Tutorial for using the CNDDB layer in the BIOS 6 CNDDB & Spotted Owl Viewer

California Department of Fish and Wildlife
California Natural Diversity Database
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The CNDDB & Spotted Owl Data Viewer is a bookmark in the Biogeographic Information and Observation System (BIOS) web-map viewer with the California Natural Diversity Database (CNDDB) and Spotted Owl Observations Database data preloaded for you. Using BIOS, you may view CNDDB data spatially, add labels, and print maps without the need to have GIS software installed on your computer. More complex spatial analysis and data manipulation will still require the use of a full GIS in conjunction with RareFind.

Additional BIOS data viewer support is also available on the Biogeographic Data Branch Tutorials and Training page.

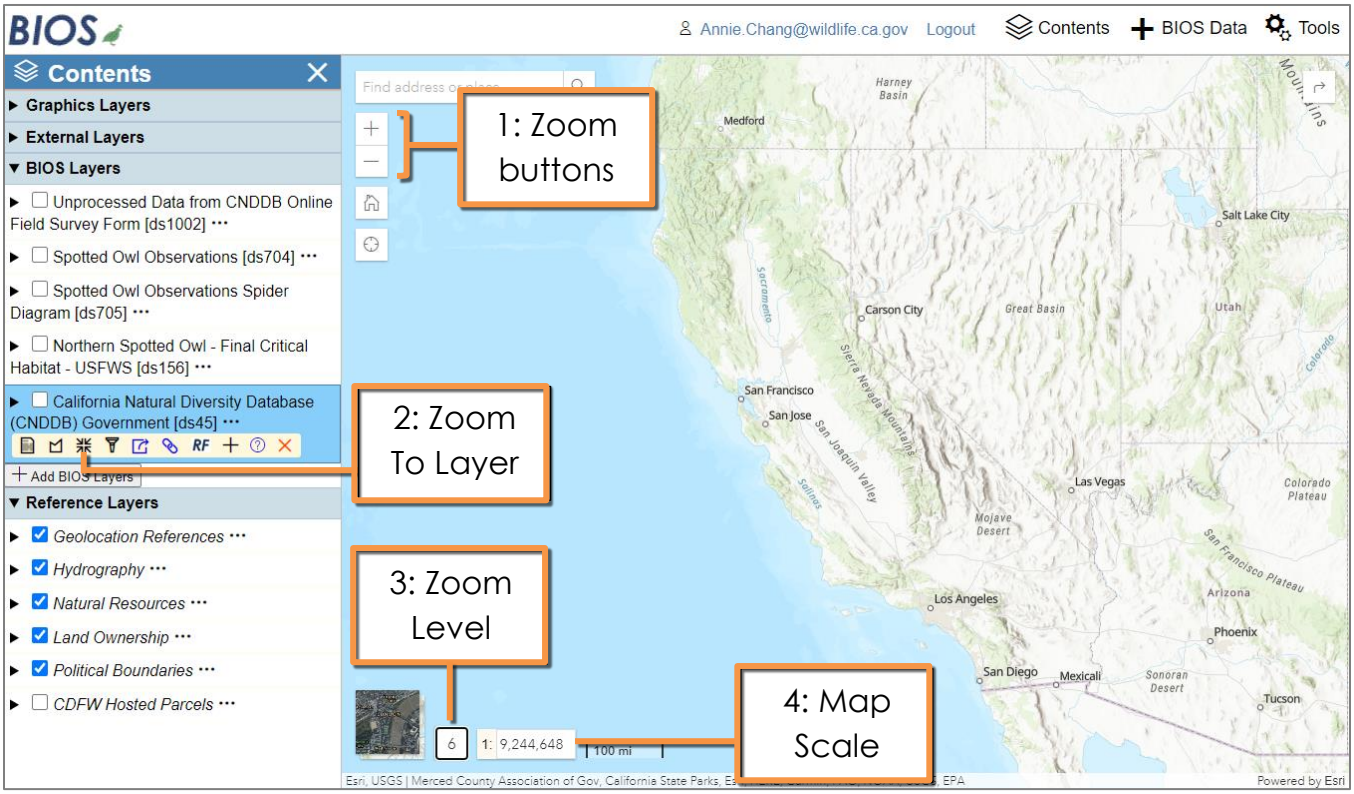
Contents

Navigating

Navigation in BIOS is achieved with the mouse or keyboard. You can pan the map in any direction by a simple click and drag.

To zoom in or out:

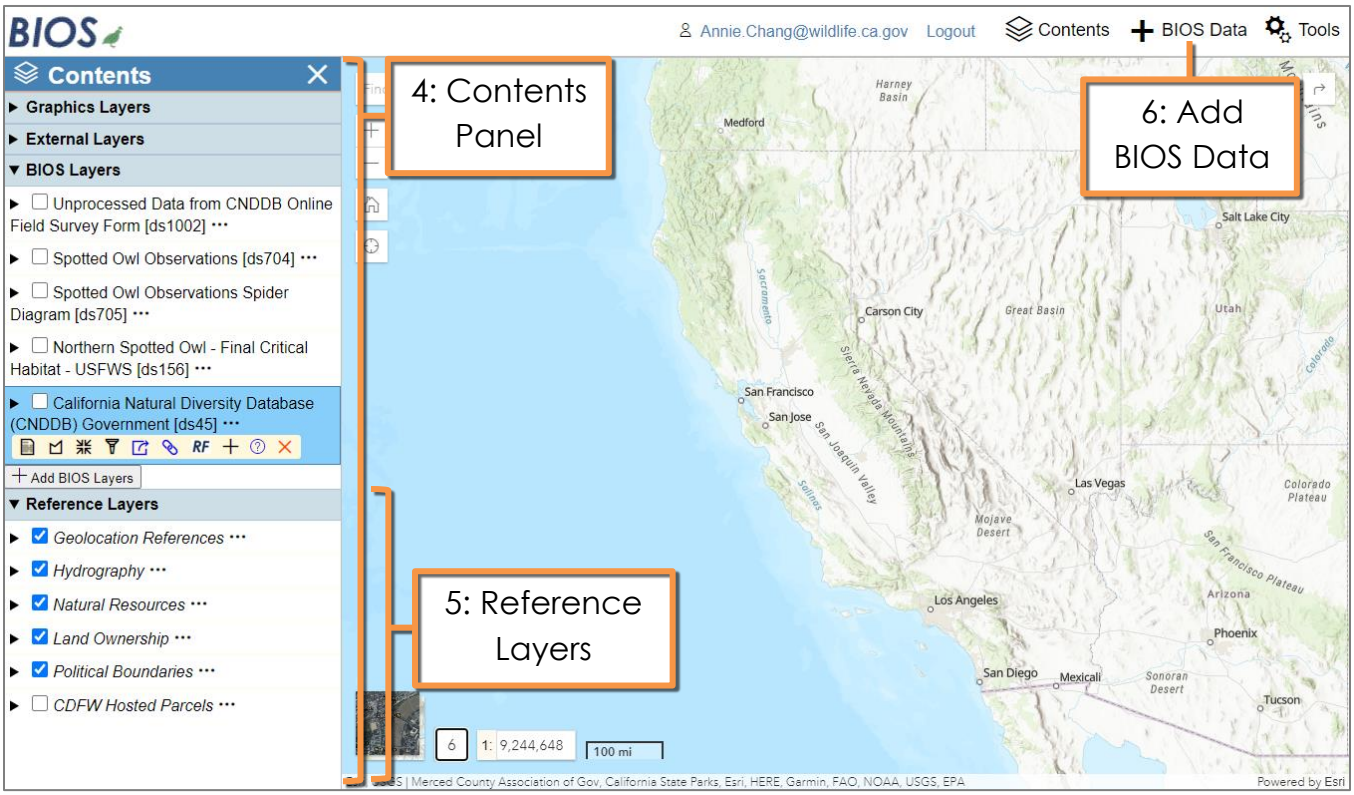
- Scroll the mouse wheel
- Hold Shift on your keyboard + click-and-drag with your mouse to form a box and zoom to that box's area (Ctrl + Shift + click-and-drag zooms out)
- Use the "+" and "-" keys on the keyboard
- Double-click to zoom in
- Press the "+" or "-" buttons on the map [1]
- Click the ellipsis by a layer to expand the menu that contains a "Zoom To Layer" button to zoom to the data in that layer [2]
- If there is a particular reference scale you prefer, you can type in the zoom level [3] or map scale [4] and press Enter. When the zoom level is at 15 or greater, the CNDDB Element Occurrences are labeled with scientific name.



Adding Layers

The CNDDB & Spotted Owl Viewer bookmark comes preloaded with the following data sets in the BIOS Layers portion of the Contents Panel [4]:

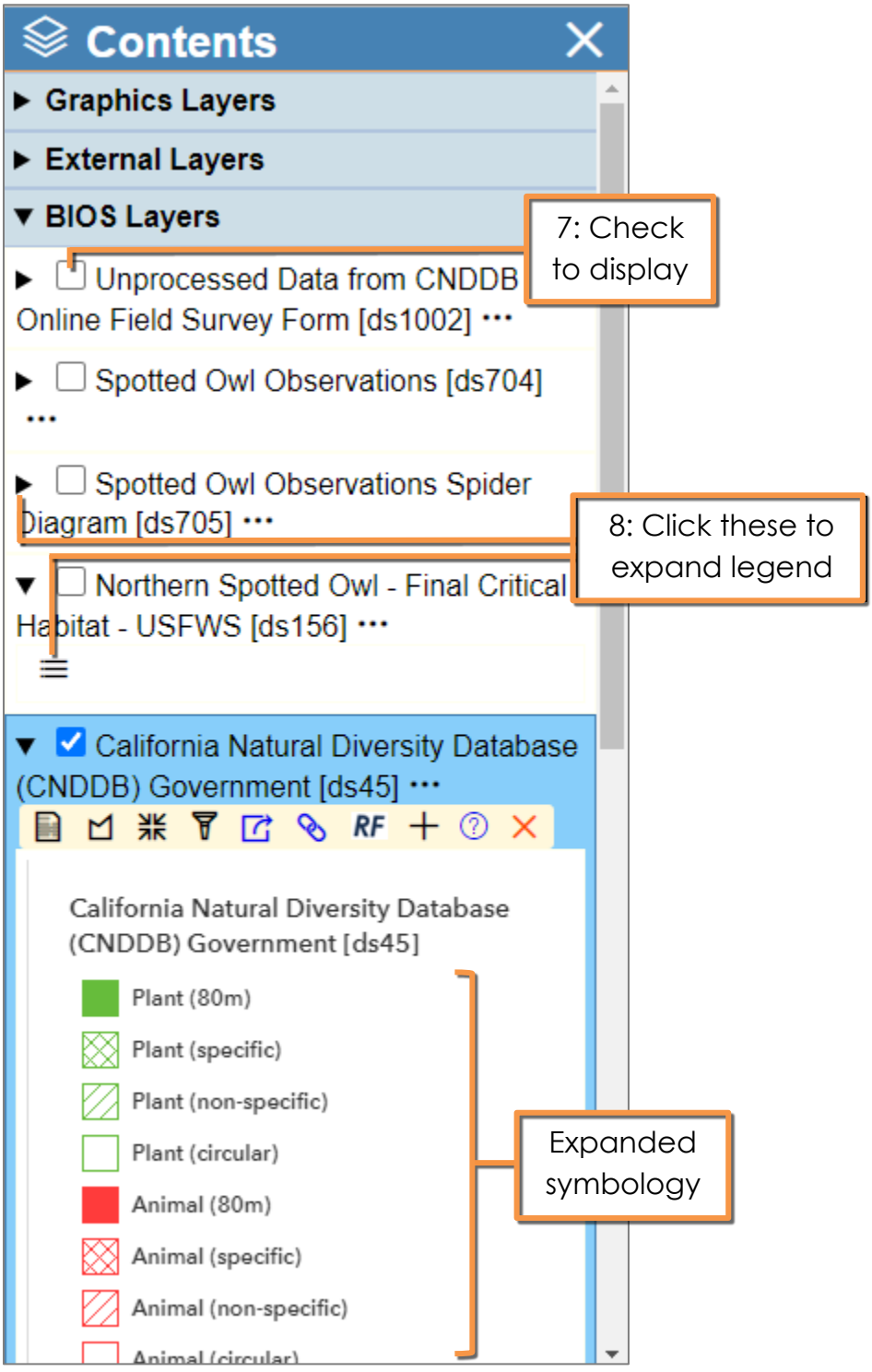
- Unprocessed Data from CNDDB Online Field Survey Form [ds1002]
- Spotted Owl Observations [ds704]
- Spotted Owl Observations Spider Diagram [ds705]
- Northern spotted owl critical habitat [ds156]
- CNDDB occurrences [ds45 or ds85]



Additionally, the BIOS viewer has several Reference Layers [5] preloaded in the Contents Panel. The viewer also allows the use of additional biogeographic data layers in conjunction with the CNDDB data layer. The "+ BIOS Data" button [6] can be used to add other BIOS data layers, such as Critical Habitat layers, vegetation, and other species data layers.

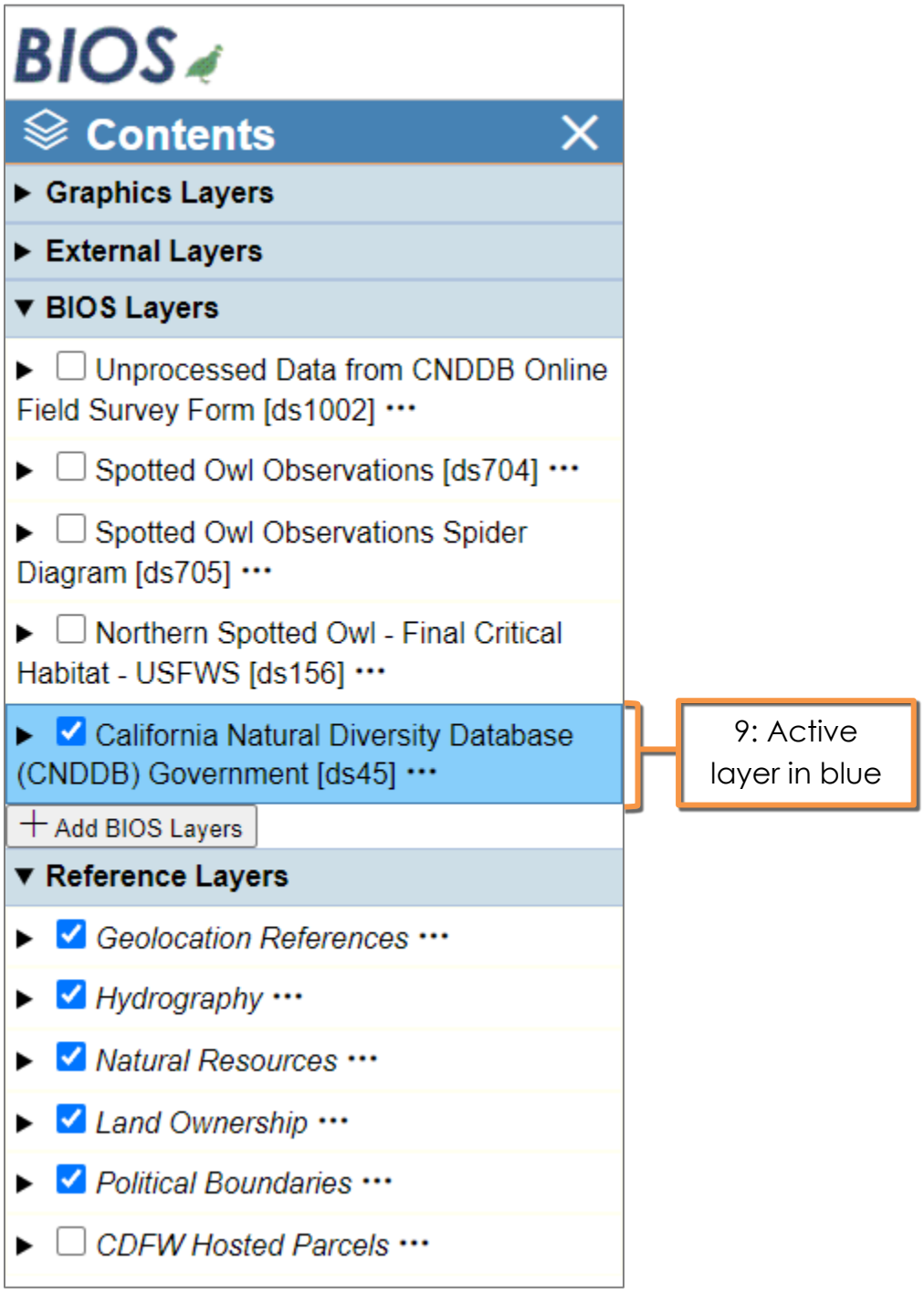
Displaying Layers

Click the checkbox of each layer that you want displayed [7]. It helps to zoom in when displaying the CNDDB data to avoid long drawing times. The symbology associated with a data set can be expanded in the Contents Panel by clicking the right triangle (►) to the left of the layer title, and then the Show Legend button (≡) to expand the legend [8].



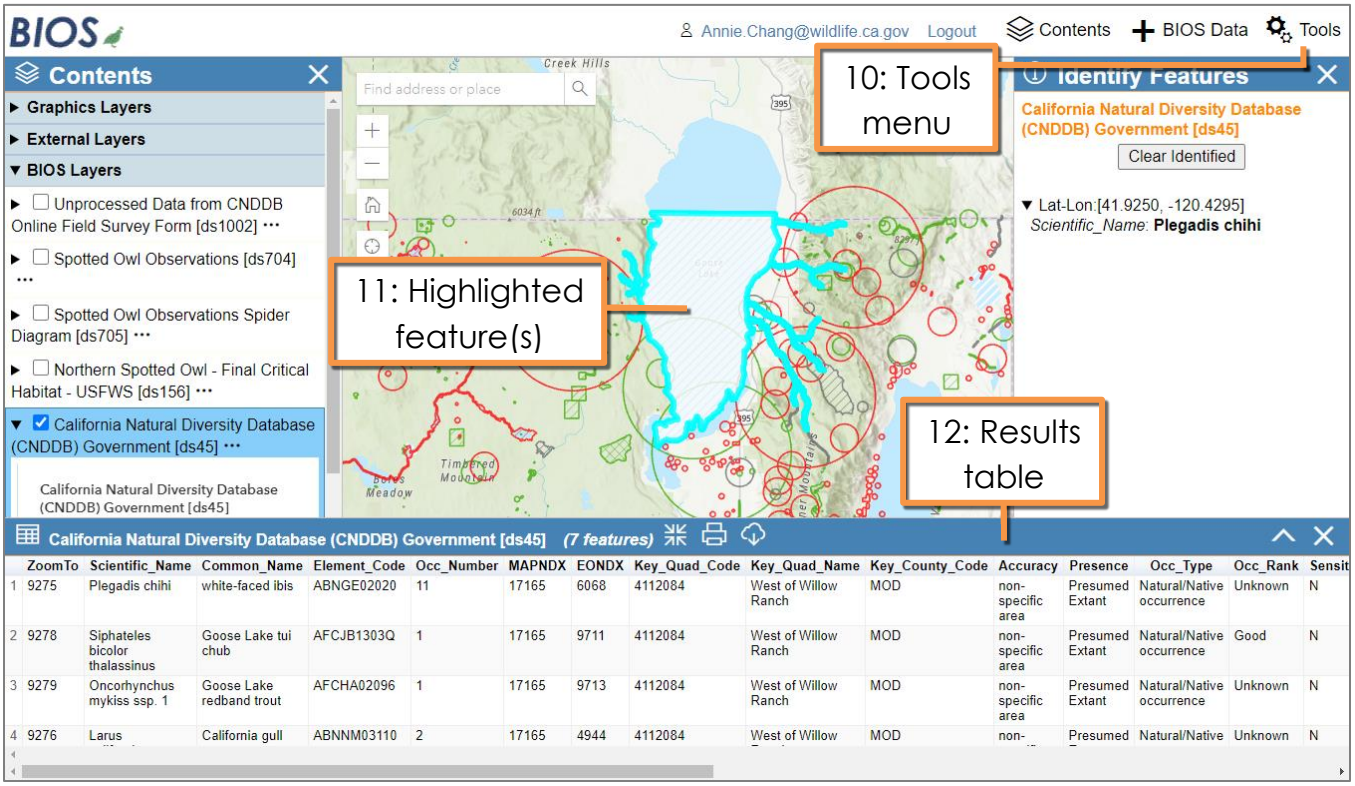
Activating a Layer

Tools in BIOS that interact with data layers only work on the "Active Layer." Only one layer at a time can be active. To make a layer active, simply click on the name of a layer [9]. You will see a blue box appear around the layer indicating it is active.



Identifying Features

Click on the layer name you are interested in to make it the Active Layer. From the Tools menu at the upper right [10], select "Identify Features" to get additional information about occurrences by activating (clicking) the tool and then clicking the feature of interest (layer must be Active Layer). The features you click on will highlight in teal [11] and a table will expand from the bottom and return the attributes of the identified feature(s) [12].



	ZoomTo	Scientific_Name	Common_Name	Element_Code	Occ_Number	MAPNDX	EONDX	Key_Quad_Code	Key_Quad_Name	Key_County_Code	Accuracy	Presence	Occ_Type	Occ_Rank	Sensit
1	9275	Plegadis chihi	white-faced ibis	ABNGE02020	11	17165	6068	4112084	West of Willow Ranch	MOD	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N
2	9278	Siphateles bicolor thalassinus	Goose Lake tui chub	AFCJB1303Q	1	17165	9711	4112084	West of Willow Ranch	MOD	non-specific area	Presumed Extant	Natural/Native occurrence	Good	N
3	9279	Oncorhynchus mykiss ssp. 1	Goose Lake redband trout	AFCHA02096	1	17165	9713	4112084	West of Willow Ranch	MOD	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N
4	9276	Larus	California gull	ABNNM03110	2	17165	4944	4112084	West of Willow	MOD	non-	Presumed	Natural/Native	Unknown	N

Selecting Element Occurrences

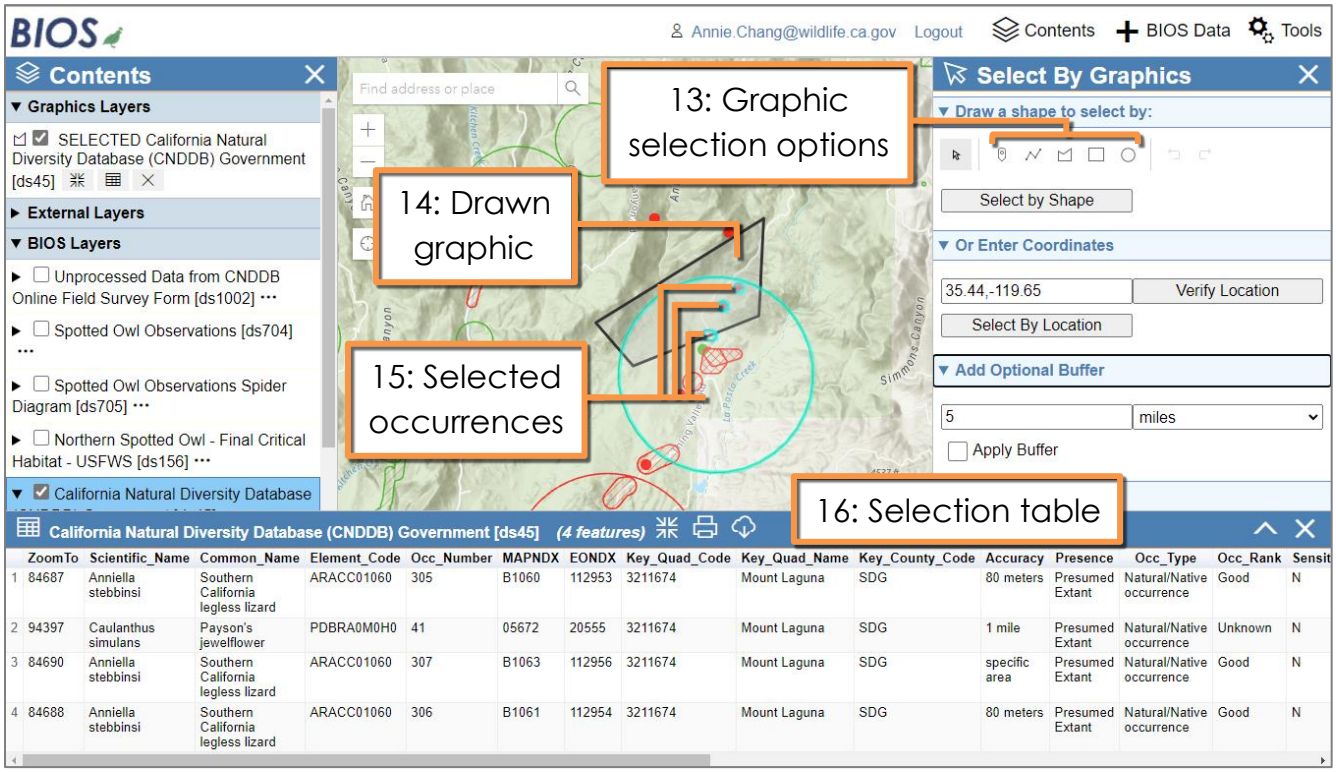
CNDDB Element Occurrence features can be selected either spatially in the map viewer or through a specific query selection. The spatial selection is useful for selecting all the occurrences in a particular area, whereas the query selection allows a selection through attributes (for example, you may use the query selection to select federally endangered birds). To select occurrences from the CNDDB layer, please make sure the CNDDB layer is set as the Active Layer.

Selecting EOs – spatial selection

If you want information on a group of occurrences in the same general area, Open the Tools menu on the upper right-hand corner and choose "Select by Graphics."

Select by drawing a shape:

There are 5 different ways of selecting through drawing a shape [13]: Draw a point, polyline, polygon, rectangle, or circle. These selection methods will select any Element Occurrence that the drawn shape touches; they do not have to completely enclose the occurrence. Simply click on the type of shape you want to draw in the menu, and then click on the map to draw your graphic [14]; double-click to complete a polyline, polygon, or rectangle. Once the selection is made, the selected occurrence will be highlighted in teal [15]. A table at the bottom of the map viewer will display the details of the selected records [16].

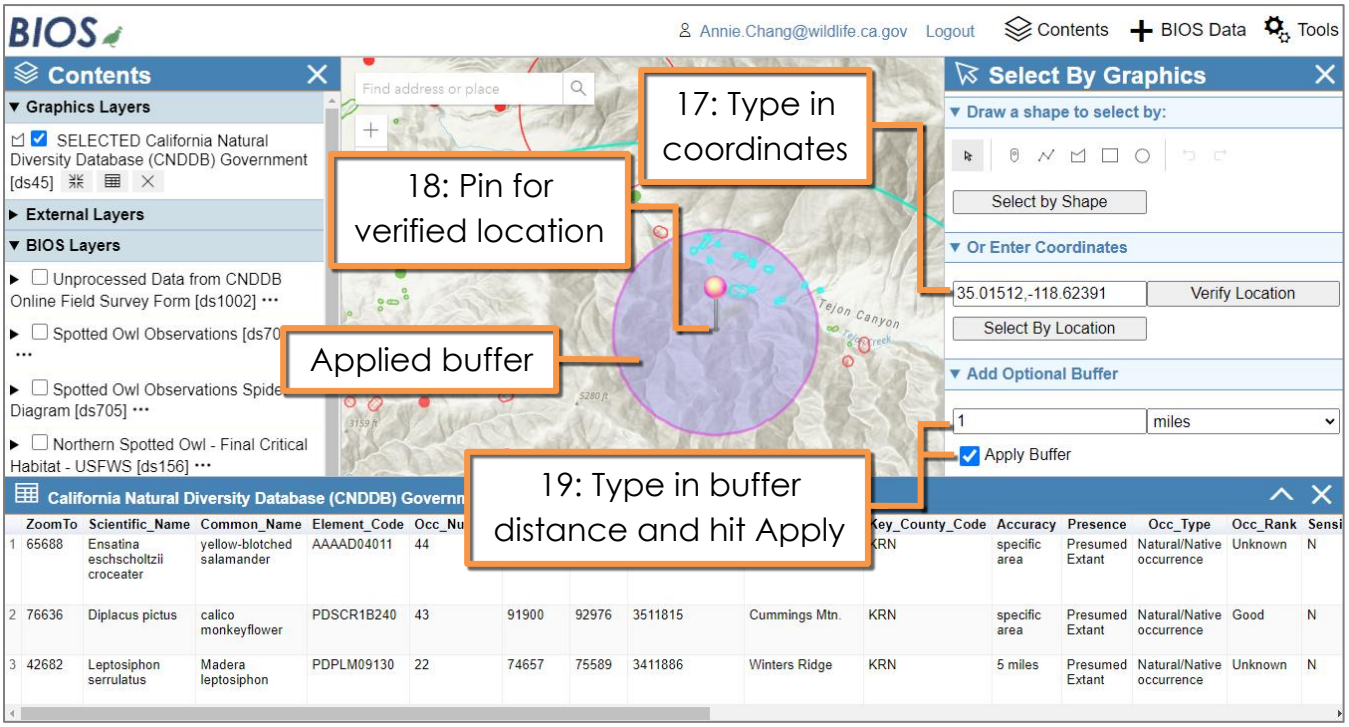


Select by entering a coordinate:

If you know the coordinates of your project site or area that you want to search, you can type that in and press "Verify Location" [17]. A pin would be drawn at your coordinates [18]. You can then press "Select by Location" to make your selection.

Add optional buffer:

You may choose to add a buffer to your graphic or coordinate to expand your selection area. Type in the distance, choose a unit, and check on "Apply Buffer" [19] By default, miles is selected.

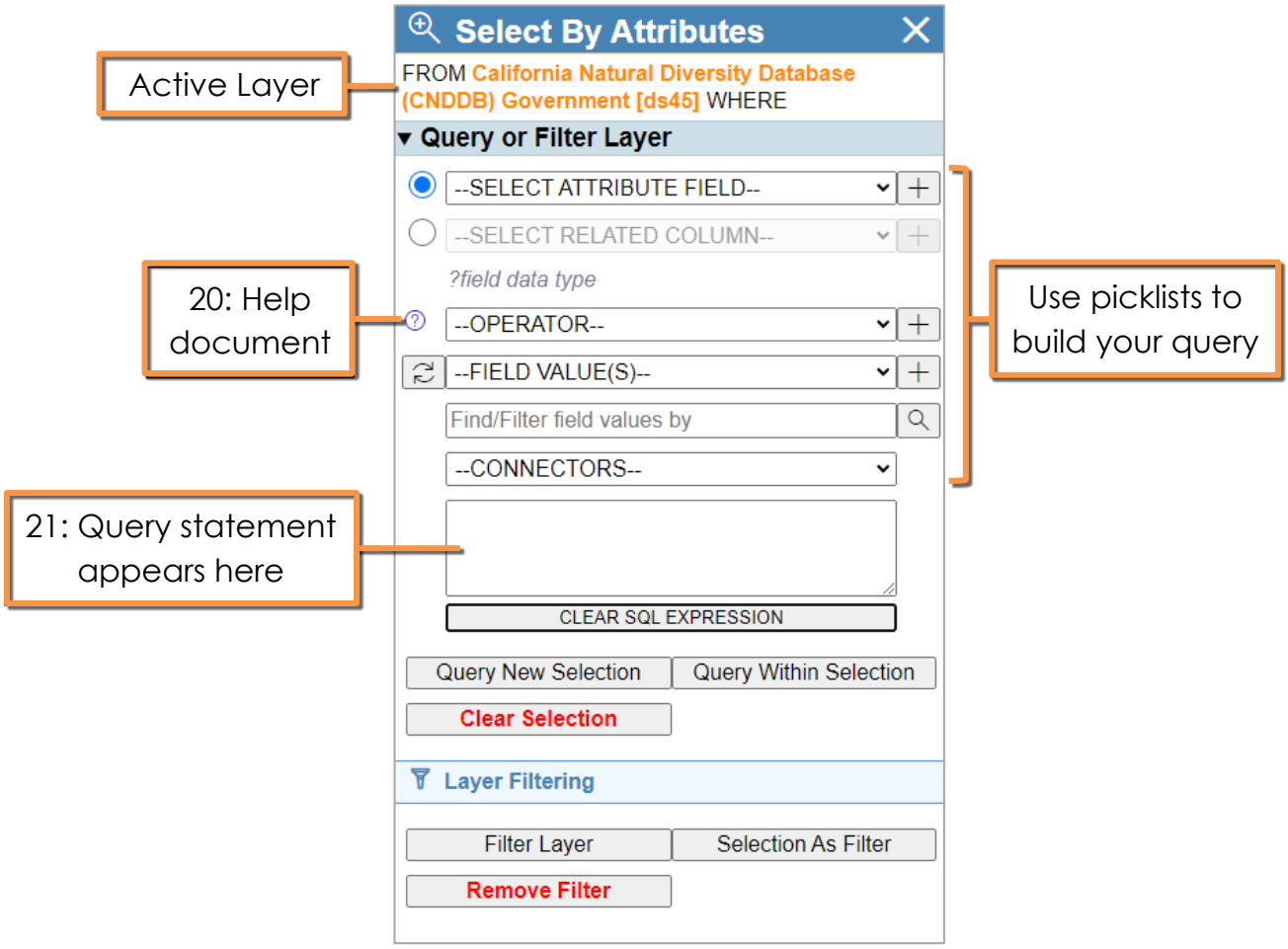


Selecting EOs – attribute selection

You can also select occurrences based upon their attributes. Open the Tools menu on the upper right-hand corner and choose "Select by Attributes."

There is a small blue circle with a question mark you can click on to open a help document that would explain how to compose a query [20]. Appendix 1 in this document also provides definitions and example queries.

To start building a query, first select an attribute field to query on using the first picklist; the fields available to pick from would be based on the active layer. Next, choose an operator from the picklist. Finally, select from the list of available field values that refresh according to the attribute field you selected in step one, or type a value directly into the SQL expression that is being built. Note that text values require apostrophes around them.



As you build your query, it will appear in the box below the picklists [21]. Once you have finished building your query, you may click "Query New Selection."

Using Selected Features

Once you've made a selection, either by spatial selection or by attributes, all of the selected features will be highlighted.

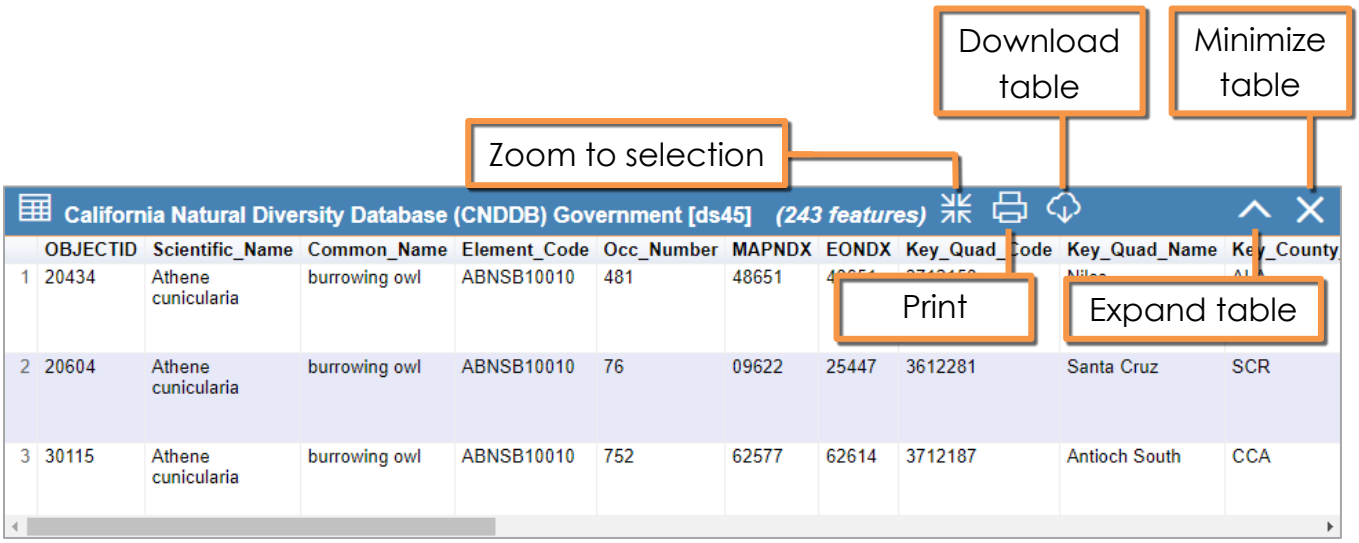
Zoom to the selected features

In the Graphics Layers section of the Contents Panel, you will see the layer containing your new selection. Click the Zoom to Selection button to zoom to the selected features.

Table of selected features

Right after you make a selection, a table should appear at the bottom of browser window. If you close your table at any point, you may open it back up by navigating to the Graphics Layers section of the Contents Panel, locating the layer that you selected from, and clicking the Display selection attributes button .

Several buttons are on the top blue bar of the table that allow you to zoom to selection, print the table, download the table, expand the table, or minimize the table.



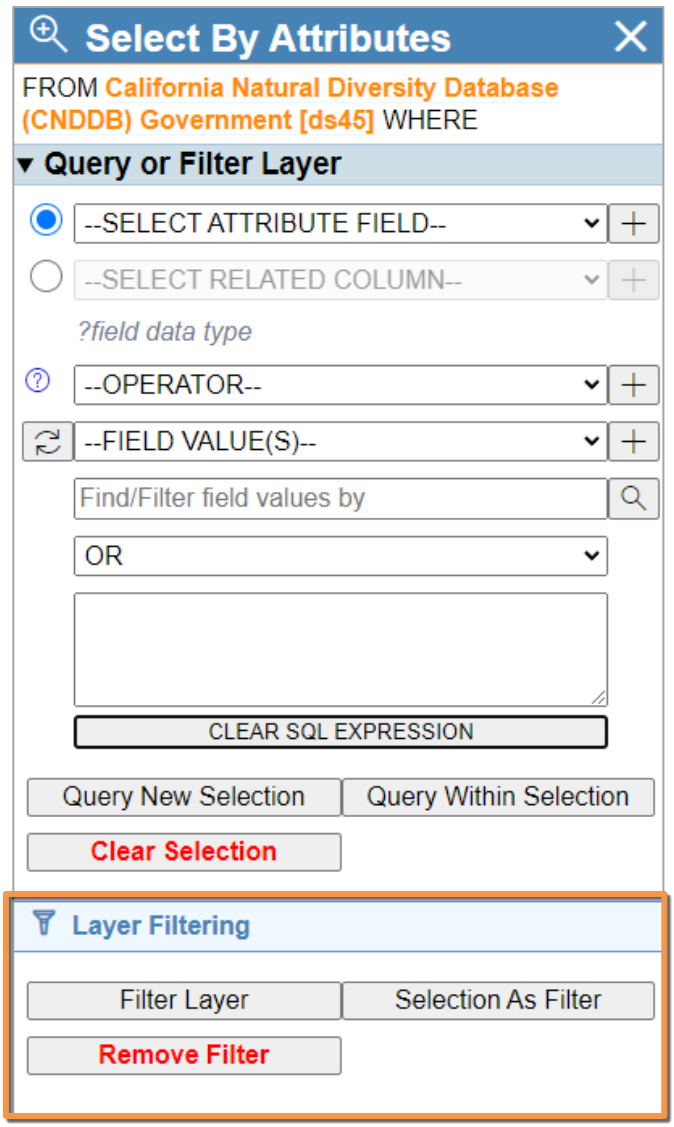
	OBJECTID	Scientific_Name	Common_Name	Element_Code	Occ_Number	MAPNDX	EONDX	Key_Quad_Code	Key_Quad_Name	Key_County
1	20434	Athene cunicularia	burrowing owl	ABNSB10010	481	48651				
2	20604	Athene cunicularia	burrowing owl	ABNSB10010	76	09622	25447	3612281	Santa Cruz	SCR
3	30115	Athene cunicularia	burrowing owl	ABNSB10010	752	62577	62614	3712187	Antioch South	CCA

Filters

One of the most requested feature enhancements by CNDDB subscribers using BIOS to view the CNDDB Element Occurrences has been the ability to view subsets or only a specific portion of the CNDDB data. This may be helpful to make maps clearer to understand where there are many CNDDB occurrences.

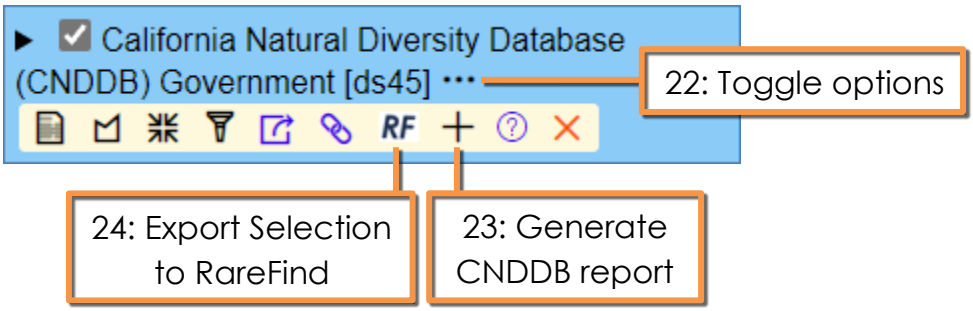
For example, one map may be filtered to show only plants, and another map to show only animals for the same location. You may also choose to filter so that only occurrences for a single species are displayed. Note: CNDDB recommends that all CNDDB-tracked species be considered during environmental review and not excluded from analysis.

To filter, first make a selection using the Select by Attributes tool. Once you have a selection, choose "Selection as Filter" at the very bottom of the Select by Attributes menu. When you want to remove a filter, click the Remove Filter button.



Reports

After Element Occurrence records are selected from the CNDDB layer, an Element Occurrence Report can be generated. To generate a report, go to the Contents Panel and toggle more options on by clicking on the ellipses under the CNDDB layer in BIOS Layers [22]. A row of additional options should appear. The "+" button generates CNDDB reports based on what you've selected in the CNDDB layer [23]. When you click on that button, a pop-up window should appear and indicate that the report is being generated and then downloaded. Please allow pop-ups if prompted. Additional report formats and tabular data exports are available using RareFind.



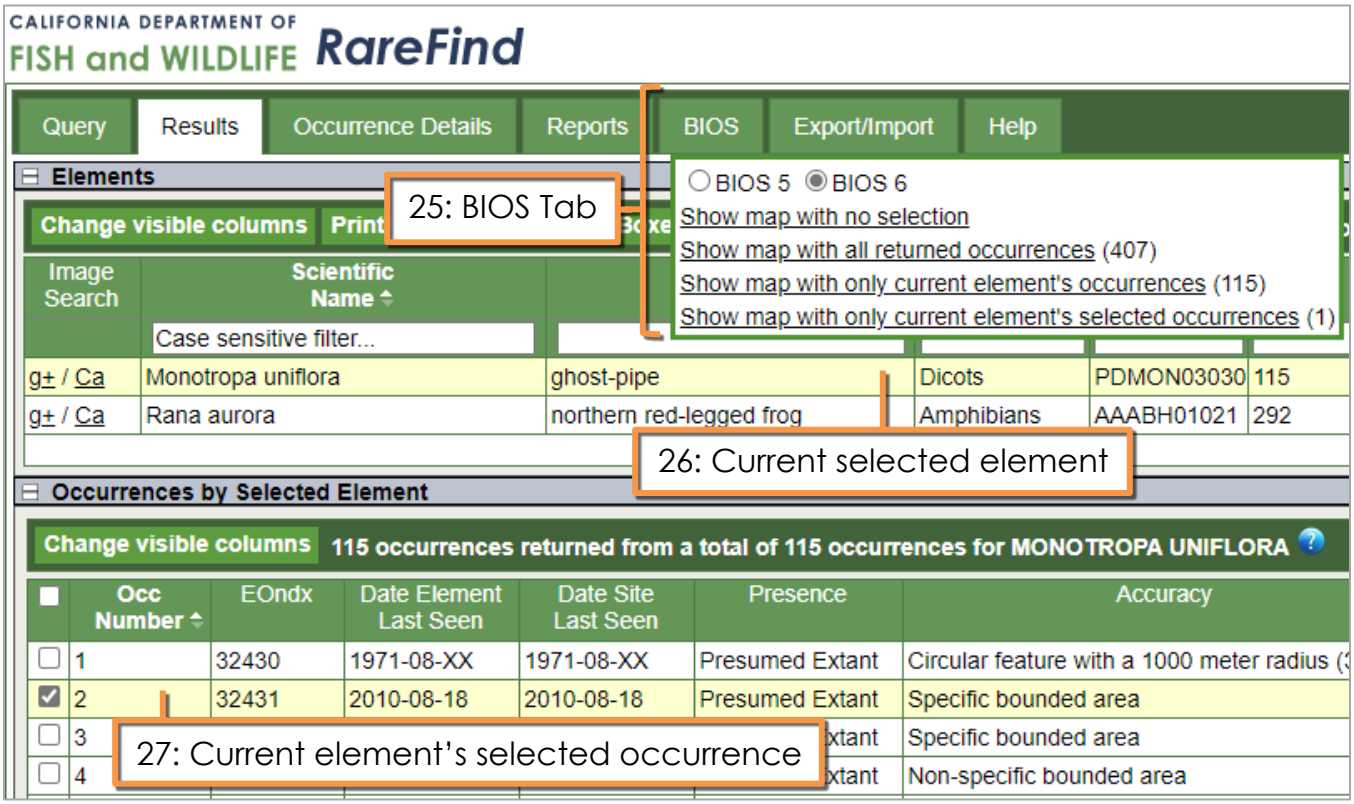
Export to RareFind

For further analysis of occurrence details or reporting functions, a selected set of Element Occurrences from the CNDDB layer in BIOS can be exported to RareFind. Click the "RF" button that appears after clicking on the ellipses in the previous example [24]. This will open RareFind in a new browser window with the selected records loaded. If RareFind is already open in a different browser window, RareFind will refresh with your BIOS selection. Please allow pop-ups if prompted.

Export Selected Records from RareFind to BIOS

The previous demonstration showed how to pass selected CNDDB occurrences in the BIOS viewer to RareFind (RareFind has more reporting and tabular export functions, as well as more data fields available). Conversely, a selection can be made in RareFind and exported to BIOS to view the selection spatially on a map. Furthermore, BIOS contains a printing function that creates a PDF map of the data and view displayed in BIOS, which could be saved for printing, emailing, or adding to documents.

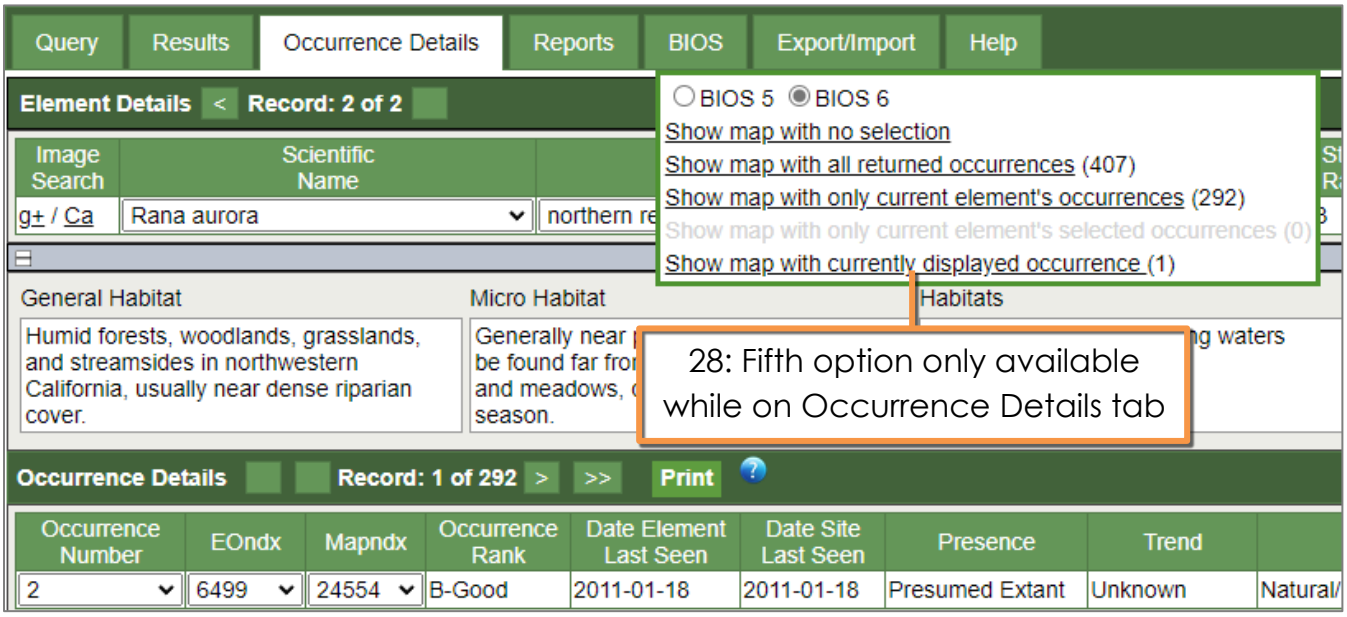
Once a query is made in RareFind, simply click the BIOS tab in RareFind [25]. A small window with up to five options will appear below the tab. The BIOS tab is best used while viewing the Results tab; what you have selected in the "Elements" [26] and "Occurrences by Selected Elements" [27] tables will affect the options you may choose from.



- **Show map with no selection**: This option will open the BIOS map viewer in a new window (if it is not open already) and then load and display the CNDDB layer.
- **Show map with ALL returned occurrences (#)**: Opens BIOS, loads the CNDDB layer, and then zooms to a layer created from all the occurrences your RareFind query. The number of occurrences selected is shown in the parentheses.
- **Show map with current element's occurrences (#)**: Opens BIOS, loads the CNDDB layer, and then zooms to a layer created from the occurrences for the current element [26] highlighted in the RareFind Results tab (all occurrences

displayed in the Occurrences table at the bottom of the Results tab). The number of occurrences selected is shown in the parentheses.

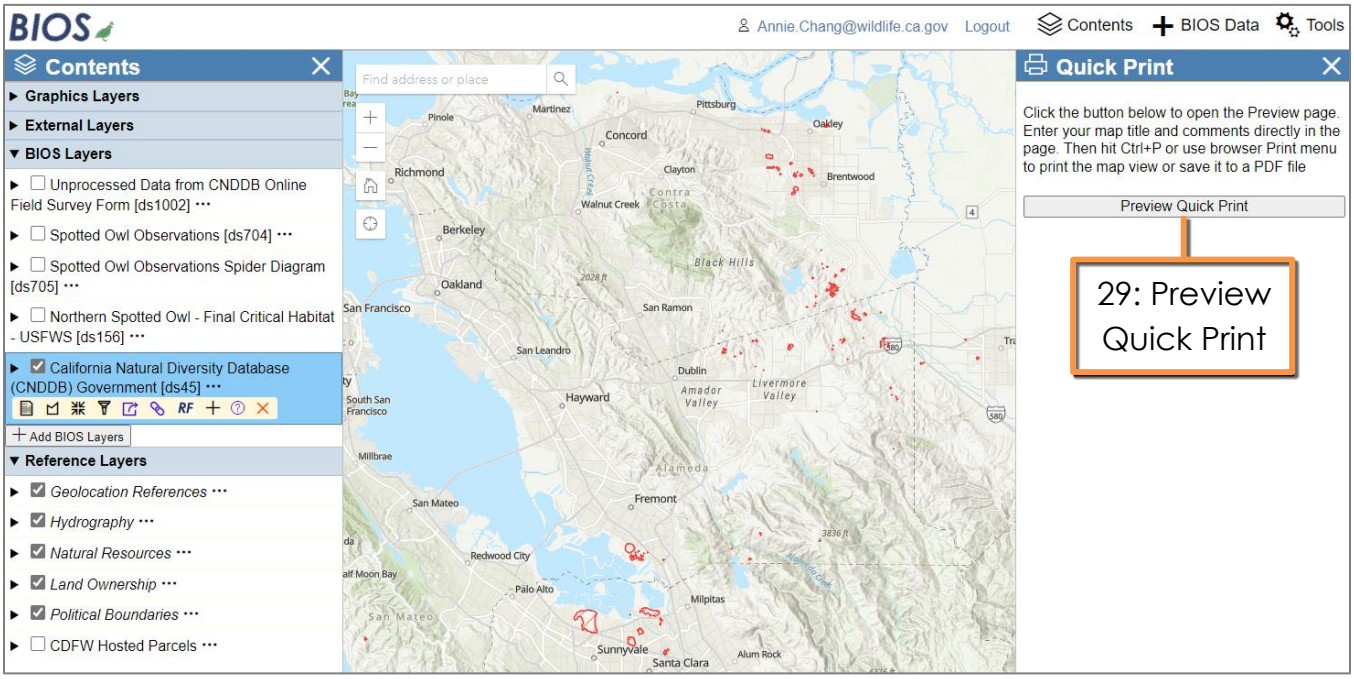
- **Show map with current element's selected occurrences (#)**: Opens BIOS, loads the CNDDB layer, and then zooms to a layer created from the selected occurrence(s) [27] of the currently selected element (occurrences checked in the Occurrences table). The number of occurrences selected is shown in parentheses.
- **Show map with currently displayed occurrence (#)**: This option is only seen when clicking on the BIOS tab while on the Occurrence Details Screen [28]. This option opens the BIOS data viewer, loads the CNDDB layer, and then zooms to a layer created from the occurrence that is currently displayed on the occurrence details screen.



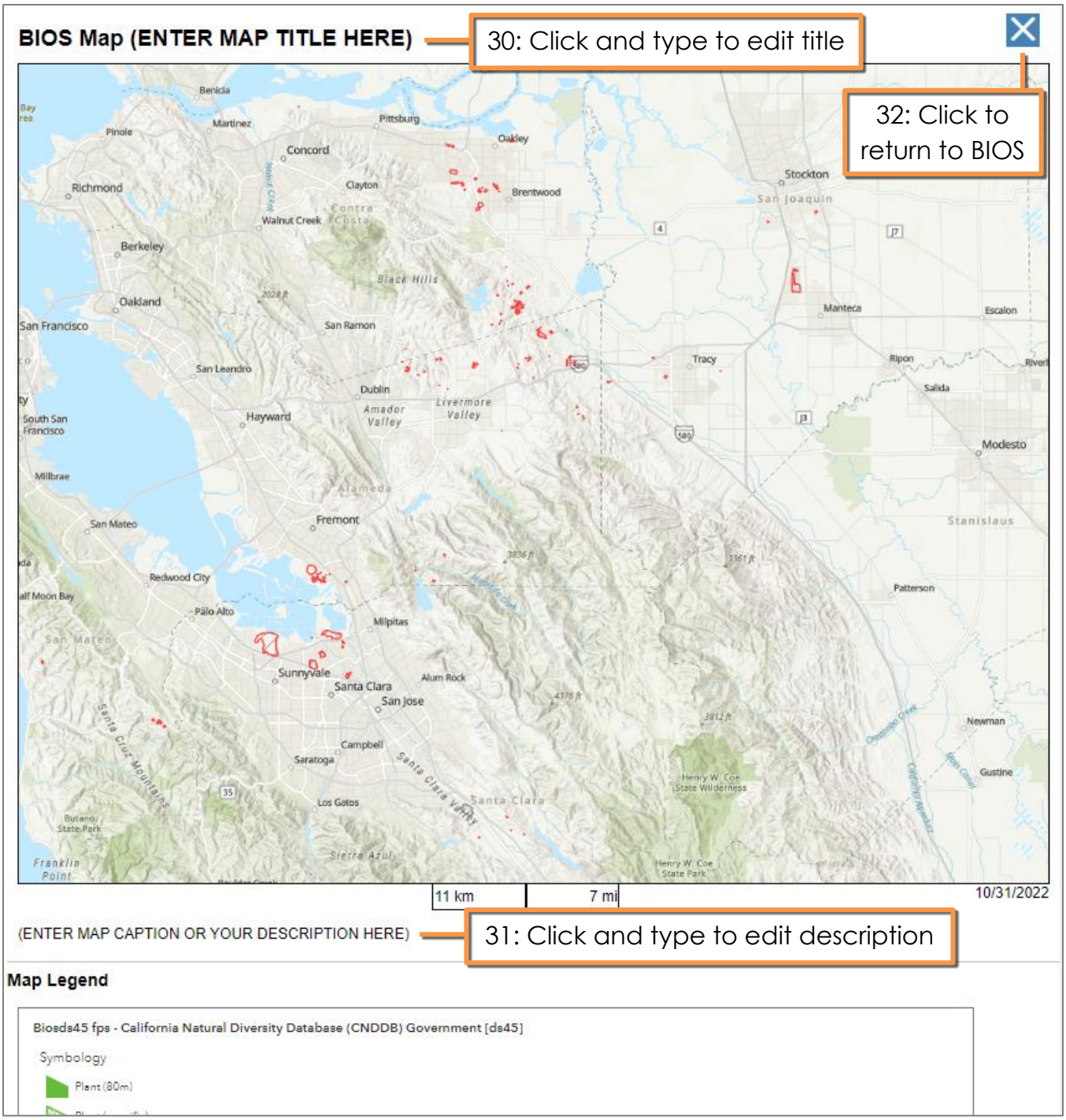
Please allow pop-ups for the BIOS browser window to open. For more information on how to work with the CNDDB data in RareFind, refer to our Rarefind 5 User Guide.

Create PDF of Map & Data

The Quick Print tool in BIOS allows you to print your current map view into a PDF. First, navigate to your area of interest, select an appropriate basemap, have the layers turned on that you are interested in showing on your map, and add any labels to your map (see the BIOS 6 User Guide for details on how to do this). Once you have the view and layers set up the way you like, go to the Tools menu and select Quick Print, and then Preview Quick Print from the menu that appears [29].



The preview window will appear over the map which includes a title, image of the current map extent (with currently visible layers), a map scale bar, a description, the current date, and the map legend. The title [30] and description [31] can be edited by first clicking on the text. Once edits have been made and you are ready to print, press CTRL+P on your keyboard or navigate to your browsers print function and select the option to print to PDF. Press the blue X button on the upper right-hand corner to return to BIOS [32].


BIOS Map (ENTER MAP TITLE HERE)
30: Click and type to edit title
32: Click to return to BIOS
Benicia
Martinez
Pittsburg
Pinole
Oakley
Concord
Richmond
Clayton
Brentwood
Stockton
San Joaquin
Walnut Creek
Contra Costa
Berkeley
Black Hills
Oakland
San Francisco
San Ramon
Manteca
Escalon
San Leandro
Tracy
Ripon
Dublin
Livermore Valley
Amador Valley
Salida
Hayward
South San Francisco
Modesto
Millbrae
Alameda
San Mateo
Fremont
Stanislaus
Redwood City
Patterson
Palo Alto
Milpitas
Sunnyvale
Santa Clara
Alum Rock
San Jose
Newman
Campbell
Saratoga
Gustine
Henry W. Coe State Wilderness
Los Gatos
Santa Clara Valley
Butano State Park
Sierra Azul
Franklin Point
Henry W. Coe State Park
11 km
7 mi
10/31/2022
(ENTER MAP CAPTION OR YOUR DESCRIPTION HERE)
31: Click and type to edit description
Map Legend
Biosds45 fps - California Natural Diversity Database (CNDDB) Government [ds45]
Symbology
Plant (80m)

Appendix 1: Conditional statements in BIOS 6

Conditional statements are used in a query, which is a way to investigate data. In BIOS 6, Conditional statements are used in the Select by Attributes tool. A conditional statement is comprised of three components: fields, operators, and values. The statement must follow a syntax (format) to be valid. More complex statements can be created by using connectors.

Fields

Fields are components that provide structure in a table. You may typically identify a field by looking at the header in a table. That header or field name should describe what data is contained in the column.

Operators

Operators are words or characters used to perform a task. In BIOS 6, you may use the following operators to generate a query:

Operator	Symbol	Description
Equals	=	Returns record(s) which equal a value
Not Equal	<>	Returns record(s) which do not equal a value
Less than	<	Returns record(s) which are less than a value
Less or Equal	<=	Returns record(s) which are less than or equal to a value
Greater than	>	Returns record(s) which are greater than a value
Greater or Equal	>=	Returns record(s) which are greater than or equal to a value
LIKE	LIKE '%%'	Used to find a record(s) with a portion of text, with a wildcard '%'
IN (List…)	IN ()	Returns record(s) that match a list of values
Is Null	IS NULL	Returns record(s) with a null value
Is Not Null	IS NOT NULL	Returns all record(s) except those with a null value
Is Not Blank	<>''	Return(s) all records which are not blank and not null

Values

Values are the data within the database, which is returned in response to your query.

Connectors

Connectors allow you to build complex queries by joining two or more conditional statements together.

Connector	Description
AND	Returns records where both statements are true
OR	Returns record(s) where either statement is true

Examples:

Example data:

ComName	Location	Number	Elevation_ft
Snowy egret	Carnegie SVRA		1850
Western toad	Carnegie SVRA	4	1725
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975
Mule deer	Stanislaus NF	6	4250
Barn owl	Stanislaus NF	11	1750

Example queries and results using various operators and connectors:

1. Equals
    a. Query: ComName = 'Western toad'
    b. Result:

ComName	Location	Number	Elevation_ft
Western toad	Carnegie SVRA	4	1725

2. Not Equal
    a. Query: Location <> 'Carnegie SVRA'
    b. Result:

ComName	Location	Number	Elevation_ft
Mule deer	Stanislaus NF	6	4250
Barn owl	Stanislaus NF	11	1750

3. Less Than
    a. Query: Elevation_ft < 1750
    b. Result:

ComName	Location	Number	Elevation_ft
Western toad	Carnegie SVRA	4	1725

4. Less or Equal
    a. Query: Elevation_ft <= 1750
    b. Result:

ComName	Location	Number	Elevation_ft
Western toad	Carnegie SVRA	4	1725
Barn owl	Stanislaus NF	11	1750

5. Greater Than
    a. Query: Number > 6
    b. Result:

ComName	Location	Number	Elevation_ft
Barn owl	Stanislaus NF	11	1750

6. Greater or Equal
    a. Query: Number >= 6
    b. Result:

ComName	Location	Number	Elevation_ft
Mule deer	Stanislaus NF	6	4250

Barn owl	Stanislaus NF	11	1750

7. Like
    a. Query: Location LIKE '%SVRA'
    b. Result:

ComName	Location	Number	Elevation_ft
Snowy egret	Carnegie SVRA		1850
Western toad	Carnegie SVRA	4	1725
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975

8. In (List…)
    a. Query: ComName IN ('Mule deer', 'Gophersnake')
    b. Result:

ComName	Location	Number	Elevation_ft
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975
Mule deer	Stanislaus NF	6	4250

9. Is Null
    a. Query: Number IS NULL
    b. Result:

ComName	Location	Number	Elevation_ft
Snowy egret	Carnegie SVRA		1850

10. Is Not Null
    a. Query: Number IS NOT NULL
    b. Result:

ComName	Location	Number	Elevation_ft
Western toad	Carnegie SVRA	4	1725
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975
Mule deer	Stanislaus NF	6	4250
Barn owl	Stanislaus NF	11	1750

11. Is Not Blank
    a. Query: Location <> ''
    b. Result: (all results returned)

ComName	Location	Number	Elevation_ft
Snowy egret	Carnegie SVRA		1850
Western toad	Carnegie SVRA	4	1725
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975
Mule deer	Stanislaus NF	6	4250
Barn owl	Stanislaus NF	11	1750

12. And
    a. Query: Location LIKE '%SVRA' AND Elevation_ft > 1850
    b. Result:

ComName	Location	Number	Elevation_ft
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975

13. Or Location LIKE '%SVRA' OR Elevation_ft > 1800
    a. Query:
    b. Result:

ComName	Location	Number	Elevation_ft
Snowy egret	Carnegie SVRA		1850
Western toad	Carnegie SVRA	4	1725
Mule deer	Carnegie SVRA	3	2150
Gophersnake	Carnegie SVRA	1	1975
Mule deer	Stanislaus NF	6	4250