Exercise 1 – Creating a Query

The objective of this exercise is to familiarize the user with how to select FIA plot, tree, condition, and tree species reference data using Query Design in MS-Access. Users will also learn how to create an expression to calculate basal area.

Users may want to refer to the FIADB 4.0 Users Manual, which describes the Forest Inventory and Analysis Database (FIADB) structure and defines all the variables in the database. The guide can be downloaded from the US Forest Service TreeSearch at http://treesearch.fs.fed.us/pubs/37446.

Note: Specific actions are in red and MS-Access keywords are in bold red.

1) Open the MS-Access file containing the FIADB data for the state of your choice. Click on the Create tab, and then click on Query Design.

2) Add the PLOT, COND, TREE, and REF_SPECIES tables to the design window by double-clicking on the table name (or click once and click on the Add button). When you are finished adding the tables, click on the Close button in the Show Table window.

3) Note that the Plot table is automatically joined to the Tree and Condition tables by the PLOT.CN and TREE.PLT_CN and COND.PLT_CN attributes, respectively, while the REF_SPECIES table is not joined to any table. You can create a join by selecting and dragging the attribute name from one table to its match on another table.
4) Join the TREE.SPCD to REF_SPECIES.SPCD, so that your tables now look like the view below:

5) There is one more join to make to ensure that you are connecting the data correctly. The CONDID in the TREE and COND table need to be joined. Join CONDID on the two tables.
6) You can add attributes by either double-clicking on the attributes in the order you want them to appear, or by selecting and dragging them to the desired column.

   Add the following attributes from the PLOT table: CN, INVYR, COUNTYCD, PLOT.
   Add CONDID from the COND table.
   Add the SUBP, SPCD, STATUSCD, DIA from the TREE table.
   Add COMMON_NAME from the REF_SPECIES table.

7) View the selected data fields by clicking on the Run button. Depending on how heavily forested your selected state is, the query may take some time to run because you are selecting all the trees for all the years for the entire state. In this case (PA), there are 307164 rows of trees selected.
8) Click on the View button and select Design View, from the drop-down list, to get back to the Query Tools.

![View Button Image]

9) Filter your selection by limiting the INVYR Criteria to only those trees which were surveyed in 2009. Click on the Run! button and see how many rows are now retrieved.

<table>
<thead>
<tr>
<th>Field:</th>
<th>CN</th>
<th>INVYR</th>
<th>COUNTYCD</th>
<th>PLOT</th>
<th>PLTID</th>
<th>CONID</th>
<th>SUBP</th>
<th>TREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table:</td>
<td>PLOT</td>
<td>Plot</td>
<td>PLOT</td>
<td>PLOT</td>
<td>CONID</td>
<td>SUBP</td>
<td>TREE</td>
<td></td>
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<tr>
<td>Sort:</td>
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<td>Show:</td>
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<tr>
<td>Criteria:</td>
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</tr>
</tbody>
</table>

10) Now select a single PLOT.CN from the list of trees in the above query, to work with one plot. Copy the CN from the run output,

![Tree List Image]

and paste it in the Criteria row in the PLOT.CN column in the Design View of your query. Note that, when you click out of the Criteria box, Access automatically puts quotes around the CN value. That is because CN is a character data type.
11) Add an Expression to calculate the Basal Area of individual trees for that plot. Right-click in a blank column and select Build to bring up the Expression Builder tool.
12) Double-click on **Tables** to view the list of tables in your database. Scroll down and double-click on the **TREE** table. The middle pane now displays the columns or attributes that are in the **TREE** table. Scroll down and double-click on **DIA** to select it for the builder display window.

13) Click on the arithmetic operator for multiplication (*), double-click on **DIA** again, and multiply that by **0.005454**.
14) Move the cursor back to the beginning of your expression to give it a name. Type basal_area for the expression name, followed by a colon (:), followed by a space.

15) Click OK, and the expression, basal_area, is now displayed in the last column. Now click on Run! to view your results. You will see that the calculations are extended many decimal places.

16) To adjust that, go back to Design View, right click on the basal_area column, and choose Properties. Select Standard from the Format drop down list, and enter 4 for the number of Decimal Places. Run! the query to check your results.
17) To obtain basal area per acre, modify the expression to include TPA_UNADJ (trees per acre, unadjusted). In Design View, right click on basal_area, select Builder, and multiply the entire expression by TREE.TPA_UNADJ (encase the expression in parentheses, insert the multiplication symbol, and select TPA_UNADJ from the TREE table). Click OK, and then Run! to view the query results.

18) Test your calculations against the BALIVE value in the COND table (basal area of live trees at least 1 inch DBH/DRC sampled in the condition). Add the COND.BALIVE to the query table.
19) Sum your basal_area calculations by COND.CONDID and TREE.STATUSCD. Click on the Totals icon, and the Totals tool row appears. Select Sum from the Totals drop down list for the basal_area column.

20) Manipulate the other columns to isolate unique values for all columns except for CONDID and STATUSCD. So, even though these aggregates make little sense, select Sum for SUBP, SPCD, and DIA. Select Where for COMMON_NAME. (Note: other methods for aggregating are to remove those fields from the query, or unselect the Show check boxes). Run! the query.

21) The sum of the basal area for the live trees (TREE.STATUSCD=1) should equal the COND.BALIVE.

End of Exercise (rest time) – Good Work!