFE) is turned on for the simulation. From the SUPPOSE toolbar menu, select **<Simulation Preparation>.** Click **<Select Variant and Extensions>**. From the list of FVS extensions, highlight **<Fire and Fuel Extension>** if not already selected. Click **<Close>** when done.
   6. Now that all stands have been selected, the next step is to add the package and related .kcp files to the current simulation. The **Simulation file contents** window lists all stands in the simulation. Clicking on any stand will expand the list to show all FVS keywords that will be applied to this stand during the simulation. This is where the .kcp file will be “attached” in the simulation.
   7. Click **<Insert from file>**. Browse to the folder where .kcp files have been saved and select the .kcp file you wish to include for this simulation (in this case, FVSOUT\_*variant*\_POTFIRE\_BaseYr.KCP). As soon as the .kcp file has been added, it should be displayed in the window. By default, FVS applies all keywords within the .kcp file to all plots selected for this simulation.
   8. FVS is now ready to run the simulation. From the **Main** window, click on **<Run Simulation>.**
   9. Name the .key file “FVSOUT\_*variant*\_POTFIRE\_BaseYr.key” and click **<Save>.** Click **<Run>** from the pop-up window to begin the simulation.
   10. When the simulation is complete, the DOS window will close and all output data will be exported to the Access database file defined in the .kcp file, assuming that a database of that name already exists and contains no FVS output tables (such as SUMMARY, POTFIRE, etc.) before the simulation executes.
       1. If the DOS window shows all zeros or your FVS\_Treelist table in the output package database are missing, see the question “Why does the Suppose interface have connection errors with Microsoft Access Databases in either Windows 7 or Windows 10 Operating Systems?” at <https://www.fs.fed.us/fvs/support/index.shtml#qa37> and install the drivers recommended for your system
   11. Check the *FVSOUT\_{variant}\_POTFIRE\_BaseYr.mdb* file
       1. Navigate to the variant folder within your project (this should be under *projectfolder*\fvs\data)
       2. Open the *FVSOUT\_{variant}\_POTFIRE\_BaseYr.mdb* file
       3. Two tables should appear:
          1. FVS\_Cases
          2. FVS\_PotFire
   12. Repeat this procedure for each variant.
   13. When complete, the database files are stored in the corresponding “fvs\data\*variant*” folder
5. Create SDI Max KCP
   1. Create an empty mdb database named *FVS\_SDImax\_out.mdb* if one does not already exist (project\_setup.R should have made one)
   2. Open FVS – Suppose
   3. On the top tool bar select **<File> <Select Locations File>.**
   4. Navigate to the BioSum project files folder. Then go to the “fvs\data\*variant*” folder and select the **Predispose.loc** file (**NOTE**: Do not select the *variantname.loc* file)
   5. After selecting the locations file, the **Select Simulation Stand** window will open. By default, the **<Pick Locations First>** radio button is selected. Click on the two-letter variant code listed in the left window pane. A list of all available stands will appear in the right window pane, as in Figure 4.20. Add all stands to the simulation using the **<All Stands>** button on the lower right of the window or use pre-defined groups to filter which stands are added. Finalize selection by clicking **<Add {count} Stands>.** **<Close>** the window.
   6. Now that all stands have been selected, the next step is to add the package and related .kcp files to the current simulation. The **Simulation file contents** window lists all stands in the simulation. Clicking on any stand will expand the list to show all FVS keywords that will be applied to this stand during the simulation. This is where the .kcp file will be “attached” in the simulation.
   7. Click **<Insert from file>**. Browse to the folder where .kcp files have been saved and select the SDI.KCP file. As soon as the .kcp file has been added, it should be displayed in the window. By default, FVS applies all keywords within the .kcp file to all plots selected for this simulation.
   8. FVS is now ready to run the simulation. From the **Main** window, click on **<Run Simulation>.**
   9. Name the .key file *{variantname}\_SDImax.key* and click **<Save>.** Click **<Run>** from the pop-up window to begin the simulation.
   10. When the simulation is complete, the DOS window will close and all output data will be exported to the Access database file defined in the .kcp file, assuming that a database of that name already exists and contains no FVS output tables (such as SUMMARY, POTFIRE, etc.) before the simulation executes.
       1. If the DOS window shows all zeros or your FVS\_Treelist table in the output package database are missing, see the question “Why does the Suppose interface have connection errors with Microsoft Access Databases in either Windows 7 or Windows 10 Operating Systems?” at <https://www.fs.fed.us/fvs/support/index.shtml#qa37> and install the drivers recommended for your system
   11. Check the *FVS\_SDImax\_out.accdb* file
       1. Navigate to the variant folder within your project (this should be under *projectfolder*\fvs\data)
       2. Open the *FVS\_SDImax\_out.accdb* file
       3. Four tables should appear:
          1. FVS\_Cases
          2. FVS\_Compute
          3. FVS\_StrClass
          4. FVS\_Summary
   12. Repeat for each variant.
6. Run the SDImax.R according to the documentation in the R script
7. Check your *FVSIn.mdb* file is properly set up
   1. Before proceeding, navigate to the variant folder and open the *FVSIn.mdb*
   2. Run these checks:
      1. *FVS\_StandInit* contains a “County” field that is populated with owncd values
         1. If not, go to step 4
      2. *FVS\_StandInit* contains a “FM\_BY” field that is populated.
         1. Some values may be blank. If all values are blank, go to steps 6-13
      3. *FVS\_StandInit* “Inv\_Year” values are all 2007
         1. If not, go to step 5
8. Run the package KCPs through FVS Suppose
   1. Open FVS – Suppose
   2. On the top tool bar select **<File> <Select Locations File>.**
   3. Navigate to the BioSum project files folder. Then go to the “fvs\data\*variant*” folder and select the **Predispose.loc** file (**NOTE**: Do not select the *variantname.loc* file)
   4. After selecting the locations file, the **Select Simulation Stand** window will open. By default, the **<Pick Locations First>** radio button is selected. Click on the two-letter variant code listed in the left window pane. A list of all available stands will appear in the right window pane, as in Figure 4.20. Add all stands to the simulation using the **<All Stands>** button on the lower right of the window or use pre-defined groups to filter which stands are added. Finalize selection by clicking **<Add {count} Stands>.** **<Close>** the window.
   5. Now that all stands have been selected, the next step is to add the package and related .kcp files to the current simulation. The **Simulation file contents** window lists all stands in the simulation. Clicking on any stand will expand the list to show all FVS keywords that will be applied to this stand during the simulation. This is where the .kcp file will be “attached” in the simulation.
   6. Click **<Insert from file>**. Browse to the folder where .kcp files have been saved and select the *{packagename}.KCP* file. As soon as the .kcp file has been added, it should be displayed in the window (see Figure X). By default, FVS applies all keywords within the .kcp file to all plots selected for this simulation.
      1. Make sure *{packagename}.KCP* is the first KCP file in the list
   7. Repeat the step above to add any other KCP files you wish to add (see Figure X for CEC example).
   8. FVS is now ready to run the simulation. From the **Main** window, click on **<Run Simulation>.**
   9. Name the .key file *{packagename}.key* and click **<Save>.** Click **<Cancel>** instead of **<Run>.** This will create the .bat and .key files you need to run the simulation, but will not start them running. This allows you to run the .bat files at a later date after necessary checks have been run.

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| Figure X. FVS – Suppose screen for running package KCP files along with BApref, regen, and SDImax |

1. Run the “key file test” R script according to the documentation within the script file.
2. Combine the .bat files according to the documentation within the “combinebatfiles” script file.
3. Run the .bat files by returning to the project directory and opening the “runall1.bat” and “runall2.bat” files (there may be more depending on how many packages you decided to put in each bat file).
   1. It may be good to check them first by right clicking and choosing “edit”. Delete any lines that have NAs.
4. Run the “postFVSqa” script according to the documentation within the script file.
   1. Note: for packages 14 and 15, the wrong\_amt\_cut test does not function perfectly and will show problems. You can ignore this (it is due to the higher lower DBH limit)
   2. Similarly, packages 3 and 13 will have less values in FVS\_Cases\_rows due to slope limitations, so deviations from the total can be ignored
5. Run the “MortCalc” R script according to the documentation within the script file.