



## Section 9 - Query Tool and External Data Analysis Exercises

Before starting these exercises you need to have a copy of the FFI-Lite training dataset: *FFI\_Lite\_Training\_Data\_10514.SDF*. The training dataset is included in the zip file if you download the training materials or it can be downloaded individually from *Software and Instructions and Training Data* tab on the *Manuals and Software* page on the FFI FRAMES website: [www.frames.gov/ffi](http://www.frames.gov/ffi).

These exercises are designed to make you familiar with the different parts of the Query tool in FFI and FFI-Lite. They are not meant to describe all the functionality of the tool.

The Query Calculation Guide is included in the zip file of training materials. The Guide is an additional resource to help explain the selections that need to be made on each tab of the Query tool.

**In these exercises you will:**

### Part 1 – Query tool: Filtering data and adding fields

- 1) Use the Query tool to view data for the Surface Fuels – Fine method.
- 2) Use the Query tool to view data for the Trees - Individuals method.
- 3) Use the Query tool to view data for the Cover – Species Composition method. Add fields from the macroplot table and master species list to the query.

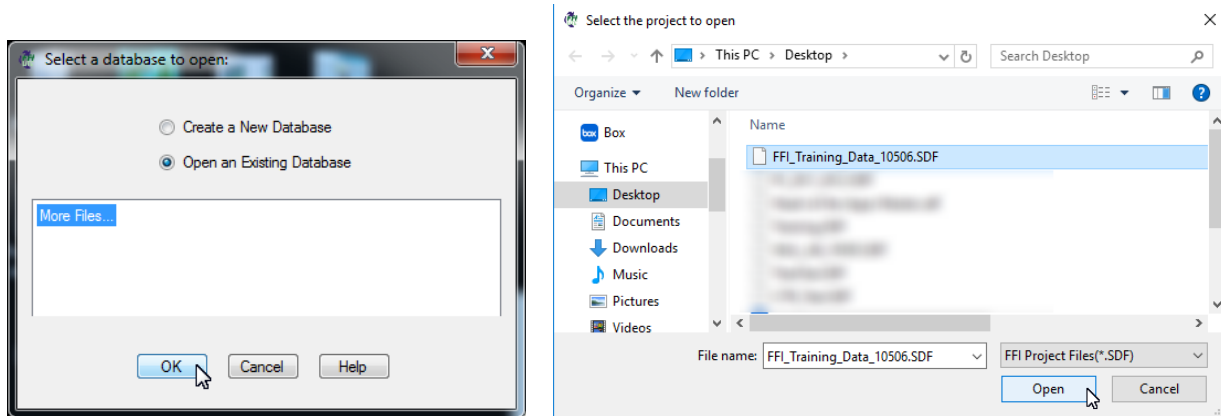
### Part 2 – Query tool: Calculations

- 4) Use the Query tool to calculate seedling density by status (live / dead) using the Trees – Seedlings (Height Class) method. Export the query results as a CSV file.
- 5) Use the Query tool to calculate basal area by dbh classes using the Trees – Individuals method.

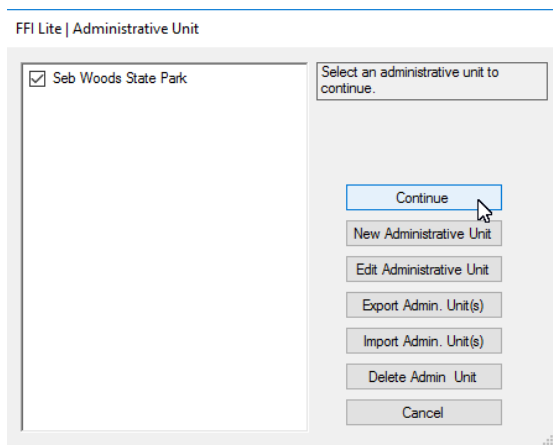
## Part 1 - Query Tool: Filtering Data and Adding Fields

### Exercise 1: Use the Query tool to view data for the Surface Fuels – Fine method.

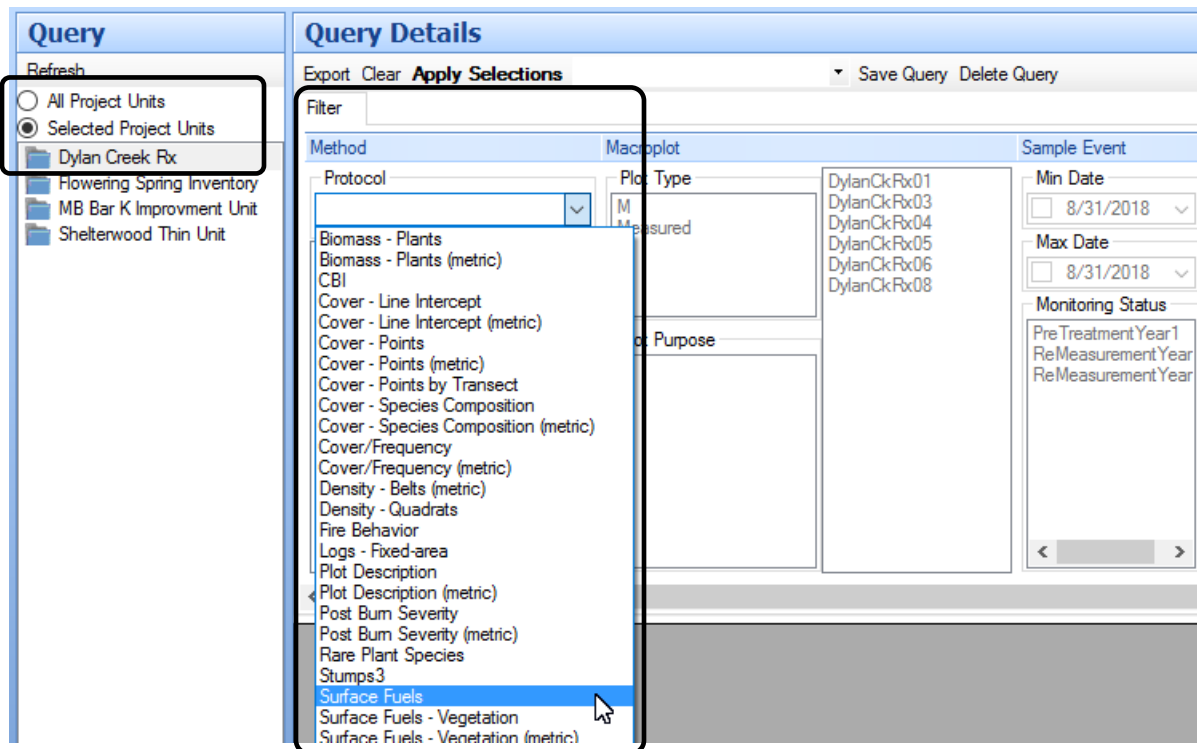
**1.1** Double click the FFI-Lite icon and log into the *FFI\_Lite\_Training\_Data\_10514*. If the training database isn't displayed click More Files..., click OK and navigate to the folder where you saved database. Click Open.



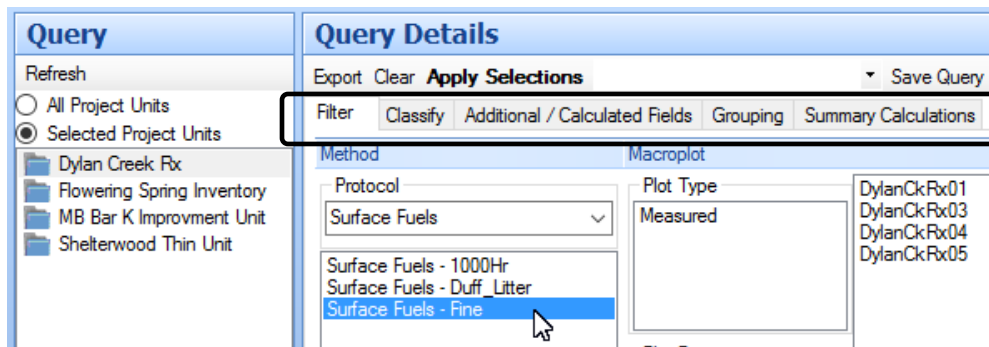
**1.2** Check the box for the *Seb Woods State Park* administrative unit and click **Continue**.



**1.3** To begin each query determine if you want to query all the data in the administration unit or only data for a specific project unit, then select the appropriate radio button in the left pane. For these exercises you will query only the *Dylan Creek Rx* project so click the *Selected Project Units* radio button and then highlight the *Dylan Creek Rx* project by clicking on it once. On the **Filter** tab select a protocol from the **Protocol** dropdown list. For this example select the *Surface Fuels* protocol.



**1.4** Next, click once on the method you want to query in the box beneath the **Protocol** field. In the image below the *Surface Fuels – Fine* method has been selected. After you’ve selected a protocol and highlighted the desired method, five tabs will be displayed: 1) **Filter**, 2) **Additional/ Calculated Fields**, 3) **Classify**, 4) **Grouping** and 5) **Summary Calculations**. Not all tabs will be used in every query.



The **Filter** and **Additional/Calculated Fields** tabs allow users to filter data for the selected sampling method and to add fields from other FFI data tables.

Data can be filtered by Macroplot, Monitoring Status, Sample Event, and Species attributes. Fields may be added to the query from the Macroplot, Sample Event, Monitoring Status, and Master Species List tables.

Data for the selected method are displayed in the Query data grid in the bottom half of the Query tool screen.

- 1.5 1) Make sure the *Surface Fuels Protocol* and *Surface Fuels - Fine Method* are selected.
- 2) Under **Macroplot**, select plots *DylanCkRx01* and *DylanCkRx03* by clicking once on each macroplot name.
- 3) Under **Sample Event**, select monitoring statuses *PreTreatment* and *ReMeasurementYear1* by clicking each.
- 4) Click **Apply Selections**
- 5) The raw *Surface Fuels – Fine* method data is displayed in the data grid. If desired, the information can be saved in comma delimited format (.csv) using the Export command (right above the filter tab).

**NOTE:** On the **Filter** tab, list items in a selection box will be included in a query when highlighted. If no items are highlighted then all list items will be included. For example, if no plots are highlighted in the Macroplot box then all plots will be included in the query.

The screenshot shows the Query Tool interface with the Query Details tab selected. The interface includes a left sidebar with navigation options: Project Management, Data Entry and Edit, Query (highlighted), Reports and Analysis, Species Management, and Toolbox. The main area is divided into several sections:

- Query Details:** Contains tabs for Filter, Classify, Additional / Calculated Fields, Grouping, and Summary Calculations. The Filter tab is active, showing a list of filters with checkboxes for 'Apply Selections', 'Save Query', and 'Delete Query'.
- Method:** A dropdown menu showing 'Surface Fuels' and 'Surface Fuels - Fine' (selected).
- Macroplot:** A list of macroplots including 'DylanCkRx01', 'DylanCkRx03', 'DylanCkRx04', and 'DylanCkRx05' (selected).
- Sample Event:** A list of monitoring statuses including 'Pre Treatment Year1', 'Re Measurement Year1', and 'Re Measurement Year2' (selected).
- Species:** A section with checkboxes for 'Biological not filtered', 'Nativity not filtered', and 'Concern not filtered'.
- Data Grid:** A table displaying the results of the query. The first row is the header for sample attribute data, and subsequent rows contain method attribute data for the selected macroplots and sample events.

Annotations in the image include:

- 1: Points to the 'Selected Project Units' section in the left sidebar.
- 2: Points to the 'Macroplot' filter section.
- 3: Points to the 'Sample Event' filter section.
- 4: Points to the 'Apply Selections' button.
- 5: Points to the 'Surface Fuels - Fine' method selection.

Sample Attribute data (header row):

| Date       | MacroPlot Name | UV3Desc | UV3 | UV2Desc | Index | Visited | Transect | Azimuth | Slope |
|------------|----------------|---------|-----|---------|-------|---------|----------|---------|-------|
| 10/15/2001 | DylanCkRx01    |         |     |         | 1     | True    | 1        |         | 26    |
| 10/15/2001 | DylanCkRx01    |         |     |         | 2     |         | 2        |         | 6     |
| 10/7/2002  | DylanCkRx01    |         |     |         | 1     | True    | 1        |         | 26    |
| 10/7/2002  | DylanCkRx01    |         |     |         | 2     |         | 2        |         | 6     |
| 10/15/2001 | DylanCkRx03    |         |     |         | 1     | True    | 1        |         | 36    |
| 10/15/2001 | DylanCkRx03    |         |     |         | 2     |         | 2        |         | 13    |

For each macroplot/sample event combination, the sample attribute data are displayed in the first row followed by one or more rows of method attribute data.

Terminology reminder: sample attributes (sometimes called the 'header data') describe the way the data were collected and method attributes are fields in the rows of the data grid. For example, when using the *Trees-Individuals* protocol, sample attributes include plot area, breakpoint diameter and snag plot area, and the method attributes include tree tag number, species, DBH and height.

**NOTE:** In FFI-Lite the data columns in the query grid are not ordered the same as on the data entry screens. You can move columns by dragging the column header.

## Exercise 2: Use the Query tool to view data for the Trees - Individuals method.

### 2.1 On the Filter tab:

- 1) Under **Protocol**, select the *Trees* protocol and the *Trees - Individuals* method.
- 2) Under **Macroplot**, select plot *DylanCkRx01*
- 3) Under **Sample Event**, select monitoring status *ReMeasurementYear1*.
- 4) Click **Apply Selections**

The screenshot shows the Query Tool interface with the Filter tab selected. The 'Protocol' dropdown is set to 'Trees' and the 'Method' dropdown is set to 'Trees - Individuals'. The 'Macroplot' dropdown is set to 'DylanCkRx01'. The 'Sample Event' dropdown is set to 'ReMeasurementYear1'. The 'Apply Selections' button is highlighted with a red box and the number 4. The 'Trees - Individuals' method is selected under Protocol, 'DylanCkRx01' is selected under Macroplot, and 'ReMeasurementYear1' is selected under Sample Event. The 'Apply Selections' button is also highlighted with a red box and the number 4.

| View | Date      | Monitoring Status | MacroPlot Name | Species Symbol | Visited | Index | IsVerified                          | QTR | SubFrac | TagNo | Status |
|------|-----------|-------------------|----------------|----------------|---------|-------|-------------------------------------|-----|---------|-------|--------|
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    |                | True    |       | <input type="checkbox"/>            |     |         |       |        |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PSME           |         | 1     | <input checked="" type="checkbox"/> |     | 1       | 1     | L      |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PICO           |         | 2     | <input checked="" type="checkbox"/> |     | 1       | 2     | L      |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PICO           |         | 3     | <input checked="" type="checkbox"/> |     | 1       | 3     | D      |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PSME           |         | 4     | <input checked="" type="checkbox"/> |     | 1       | 4     | L      |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PICO           |         | 5     | <input checked="" type="checkbox"/> |     | 1       | 5     | D      |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PSME           |         | 6     | <input checked="" type="checkbox"/> |     | 1       | 6     | D      |

### 2.2 If you want to see only live trees; under **Species**, check the **Live perennials and all annuals** checkbox and click **Apply Selections**. Scroll to the right in the data grid and you will see only trees where Status = L

The screenshot shows the Query Tool interface with the Filter tab selected. The 'Protocol' dropdown is set to 'Trees' and the 'Method' dropdown is set to 'Trees - Individuals'. The 'Macroplot' dropdown is set to 'DylanCkRx01'. The 'Sample Event' dropdown is set to 'ReMeasurementYear1'. The 'Live perennials and all annuals' checkbox is checked under the Species section. The 'Apply Selections' button is highlighted with a red box and the number 4. The 'Trees - Individuals' method is selected under Protocol, 'DylanCkRx01' is selected under Macroplot, and 'ReMeasurementYear1' is selected under Sample Event. The 'Live perennials and all annuals' checkbox is checked under Species. The 'Apply Selections' button is also highlighted with a red box and the number 4.

| View | IsVerified                          | QTR | SubFrac | TagNo | Status | DBH | Ht | CrownRto | CrownCl | LCRbHt |
|------|-------------------------------------|-----|---------|-------|--------|-----|----|----------|---------|--------|
|      | <input type="checkbox"/>            |     |         |       |        |     |    |          |         |        |
|      | <input checked="" type="checkbox"/> |     | 1       | 1     | L      | 4.9 | 88 | 15       | C       | 75     |
|      | <input checked="" type="checkbox"/> |     | 1       | 2     | L      | 4.5 | 48 | 25       | I       | 35     |
|      | <input checked="" type="checkbox"/> |     | 1       | 4     | L      | 2.1 | 82 | 45       | C       | 45     |

- 2.3** If you want to see trees of a certain species select the desired species code under **Picklist** and click **Apply Selections**. For example, select *PICO* (lodgepole pine) and click **Apply Selections**. Data for live lodgepole pine will be displayed in the data grid. Note that if you uncheck **Live perennials and all annuals** the data grid reverts to show all statuses and species. You must select a species code again to re-filter the data grid view.

**Query**

Refresh

☐ All Project Units

☒ Selected Project Units

- Dylan Creek Rx
- Flowering Spring Inventory
- MB Bar K Improvement Unit
- Shelterwood Thin Unit

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields Grouping Summary Calculations

**Method**

Protocol: Trees

**Macroplot**

Plot Type: Measured

Plot Purpose:

**Sample Event**

Min Date: 8/31/2018

Max Date: 8/31/2018

Monitoring Status: PreTreatmentYear1, ReMeasurementYear, ReMeasurementYear

**Species**

Biological not filtered

Nativity not filtered

Concern not filtered

Exclude non-vascular: ☐

Exclude trees dead/down: ☐

Live perennials and all annuals: ☒

Genus: Abies, Larix, Pinus, Pseudotsuga

Lifeform: Fern, Forb/herb, Graminoid, Grass-like, Lichenous, Nonvascular, Shrub, Subshrub, Tree, Undefined

Lifecycle: Annual, Biennial, Perennial

**Picklist**

ABLA, LAOC, **PICO**, PIPO, PSME

| View | Date      | Monitoring Status | MacroPlot Name | Species Symbol | Lifecycle | Visited | Index | IsVerified                          | QTR | SubFrac | TagNo |
|------|-----------|-------------------|----------------|----------------|-----------|---------|-------|-------------------------------------|-----|---------|-------|
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    |                |           | True    |       | <input type="checkbox"/>            |     |         |       |
|      | 10/7/2002 | ReMeasurement...  | DylanCkRx01    | PICO           | Perennial |         | 2     | <input checked="" type="checkbox"/> |     | 1       | 2     |

**Project Management**

**Data Entry and Edit**

**Query**

**Reports and Analysis**

**Species Management**

**Toolbox**

**Exercise 3: Use the Query tool to view data for the Cover – Species Composition method. Add fields from the macroplot table and master species list to the query.**

**3.1** On the **Filter** tab:

- 1) Select the *Cover – Species Composition* protocol and highlight *Cover – Species Composition* in the method box to display the other tabs.
- 2) Select plots *DylanCkRx01* and *DylanCkRx03*
- 3) Select monitoring statuses *PreTreatment* and *ReMeasurementYear1*.
- 4) Click **Apply Selections** to see all the species on the selected plots and sample events.

**Query Details**

Export Clear **Apply Selections** 4 Save Query Delete Query 3

Filter Classify Additional / Calculated Fields Grouping Summary Calculations 2

**Method**

Protocol  
Cover - Species Composition

**Macroplot**

Plot Type  
Measured

Plot Purpose

**Sample Event**

Min Date  
8/31/2018

Max Date  
8/31/2018

Monitoring Status  
Pre Treatment Year1  
ReMeasurement Year

**Species**

Biological not filtered

Nativity not filtered

Concern not filtered

Exclude non-vascular: ☐

Exclude trees dead/down: ☐

Live perennials and all annuals: ☐

Genus:  
Agropyron  
Arctostaphylos  
Festuca  
Larix  
Physocarpus  
Pinus  
Pseudotsuga  
Symphoricarpos  
Vaccinium  
Xerophyllum

Lifform:  
Fem  
Forb/herb  
Graminoid  
Grass-like  
Lichenous  
Nonvascular  
Shrub  
Subshrub  
Tree  
Undefined

Picklist  
AGSP  
ARUV  
FEID  
LAOC  
PHMA5  
PICO  
PIPO  
PSME  
SYAL  
VAGL  
XETE

| View | Date       | Monitoring Status | MacroPlot Name | Area | Species Symbol | Visited | Index | Status | SizeCI | AgeCI | Cover |
|------|------------|-------------------|----------------|------|----------------|---------|-------|--------|--------|-------|-------|
| ▶    | 10/15/2001 | PreTreatmentYear1 | DylanCkRx01    |      |                | True    |       |        |        |       |       |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx01    |      | ARUV           |         | 1     | L      | TO     |       | 0.5   |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx01    |      | PHMA5          |         | 2     | L      | TO     |       | 10    |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx01    |      | PICO           |         | 3     | L      | TO     |       | 50    |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx01    |      | PSME           |         | 4     | L      | TO     |       | 20    |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx01    |      | SYAL           |         | 5     | L      | TO     |       | 10    |
|      | 10/7/2002  | ReMeasurement...  | DylanCkRx01    |      |                | True    |       |        |        |       |       |
|      | 10/7/2002  | ReMeasurement...  | DylanCkRx01    |      | ARUV           |         | 1     | L      | TO     |       | 10    |
|      | 10/7/2002  | ReMeasurement...  | DylanCkRx01    |      | PHMA5          |         | 2     | L      | TO     |       | 10    |

**3.2** Select *Graminoid* in the **Lifeform** list box and click **Apply Selections**. This will filter the data to display only graminoids (*Lifeform* in an attribute assigned to each species in the master list).

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields Grouping Summary Calculations

**Method** Protocol: Cover - Species Composition

**Macroplot** Plot Type: Measured  
Macroplot Name: DylanCkRx01, DylanCkRx03, DylanCkRx04, DylanCkRx05  
Plot Purpose:

**Sample Event** Min Date: 8/31/2018, Max Date: 8/31/2018  
Monitoring Status: Pre Treatment Year1, ReMeasurement Year, ReMeasurement Year

**Species** Biological not filtered, Nativity not filtered, Concern not filtered  
Exclude non-vascular: ☐, Exclude trees dead/down: ☐, Live perennials and all annuals: ☐

**Genus:** Agropyron, Arctostaphylos, Festuca, Larix, Physocarpus, Pinus, Pseudotsuga, Symphoricarpos, Vaccinium, Xerophyllum

**Lifeform:** Fem, Forb/herb, **Graminoid**, Grass-like, Lichenous, Nonvascular, Shrub, Subshrub, Tree, Undefined

**Lifecycle:** Annual, Biennial, Perennial

**Picklist:** AGSP, FEID

| View | Date       | Monitoring Status   | MacroPlot Name | Area | Species Symbol | Visited | Index | Status | SizeCI | AgeCI | Cover |
|------|------------|---------------------|----------------|------|----------------|---------|-------|--------|--------|-------|-------|
| ▶    | 10/15/2001 | Pre Treatment Year1 | DylanCkRx01    |      |                | True    |       |        |        |       |       |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx01    |      |                | True    |       |        |        |       |       |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx03    |      |                | True    |       |        |        |       |       |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx03    |      | AGSP           |         | 1     | L      | TO     |       | 20    |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx03    |      | FEID           |         | 2     | L      | TO     |       | 10    |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx03    |      |                | True    |       |        |        |       |       |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx03    |      | AGSP           |         | 1     | D      | TO     |       | 10    |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx03    |      | AGSP           |         | 2     | L      | TO     |       | 10    |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx03    |      | FEID           |         | 3     | L      | TO     |       | 10    |

**3.3** Select *Festuca* in the **Genus** list box and click **Apply Selections**. This will filter the data to display only grasses in the genus *Festuca*; in this case only *Festuca idahoensis* (Idaho fescue). Note there are no instances of *FEID* at either sample event for *DylanCkRx01*.

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields Grouping Summary Calculations

**Method** Protocol: Cover - Species Composition

**Macroplot** Plot Type: Measured  
Macroplot Name: DylanCkRx01, DylanCkRx03, DylanCkRx04, DylanCkRx05  
Plot Purpose:

**Sample Event** Min Date: 8/31/2018, Max Date: 8/31/2018  
Monitoring Status: Pre Treatment Year1, ReMeasurement Year, ReMeasurement Year

**Species** Biological not filtered, Nativity not filtered, Concern not filtered  
Exclude non-vascular: ☐, Exclude trees dead/down: ☐, Live perennials and all annuals: ☐

**Genus:** Agropyron, Arctostaphylos, **Festuca**, Larix, Physocarpus, Pinus, Pseudotsuga, Symphoricarpos, Vaccinium, Xerophyllum

**Lifeform:** Fem, Forb/herb, Graminoid, Grass-like, Lichenous, Nonvascular, Shrub, Subshrub, Tree, Undefined

**Lifecycle:** Annual, Biennial, Perennial

**Picklist:** FEID

| View | Date       | Monitoring Status   | MacroPlot Name | Area | Species Symbol | Visited | Index | Status | SizeCI | AgeCI | Cover |
|------|------------|---------------------|----------------|------|----------------|---------|-------|--------|--------|-------|-------|
| ▶    | 10/15/2001 | Pre Treatment Year1 | DylanCkRx01    |      |                | True    |       |        |        |       |       |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx01    |      |                | True    |       |        |        |       |       |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx03    |      |                | True    |       |        |        |       |       |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx03    |      | FEID           |         | 2     | L      | TO     |       | 10    |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx03    |      |                | True    |       |        |        |       |       |
|      | 10/7/2002  | ReMeasurement...    | DylanCkRx03    |      | FEID           |         | 3     | L      | TO     |       | 10    |



**3.4** Once you have filtered your data you can add other data columns to the data grid using options on the **Additional/Calculated Fields** tab.

- 1) On the **Filter** tab unselect *Festuca* and *Graminoid* by clicking once on each.
- 2) Click **Apply Selections**
- 3) Click on the **Additional/Calculated Fields** tab
- 4) Under **Macroplot Fields** check *Elevation* and *Aspect*.
- 5) Add *Scientific Name* and *Common Name* under **Species Fields**.
- 6) Click **Apply Selections**
- 7) Scroll through the grid to see the four new fields. They've been re-ordered in the screen shot but won't initially be together in your results.

**Query Details**

Export Clear **Apply Selections** 6 Save Query Delete Query

Filter Classify **Additional / Calculated Fields** 3 Geoplotting 4 Summary Calculations 5

**Sample Event Fields**

- ☐ Default Monitoring
- ☐ Burn/Treatment Unit
- ☐ Team
- ☐ Comment
- ☐ User Variable 1
- ☐ User Variable 2
- ☐ User Variable 3

**Monitoring Status Fields**

- ☐ Prefix
- ☐ Base
- ☐ Suffix
- ☐ Order
- ☐ Comment
- ☐ User Variable 1
- ☐ User Variable 2
- ☐ User Variable 3

**Macroplot Fields**

- ☐ PDOP
- ☐ Precision
- ☐ Date In
- ☒ Elevation
- ☐ Azimuth
- ☒ Aspect
- ☐ Slope of Hill
- ☐ Slope of Transect
- ☐ Start Point
- ☐ Directions

**Species Fields**

- ☐ ITIS TSN
- ☒ Scientific Name
- ☒ Common Name
- ☐ Genus
- ☐ Family
- ☐ Preferred Lifeform
- ☐ Default Lifeform
- ☐ Lifecycle
- ☐ Nativity
- ☐ Invasive

**Number of Subsamples and Area**

- ☐ Calculate Number of Subsamples
- ☐ Calculate Area
- Num. Transects
- Num. Quad./Num. Pts./Tran. Len.
- Quadrat Length
- Quadrat Width

**Calculated Fields**

- ☐ Calculate DBH<sup>2</sup>
- DBH Field (for BA)

| View | Monitoring Status | MacroPlot Name | MacroPlot Elevation | MacroPlot Aspect | ScientificName      | Common Name      | Area | Species Symbol | Visited | Index | Stat |
|------|-------------------|----------------|---------------------|------------------|---------------------|------------------|------|----------------|---------|-------|------|
| ►    | PreTreatmentYear1 | DylanCkRx01    | 1219                |                  |                     |                  |      |                | True    |       |      |
|      | PreTreatmentYear1 | DylanCkRx01    | 1219                |                  | Arctostaphylos u... | kinnikinnick     | 7    | ARUV           |         | 1     | L    |
|      | PreTreatmentYear1 | DylanCkRx01    | 1219                |                  | Physocarpus mal...  | mallow ninebark  |      | PHMA5          |         | 2     | L    |
|      | PreTreatmentYear1 | DylanCkRx01    | 1219                |                  | Pinus contorta      | lodgepole pine   |      | PICO           |         | 3     | L    |
|      | PreTreatmentYear1 | DylanCkRx01    | 1219                |                  | Pseudotsuga me...   | Douglas-fir      |      | PSME           |         | 4     | L    |
|      | PreTreatmentYear1 | DylanCkRx01    | 1219                |                  | Symphoricarpos ...  | common snowberry |      | SYAL           |         | 5     | L    |
|      | ReMeasurement...  | DylanCkRx01    | 1219                |                  |                     |                  |      |                | True    |       |      |
|      | ReMeasurement...  | DylanCkRx01    | 1219                |                  | Arctostaphylos u... | kinnikinnick     |      | ARUV           |         | 1     | L    |
|      | ReMeasurement...  | DylanCkRx01    | 1219                |                  | Physocarpus mal...  | mallow ninebark  |      | PHMA5          |         | 2     | L    |
|      | ReMeasurement...  | DylanCkRx01    | 1219                |                  | Pinus contorta      | lodgepole pine   |      | PICO           |         | 3     | L    |
|      | ReMeasurement...  | DylanCkRx01    | 1219                |                  | Pseudotsuga me...   | Douglas-fir      |      | PSME           |         | 4     | L    |
|      | PreTreatmentYear1 | DylanCkRx03    | 1219                | 180              |                     |                  |      |                | True    |       |      |
|      | PreTreatmentYear1 | DylanCkRx03    | 1219                | 180              | Agropyron spicat... |                  |      | AGSP           |         | 1     | L    |

## **Part 2: Query Tool: Calculations**

The Query tool provides calculations for density, cover, frequency, and basal area. These calculations work for all the sampling methods provided with the FFI software including custom protocols. Because they offer the flexibility to work with existing and new sampling methods, the query tool calculations require users to input the appropriate fields for each calculation. Users must have some familiarity with how the appropriate sample attributes and method attributes are used to summarize the data.

The following exercises provide examples of how to use the calculations for cover, density, frequency, and basal area with various FFI sampling methods. They also emphasize the classification and grouping options in query tool, which offer additional data summary capabilities not available using the standard data summary reports. Finally, these exercises demonstrate how to export Query tool data for input into the FFI External Data Analysis Tool. Using Query tool results with the External Data Analysis Tool allows users to analyze data summarized differently than in the standard data summary reports.

### **Exercise 4: Use the Query tool to calculate seedling density by status (live / dead) using the Trees – Seedlings (Height Class) method. Export the query results as a CSV file.**

In order to calculate density by status, we first need to group the seedlings by status class (live or dead). Next, we must sum the number of seedlings in each status class and then we can calculate density by dividing the number of seedlings in each status class by the area sampled. The area sampled is the macroplot area if grouping data by macroplot and sample event, or it is the sum of macroplot areas if grouping data for multiple macroplots and/or sample events. Finally, we need to provide a conversion factor to display the data in the desired units (per acre or per hectare).

- 4.1** Click the **Filter** tab and select the *Trees* protocol and the *Trees - Seedlings (Height Class)* method, and click **Apply Selections**.

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter **Classify** Additional / Calculated Fields Grouping Summary Calculations

**Method**

Protocol: Trees

Method: Trees - Seedlings (Height Class)

**Macroplot**

Plot Type: Measured

Plot Purpose:

Macroplot Name: DylanCkRx01, DylanCkRx03, DylanCkRx04, DylanCkRx05

**Sample Event**

Min Date: 9/ 4/2018

Max Date: 9/ 4/2018

Monitoring Status: PreTreatmentYear1, ReMeasurementYear

**Species**

Biological not filtered

Nativity not filtered

Concern not filtered

Exclude non-vascular: ☐

Exclude trees dead/down: ☐

Live perennials and all annuals: ☐

Genus: Lartx, Pinus, Pseudotsuga

Lifeform: Fem, Forb/herb, Graminoid, Grass-like, Lichenous, Nonvascular, Shrub, Subshrub, Tree, Undefined

Lifecycle: Annual, Biennial, Perennial

Picklist: LAOC, PICO, PIPO, PSME

| View | Date       | Monitoring Status | MacroPlot Name | Species Symbol | Visited | Index | SizeCIHt | Status | AgeCI | Count | AvgDia |
|------|------------|-------------------|----------------|----------------|---------|-------|----------|--------|-------|-------|--------|
| ▶    | 10/15/2001 | PreTreatmentYear1 | DylanCkRx05    |                | True    |       |          |        |       |       |        |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx05    | PSME           |         | 1     | 1        | D      |       | 1     |        |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx05    | PSME           |         | 2     | 1        | L      |       | 2     |        |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx05    | PICO           |         | 3     | 2        | L      |       | 2     |        |
|      | 10/15/2001 | PreTreatmentYear1 | DylanCkRx05    | PSME           |         | 4     | 3        | L      |       | 2     |        |
|      | 10/8/2002  | ReMeasurement...  | DylanCkRx05    |                | True    |       |          |        |       |       |        |
|      | 10/8/2002  | ReMeasurement...  | DylanCkRx05    | PSME           |         | 1     | 1        | D      |       | 3     |        |
|      | 10/8/2002  | ReMeasurement...  | DylanCkRx05    | PICO           |         | 2     | 2        | D      |       | 2     |        |

- 4.2** On the **Additional/Calculated Fields** tab check monitoring status *Order* under **Monitoring Status Fields** and click **Apply Selections**.

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter **Classify** Additional / Calculated Fields **Grouping** Summary Calculations

**Sample Event Fields**

☐ Default Monitoring

☐ Burn/Treatment Unit

☐ Team

☐ Comment

☐ User Variable 1

☐ User Variable 2

☐ User Variable 3

**Monitoring Status Fields**

☐ Prefix

☐ Base

☐ Suffix

☒ Order

☐ Comment

☐ User Variable 1

☐ User Variable 2

☐ User Variable 3

**Macroplot Fields**

☐ PDOP

☐ Precision

☐ Date In

☐ Elevation

☐ Azimuth

☐ Aspect

☐ Slope of Hill

☐ Slope of Transect

☐ Start Point

☐ Directions

**Species Fields**

☐ ITIS TSN

☐ Scientific Name

☐ Common Name

☐ Genus

☐ Family

☐ Preferred Lifeform

☐ Default Lifeform

☐ Lifecycle

☐ Nativity

☐ Invasive

**Number of Subsamples and Area**

☐ Calculate Number of Subsamples

☐ Calculate Area

Num. Transects:

Num. Quad./Num. Pts./Tran. Len.:

Quadrat Length:

Quadrat Width:

**Calculated Fields**

☐ Calculate DBH<sup>2</sup>

DBH Field (for BA):

| View | Date       | Monitoring Status | Status Order | MacroPlot Name | Species Symbol | Visited | Index | SizeCIHt | Status | AgeCI | Count |
|------|------------|-------------------|--------------|----------------|----------------|---------|-------|----------|--------|-------|-------|
| ▶    | 10/15/2001 | PreTreatmentYear1 | 1            | DylanCkRx05    |                | True    |       |          |        |       |       |
|      | 10/15/2001 | PreTreatmentYear1 | 1            | DylanCkRx05    | PSME           |         | 1     | 1        | D      |       | 1     |
|      | 10/15/2001 | PreTreatmentYear1 | 1            | DylanCkRx05    | PSME           |         | 2     | 1        | L      |       | 2     |
|      | 10/15/2001 | PreTreatmentYear1 | 1            | DylanCkRx05    | PICO           |         | 3     | 2        | L      |       | 2     |
|      | 10/15/2001 | PreTreatmentYear1 | 1            | DylanCkRx05    | PSME           |         | 4     | 3        | L      |       | 2     |
|      | 10/8/2002  | ReMeasurement...  | 2            | DylanCkRx05    |                | True    |       |          |        |       |       |
|      | 10/8/2002  | ReMeasurement...  | 2            | DylanCkRx05    | PSME           |         | 1     | 1        | D      |       | 3     |
|      | 10/8/2002  | ReMeasurement...  | 2            | DylanCkRx05    | PICO           |         | 2     | 2        | D      |       | 2     |
|      | 10/8/2002  | ReMeasurement...  | 2            | DylanCkRx05    | PSME           |         | 3     | 3        | D      |       | 1     |

**4.3** On the **Grouping** tab you will need to group the data by tree status.

1) Under **Macroplot Group By** select *Macro Plot* and *Monitoring Status*.

2) Under **Method Fields to Group By - Method Attributes** group the data by *Status* (this is the tree status class – live or dead).

3) Click **Apply Selections** to create the requested groups, and refresh the data grid.

**Query Details**

Export Clear **1** **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields **Grouping** Summary Calculations **2**

**Macroplot Group By**

☒ Macro Plot

Event

☐ Nothing

☐ Date

☒ Monitoring Status

☐ Mon. Status Prefix

☐ Mon. Status Base

☐ Mon. Status Suffix

**Method Fields to Group By**

Sample Attributes

Visited

Plot Area

Collected By

Entered/Verif. By

UV1 Description

UV2 Description

UV3 Description

Comment

Method Attributes

Index

Ht. Class

Species

**Status**

Age Class

Count

Avg. Diameter

Avg. Crown Ratio

Subplot Frac.

Comment

UV1

UV2

UV3

**Species Attributes**

☒ Nothing

☐ Species

☐ Genus

☐ Family

☐ Lifeform

☐ Lifecycle

☐ Plant / Not Plant

☐ Nativity

☐ Lifeform+Nativity

☐ UV1

☐ UV2

☐ UV3

| View | Monitoring Status   | Status Order | MacroPlot Name | Status | ROWCOUNT |
|------|---------------------|--------------|----------------|--------|----------|
| ►    | Pre Treatment Year1 | 1            | DylanCkRx01    |        | 1        |
|      | Pre Treatment Year1 | 1            | DylanCkRx01    | D      | 1        |
|      | Pre Treatment Year1 | 1            | DylanCkRx01    | L      | 3        |
|      | ReMeasurement...    | 2            | DylanCkRx01    |        | 1        |
|      | ReMeasurement...    | 2            | DylanCkRx01    | D      | 2        |
|      | ReMeasurement...    | 2            | DylanCkRx01    | L      | 1        |
|      | ReMeasurement...    | 3            | DylanCkRx01    |        | 1        |
|      | ReMeasurement...    | 3            | DylanCkRx01    | D      | 3        |

4.4 On the **Summary Calculations** tab you will need to calculate density by tree status.

1) Under **Method Fields to Sum** select the **Sample Attribute Plot Area** and the **Method Attribute Count**. These fields are required to perform the density calculation.

2) The selections in the first step must be applied before the density calculations can be made. Click **Apply Selections** to create the requested summaries, and refresh the data grid.

**Query Details**

Exp. Clear **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields Grouping **Summary Calculations**

**Method Fields to Sum**

| Sample Attributes | Method Attributes |
|-------------------|-------------------|
| Plot Area         | Ht. Class         |
|                   | Count             |
|                   | Avg. Diameter     |
|                   | Avg. Crown Ratio  |
|                   | Subplot Frac.     |

**Calculations**

**Cover**

☐ Calculate Cover

Number of Subsamples

Method Attribute (Subplot Fraction)

SUBFRAC

Cover Field

**Frequency**

☐ Calculate Frequency

Number of Subsamples

Frequency Field

**Basal Area**

☐ Calculate Basal Area

| View | Monitoring Status | Status Order | MacroPlot Name | Status | ROWCOUNT | SUM_MICROPLOT | SUM_COUNT |
|------|-------------------|--------------|----------------|--------|----------|---------------|-----------|
| ►    | PreTreatmentYear1 | 1            | DylanCkRx01    |        | 1        | 0.01          |           |
|      | PreTreatmentYear1 | 1            | DylanCkRx01    | D      | 1        |               | 1         |
|      | PreTreatmentYear1 | 1            | DylanCkRx01    | L      | 3        |               | 5         |
|      | ReMeasurement...  | 2            | DylanCkRx01    |        | 1        | 0.01          |           |
|      | ReMeasurement...  | 2            | DylanCkRx01    | D      | 2        |               | 4         |
|      | ReMeasurement...  | 2            | DylanCkRx01    | L      | 1        |               | 2         |
|      | ReMeasurement...  | 3            | DylanCkRx01    |        | 1        | 0.01          |           |
|      | ReMeasurement...  | 3            | DylanCkRx01    | D      | 3        |               | 5         |

3) Under **Calculations - Density** fill in the appropriate fields for the **Density** calculation text boxes.

a) Select the field *sum\_MicroPlotSize* in the **Area** textbox. MicroPlotSize is the sampled area for seedlings for each macroplot and sample event.

b) The **Method Attribute (Subplot Fraction)** is optional here. It is only required when some seedlings are sampled within a fraction of the sampling area. Leave blank for this exercise.

c) Select *sum\_Count* in the **Count Field** text box. This field sums the number of seedlings in each status (live or dead).

d) Select *Acres – Area (acres)* in the **Unit Conversions** text box. This conversion factor will calculate density as the number of seedlings per acre given that the sampling area was recorded in acres.

e) Check the **Calculate Density** checkbox.

4) Click **Apply Selections** to make the final density calculation and add it to the query data grid.

5) **Export** the Query tool results as a CSV file and save on your desktop, if desired.

**5** **4** **3**

| View | Monitoring Status | Status Order | MacroPlot Name | Status | ROWCOUNT | SUM_MICROPLOT | SUM_COUNT | Density_acres |
|------|-------------------|--------------|----------------|--------|----------|---------------|-----------|---------------|
| ►    | PreTreatmentYear1 | 1            | DylanCkRx01    | D      | 1        |               | 1         | 100           |
|      | PreTreatmentYear1 | 1            | DylanCkRx01    | L      | 3        |               | 5         | 500           |
|      | ReMeasurement...  | 2            | DylanCkRx01    | D      | 2        |               | 4         | 400           |
|      | ReMeasurement...  | 2            | DylanCkRx01    | L      | 1        |               | 2         | 200           |
|      | ReMeasurement...  | 3            | DylanCkRx01    | D      | 3        |               | 5         | 500           |
|      | ReMeasurement...  | 3            | DylanCkRx01    | L      | 1        |               | 1         | 100           |
|      | PreTreatmentYear1 | 1            | DylanCkRx05    | D      | 1        |               | 1         | 100           |
|      | PreTreatmentYear1 | 1            | DylanCkRx05    | L      | 3        |               | 6         | 600           |

### Exercise 5: Use the Query tool to calculate basal area by dbh classes using the Trees – Individuals method.

In order to calculate basal area by dbh classes we need to know the DBH<sup>2</sup> value of each tree so we can calculate the basal area of each tree as a constant \* DBH<sup>2</sup>. The constant is derived from the equation  $\text{area} = \pi(\text{DBH}/2)^2$ . The constant differs depending on basal area units (ft<sup>2</sup>/acre or m<sup>2</sup>/ha) and whether you recorded DBH in inches or cm.

Next we must classify the actual DBH values into our desired classes. Then we will sum the basal area by DBH classes. We will calculate basal area by our DBH classes by dividing the sum of basal area for each DBH class by the area sampled. The area sampled is the macroplot area if grouping the data by macroplot and sample event, or it is the sum of macroplot areas if grouping data for multiple macroplots and/or sample events. Finally, we will provide a conversion factor to display the data in the desired units (ft<sup>2</sup>/acre or m<sup>2</sup>/ha).

#### 5.1 On the **Filter** tab select the *Trees* protocol and the *Trees-Individuals* method, and click **Apply Selections**.

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields Grouping Summary Calculations

**Method**

Protocol: Trees

Method: Trees - Individuals

Trees - Saplings (Diameter Class)

Trees - Seedlings (Height Class)

**Macroplot**

Plot Type: Measured

Plot Purpose:

Macroplot Name: DylanCkRx01  
DylanCkRx03  
DylanCkRx04  
DylanCkRx05

**Sample Event**

Min Date: 9/ 4/2018

Max Date: 9/ 4/2018

Monitoring Status: Pre Treatment Year1  
Re Measurement Year  
Re Measurement Year

**Species**

Biological not filtered

Nativity not filtered

Concern not filtered

Exclude non-vascular: ☐

Exclude trees dead/down: ☐

Live perennials and all annuals: ☐

Genus: Abies  
Larix  
Pinus  
Pseudotsuga

Lifeform: Fem  
Forb/herb  
Graminoid  
Grass-like  
Lichenous  
Nonvascular  
Shrub  
Subshrub  
Tree  
Undefined

Lifecycle: Annual  
Biennial  
Perennial

Picklist: ABLA  
LAOC  
PICO  
PIPO  
PSME

| View | Date       | Monitoring Status   | MacroPlot Name | Species Symbol | Visited | Index | IsVerified                          | QTR | SubFrac | TagNo | Status |
|------|------------|---------------------|----------------|----------------|---------|-------|-------------------------------------|-----|---------|-------|--------|
| ▶    | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    |                | True    |       | <input type="checkbox"/>            |     |         |       |        |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    | PICO           |         | 1     | <input checked="" type="checkbox"/> |     | 1       | 1     | L      |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    | PICO           |         | 2     | <input checked="" type="checkbox"/> |     | 1       | 2     | L      |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    | LAOC           |         | 3     | <input checked="" type="checkbox"/> |     | 1       | 3     | L      |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    | LAOC           |         | 4     | <input checked="" type="checkbox"/> |     | 1       | 4     | L      |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    | PIPO           |         | 5     | <input checked="" type="checkbox"/> |     | 1       | 5     | L      |
|      | 10/15/2001 | Pre Treatment Year1 | DylanCkRx05    | PICO           |         | 6     | <input checked="" type="checkbox"/> |     | 1       | 6     | D      |
|      | 10/15/2002 | Re Measurement      | DylanCkRx05    |                | True    |       | <input type="checkbox"/>            |     |         |       |        |

- 5.2** On the **Additional/Calculated Fields** tab check monitoring status *Order* under **Monitoring Status Fields**. Monitoring Status *Order* is needed if Query tool data are to be used with the External Data Analysis Tool.

Under **Calculated Fields** select *DBH* in the **DBH Field (for BA)** and check **Calculate DBH<sup>2</sup>**. This will calculate DBH<sup>2</sup> for calculating basal area. Click **Apply Selections** and scroll right in the data grid to see the *DBH<sup>2</sup>* field.

| View | MacroPlotSize | SnagPlotSize | BkPrntDia | FieldTeam | EntryTeam | UV1Desc | UV2Desc | UV3Desc | SaComment | DBH <sup>2</sup> |
|------|---------------|--------------|-----------|-----------|-----------|---------|---------|---------|-----------|------------------|
| ▶    | 0.1           | 0.1          | 5         |           |           |         |         |         |           | 34.8100          |
|      |               |              |           |           |           |         |         |         |           | 28.0900          |
|      |               |              |           |           |           |         |         |         |           | 106.0900         |
|      |               |              |           |           |           |         |         |         |           | 134.5600         |
|      |               |              |           |           |           |         |         |         |           | 184.9600         |
|      |               |              |           |           |           |         |         |         |           | 27.0400          |

- 5.3** On the **Classify** tab, make two classes of trees based on DBH: Pole (<=9" DBH) and Overstory (>9" DBH).

- 1) Select *DBH* from **Field to Classify** dropdown list.
- 2) On the first line of the classification grid type "9" in the **Upper Cutoff** field and "Pole" in the **Class Label** field.
- 3) On the second line type "Overstory" in the **Class Label** field.
- 4) Click the **Apply** button under the *Field to Classify* dropdown.

| Field to classify: | Lower Cutoff | Upper Cutoff | Class Label |
|--------------------|--------------|--------------|-------------|
| DBH                | > MIN        | <= 9         | Pole        |
|                    | > 9          | <= MAX       | Overstory   |



Scroll to the right in the data grid and you will see that the numeric DBH values have been replaced with their classified value. This classified value will be carried over to the **Grouping and Summary Calculations** tab. (The data are not changed in the database when using the Classify function, only the values in the query data grid and data exported from query tool are changed.)

| View | R | SubFrac | TagNo | Status | DBH       | Ht | CrownRto | CrownCl | LCrBht | CrFuBht | C |
|------|---|---------|-------|--------|-----------|----|----------|---------|--------|---------|---|
|      |   | 1       | 1     | L      | Overstory | 88 | 60       | C       | 35     |         |   |
|      |   | 1       | 2     | L      | Pole      | 48 | 54       | I       | 22     |         |   |
|      |   | 1       | 3     | L      | Pole      | 41 | 31       | S       | 28     |         |   |
|      |   | 1       | 4     | L      | Overstory | 82 | 62       | C       | 31     |         |   |
|      |   | 1       | 5     | L      | Pole      | 56 | 64       | C       | 20     |         |   |
|      |   | 1       | 6     | D      |           | 75 |          |         |        |         |   |
|      |   |         |       |        |           |    |          |         |        |         |   |
|      |   | 1       | 1     | L      | Overstory | 88 | 15       | C       | 75     |         |   |
|      |   | 1       | 2     | L      | Pole      | 48 | 25       | I       | 35     |         |   |
|      |   | 1       | 3     | D      | Pole      | 41 |          |         |        |         |   |
|      |   | 1       | 4     | L      | Overstory | 82 | 45       | C       | 45     |         |   |
|      |   | 1       | 5     | D      | Pole      | 56 |          |         |        |         |   |
|      |   | 1       | 6     | D      | Overstory | 75 |          |         |        |         |   |

**5.4** On the **Grouping** tab you will group the data by DBH class for each Macroplot and Monitoring Status.

- 1) Under **Macroplot Group By** check *Macro Plot* and select *Monitoring Status*.
- 2) Under **Method Fields to Group By – Method Attributes** select *DBH*.
- 3) Click **Apply Selections** to create the groups, and refresh the data grid.

**Query Details**

Export Clear **Apply Selections** Save Query Delete Query

Filter Classify Additional / Calculated Fields **Grouping** Summary Calculations

**Macroplot Group By**

Macro Plot

☒ Macro Plot

Event

☐ Nothing

☐ Date

☒ Monitoring Status

☐ Mon. Status Prefix

☐ Mon. Status Base

☐ Mon. Status Suffix

**Method Fields to Group By**

Sample Attributes

Visited

Plot Area

Snag Plot Area

Break Pnt. Dia.

Collected By

Entered/Verif. By

UV1 Description

UV2 Description

UV3 Description

Comment

**Method Attributes**

Index

Is Verified

Quarter

Subplot Frac.

Tag Num.

Species

Status

**DBH**

Height

Crown Ratio

Crown Class

Live Crown Base Ht.

Crown Fuel Base Ht.

Crown Radius

Age

Growth Rate

Mortality

Decay Class

Ladder Bht

Ladder Max. Ht.

**Species Attributes**

☒ Nothing

☐ Species

☐ Genus

☐ Family

☐ Lifeform

☐ Lifecycle

☐ Plant / Not Plant

☐ Nativity

☐ Lifeform+Nativity

☐ UV1

☐ UV2

☐ UV3

| View | Monitoring Status | Status Order | MacroPlot Name | SUM_DBH^2 | DBH       | ROWCOUNT |
|------|-------------------|--------------|----------------|-----------|-----------|----------|
|      | PreTreatmentYear1 | 1            | DylanCkRx01    |           |           | 2        |
|      | PreTreatmentYear1 | 1            | DylanCkRx01    | 368.4200  | Overstory | 2        |
|      | PreTreatmentYear1 | 1            | DylanCkRx01    | 133.3100  | Pole      | 3        |
|      | ReMeasurement...  | 2            | DylanCkRx01    |           |           | 1        |
|      | ReMeasurement...  | 2            | DylanCkRx01    | 498.3800  | Overstory | 3        |
|      | ReMeasurement...  | 2            | DylanCkRx01    | 133.3100  | Pole      | 3        |
|      | ReMeasurement...  | 3            | DylanCkRx01    |           |           | 1        |
|      | ReMeasurement...  | 3            | DylanCkRx01    | 498.3800  | Overstory | 3        |

**5.5** On the **Summary Calculations** tab you will calculate basal area by DBH class for each Macroplot and Monitoring Status.

- 1) Under **Method Fields to Sum – Sample Attributes** select *Plot Area*.
- 2) Click **Apply Selections** to create the summaries, and refresh the data grid.
- 3) Under **Calculations** scroll down to the **Basal Area** section and fill in the appropriate fields.
  - a) Select the field *sum\_MacroplotSize* in the **Area** textbox. This will give us the total plot area sampled.
  - b) The **Method Attribute (Subplot Fraction)** is optional here. It is only required when some trees are sampled on a fraction of the macroplot area. Leave blank for this exercise.
  - c) Select *sum\_DBH^2* in the **DBH Squared** text box. This field will provide the sum of  $DBH^2$  for calculating basal area.
  - d) Select “*Sq. Ft. / Acre – DBH (in), Area (acres)*” for the **Unit Conversion**. This will apply the appropriate unit conversion to calculate basal area in  $ft^2/acre$  given that DBH was recorded in inches and macroplot area was recorded in acres.
  - e) Check the **Calculate Basal Area** checkbox.
  - f) Click **Apply Selections** to calculate basal area and add to the data grid.

| View | Monitoring Status    | Status Order | MacroPlot Name | SUM_DBH^2 | DBH       | ROWCOUNT | SUM_MACROPLOTSIZE | BasalArea_sq.ft./ac |
|------|----------------------|--------------|----------------|-----------|-----------|----------|-------------------|---------------------|
| ►    | Pre Treatment Year 1 | 1            | DylanCkRx01    | 368.4200  | Overstory | 2        |                   | 20.09               |
|      | Pre Treatment Year 1 | 1            | DylanCkRx01    | 133.3100  | Pole      | 3        |                   | 7.27                |
|      | ReMeasurement...     | 2            | DylanCkRx01    | 498.3800  | Overstory | 3        |                   | 27.18               |
|      | ReMeasurement...     | 2            | DylanCkRx01    | 133.3100  | Pole      | 3        |                   | 7.27                |
|      | ReMeasurement...     | 3            | DylanCkRx01    | 498.3800  | Overstory | 3        |                   | 27.18               |
|      | ReMeasurement...     | 3            | DylanCkRx01    | 133.3100  | Pole      | 3        |                   | 7.27                |
|      | Pre Treatment Year 1 | 1            | DylanCkRx05    | 425.6100  | Overstory | 3        |                   | 23.21               |
|      | Pre Treatment Year 1 | 1            | DylanCkRx05    | 89.9400   | Pole      | 3        |                   | 4.91                |

4) **Export** the Query tool results as a CSV file, if desired.