BIOS 6 Advanced Tools

Introduction (00:00)

Welcome to BIOS Advanced Tools, the final part of a 3-part training course covering everything you need to know to get started working in the California Department 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.

Topics (00:29)

In this session we will cover the following topics: how to select features geographically using the Select By Graphics tool, using the Select By Attributes tool to select features based on attribute information, applying layer filters to limit which features are displayed in the map, and how to generate additional information for the CNDDB layer.

BIOS Tool List (00:55)

The tools in BIOS are found in the Tool List, which can be accessed via the Tools button in the upper right, in the banner across the top of the viewer. If closed, the contents pane can be re-opened from the banner.

Select By Graphics (01:11)

The Select By Graphics 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 By Graphics tool allows you to define a broader geographic area for your selections. The tool has 6 methods for defining your geographic area: you can place a point, draw a line, rectangle, polygon, or circle. Alternatively, you can enter latitude and longitude to select by location. For each method you can apply a buffer. First specify the buffer distance and units using the drop-down menu. Then check the box adjacent to Apply Buffer option. The point method functions the same as the Identify Features tool, select the Draw a point method then click in the map. If you chose the line or polygon method, click in the map to begin, then click once to place each vertex or point, then double-click to finish the line or polygon. To use the rectangle or circle method click and hold to create the starting corner of the rectangle or the center of the circle, then drag to create a box or circle within the map and then release your mouse to finish your selection area. Each of these methods create a graphic, symbolized as black lines. Graphics can be cleared using the Clear Graphics button found at the bottom of the tool. Additionally, once a graphic has been created, it can be edited to adjust the size and shape. Features can then be reselected using the edited shape by pressing the Select by Shape button. To use coordinates to select by location, enter the coordinates into the text box as latitude comma longitude format. You can press the Verify Location button to pan the map to the location to ensure it is correct. Finally, press the Select By Location button to create the selection. This tool always creates a new selection, overriding existing selections.

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.

Select By Graphics - Contents (03:44)

The results from the Select By Graphics tool appear in the Graphics Layers section, in the Contents panel. Selected features are symbolized with a blue boarder and can be toggled on and off in the map, independently from the source BIOS layer.

Select By Graphics - Symbology (04:01)

This selection symbology is retained when printing a map, this can be useful for highlighting an area of interest. The attributes from the selected features are displayed in the Results Table at the bottom of the map. If this table is closed it can be re-opened by pressing the Display Selection Attributes button on the selection item in the Graphics Layers section. You can export the contents of the table to either an Excel file or a PDF. To remove a selection, use the X button on the selection item or press the Clear Selection button on the Select By Graphics tool. An important point to remember, you can only have one selection on a dataset, but each dataset can have its own selection.

Select By Attributes (04:49)

The Select By Graphics Tool is used to select features within the map and return associated attribute values. While the Select By Attributes tool, does the opposite, it selects attributes and returns associated features. The selection of attributes within this tool is done by writing a conditional statement. When the query is run, records that meet the conditions of the statement are selected, as are the corresponding features within the map. A conditional statement is composed of Fields, Operators, and Field Values, written in a particular format or syntax. For additional help with creating conditional statements, click on the blue question mark to the left of to the Operator's drop-down menu. This will open a help document with information about creating queries. You have the option to create a new selection with your query or select from within an already existing selection. The first step in building your conditional statement is to select the field of interest. Some field names are self-explanatory, while others are a bit more complex. If you want more information about the attribute fields, they are defined in the full metadata.

Field Definition Location (06:12)

As you remember from the BIOS Basics session, the full metadata is accessed from the Metadata Brief panel. Click the metadata button for the layer of interest in the Contents panel, then click the Complete metadata button, and scroll down to the Field Definitions section. Here you will see a list of definitions for each field in the attribute table.

Select By Attributes - Query Format (06:36)

The second component of the conditional query is the Operator. Operators are values such as greater than (>), less than (<), or equal to (=). If you are unfamiliar with the use of operators,

please refer to the BIOS User Guide for definitions and examples of the available operators. The last component of the conditional query is the field value. This refers to the actual values found in the field in the attribute table. To begin building your conditional statement, first chose a field from the --SELECT ATTRIBUTE FIELD-- drop-down menu. You will notice there is a second drop-down menu below, --SELECT RELATED COLUMN--. With most data, you can ignore this. This comes into play if the layer you are working with has data that has a related table. An example of a related table would be a situation where several species may be observed at the same survey point, the survey point may be represented as a single point within the dataset and each species would have its own record in the related table. When you select a field from the select attribute field drop-down menu, you will see that it is added to the query box below. Next, you will need to select an operator from the --OPERATOR-- drop-down menu. Now to select your value, be sure you have a field selected, then click the --FIELD VALUE(S)-- drop-down menu and select a value from the list generated. You can filter the available values by entering key words in the search box below. Now that you have your conditional query, click either the Query New Selection button to execute a new selection or the Query Within Selection button to refine your pre-existing selections.

Select By Attributes - Complex Queries (08:28)

Multiple conditional statements can be connected together to form a more complex query using the "AND" or "OR" operators, found in the --CONNECTORS-- drop-down menu. The "AND" operator is used to further restrict the results, because both conditions must be true. For example, if we had the conditional statement which reads ecoregion biodiversity rank equals 4 and ecoregion biodiversity rank equals 5, it would return no results, because this cannot be true for a single hexagon record. Each hexagon only has one defined rank. If we instead had, ecoregion biodiversity rank equals 4 or ecoregion biodiversity rank equals 5, the query would return a list of all the records which have an Ecoregion Biodiversity Rank of 4 or 5. The "OR" operator returns results where either of the conditions are met, as opposed to the "AND" which requires both to be met. "AND" is typically used when creating a conditional statement which uses multiple different fields.

Select By Attributes – Evaluation Order (09:47)

Queries can be further refined by defining an order of operation, similar to math equations. Typically, conditional statements are evaluated left to right. A subset of conditions can be evaluated first by encasing them in parenthesis. In this example, we have further refined the conditional statement to only include those records from El Dorado County. If the parenthesis were not included, the conditional statement would return all ecoregion biodiversity rank of 4 throughout California and all those of rank 5 in El Dorado County. The "AND County" condition only applies to the statement that precedes it, unless we specify that with the parenthesis. The formatting or syntax of the conditional statement is very important; to maintain the proper syntax we suggest building the statement by selecting the items from the drop-down menu or pressing the adjacent + button, rather than typing them into the query box. If nothing happens when you execute the query, review the syntax.

Select By Attributes Example (10:56)

Here you see the results from the Select By Attributes tool, highlighting all features in the map which are ecoregion biodiversity Rank 4 or 5 found within El Dorado County.
As with the Select By Graphics tool, the selection is saved to the Graphics Layers section.

Layer Filter (11:16)

The Filter Layer function is found within the Select By Attributes tool, it provides a different way of working with the data. Using the same methodology as previously discussed, first build a conditional statement. Then once the conditional statement is executed as a filter, rather than a selection, it will instead limit the data visible in the map.

Layer Filter Tool Example (11:41)

Here you see the results of the same conditional statement used in the Select By Attributes selection, but instead applied as a Layer Filter. The features in the map only represent the hexagons with ecoregion biodiversity rank 4 or 5 found within El Dorado County, while the other hexagons have been filtered out. You may notice there is a new filter button on the Terrestrial Biodiversity Summary dataset in the BIOS Layers section of the Contents panel, 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.

Selection vs. Layer Filter (12:55)

Here is a side-by-side comparison from those last two examples. On the top you see the selection results from the Select by Attributes tool with those matching the conditions highlighted. And on the bottom the results from the Layer Filter, where only those that match the conditions remain visible.

Comparison - No Selection/Filter (12:44)

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

Comparison - Select By Attributes (13:01)

Now we are going to use the Select By Attributes 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, we are going to use what is called a wildcard (%). The percent symbol (%) is used to represent any string of text. 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 we are looking for being with "Juncus", so we are placing the wildcard symbol after "Juncus".

Comparison - Select By Attributes Results (13:43)

After executing a new selection query with the Select By Attributes tool, you can see selected features and records with NVCS Names beginning with "Juncus". The selection appears in the Graphics Layers section of the Contents panel and the selected attributes are returned in the Results Table.

Comparison - Layer Filter & Selection (14:02)

If we wanted to apply the same conditional statement as a Layer Filter, simply press the Filter Layer button under the Layer Filtering section of the tool. A filter will be created, and the selection will be retained. Here we see both the selection and layer filter active.

Comparison - Layer Filter Results (14:21)

Turning off the symbology for the selection in the Graphics Layer section of the Contents panel reveals just those features beginning with "Juncus" in the NVCS name are visible. All other features are hidden.

CNDDB - Report (14:35)

If you are working with the California Natural Diversity Database and want to get additional information for the selected CNDDB features, you can generate a PDF report of the currently selected features. To create the report, ensure you have a selection on the CNDDB layer and open the additional options for that layer. As a reminder, that is found by clicking on the three ellipses under the BIOS Layers section of the Contents Panel for a specified layer. After you click the button, another window will open indicating the report is generating. Once completed the report can be accessed from the location your web browser saves downloads, generally the Download folder. This report contains more information that what is available in the CNDDB BIOS layer.

CNDDB - Selection to RareFind (15:24)

If you want to get additional information about CNDDB selections outside of the report feature, you can pass the selection into the RareFind application. RareFind offers more robust querying and reporting options of CNDDB data. As with the report, you will find additional information not found in the CNDDB BIOS data layer. From RareFind you can generate a PDF report or export the data into Excel format. For more information on Rarefind, please look to the RareFind User Guide found on the Biogeographic Data Branch Tutorials and Training page.

Closing (16:03)

For the most up-to-date information on BIOS, please see the User Guide. Thank you for your time.