# FFI Query <u>Calculations</u> Guide

**Purpose of this Guide**

This guide is a supplement to the FFI User Guide which contains general instructions for all FFI Query tool functions. The Query tool in FFI can perform calculations for density, cover, frequency, and basal area that cannot be done using standard FFI analysis functions (e.g. summary by life form or user-defined height class). To perform these calculations, the Query data grid must contain all variables (fields) needed for the equations. This guide was designed to help users make the appropriate selections in the Query tabs to select the fields needed to carry out the calculations. The Query tool can also perform these calculations on custom protocol data designed in Protocol Manager, but the process will depend on the fields in the custom protocol, and therefore steps outlined in this guide must be adjusted accordingly.

**How this Guide Works**

The following pages describe the general steps to take **after** data are filtered to perform calculations for density, cover, basal area, and frequency. Each page displays one calculation for a single protocol (e.g. density calculation for the Density – Quadrats protocol). The basic formula is displayed along with the same formula written with Query field names to illustrate how each field is used in the calculation and to assist in making the appropriate selections during the query. Some suggested situations in which calculations might be used are included at the top of each page.

- **Before** following the steps on each page, you must first use the **FILTER** tab to determine which data will be included in the calculation. Filtering will vary based on analysis needs. Also, if you want to perform the calculations on user-defined classes of numeric data (e.g. by height class or diameter class), use the **CLASSIFY** tab after filtering. See the FFI User Guide for instructions on using the Query tool for filtering and classifying data.

- Once filters are applied, the steps on each page in the guide describe how to make selections on the **ADDITIONAL / CALCULATED FIELDS**, **GROUPING,** and **SUMMARY CALCULATIONS** tabs to complete the calculation for that protocol. Selections will vary depending upon the data and desired analysis – try to consider which fields are needed for a particular calculation and do not expect to make the same selections for different calculations and protocols!

- Below is a key to formatted text used in the guide and the following page is a glossary of Query fields created in the data grid during calculation queries. At the end of the guide, one example is included with screen shots to demonstrate all steps used in calculating basal area by user-defined diameter class for live and dead trees, including exporting the query results.

<u>Guide Text Key:</u>

| | |
|---|---|
| *italics* = formula | SMALL CAPS BOLD = Query Tab |
| **bold** = field name | <u>Underlined</u> = Query Tab subsection |

Glossary of Query fields:

**CalcArea** = the sample area for a Macro Plot calculated from the sample attributes (e.g., the total area of all quadrats in a Macro Plot for the Density – Quadrats protocol using quadrat length times quadrat width times number of quadrats)

**DBH^2** = the diameter at breast height squared

**NumSubsamples** = the total number of subsamples in a Macro Plot calculated from sample attributes (e.g., total number of points sampled in a Macro Plot for the Cover – Points protocols using number of transects times number of points per transect)

**RowCount** = the number of rows or records in each group

**sum_CalcArea** = the sum of the sample area in each group

**sum_Count** = the sum of the **Count** field tallies in each group

**sum_DBH^2** = the sum of the diameter at breast height squared for each group

**sum_Hits** = the sum of the number of hits in each group

**sum_Int** = the sum of the intercept distance in each group

**sum_MacroPlot Size** = the sum of the Macro Plot area sampled in each group (e.g., sum of the sample attribute field **Area)**

**sum_MicroPlotSize** = the sum of the Micro Plot area sampled for each group (e.g., sum of the sample attribute field **Area)**

**sum_NumQuadTran** = the sum of the number of quadrats per transect for each group

**sum_NumSubsamples** = the sum of the number of subsamples in each group (e.g., total length of transect sampled for Cover – Line Intercept protocol for all Macro Plots in a group)

**sum_NumTran** = the sum of the number of transects for each group

Use this calculation to get a summary of the density of individuals for the Density – Belts protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Lifeform or UV field).

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**Protocol: Density – Belts**
**Calculation: Density**

| Formula: | Corresponding Query fields: |
|---|---|
| $$Density = \left(\frac{Number\ of\ individuals}{Area\ sampled}\right) \times Unit\ Conversion$$ | $$\mathbf{Density\_units} = \left(\frac{\mathbf{sum\_Count}}{\mathbf{sum\_CalcArea}}\right) \times Unit\ Conversion$$ |

**ADDITIONAL / CALCULATED FIELDS TAB**

Monitoring Status Fields:
    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)

Number of Subsamples and Area:
    Num. Transects = **Num. Transects**
    Quadrat Length = **Tran. Length**
    Quadrat Width = **Tran. Width**
    check "Calculate Area**"** to get **CalcArea**

Click on **Apply Selections** menu button to update data grid

**GROUPING TAB**

Macroplot Group By:
    check **Macro Plot** (to get results for each Macro Plot)
    select **Monitoring Status** (or **Date**)
Method Fields to Group By:
    select **Subplot Frac.** if used select others as needed (e.g.
        **Status** and/or **Species** radio button)

Click on **Apply Selections** menu button to update data grid

**SUMMARY CALCULATIONS TAB**

Method Fields to Sum:
    select **Count** (will sum all tallies in Count field by selected groupings)
Click on **Apply Selections** menu button to update data grid

Calculations – Density:
    Area = **sum_CalcArea** (*Area sampled*)
    Method Attribute = **SubFrac** (if Subplot Fraction is used)
    Count Field = **Sum_Count** (*Number of individuals*)
    Unit Conversions = select Output Units desired – (Area measured units)
        [e.g. "Hectares – Area (sq. m)" means calculate density in number per hectare from area measurements taken in square meters]
    Check "Calculate Density" to get **Density_units**

Click on **Apply Selections** menu button to update data grid

Use this calculation to get a summary of the density of individuals for the Density – Quadrats protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Lifeform or UV field).

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**Protocol:  Density – Quadrats**
**Calculation:  Density**

| Formula: | Corresponding Query fields: |
|---|---|
| $$Density = \left(\frac{Number\ of\ individuals}{Area\ sampled}\right) \times Unit\ Conversion$$ | $$\textbf{Density\_units} = \left(\frac{\textbf{sum\_Count}}{\textbf{sum\_CalcArea}}\right) \times Unit\ Conversion$$ |

| **ADDITIONAL / CALCULATED FIELDS TAB** | **GROUPING TAB** |
|---|---|
| Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br><br>Number of Subsamples and Area:<br>    Num. Transects = **Num. Transects**<br>    Num. Quad/Num. Pts./Tran. Len. = **Num. Quad/Tran.** (provides the number of frames or quadrats per transect)<br>    Quadrat Length = **Quad. Length**<br>    Quadrat Width = **Quad. Width**<br>    check "Calculate Area" to get **CalcArea**<br><br>Click on **Apply Selections** menu button to update data grid | Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br>Method Fields to Group By:<br>    select **Subplot Frac.** if used<br>    select others as needed (e.g. **Status** and/or **Species** radio button)<br>Click on **Apply Selections** menu button to update data grid<br><br>**SUMMARY CALCULATIONS TAB**<br><br>Method Fields to Sum:<br>    select **Count** (will sum all tallies in Count field by selected groupings)<br><br>Calculations – Density:<br>    Area = **sum_CalcArea**  (*Area sampled*)<br>    Method Attribute = **SubFrac** (if Subplot Fraction is used)<br>    Count Field = **Sum_Count** (*Number of individuals*)<br>    Unit Conversions = select Output Units desired – (Area measured units)<br>    Check "Calculate Density" to get **Density_units**<br>Click on **Apply Selections** menu button to update data grid |

Use this calculation to get a summary of the density of individuals for the Trees - Individuals protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Status, custom Height or DBH classes, or UV field).

| **Protocol: Trees – Individuals**<br>**Calculation: Density** | |
|---|---|
| Formula:<br><br>$$Density = \left(\frac{Number\ of\ individuals}{Area\ sampled}\right) \times Unit\ Conversion$$ | Corresponding Query fields:<br><br>$$\textbf{Density\_units} = \left(\frac{\textbf{RowCount}}{\textbf{sum\_MacroPlotSize}}\right) \times Unit\ Conversion$$ |
| **ADDITIONAL / CALCULATED FIELDS TAB**<br><br>Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br><br>Number of Subsamples and Area:<br>    Not needed; Plot Size is a sample attribute<br><br>Click on **Apply Selections** menu button to update data grid<br><br>**GROUPING TAB**<br><br>Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br>Method Fields to Group By:<br>    select **Subplot Frac.** if used<br>    select others as needed (e.g. **Status** and/or **Species** radio button)<br><br>Click on **Apply Selections** menu button to update data grid | **SUMMARY CALCULATIONS TAB**<br><br>Method Fields to Sum:<br>    select **Plot Size**<br>    no need to select field to sum trees as each record (row) is an individual tree and does not contain a tally field<br><br>Click on **Apply Selections** menu button to update data grid<br><br>Calculations – Density:<br>    Area = **sum_MacroPlot Size** (*Area sampled*)<br>    Method Attribute = **SubFrac** (if Subplot Fraction is used)<br>    Count Field = **RowCount** (*Number of individuals*)<br>    Unit Conversions = select Output Units desired – (Area measured units)<br>    Check "Calculate Density" to get **Density_units**<br><br>Click on **Apply Selections** menu button to update data grid |

Use this calculation to get a summary of basal area for the Trees - Individuals protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Status, custom Height or DBH classes, or UV field).

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**Protocol:  Trees – Individuals**
**Calculation:  Basal Area**

| | |
|---|---|
| Formula:<br><br>$$Basal\ Area = \sum \frac{(\pi \times (diameter \div 2))^2}{(4 \times Area\ sampled)} \times Unit\ Conversion$$ | Corresponding Query fields:<br><br>$$\textbf{BasalArea\_units} = \left(\frac{\textbf{sum\_DBH\textasciicircum 2}}{\textbf{sum\_MacroPlotSize}}\right) \times Unit\ Conversion$$ |

| | |
|---|---|
| **ADDITIONAL / CALCULATED FIELDS TAB**<br><br>Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br>Number of Subsamples and Area:<br>    Not needed; Plot Size is a sample attribute<br>Calculated Fields:<br>    DBH Field (for BA) = DBH<br>    check "Calculate DBH^2" to get **DBH^2**<br><br>Click on **Apply Selections** menu button to update data grid<br><br><br> **GROUPING TAB**<br>Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br>Method Fields to Group By:<br>    select **Subplot Frac.** if used<br>    select others as needed (e.g. **Status** and/or **Species** radio button)<br><br>Click on **Apply Selections** menu button to update data grid | **SUMMARY CALCULATIONS TAB**<br><br>Method Fields to Sum:<br>    select **Plot Size**<br><br>Calculations – Basal Area:<br>    Area = **sum_MacroPlot Size** (*Area sampled*)<br>    Method Attribute = **SubFrac** (if Subplot Fraction is used)<br>    DBH Squared = **sum_DBH^2** (*Sum of diameter*)<br>    Unit Conversions = select Output Units desired – (Area measured units)<br>    Check "Calculate Basal Area" to get **BasalArea_units**<br><br>Click on **Apply Selections** menu button to update data grid |

**Trees – Individuals: Basal Area**

Use this calculation to get a summary of the density of individuals for the Trees - Saplings protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Status or UV field). This is particularly useful because the standard analyses in the current version of FFI (1.04) do not separate live and dead saplings.

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**Protocol:  Trees – Saplings**
**Calculation:  Density**

| Formula: | Corresponding Query fields: |
|---|---|
| $$Density = \left(\frac{Number\ of\ individuals}{Area\ sampled}\right) \times Unit\ Conversion$$ | $$\textbf{Density\_units} = \left(\frac{\textbf{sum\_Count}}{\textbf{sum\_MacroPlotSize}}\right) \times Unit\ Conversion$$ |

| **ADDITIONAL / CALCULATED FIELDS TAB** | **SUMMARY CALCULATIONS TAB** |
|---|---|
| Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br><br>Number of Subsamples and Area:<br>    Not needed; Plot Size is a sample attribute<br><br>Click on **Apply Selections** menu button to update data grid<br><br>**GROUPING TAB**<br><br>Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br>Method Fields to Group By:<br>    select **Subplot Frac.** if used<br>    select others as needed (e.g. **Status** and/or **Species** radio button)<br><br>Click on **Apply Selections** menu button to update data grid | Method Fields to Sum:<br>    select **Plot Size**<br>    select **Count** (will sum all tallies in Count field by selected groupings)<br>Click on **Apply Selections** menu button to update data grid<br><br>Calculations – Density:<br>    Area = **sum\_MacroPlot Size** (*Area sampled*)<br>    Method Attribute = **SubFrac** (if Subplot Fraction is used)<br>    Count Field = **sum\_Count** (*Number of individuals*)<br>    Unit Conversions = select Output Units desired – (Area measured units)<br>    Check "Calculate Density" to get **Density\_units**<br><br>Click on **Apply Selections** menu button to update data grid |

**Trees – Saplings: Density**

Use this calculation to get a summary of the density of individuals for the Trees - Seedlings protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Status or UV field). This is particularly useful because the standard analyses in the current version of FFI (1.04) do not separate live and dead seedlings.

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**Protocol:  Trees – Seedlings**
**Calculation:  Density**

| Formula: | Corresponding Query fields: |
|---|---|
| $$Density = \left(\frac{Number\ of\ individuals}{Area\ sampled}\right) \times Unit\ Conversion$$ | $$\textbf{Density\_units} = \left(\frac{\textbf{sum\_Count}}{\textbf{sum\_MicroPlotSize}}\right) \times Unit\ Conversion$$ |

| **ADDITIONAL / CALCULATED FIELDS TAB** | **GROUPING TAB** |
|---|---|
| Monitoring Status Fields: <br>     check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events) <br><br> Number of Subsamples and Area: <br>     Not needed; Plot Size is a sample attribute <br><br> Click on **Apply Selections** menu button to update data grid | Macroplot Group By: <br>     check **Macro Plot** (to get results for each Macro Plot) <br>     select **Monitoring Status** (or **Date**) <br> Method Fields to Group By: <br>     select **Subplot Frac**. If used <br>     select others as needed (e.g. **Status** and/or **Species** radio button) <br><br> **SUMMARY CALCULATIONS TAB** <br> Method Fields to Sum: <br>     select **Plot Size** <br>     select **Count** (will sum all tallies in Count field by selected groupings) <br><br> Calculations – Density: <br>     Area = **sum_MicroPlot Size** (*Area sampled*) <br>     Method Attribute = **SubFrac** (if Subplot Fraction is used) <br>     Count Field = **sum_Count** (*Number of individuals*) <br>     Unit Conversions = select Output Units desired – (Area measured units) <br>     Check "Calculate Density" to get **Density_units** <br><br> Click on **Apply Selections** menu button to update data grid |

**Trees – Seedlings: Density**

Use this calculation to get a summary of cover values for the Cover – Line Intercept protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Lifeform or UV field).

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**Protocol: Cover – Line Intercept**
**Calculation: Cover**

| Formula: | Corresponding Query fields: |
|---|---|
| $$Cover = \left(\frac{Length\ of\ transect\ intercepted}{Total\ length\ of\ transect\ sampled}\right) \times 100$$ | $$\textbf{Cover} = \left(\frac{\textbf{sum\_Int}}{\textbf{sum\_NumSubsamples}}\right) \times 100$$ |

| **ADDITIONAL / CALCULATED FIELDS TAB** | **GROUPING TAB** |
|---|---|
| Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br><br>Number of Subsamples and Area:<br>    Num. Transects = **Num. Transects**<br>    Num. Quad./Num. Pts./Tran. Len. = **Tran. Length**<br>    check "Calculate Number of Subsamples" to get<br>      **NumSubsamples**<br><br>Click on **Apply Selections** menu button to update data grid | Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br>Method Fields to Group By:<br>    select grouping fields as needed (e.g. **Status** and/or **Species** or<br>      **Lifeform** radio button)<br><br>Click on **Apply Selections** menu button to update data<br><br>**SUMMARY CALCULATIONS TAB**<br><br>Method Fields to Sum:<br>    select **Intercept** (to sum the length of the transect intercepted by selected groupings)<br><br>Calculations – Cover:<br>    Number of Subsamples = **sum_NumSubsamples** (*Total length of transect sampled*)<br>    Method Attribute = **SubFrac** (if Subplot Fraction is used)<br>    Cover Field = **Sum_Int** (*Number of hits*)<br>    Check "Calculate Cover" to get **Cover**<br><br>Click on **Apply Selections** menu button to update data grid |

**Cover – Line Intercept**

Use this calculation to get a summary of cover values for the Cover – Points protocol (FMH method) for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Lifeform or UV field).

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**Protocol:  Cover – Points**
**Calculation:  Cover**

| Formula: | Corresponding Query fields: |
|---|---|
| $$Cover = \left(\frac{Number\ of\ hits\ *}{Total\ number\ of\ points\ sampled}\right) \times 100$$ | $$\textbf{Cover} = \left(\frac{\textbf{RowCount}}{\textbf{sum\_NumSubsamples}}\right) \times 100$$ |

| **ADDITIONAL / CALCULATED FIELDS TAB** | **GROUPING TAB** |
|---|---|
| Monitoring Status Fields: <br>      check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events) <br><br> Number of Subsamples and Area: <br>      Num. Transects = **Num. Transects** <br>      Num. Quad./Num. Pts./Tran. Len. = **Num. Pts./Tran.** <br>      Check "Calculate Number of Subsamples" to get **NumSubsamples** <br><br> Click on **Apply Selections** menu button to update data grid | Macroplot Group By: <br>      check **Macro Plot** (to get results for each Macro Plot) <br>      select **Monitoring Status** (or **Date**) <br> Method Fields to Group By: <br>      *select **Transect** and **Point** if unique hits are needed (e.g. if species/group is sampled more than once at a point and you don't want to include duplicate hits in cover calculation) <br>      *do not select Transect and Point if a species is only sampled once at each point or if you want multiple hits per species/group to be included in the cover calculation <br>      select others as needed (e.g. **Status** and/or **Species** or **Lifeform** button) <br> Click on **Apply Selections** menu button to update data grid <br><br> **SUMMARY CALCULATIONS TAB** <br> Method Fields to Sum: <br>      none needed; each row (record) equals one hit so there are no tallies to be summed (RowCount does this automatically by counting the rows) <br> Calculations – Cover: <br>      Number of Subsamples = **sum\_NumSubsamples** (*Total number of points sampled*) <br>      Method Attribute = **SubFrac** (if Subplot Fraction is used) <br>      Cover Field = **RowCount** (*Number of hits*) <br>      Check "Calculate Cover" to get **Cover** <br> Click on **Apply Selections** menu button to update data grid |

Use this calculation to get a summary of cover values for the Cover – Points by Transect protocol (FIREMON method) for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Lifeform or UV field).

| Protocol: Cover – Points by Transect<br>Calculation: Cover | |
|---|---|
| Formula:<br><br>$$Cover = \left(\frac{Number\ of\ hits}{Total\ number\ of\ points\ sampled}\right) \times 100$$ | Corresponding Query fields:<br><br>$$\textbf{Cover} = \left(\frac{\textbf{sum\_Hits}}{\textbf{sum\_NumSubsamples}}\right) \times 100$$ |
| **ADDITIONAL / CALCULATED FIELDS TAB**<br><br>Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br><br>Number of Subsamples and Area:<br>    Num. Transects = **Num. Transects**<br>    Num. Quad./Num. Pts./Tran. Len. = **Num. Pts./Tran.**<br>    Check "Calculate Number of Subsamples" to get **NumSubsamples**<br><br>Click on **Apply Selections** menu button to update data grid | **GROUPING TAB**<br><br>Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br><br>Method Fields to Group By:<br>    select fields to group as needed (e.g. **Status** and/or **Species** or **Lifeform** radio button)<br><br>Click on **Apply Selections** menu button to update data grid<br><br>**SUMMARY CALCULATIONS TAB**<br><br>Method Fields to Sum:<br>    select **Hits** (will sum all hits by selected groupings)<br><br>Calculations – Cover:<br>    Number of Subsamples = **sum\_NumSubsamples** (*Total number of points sampled*)<br>    Method Attribute = **SubFrac** (if Subplot Fraction is used)<br>    Cover Field = **sum\_Hits** (*Number of hits*)<br>    Check "Calculate Cover" to get **Cover**<br><br>Click on **Apply Selections** menu button to update data grid |

**Cover – Points by Transect**

Use this calculation to get a summary of frequency for the Cover/Frequency protocol for groupings that cannot be analyzed using the standard FFI Reports and Analysis functions (e.g. grouping by Lifeform or UV field).

| **Protocol: Cover/Frequency**<br>**Calculation: Frequency** | |
|---|---|
| Formula:<br><br>$$Frequency = \left(\frac{Number\ of\ quadrats\ in\ which\ spp\ occurs}{Total\ number\ of\ quadrats\ sampled}\right) \times 100$$ | Corresponding Query fields:<br><br>$$\textbf{Frequency} = \left(\frac{\textbf{RowCount}}{\textbf{sum\_NumSubsamples}}\right) \times 100$$ |
| **ADDITIONAL / CALCULATED FIELDS TAB**<br><br>Monitoring Status Fields:<br>    check **Order** (if exporting for use in External Data Analysis tools; this field tells FFI in which order to analyze the sample events)<br><br>Number of Subsamples and Area:<br>    Num. Transects = **Num. Transects**<br>    Num. Quad./Num. Pts./Tran. Len. = **Num. Quad./Tran.**<br>    check "Calculate Number of Subsamples" to get<br>        **NumSubsamples**<br><br>Click on **Apply Selections** menu button to update data grid | **GROUPING TAB**<br><br>Macroplot Group By:<br>    check **Macro Plot** (to get results for each Macro Plot)<br>    select **Monitoring Status** (or **Date**)<br>Method Fields to Group By:<br>    select fields to group as needed (e.g. **Status** and/or **Species** or<br>        **Lifeform** radio button)<br><br>Click on **Apply Selections** menu button to update data grid<br><br>**SUMMARY CALCULATIONS TAB**<br><br>Calculations – Frequency:<br>    Number of Subsamples = **sum\_NumSubsamples** (*Total number of quadrats sampled*)<br>    Frequency Field = **RowCount** (*Number of quadrats in which spp occurs*)<br>    Check "Calculate Frequency" to get **Frequency**<br><br>Click on **Apply Selections** menu button to update data grid |

**Cover/Frequency**

**EXAMPLE: Trees – Individuals, Basal Area grouped by DBH class and Live/Dead**

**FILTER**: Select the Project Unit and Protocol (FOREST and Trees – Individuals). Click on the method name (Trees – Individuals) and click on **Apply Selections** menu button to populate the data grid at the bottom of the screen. Select Macroplots to include in the analysis (TESTFOREST1, 3, 4, and 5). Select Sample Events/ Monitoring Statuses to include only a subset (all are included in this example, therefore, none need to be selected). Select Species field(s) to filter if desired (all species included in this example). Note that the data grid will display the filtering results only after clicking on the **Apply Selections** menu button.

**EXAMPLE:  Trees – Individuals, Basal Area grouped by DBH class and Live/Dead (cont.)**

ADDITIONAL / CALCULATED FIELDS: Select **Order** from Monitoring Status Fields to use results from the calculation query in the FFI External Data Analysis Tools (see User Guide for instructions on using the External Data Analysis Tools). Select any other Sample Event, Macroplot, or Species fields to include in the results as desired (none selected for this example). Select DBH Field (for BA) in the Calculated Fields box to provide the diameter field that will be used in the basal area calculation (**DBH**). Check the box to Calculate DBH^2. Click on the **Apply Selections** menu button to refresh the data grid. Scrolling all the way to the right on the data grid will reveal the new calculated field **DBH^2**.

**EXAMPLE: Trees – Individuals, Basal Area grouped by DBH class and Live/Dead (cont.)**

CLASSIFY: Select the Field to classify (**DBH**). Fill in the values for the class Upper Cutoff and type in names for the Class Label as desired (three classes are created in this example: Small – trees less than 8 inches, Medium – trees between 8 and 12 inches, and Large – trees greater than 12 inches in diameter). The class Lower Cutoff values are automatically populated based on the previous Upper Cutoff values and operators can be changed as needed by using the dropdown lists. Click on both the Apply button on the tab AND the **Apply Selections** menu button to refresh the data grid. Scroll to view the classes created in the DBH field that replace the numeric values (Small, Medium, and Large).

**EXAMPLE: Trees – Individuals, Basal Area grouped by DBH class and Live/Dead (cont.)**

GROUPING: Under Macroplot Group By, Select Macro Plot and Event, **Monitoring Status**. Select fields in Method Fields to Group By as desired (**Status** and **DBH** to group by live/dead and diameter classes in this example). Select Species Attribute fields if desired (none selected in this example). Click on the **Apply Selections** menu button to refresh the data grid.

**EXAMPLE:  Trees – Individuals, Basal Area grouped by DBH class and Live/Dead (cont.)**

SUMMARY CALCULATIONS: Select Method Fields to Sum (**Plot Size** selected to calculate total area sampled by summing plot area for each Macro Plot). Click on the **Apply Selections** menu button to refresh the data grid. Select Area field (**sum_MacroPlotSize**), DBH Squared field (**sum_DBH^2**), and Unit Conversions (Sq. Ft. / Acre – DBH (in.), Area (acres)), since we want basal area results reported in Sq. Ft. / Acre and units measured in the field were inches for DBH and acres for Area. Check the Calculate Basal Area check box. Click on the **Apply Selections** menu button to refresh the data grid. Resulting basal area is displayed in the new field, Basal Area_sq.ft./acre.

**EXAMPLE: Trees – Individuals, Basal Area grouped by DBH class and Live/Dead (cont.)**

**Exporting**: The query calculation results can be exported by clicking on the Export menu above the Filter tab and naming and saving the export file (.csv) to a specified location.

To import the data into the FFI External Data Analysis Tools, you can open the .csv file directly in the File, Open menu by selecting Text from the Files of Type dropdown. Then, following the instructions found in the FFI User Guide, you can analyze the imported data in a manner similar to the FFI Reports and Analysis. Keep in mind that the tools can only stratify by one variable (field), therefore, results exported from this example cannot be analyzed by FFI External Data Analysis Tools because the data were grouped by both DBH class and Status (live/dead). These results can, however, be imported into other applications for further analysis if needed.