Examples of how to use the Fisheries Resource Database

<u>Scenario 2:</u>
A location is being considered for a renewable energy facility. What types of fishing and landings occur within a specific number of blocks that overlap with the nominated site, and what is the annual variability?

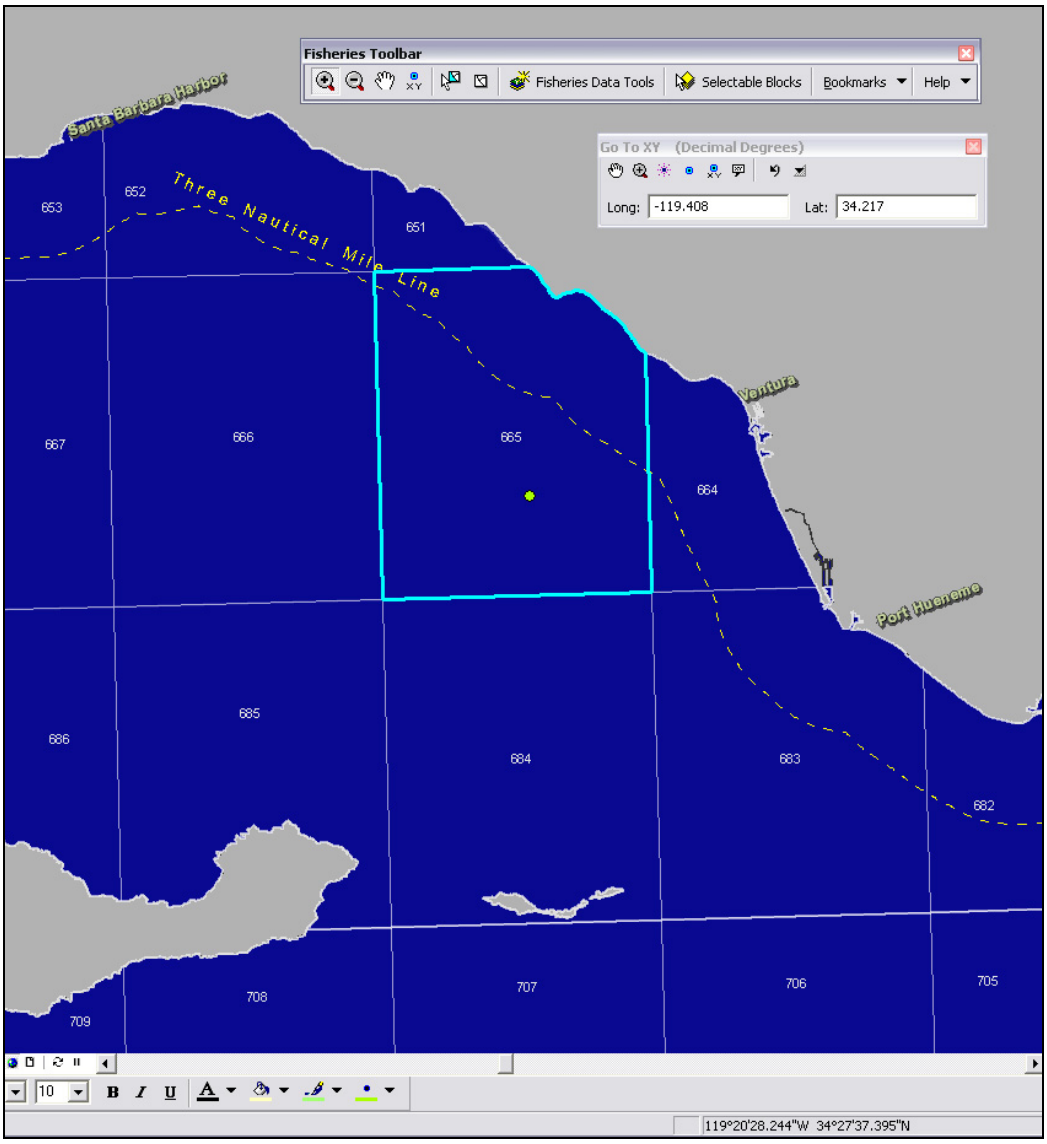
1. The geographic coordinates for the approximate center of the renewable energy site in decimal degrees is 34.217 N, -119.408 W. To find this location on the map, click on the "Go To XY" tool on the Fisheries Toolbar.

2. In the "Go To XY" dialog, make sure "Decimal Degrees" is selected from the small arrow drop-down and type in "-119.408" for the Longitude and "34.217" for the Latitude.

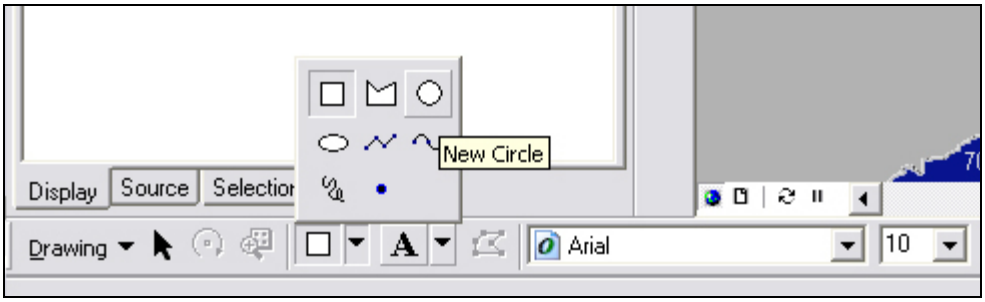
3. With the coordinates entered, click on the "Zoom To" button in the "Go To XY" dialog. This should zoom the map in slightly closer and briefly flash a point at the location. Click on the "Add Point" button to create a point graphic on the map at the coordinate location. Use the zoom tools on the Fisheries Toolbar to zoom in closer to the location. If you need to, you can click the "Zoom To" button again, or the "Flash" button to see the location again.

   (If you would like to delete a point you created and make one for a different location, choose the "Select Elements" tool from the main ArcMap™ toolbar, select the point, and delete it.)

4. The location falls inside fishing block 665, but could potentially impact fishing in surrounding blocks as well. We'd like to view commercial fishing data that occurs within a 10 mile radius of the site. Since our location is currently represented by a graphic point rather than a shapefile or feature class point, we cannot buffer it. However, we can create another shape to represent a circle with a 10 mile radius. First, right-click on an open area of the map and choose "Data Frame Properties…" Click on the "General" tab, then in the Units portion of the dialog, choose "Miles" in the "Display" drop-down menu. Click ok.

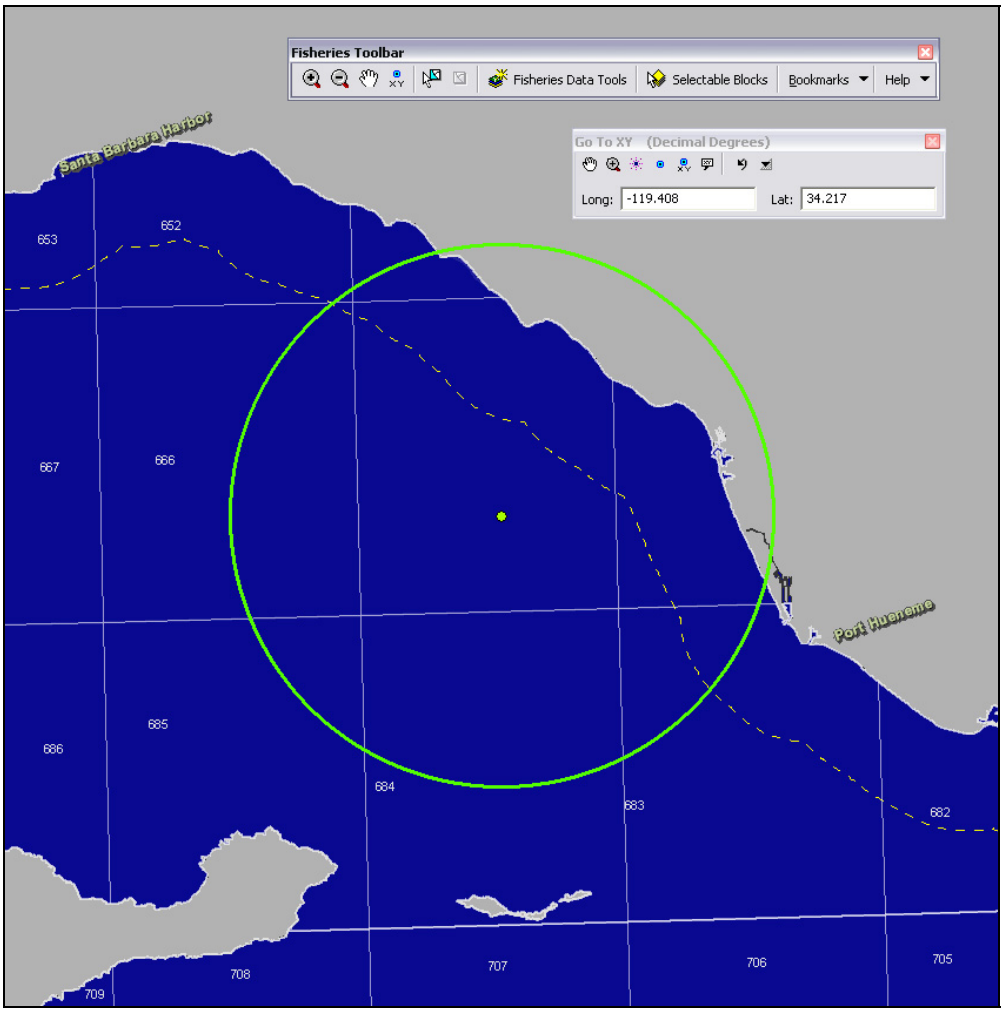


5. From the Draw toolbar in the lower right of the screen, choose a circle shape from the drawing menu. (If you do not see the Draw toolbar, you may need to right-click within the menu area of the screen and put a check next to "Draw" on the list).



6. Align the crosshair of the cursor with the point at our location and click-drag to begin drawing a circle. You'll notice that area, circumference, and radius of the circle are displayed in the lower left corner as you draw the circle. When the radius reaches approximately 10 miles, release the mouse button to create the circle.

   If you make a mistake, or you are not happy with the circle, simply click on the "Select Elements" tool on the Tools toolbar, click on the circle to select it, and press "Delete" on your keyboard. Then click on the circle icon on the Draw toolbar to start again. (Advanced users may prefer to create a point shapefile or feature class and buffer that point to be more precise.)



7. Once your circle is created, you can use it to select blocks that intersect with it. From the main menu, choose Selection > Select by Graphics. This automatically selects any features that touch the circle graphic. You should see that blocks 651, 652, 664, 665, 666, 683, 684, and 685 are now selected on the map (some of the block numbers may be obscured by the circle graphic).

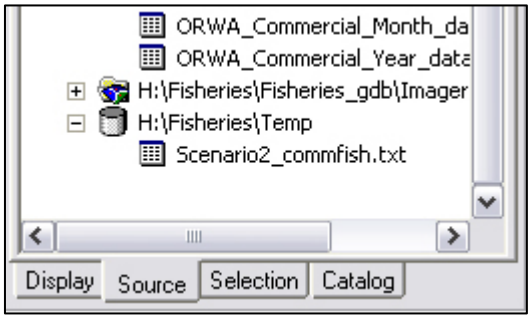
8. Once the blocks are selected, click the “Fisheries Data Tools” button on the Fisheries Toolbar.

9. In the Fisheries Data Tools dialog, choose “CA Commercial Fisheries (1972 – 2009)” from the drop-down menu. Click the “View Related Records” button (this may take a couple of minutes to process). A table window should appear showing all of the commercial fishing data for those eight blocks. (Alternatively, you could click the "Export to Excel®" button instead of "View Related Records" to simply work in the Microsoft Excel® environment rather than continue in ArcMap.)

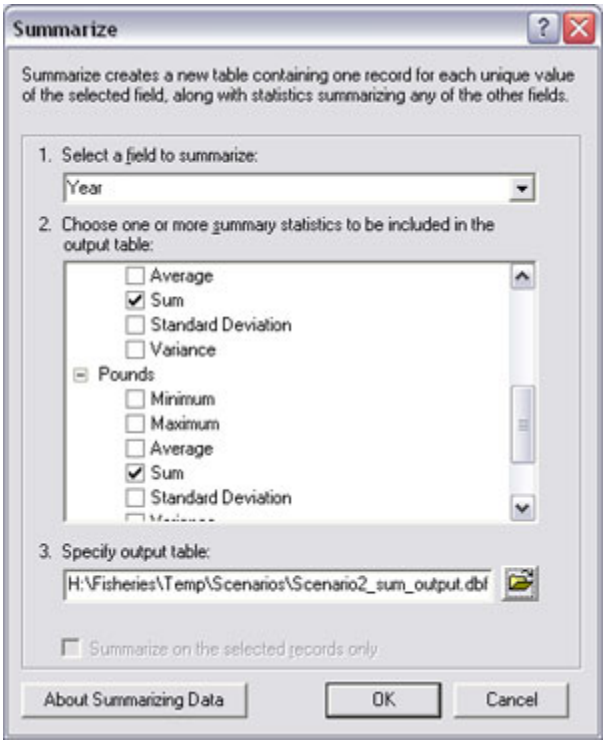
10. The total number of records is not immediately visible in the attribute window that opened for this virtual table until you click on the button. After you click the button, you see that there are 44,899 records associated with the selected area on the map.

11. This virtual table offers limited functionality for queries, so we will export it out as a new stand-alone table that we can work with further in ArcMap and Excel®. Click on the "Options" button near the bottom of the table window and choose "Export..." Click the “Browse” button to select a location for the output table. Select “Text File” as the type, give it a name, and click “Ok.” Click "Yes" to add the table to the map.

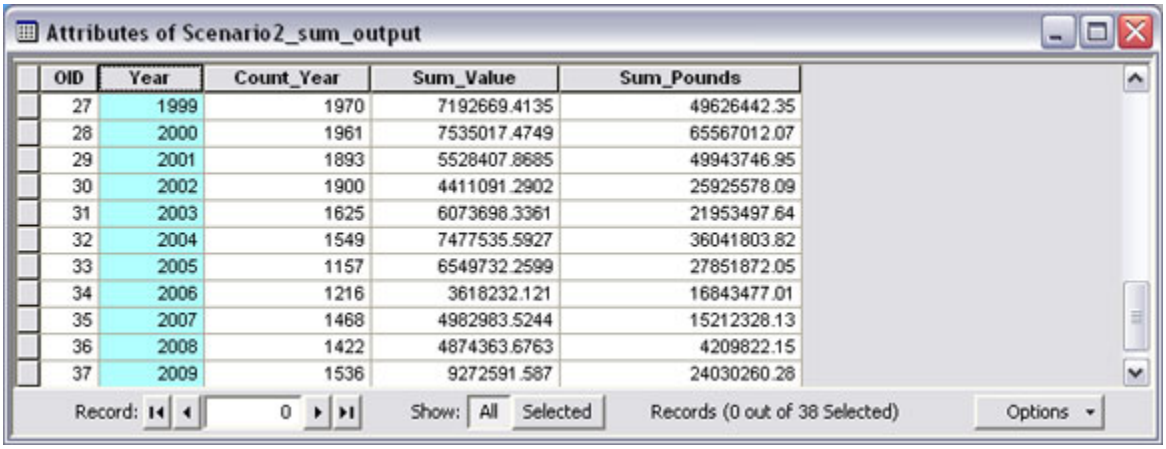
12. Your new table will not be visible in the "Display" section of ArcMap's Table of Contents. Click on the "Source" tab near the bottom of the Table of Contents window to see all the datasets currently loaded in the ArcMap document. Your new table should be in the list. Right click on the new table and choose "Open."



13. In ArcMap, we can perform a summary to see the overall annual variability of commercial fishing for our area of interest (this will create a new table). In the open table window, right-click on the “Year” column heading and choose “Summarize…” In the Summarize dialog, expand the options for “Value” and “Pounds.” Add a check next to "Sum" for each field. Choose an output location, name, and file type, and then click “OK.” When prompted to add the table to the map, click "Yes.”

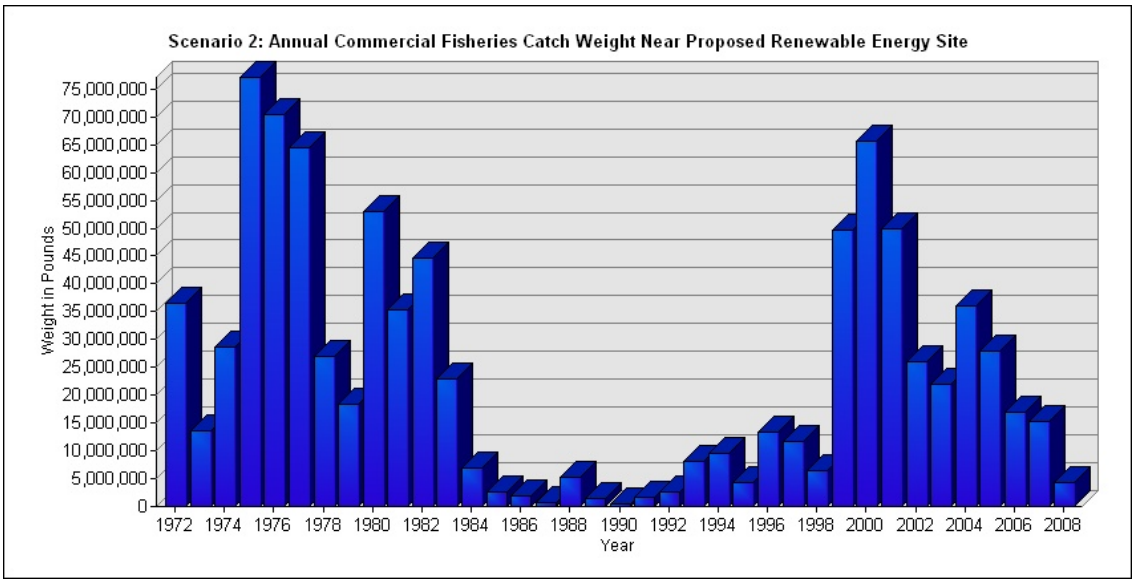


14. You should see your summary table in the Table of Contents. Right click on it and choose "Open." This table displays the total value and weight of fish caught for each year in all of selected blocks combined.



OID	Year	Count_Year	Sum_Value	Sum_Pounds
27	1999	1970	7192669.4135	49626442.35
28	2000	1961	7535017.4749	65567012.07
29	2001	1893	5528407.8685	49943746.95
30	2002	1900	4411091.2902	25925578.09
31	2003	1625	6073698.3361	21953497.64
32	2004	1549	7477535.5927	36041803.82
33	2005	1157	6549732.2599	27851872.05
34	2006	1216	3618232.121	16843477.01
35	2007	1468	4982983.5244	15212328.13
36	2008	1422	4874363.6763	4209822.15
37	2009	1536	9272591.587	24030260.28

15. To create a graph of this information, choose Tools > Graphs > Create… from the main menu. In the “Create Graph Wizard” window that opens, make sure your summary table is selected as the “Layer/Table.” You can then customize the various settings to create the style of graph of your choice. Once the graph is created, you can right-click on it and choose “Export…” to save it as an image.



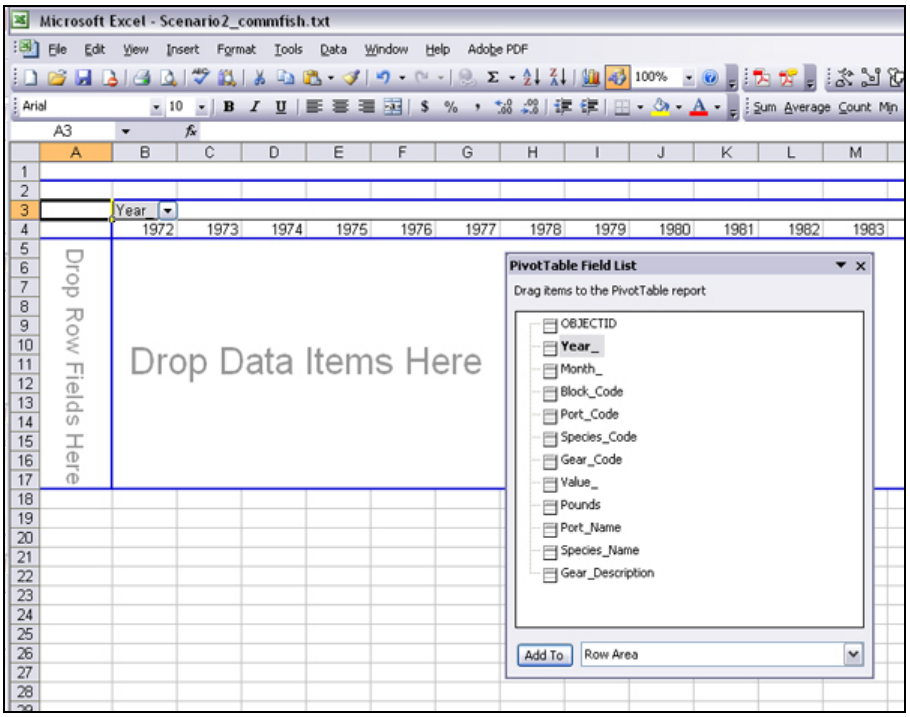
16. We can also perform a less generalized analysis of the data using Microsoft Excel® (the following steps are for Excel® 2003). In Excel®, choose File > Open… from the main menu. Choose "Text Files" for the file type and navigate to the first table you created that contains all of the fishing records for the area of interest. An import wizard dialog will appear. Choose "Delimited" as the original data type and click "Next." On the next screen, make sure "Comma" is checked and click "Next." Then click "Finish."

    Alternatively, if you still have the blocks selected in ArcMap, you can also choose Data Extraction Tools > Fisheries Data Tools from the Fisheries Toolbar. Pick the CA Commercial Fisheries database from the drop-down and click "Export to Excel®." This may take several minutes due to the large size of the CA Commercial Fisheries database. Also, this tool is only designed to work with Excel® 2003 and Excel® 2007. Once it loads into an open worksheet, save it before performing any further steps.

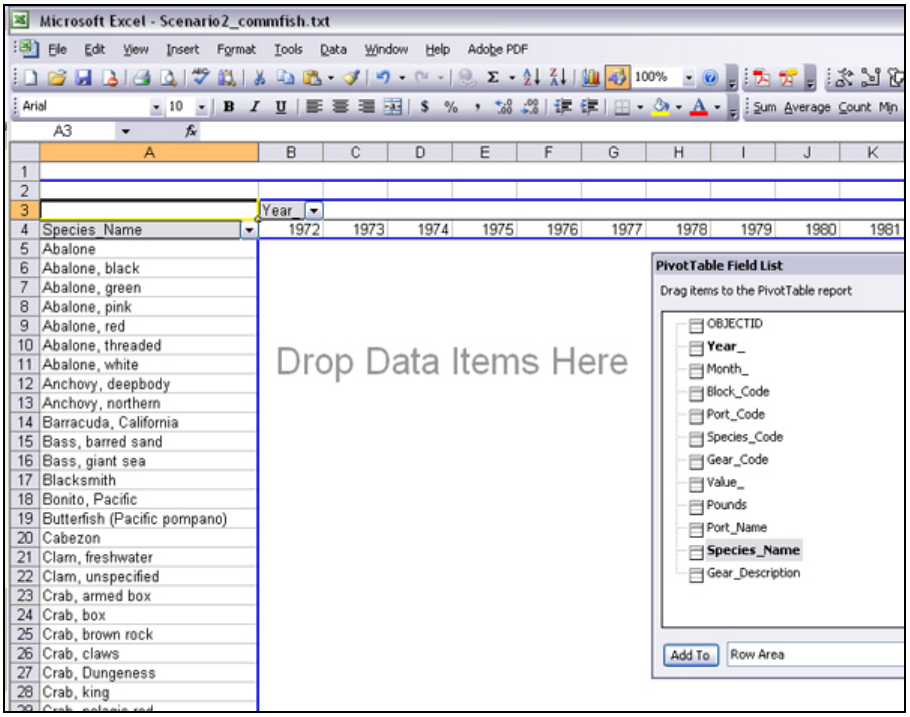
17. With your table open in Excel®, choose Data > PivotTable and PivotChart Report… to open the PivotTable wizard. In the wizard, make sure "Microsoft Office Excel list or database" and "PivotTable" are selected, and then click "Next."

18. The range of cells listed should automatically include your entire table, so click "Next." Make sure "New worksheet" is selected and click "Finish."

19. You should see a design view for the pivot table we want to create. From the "PivotTable Field List," drag the "Year" field to the box labeled "Drop Column Fields Here." A list of all years present appears in the first in the top row.

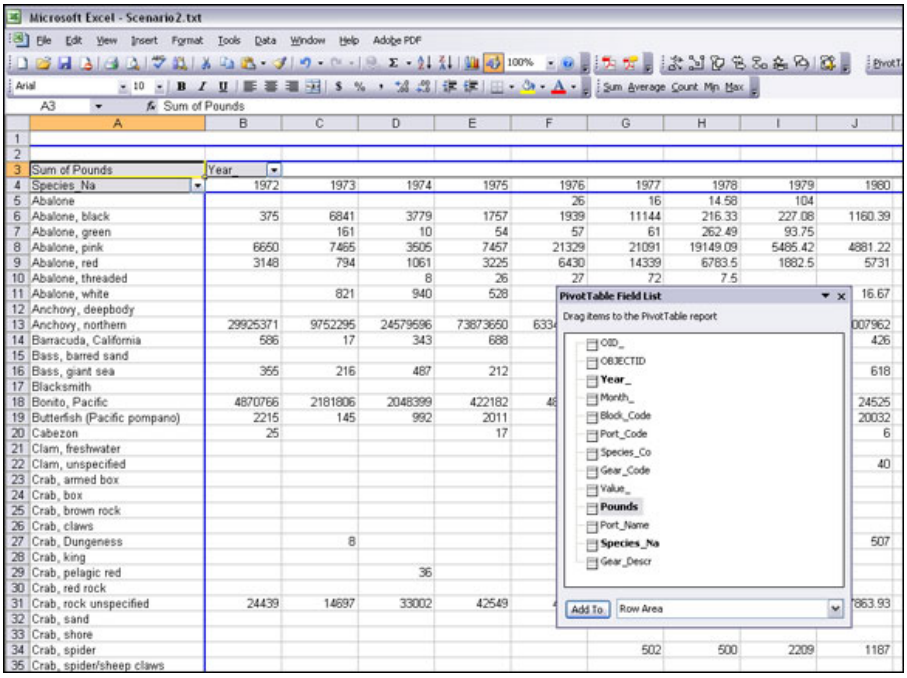


20. Next, drag the "Species_Name" field from the list over to the box labeled "Drop Row Fields Here." The names of each species present in the table appear in a row.



21. We can now choose a field that we would like to analyze by Species and Year. Again, let's look at the annual variability in catch weight. Choose "Pounds" from the list and

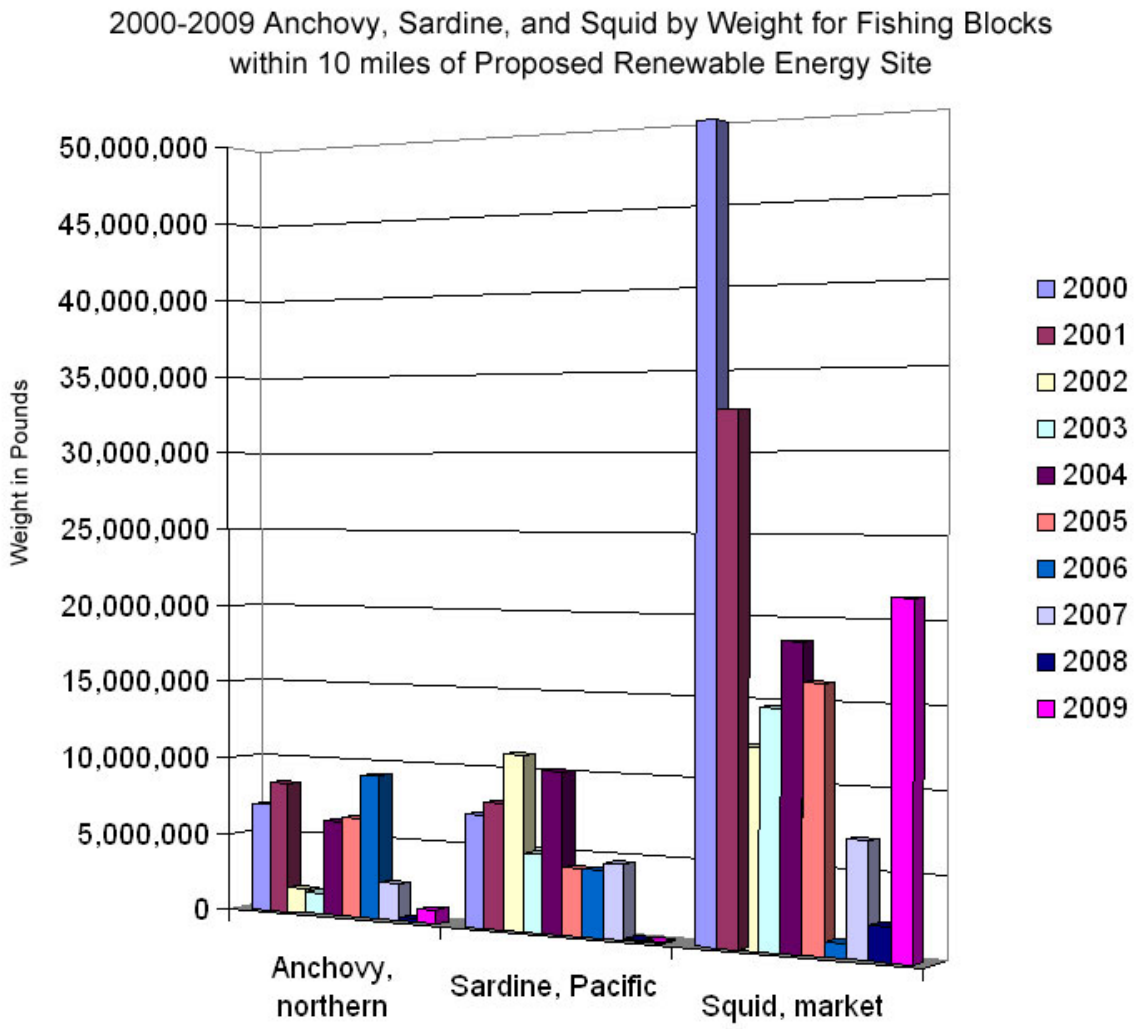
drop it into the box labeled “Drop Data Items Here.”



22. Although we have a table that shows annual changes in the amount of fish caught in our area of interest, it might be more meaningful to limit the results. Perhaps we are only interested in fish caught since 2000 in this area. To limit our table to those years, click on the “Year” drop-down list. Uncheck “(Show All)”, and then check each individual year from 2000 to 2009. The pivot table adjusts itself accordingly.

23. Displayed is a smaller range of years, but still a huge number of fish species in our list. Looking over the grand totals for weight of each fish, we see that market squid has by far the highest catch weight since 2000, with pacific sardine and northern anchovy coming in second and third. In the “Species_Name” drop-down list, uncheck “(Show All)”, and then check “Anchovy, northern”, “Sardine, Pacific”, and “Squid, market.”

24. Now we have a table with the three species of fish caught in the highest volume in our area of interest for the last 10 years. To compare these visually, click on the “Chart Wizard” button on the PivotTable toolbar (if the PivotTable toolbar is not visible, right-click in the toolbar area and put a check next to it in the list). A new worksheet is created with a chart automatically generated. To alter this chart, click on the “Chart Wizard” button once more to bring up the dialog window. From here, you can customize your chart type, elements, and appearance.



Additional options: In the pivot table, you can choose a different combination of fields depending on your interest, such as using "Gear_Description" instead of "Species_Name" or "Value" instead of "Pounds."

Also, rather than using the commercial fisheries data, you could perform these same steps using the CA Sport Fishing data or CA MRFSS/CRFS data (the fields included and names may vary between tables). If you are interested in fish count surveys, you can also make a selection of Reefs or Platforms on the map and export those data to Excel®.