

# BIOS Advanced Tools

## Slide 1 (00:00): Introduction

Welcome to BIOS Advanced Tools, the final part of a three-part training course covering everything you need to know to get started working in the California Department of Fish and Wildlife's (CDFW) web-map viewer. My name is Joel Boros, I am the BIOS Lead, and your primary point of contact for questions and comments regarding BIOS. In this final session we will cover the tools and methods used for selecting and filtering data.

## Slide 2 (00:32): Topics

In this video we will cover the following topics:

- how to select features geographically using the Select tool,
- using the Query Builder tool to select features based on attribute information,
- and applying layer filters to limit which features are displayed in the map.

## Slide 3 (00:50): Tools Menu

As we covered in the previous video, BIOS has tools grouped into three menus. Quick Tools, which work with the search box adjacent to it. Map Tools, which work within the map frame. Advanced Tools, which require additional input from the user.

## Slide 4 (01:09): Tools Covered

From the Map Tools menu we will be covering the Select tool. From the Advanced Tools menu we will be covering the Layer Filter and Query Builder tool.

## Slide 5 (01:19): Select Tool

The Select tool works in a similar fashion to the Identify Features tool. Both select features within the map. However, while the Identify Features tool selects features from one point within the map, the Select tool allows you to define a broader geographic area for your selections. The Select tool has three methods for defining your geographic area: you can draw a rectangle or polygon, or buffer a point. To use the rectangle method, click the option in the tool, then click and drag to create a box within the map. If you choose the polygon method, click the option in the tool, then click the map to begin the polygon, then click once to place each vertex or point, then double-click to complete the polygon. The point buffer works first by defining the buffer radius in miles, then selecting a point within the map. By default, the select tool creates a new selection on the dataset. However, by selecting the "Select from Set" operation at the bottom of the tool panel, you can instead narrow an existing selection. For example, if all osprey in the California Natural Diversity Database (CNDDDB) dataset are selected, we can further refine that selection by drawing a polygon around the project site with the "Select from Set" operation chosen. This will narrow the selection to just those osprey within the project area. Three things to remember:

- as with all tools, the Select tool works on the active layer,

- selections cannot be made on raster data,
- and be wary of creating large selections, as they may affect performance of the tool.

## Slide 6 (03:14): Select Tool Continued

The results from the Select tool appear in the Graphics and Selection section, above the BIOS Layers. Selected features are symbolized with a yellow border and a red fill and can be toggled on and off in the map, independently from the source BIOS layer.

## Slide 7 (03:33): Select Tool Continued

The selection symbology is retained when printing a map, this can be useful for highlighting an area of interest. The attributes from the selected feature are displayed in a table at the bottom of the map. If the table is closed, it can be re-opened by pressing the T button on the selection item in the Graphics and Selections section. You can export the contents of the attributes to either an Excel file or a PDF. To remove a selection, use the X button on the selection item. You can only have one selection on a dataset, but each data set can have its own selection.

## Slide 8 (04:14): Query Builder Tool

The select tool functions to select features within a map and return associated attribute values. While the Query Builder tool does the opposite, it selects attributes and returns associated features. Selecting of attributes within the Query Builder tool is done by writing a conditional statement. Records that meet the conditions of that statement are then selected, as are the corresponding features within the map. A conditional statement is composed of Fields, Operators, and Values, written in a particular format or syntax. As with the Select tool, you have the option to create a new selection with your query or select from within a set. The first step in creating your conditional statement is selecting the field of interest. As you can see here, some fields are self explanatory, while others are a bit more complex. If you want more information about fields, they are defined in the full metadata.

## Slide 9 (05:18): Field Definitions

As you remember from the BIOS Basics video, the full metadata is accessed from the BIOS Layer section. Click the metadata button, then click the Complete Metadata button, and scroll down to the Field Definition section. Here you will see a complete definition of each field in the attribute table.

## Slide 10 (05:39): Query Builder Tool Continued

The second component of the conditional query is the Operator. Operators are values such as greater than (>), less than (<), or equal to (=), and Boolean operators such as "AND", "OR", and "LIKE". If you are unfamiliar with the use of operators, please refer to the BIOS User Guide for a definition and example of the available operators. The last component of the conditional query is the Value. This refers to the actual values found in the field in the attribute table. To begin building your conditional statement, first choose a field from the fields list by double-clicking it. You will see it is added to the query box below. Then you will need to single-click an operator to add it to the query box. Now to select your Value, be sure you have a field selected in the Fields

list, then click the List button above the Values box to generate a list of values. If you are querying from a set, you can check the In Selection box above the values list to filter the available values to only those within the selection. You can also search the values list using the search box immediately below the listed values. Double-click a value to add it to your conditional query. Now that you have your conditional query, choose either "New Query" to create a new selection, or "Query from Set" to refine your existing selection, then press Execute Query.

## Slide 11 (07:22): Query Builder Tool Continued

Multiple conditional statements can be linked together to form a more complex query using the "AND" or "OR" operators. The "AND" operator is used to further restrict the results, because both conditions must be true. For example, using the conditional statement as seen above, `Common_Name = 'burrowing owl' AND Common_Name = 'Mojave ground squirrel'`, would return no results, because this cannot be true for a single species record. Changing the operator to "OR" would give us `Common_Name = 'burrowing owl' OR Common_Name = 'Mojave ground squirrel'`, which would return a list of all of the records for burrowing owl and all the records from Mojave Ground Squirrel. The "OR" operator returns results where either of the conditions are met, as opposed to the "AND" which requires both to be met. The formatting or syntax of the conditional statement is very important; to maintain the proper syntax we suggest building the statement by double-clicking Fields and Values, rather than typing them into the box. If when you execute your query and nothing happens, re-open the tool and check your syntax.

## Slide 12 (08:48): Query Builder Tool Example

Here you see the results from the Query Builder, highlighting all burrowing owls and Mojave ground squirrels in the map and a table containing the returned records. As with the Select tool, the selection is saved to the Graphics and Selections section.

## Slide 13 (09:06): CNDDDB Special Function

If you are working with the CNDDDB data and want to get additional information for the selected CNDDDB features, you can click these Special Options button in the BIOS Layer section. A panel will open on the right and you will see the Full Report with Sources button. Clicking this button will generate a one page report for each selected feature with all the detailed comments and sources used to map the feature. Be sure to limit your selection as these reports can get very lengthy.

## Slide 14 (09:42): Layer Filter Tool

Although the Layer Filter looks much like the Query Builder, it performs a very different function. You can use the interface to build a conditional statement, just like you did in the Query Builder tool. However, when you apply it as a filter rather than creating a selection, it will instead use it to limit the data visible in the map.

## Slide 15 (10:05): Layer Filter Tool Example

Here you will see the results of the same conditional statement used in the Query Builder tool, but instead applied with the Layer Filter tool. The features on the map only represent the burrowing owl and the Mohave ground squirrel, while the other species have been filtered out. You may notice there is a new filter button on the CNDDDB data, indicating a filter has been applied, and any tools used on this data will return results only on the filtered data rather than the full dataset. To remove the filter, click the filter button, and choose remove filter.

## Slide 16 (10:45): Side-by-Side Comparison

Here is a side-by-side comparison from those last two examples. On the top you see the selection results from the Query Builder tool and on the bottom the results from the Layer Filter tool.

## Slide 17 (10:59): Query Builder vs. Layer Filter Example

Let's go through another example of Query Builder tool versus Layer Filter tool. Here we have one of our vegetation datasets from these Vegetation Classification and Mapping Program (VegCAMP). We have just added the data and no queries or filters are applied.

## Slide 18 (11:20): Query Builder vs. Layer Filter Continued

Now we are going to use the Query Builder tool to create a conditional statement searching for all NVCS\_Names that begin with the word "Juncus". We are expecting multiple results and rather than creating a complex query listing each of them out, we are going to use what is called a wildcard. The percent symbol (%) is used to represent any string of text following the word "Juncus". The wildcard can be used before, after, or before and after any string of text you want to search for. In our example, we know the values began with "Juncus", so we are placing the wildcard symbol after "Juncus".

## Slide 19 (12:06): Query Builder vs. Layer Filter Continued

After executing the Query Builder tool, you can see the selected features and records with the NVCS names beginning with "Juncus". The selection appears in the Graphics and Selections section and the selected attributes are returned in a table.

## Slide 20 (12:23): Query Builder vs. Layer Filter Continued

If we wanted to apply the same conditional statement as a Layer Filter, you can either recreate the statement or use the Selection as Filter button on the Layer Filter tool. If this button is used, the current selection will be cleared and used to create a filter.

## Slide 21 (12:43): Query Builder vs. Layer Filter Continued

Here I have used the Selection as Filter button and the selection was removed. You will notice the vegetation dataset under the BIOS Layers section now has a filter button.

## Slide 22 (12:56): Query Builder vs. Layer Filter Continued

The only visible features are those that have their NVCS name beginning with "Juncus". There are no records returned because nothing was selected.

## Slide 23 (13:06): CNDDDB Instant Filter

As one of our more prominent datasets, CNDDDB, has additional filter options in the Instant Filter tool. It is available as a separate tab within the Layer Filter tool when CNDDDB is the active layer. By clicking the button next to one of the taxonomic groups, the dataset is instantly filtered within the map.

## Slide 24 (13:30): Topic Review

To review in this video we cover the following topics:

- selecting features in the map with the Select tool,
- using the Query Builder tool to select features using their attributes,
- and filtering data using the Layer Filter tool.

## Slide 25 (13:46): Closing

Thank you for watching the BIOS Advanced Tools tutorial. If you would like more training information on CNDDDB or VegCAMP, please check out our videos at the URL shown here, [wildlife.ca.gov/data/training](http://wildlife.ca.gov/data/training).