

Graphing Your Data

HAWK WATCH STATISTICS

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This document supplements our article,
Analyzing Hawk Count Data: Graphs that show Year to Year Trends,
published in the [*HMANA Hawk Migration Studies*](#), September, 2003.

Table of Contents *(Click on Bookmark Tab on the left for links.)*

A. Creating the Graph	p.2
1. Selecting the File and Preparing the Data	
2. Selecting Data to be graphed	
3. Selecting Chart Type – XY(Scatter)	p.3
4. Checking Source Data	p.4
5. Chart Options	
6. Chart Location	
B. Amending the Graph	p.5
1. Sizing and Moving the Graph	
2. Changing Data	
3. Changing Titles	
4. Changing Color or Size of Data Points or Connecting Lines	
5. Printing the Graph	
C. Assignment	p.6

(For data entry, manipulation, and sorting, please see [Introductory Excel.](#))

We welcome your comments, criticism, or questions. [Contact the Authors](#)

(This document may be browsed on the web or printed for use at your computer.)

A. Creating the Graph

1. Selecting the File and Preparing the Data.

- a) Open Excel and the file with your data. Or, download the practice file which we will use in this lesson: [practice.xls](#). (Right click and save.)
- b) Identify your independent variable (x axis) and check to see that the data is sorted. For our example the independent variable is the year and we will check that the years are sequential. (This step can be omitted if you do not choose the sub-type that connects data points by a line. See 3c.)


2. Selecting Data to be graphed.

- a) If the data occurs in adjacent columns, **highlight the two columns of data**, including the column headings.
- b) If the data occurs in columns that are not adjacent, highlight the first column. Then, while holding the Ctrl key, highlight the second column.
- c) For the purposes of demonstration, we have selected to graph the Sharp-shinned Hawk year-to-year data for Fire Island. We need the year and the SS count. These are not located in adjacent columns on the table, so we need to use the Ctrl key.

FIRE ISLAND YEARLY SUMMARIES 1982-2002

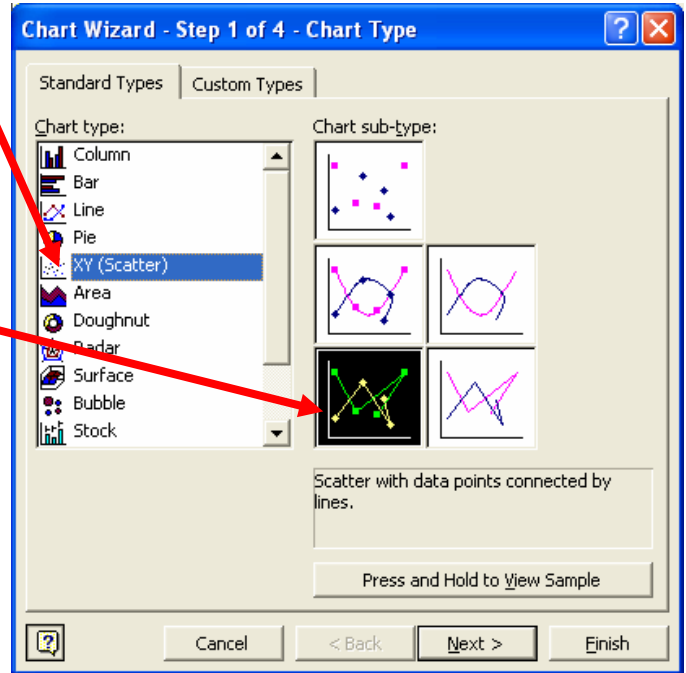
YEAR	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	U	TH	HRS	DAYS	Range	Reg	Coverage
1982	49	0	65	435	1	0	0	1	0	0	0	1204	226	30	15	2026	86	14			
1983	52	0	78	312	8	0	0	1	2	0	0	989	497	39	43	2021	213	33	9/15 - 10/20		
1984	108	0	151	676	8	0	0	1	0	0	0	999	491	53	31	2518	212	31	9/16 - 10/16		
1985	167	1	239	1284	6	0	0	1	0	0	0	1613	1027	40	30	4408	260	37	9/11 - 10/20		
1986	135	1	252	1171	23	0	0	1	0	0	0	1851	1093	110	35	4672	286	42	9/9 - 10/20		
1987	258	1	175	841	16	0	0	0	0	0	0	3245	1181	169	10	5896	287	42	9/10 - 10/20		
1988	301	2	207	602	3	0	0	0	0	1	0	2536	1342	99	35	5128	334	46	9/10 - 10/30		
1989	267	0	237	1036	6	0	0	1	0	1	0	2214	1348	199	16	5325	362	46	9/9 - 10/25		
1990	235	0	191	530	9	1	0	0	0	0	0	1538	1118	249	32	3903	427	55	9/7 - 10/31		
1991	278	0	131	639	10	0	0	1	2	1	0	2051	1092	168	33	4406	445	59	9/6 - 10/30		
1992	257	5	153	857	28	0	0	0	1	2	1	2311	1203	114	36	4968	483	60	9/9 - 11/8		
1993	321	3	328	753	34	4	2	2	1	0	0	3271	1249	112	24	6104	429	57	9/8 - 11/7		
1994	227	4	391	712	36	0	0	0	0	1	0	3523	1638	78	44	6654	480	65	9/10 - 11/13		
1995	350	0	200	311	13	0	0	1	2	0	0	1121	1084	162	29	3273	472	65	9/9 - 11/13		
1996	241	3	98	291	18	1	0	0	1	0	0	982	1123	171	30	2946	411	59	9/11 - 11/12		
1997	237	2	133	464	17	0	0	0	2	0	0	1229	851	148	13	3096	424	66	9/11 - 11/6		
1998	409	6	328	474	11	0	0	0	1	0	0	1598	1600	214	28	4669	470	65	9/7 - 11/9		
1999	390	5	228	501	24	1	0	0	1	3	0	1503	1581	253	35	4504	340	51	9/11 - 11/7		
2000	325	4	208	273	8	5	1	0	1	1	0	1222	888	148	32	3116	445	65	9/5 - 11/8		
2001	383	4	249	561	32	7	1	0	1	1	0	888	1382	185	27	3722	471	68	9/10 - 11/12		
2002	287	1	169	355	22	1	0	0	3	0	0	1105	1415	169	15	3543	399	55	9/5 - 11/8		

3. Selecting Chart Type – XY (Scatter)

a) With the data highlighted, click the **CHART Button**  on the standard bar to start the Chart Wizard. Or, using the top menu, select: Insert/Chart

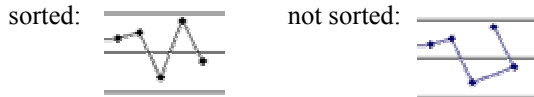
b) Select **XY(Scatter)** as the graph type, and click the PRESS AND HOLD button to get your first look. You should see the individual data points. (If the data was not highlighted, you will see a blank chart.)

c) Release the hold and select the **chart sub-type** (right side, lower left option) which is the “scatter with **data points connected by lines.**” Click the PRESS AND HOLD button to view this sub-type. Select the sub-type that you prefer.



Notes: 1) **XY scatter is the only chart option that correctly scales the horizontal axis.** The other chart types will label the x axis using your data in the sequence in which it occurs, resulting in a chart that is not a graph. The XYscatter option does not require sorting to correctly plot points and compute regressions lines.

2) However, if you opt for the **line sub chart** and your data is not sorted, the connecting lines may go backwards.



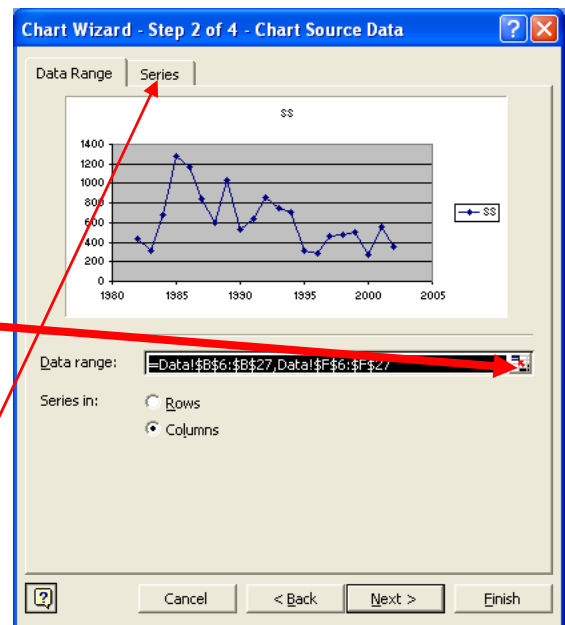
d) Click NEXT to proceed.

4. Checking that **Source Data** is correct.

a) If the graph in the window looks correct, with years along the horizontal axis and counts along the vertical axis, then you can proceed to step 5. Otherwise, continue here.

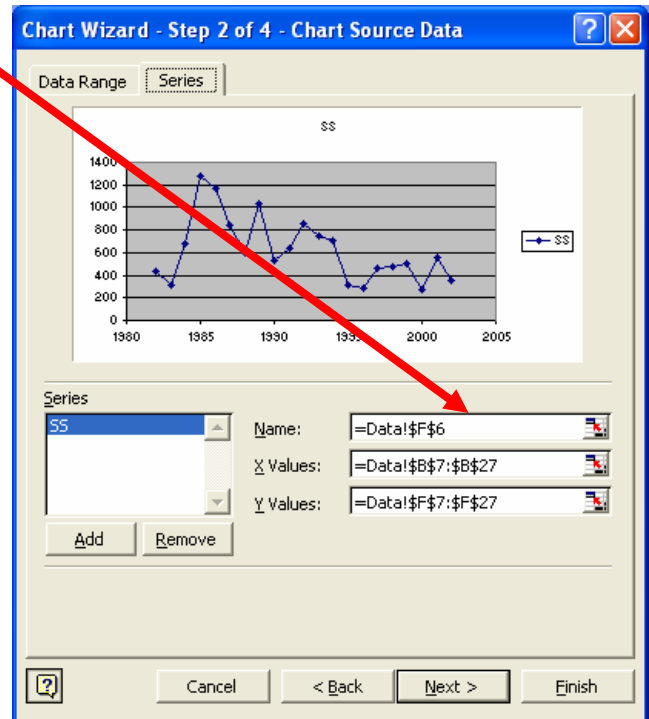
b) In the DATA RANGE box, click the little tricolored square on the right side. This brings you to the data, and gives you a chance to change your selected data by highlighting different cells. Click the right square to get back to the chart wizard.

c) Click on the SERIES tab.



d) Check that the NAME box references the cell with the heading for the dependent variable. If not, click the right square, and highlight the correct cell. Click the right square again to return to the wizard. For the practice file this is cell F6 which contains the heading 'SS'. In the NAME box this is written as: =Data!\$F\$6.

e) Check that the X Values box contains the array for your independent variable (years). For the practice file the X Value box should contain =Data!\$B\$7:\$B\$27. The Y Values box should contain the array for your dependent variable (SS count), which is: =Data!\$F\$7:\$F\$27 for the practice file. If not, then click on the right square and highlight the correct arrays. For the practice file, use B7 to B27 for the X Values and F7 to F27 for the Y Values. Remember that clicking on the right square will return you to the chart wizard.



f) Click NEXT.

5. Chart Options:

a) Click the TITLES tab. In the TITLES box, type a good title for your graph. For the practice file, use: Sharp-shinned Hawks, Fire Island, NY. Also enter 'Year' as the X axis title and 'Count' as the Y axis title.

b) Click on the LEGEND TAB. Since our graph has only one data series and doesn't need a legend, remove the check from the SHOW LEGEND box. The change is immediately shown.

c) Other options should already be selected: values on the AXES, major Y axis gridlines, and no data labels. You should try each of these so you are familiar with them.

d) Click NEXT.



6. **Chart Location:** You may choose to place the graph in the same sheet as the data or on a separate sheet. If you choose a new sheet, the label on the tab (bottom of the screen) for the new sheet will most likely be Chart1. You can change the label by right clicking on the label and renaming it. We will locate the graph on the same sheet for now, so we can see any immediate changes.

B. Amending the Graph.

1. Sizing and Moving the graph

- a) Click anywhere on the graph to select it. Move the cursor over the lower right corner square. When the cursor changes to a double arrow, click and drag the graph to make it smaller. (This retains a better proportion than using a box in the middle of a side and changing the width or height separately.)
- b) Click and drag the graph to a position where you like it.

2. Changing data.

- a) Suppose that the count for 1989 was incorrectly typed and should be 1236 instead of 1036. Change the 1036 in cell F14 to 1236, keeping your eye on the graph. If you didn't see a change, click the undo button  on the standard bar, then the redo button . You can repeat this to watch the change. Neat, isn't it?
- b) Now try deleting the 1036. This breaks the line graph and looks wrong. If we had selected the scattergram without connecting lines, the point would be missing, but the graph would still look correct. So, if you are adamantly in favor of a graph with connecting lines and you have no data for 1989, you will need to remove the whole 1989 row and sort the data so there are no missing numbers. The connecting lines do show the ups and downs of the SS numbers from year to year more clearly than not connecting the lines. (The authors are split on this issue, with Drew in favor of lines and Trudy preferring no lines.)

3. Changing titles

- a) The title for the dependent variable really isn't very descriptive. Let's change it from 'Count' to 'Number of Migrants'. Click on the title once, and then once again. It will change orientation, and you can edit it directly. Or, right click on the graph and select Chart Options/Title.
- b) Change the size and font of any title by selecting the title and using the menu for the changes, or by double clicking on the title and selecting format options.

4. Changing color or size of data points or connecting lines

- a) Position the cursor over one of the data points and right click. From the menu that appears, select Format Data Series/Patterns. Here you can select different colors, thicknesses (weights), and styles for both the points and the lines.

5. Printing the Graph

- a) Click on the graph to highlight the whole thing.
- b) From the menu select: File / Print / Preview
- c) Click the MARGIN button , and resize the chart on the page. Then PRINT.

C. Assignment:

Either: Cover the hawk watch at the Fire Island for 2 days,

Or: Prepare a graph for Merlins that is similar to the one we just did for Sharpies.

And: Let us know who you are and how you are doing: [Contact the Authors](#)