

Tips for Data Manipulation: Tutorial

Information to get started:

- The lesson below contains step-by-step instructions and "snapshots" of what each step looks like when carried out in a Microsoft Excel workbook. Blue shading of information in the Excel illustrations denotes changes made from the previous step. Dots placed in three consecutive rows indicate that a portion of data is hidden from sight.
 - You can download an Excel workbook containing the complete data set by clicking on the "Download Data" link below. It contains each calculation step on a separate worksheet. To move between steps, click on the tabs at the bottom of the excel window.
 - When you download the file, it may open in your browser window. You may wish to use the "save as" function to save the file to a local drive and then reopen it in Excel. This will make it easier to flip between the online lesson and the example workbook.
 - Finally, we want to remind you that the techniques explained on this site are statistically based; therefore results must be viewed as predictions and not as facts. Please use the techniques and the information obtained from them responsibly!
-

Download Data

Step 1: Copy Daily Streamflow Data from USGS web site into Excel Spreadsheet

- Go to <http://oregon.usgs.gov>
- Select Historical Water Data
- Select Surface Water
- Select Streamflow
- Check box under Site Identifier for Site Name and Submit
- Type in Alsea under Site Name and select match any part and Submit
- Select gage near TIDEWATER (14306500)
- In the Retrieve data from boxes enter the date range of "1990-10-01" to "2000-10-01"
- Select Tab-separated data and Display in browser and Submit
- Select the entire data set to copy
- Paste Special as text (this will separate the data into columns)

Microsoft Excel - Topystep1

File Edit View Insert Format Tools Data Window Help

AE21

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	USGS	14306500	10/1/90	83											
2	USGS	14306500	10/2/90	85											
3	USGS	14306500	10/3/90	93											
4	USGS	14306500	10/4/90	96											
5	USGS	14306500	10/5/90	101											
6	USGS	14306500	10/6/90	106											
7	USGS	14306500	10/7/90	94											
8	USGS	14306500	10/8/90	87											
9	USGS	14306500	10/9/90	84											
10	USGS	14306500	10/10/90	82											
11	USGS	14306500	10/11/90	83											
12	USGS	14306500	10/12/90	94											
13	USGS	14306500	10/13/90	99											
14	USGS	14306500	10/14/90	97											
15	USGS	14306500	10/15/90	130											
16	USGS	14306500	10/16/90	177											
17	USGS	14306500	10/17/90	152											
18	USGS	14306500	10/18/90	241											
19	USGS	14306500	10/19/90	360											
20	USGS	14306500	10/20/90	209											
21	USGS	14306500	10/21/90	272											
22	USGS	14306500	10/22/90	575											
23	USGS	14306500	10/23/90	315											
24	USGS	14306500	10/24/90	220											
25	.	.	.	.							
26	.	.	.	.							
27	.	.	.	.							
3653	USGS	14306500	9/27/00	83											
3654	USGS	14306500	9/28/00	82											
3655	USGS	14306500	9/29/00	83											
3656	USGS	14306500	9/30/00	86											
3657															

Sheet1 / Sheet2 / Sheet3

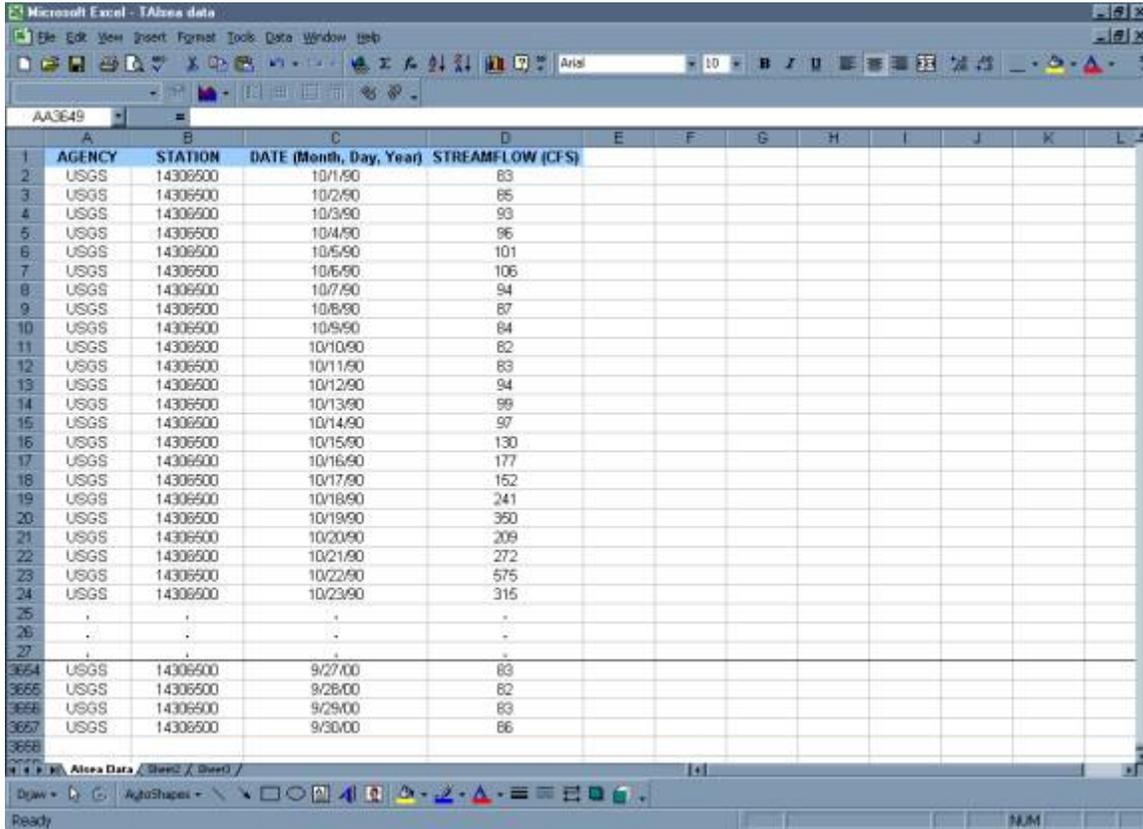
Ready

Step 2: Organize spreadsheet with data

- Eliminate extraneous data (i.e., column E)
- Add titles to remaining Four columns

NOTE: Data are listed in water years, hence 10/1/1990– 9/30/1990 is Water Year 1990.

- Label Sheet



The screenshot shows a Microsoft Excel spreadsheet titled "Alsea Data". The spreadsheet has four columns: AGENCY, STATION, DATE (Month, Day, Year), and STREAMFLOW (CFS). The data is organized into two groups. The first group contains 24 rows of data for the year 1990, with dates from 10/1/90 to 10/23/90. The second group contains 4 rows of data for the year 2000, with dates from 9/27/00 to 9/30/00. The streamflow values range from 62 to 575 CFS.

	AGENCY	STATION	DATE (Month, Day, Year)	STREAMFLOW (CFS)
1	USGS	14306500	10/1/90	83
2	USGS	14306500	10/2/90	85
3	USGS	14306500	10/3/90	93
4	USGS	14306500	10/4/90	96
5	USGS	14306500	10/5/90	101
6	USGS	14306500	10/6/90	106
7	USGS	14306500	10/7/90	94
8	USGS	14306500	10/8/90	87
9	USGS	14306500	10/9/90	84
10	USGS	14306500	10/10/90	82
11	USGS	14306500	10/11/90	83
12	USGS	14306500	10/12/90	94
13	USGS	14306500	10/13/90	99
14	USGS	14306500	10/14/90	97
15	USGS	14306500	10/15/90	130
16	USGS	14306500	10/16/90	177
17	USGS	14306500	10/17/90	152
18	USGS	14306500	10/18/90	241
19	USGS	14306500	10/19/90	350
20	USGS	14306500	10/20/90	209
21	USGS	14306500	10/21/90	272
22	USGS	14306500	10/22/90	575
23	USGS	14306500	10/23/90	315
24	USGS	14306500	10/23/90	315
25	.	.	.	.
26	.	.	.	.
27	.	.	.	.
3654	USGS	14306500	9/27/00	83
3655	USGS	14306500	9/28/00	82
3656	USGS	14306500	9/29/00	83
3657	USGS	14306500	9/30/00	66
3658				

Step 3: Obtain Monthly Averages

MANUALLY

- In fifth column, use the average function in Excel to obtain the average for each month for the first four years.

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	AGENCY	STATION	DATE (Month, Day, Year)	STREAMFLOW (CFS)	MONTHLY AVERAGE										
1	USGS	14308500	10/1/90	83											
2	USGS	14308500	10/2/90	85											
3	USGS	14308500	10/3/90	93											
4	USGS	14308500	10/4/90	96											
5	USGS	14308500	10/5/90	101											
6	USGS	14308500	10/6/90	106											
7	USGS	14308500	10/7/90	94											
8	USGS	14308500	10/8/90	87											
9	USGS	14308500	10/9/90	84											
10	USGS	14308500	10/10/90	82											
11	USGS	14308500	10/11/90	83											
12	USGS	14308500	10/12/90	84											
13	USGS	14308500	10/13/90	89											
14	USGS	14308500	10/14/90	97											
15	USGS	14308500	10/15/90	130											
16	USGS	14308500	10/16/90	177											
17	USGS	14308500	10/17/90	152											
18	USGS	14308500	10/18/90	241											
19	USGS	14308500	10/19/90	350											
20	USGS	14308500	10/20/90	209											
21	USGS	14308500	10/21/90	272											
22	USGS	14308500	10/22/90	575											
23	USGS	14308500	10/23/90	315											
24	USGS	14308500	10/24/90	220											
25	USGS	14308500	10/25/90	195											
26	USGS	14308500	10/26/90	352											
27	USGS	14308500	10/27/90	315											
28	USGS	14308500	10/28/90	323											
29	USGS	14308500	10/29/90	431											
30	USGS	14308500	10/30/90	999											
31	USGS	14308500	10/31/90	1400	256										
32	USGS	14308500	11/1/90	927											
33	-	-	-	-	-										
34	-	-	-	-	-										
35	-	-	-	-	-										
36	-	-	-	-	-										
1484	USGS	14308500	9/29/94	65											
1485	USGS	14308500	9/30/94	75	81										
1486	USGS	14308500	10/1/94	78											
1487	USGS	14308500	10/2/94	73											

Copy the Monthly Average Column for the first four years and paste to rest of data set. This will compute the monthly averages for the remaining years.

Microsoft Excel - Tmonthstep2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	AGENCY	STATION	DATE (Month, Day, Year)	STREAMFLOW (CFS)	MONTHLY AVERAGE										
2	USGS	14308500	10/1/94	83											
3	USGS	14308500	10/2/94	86											
4	USGS	14308500	10/3/94	93											
5	.	.	.	.	.					
6	.	.	.	.	.					
7	.	.	.	.	.					
1485	USGS	14308500	9/30/94	75	81										
1486	USGS	14308500	10/1/94	78											
1487	USGS	14308500	10/2/94	73											
1488	USGS	14308500	10/3/94	69											
1489	USGS	14308500	10/4/94	63											
1490	USGS	14308500	10/5/94	60											
1491	USGS	14308500	10/6/94	60											
1492	USGS	14308500	10/7/94	59											
1493	USGS	14308500	10/8/94	58											
1494	USGS	14308500	10/9/94	58											
1495	USGS	14308500	10/10/94	58											
1496	USGS	14308500	10/11/94	58											
1497	USGS	14308500	10/12/94	58											
1498	USGS	14308500	10/13/94	59											
1499	USGS	14308500	10/14/94	74											
1500	USGS	14308500	10/15/94	90											
1481	USGS	14308500	10/16/94	87											
1482	USGS	14308500	10/17/94	77											
1483	USGS	14308500	10/18/94	72											
1484	USGS	14308500	10/19/94	71											
1485	USGS	14308500	10/20/94	70											
1486	USGS	14308500	10/21/94	82											
1487	USGS	14308500	10/22/94	98											
1488	USGS	14308500	10/23/94	87											
1489	USGS	14308500	10/24/94	78											
1490	USGS	14308500	10/25/94	75											
1491	USGS	14308500	10/26/94	119											
1492	USGS	14308500	10/27/94	3170											
1493	USGS	14308500	10/28/94	2170											
1494	USGS	14308500	10/29/94	837											
1495	USGS	14308500	10/30/94	523											
1496	USGS	14308500	10/31/94	1130	314										
1497	USGS	14308500	11/1/94	5530											

- Organize Monthly Data by Year

Microsoft Excel - Tmonthstep3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	YEAR	MONTH	STREAMFLOW (CFS)			WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	
2	1990	10	256			1991	256	1553	1554	1905	1968	2467	1889	869	
3	1990	11	1553			1992	92.4	721	1464	1760	2526	774	1303	503	
4	1990	12	1554			1993	124	878	2478	2371	921	2456	2958	1341	
5	1991	1	1905			1994	100	108	1389	1533	1969	1486	1208	410	
6	1991	2	1968			1995	314	2254	3925	4823	3646	3029	1784	880	
7	1991	3	2467			1996	327	2412	5250	4745	6909	1386	2012	1262	
8	1991	4	1969			1997	323	2307	6977	4115	2127	3035	1314	746	
9	1991	5	889			1998	1291	2039	2085	4233	3675	2533	1055	738	
10	1991	6	413			1999	170	2782	5507	4848	6750	2854	1441	962	
11	1991	7	200			2000	133	2189	3879	3535	2903	1620	650	961	
12	1991	8	119												
13	1991	9	83												
14															
15	1991	10	92.4												
16	1991	11	721												
17	1991	12	1464												
18	1992	1	1760												
19	1992	2	2526												
20	1992	3	774												
21	1992	4	1303												
22	1992	5	503												
23	1992	6	209												
24	1992	7	116												
25	.	.	.												
26	.	.	.												
27	.	.	.												
130	2000	6	602												
131	2000	7	229												
132	2000	8	125												
133	2000	9	113												
134															

IF USING A USGS GAGE, MONTHLY STATISTICS ARE ALREADY CALCULATED

- Go to <http://oregon.usgs.gov>
- Select Historical Water Data
- Select Surface Water
- Select Statistics (Monthly)
- Check box under Site Identifier for Site Name and Submit
- Type in Alsea under Site Name and select match any part and Submit
- In the Retrieve data from boxes enter the date range of "1990-10-01" to "2000-10-01"
- Select Tab-separated data and Display in browser and Submit
- Select gage at TIDEWATER (14306500)

** Data included in this table are for all of the Alsea gages, be absolutely certain that you are using the data for your desired gage (in this case 14306500)

- Select Data Set for desired gage to copy
- Paste Special as text (this will separate the data into columns)

Microsoft Excel - Trmonthstep3

File Edit View Insert Format Tools Data Window Help

Address: A10

Sheet1

YEAR	MONTH	STREAMFLOW (CFS)	STREAMFLOW (CFS)													
			WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY					
1990	10	256	1991	256	1553	1554	1905	1968	2467	1889	689					
1990	11	1553	1992	92.4	721	1464	1760	2526	774	1303	503					
1990	12	1554	1993	124	878	2478	2371	921	2496	2958	1341					
1991	1	1905	1994	100	108	1389	1533	1969	1496	1208	410					
1991	2	1968	1995	314	2254	3925	4823	3646	3029	1784	680					
1991	3	2467	1996	327	2412	5250	4745	6909	1386	2012	1262					
1991	4	1889	1997	323	2307	6977	4115	2127	3035	1314	746					
1991	5	689	1998	1291	2039	2085	4233	3675	2533	1055	738					
1991	6	413	1999	170	2782	5507	4848	6750	2954	1441	962					
1991	7	200	2000	133	2188	3879	3535	2903	1620	650	961					
1991	8	119														
1991	9	83														
1991	10	92.4														
1991	11	721														
1991	12	1464														
1992	1	1760														
1992	2	2526														
1992	3	774														
1992	4	1303														
1992	5	503														
1992	6	209														
1992	7	116														
2000	6	602														
2000	7	229														
2000	8	125														
2000	9	113														

monthly data / Sheet2 / Sheet3

Ready

Microsoft Excel - Trmonthstep3

File Edit View Insert Format Tools Data Window Help

Address: A10

Sheet1

STREAMFLOW (CFS)												
WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1991	256	1553	1554	1905	1968	2467	1889	689	413	200	119	83
1992	92.4	721	1464	1760	2526	774	1303	503	209	116	71.8	82.6
1993	124	878	2478	2371	921	2496	2958	1341	1053	346	173	105
1994	100	108	1389	1533	1969	1496	1208	410	332	151	89.1	80.8
1995	314	2254	3925	4823	3646	3029	1784	680	402	188	109	123
1996	327	2412	5250	4745	6909	1386	2012	1262	493	224	120	122
1997	323	2307	6977	4115	2127	3035	1314	746	443	203	128	262
1998	1291	2039	2085	4233	3675	2533	1055	738	446	211	118	102
1999	170	2782	5507	4848	6750	2954	1441	962	383	191	128	80.5
2000	133	2188	3879	3535	2903	1620	650	961	602	229	125	113

monthly data / Sheet2 / Sheet3

Ready

Step 4: Obtain Annual Averages

Tips for Data Manipulation: Tutorial from Streamflow Evaluations for Watershed Restoration Planning and Design, <http://water.oregonstate.edu/streamflow/>, Oregon State University, 2002-2005.

MANUALLY (Annual Averages are done based on Water Years 10/1/XX-9/30/XX)

- In Fifth Column, use the average function in Excel to obtain the average for each water year for the first four water years in the period of record.

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J
	AGENCY	STATION	DATE (Month, Day, Year)	STREAMFLOW (CFS)	ANNUAL AVERAGES (CFS)					
1	USGS	14306500	10/1/90	63						
2	USGS	14306500	10/2/90	86						
3	USGS	14306500	10/3/90	93						
4	USGS	14306500	10/4/90	96						
5	USGS	14306500	10/5/90	101						
6	USGS	14306500	10/6/90	106						
7	USGS	14306500	10/7/90	94						
8	USGS	14306500	10/8/90	87						
9	USGS	14306500	10/8/90	84						
10	USGS	14306500	10/10/90	82						
11	USGS	14306500	10/11/90	83						
12	USGS	14306500	10/12/90	94						
13	USGS	14306500	10/13/90	99						
14	USGS	14306500	10/14/90	97						
15	USGS	14306500	10/15/90	130						
16	USGS	14306500	10/16/90	177						
17	USGS	14306500	10/17/90	152						
18	USGS	14306500	10/18/90	241						
19	USGS	14306500	10/19/90	360						
20	USGS	14306500	10/20/90	209						
21	USGS	14306500	10/21/90	272						
22	USGS	14306500	10/22/90	575						
23	USGS	14306500	10/23/90	315						
24	USGS	14306500	10/24/90	220						
25	USGS	14306500	10/25/90	195						
26	USGS	14306500	10/26/90	352						
27	USGS	14306500	10/27/90	315						
28	USGS	14306500	10/28/90	323						
1458	USGS	14306500	9/26/94	62						
1459	USGS	14306500	9/27/94	62						
1460	USGS	14306500	9/28/94	61						
1461	USGS	14306500	9/29/94	65						
1462	USGS	14306500	9/30/94	75	731					
1463	USGS	14306500	10/1/94	78						
1464	USGS	14306500	10/2/94	73						

- Copy the Annual Average Column for the first four years and paste to rest of Data Set. This will compute the annual averages for the remaining years.

	A	B	C	D	E	F	G	H	I	J
1	AGENCY	STATION	DATE (Month, Day, Year)	STREAMFLOW (CFS)	ANNUAL AVERAGES (CFS)					
2	USGS	14306500	10/1/90	83						
3	USGS	14306500	10/2/90	85						
4	USGS	14306500	10/3/90	93						
5	.	.	.	.		
6	.	.	.	.		
7	.	.	.	.		
1464	USGS	14306500	9/29/94	65						
1465	USGS	14306500	9/30/94	75						
1466	USGS	14306500	10/1/94	78	731					
1467	USGS	14306500	10/2/94	73						
1468	USGS	14306500	10/3/94	69						
1469	USGS	14306500	10/4/94	63						
1470	USGS	14306500	10/5/94	60						
1471	USGS	14306500	10/6/94	60						
1472	USGS	14306500	10/7/94	58						
1473	USGS	14306500	10/8/94	58						
1474	USGS	14306500	10/9/94	58						
1475	USGS	14306500	10/10/94	58						
1476	USGS	14306500	10/11/94	58						
1477	USGS	14306500	10/12/94	58						
1478	USGS	14306500	10/13/94	59						
1479	USGS	14306500	10/14/94	74						
1480	USGS	14306500	10/15/94	93						
1481	USGS	14306500	10/16/94	87						
1482	USGS	14306500	10/17/94	77						
1483	USGS	14306500	10/18/94	72						
1484	USGS	14306500	10/19/94	71						
1485	USGS	14306500	10/20/94	70						
1486	USGS	14306500	10/21/94	82						
1487	USGS	14306500	10/22/94	96						
1488	USGS	14306500	10/23/94	87						
1489	USGS	14306500	10/24/94	36						

- Organize Annual Data by Year for Period of Record

	A	B	C	D	E	F	G	H	I	J	K	L
1	WATER YEAR	STREAMFLOW (CFS)	STREAMFLOW (CFS)									
2		WATER YEAR	USGS - CALENDAR YEAR									
3	1991	1102	1012									
4	1992	796	896									
5	1993	1262	1104									
6	1994	731	1141									
7	1995	1762	1908									
8	1996	2088	2226									
9	1997	1637	1482									
10	1998	1533	1790									
11	1999	2148	1958									
12	2000	1409										
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33												
34												
35												
36												

IF USING A USGS GAGE, ANNUAL STATISTICS ARE ALREADY CALCULATED

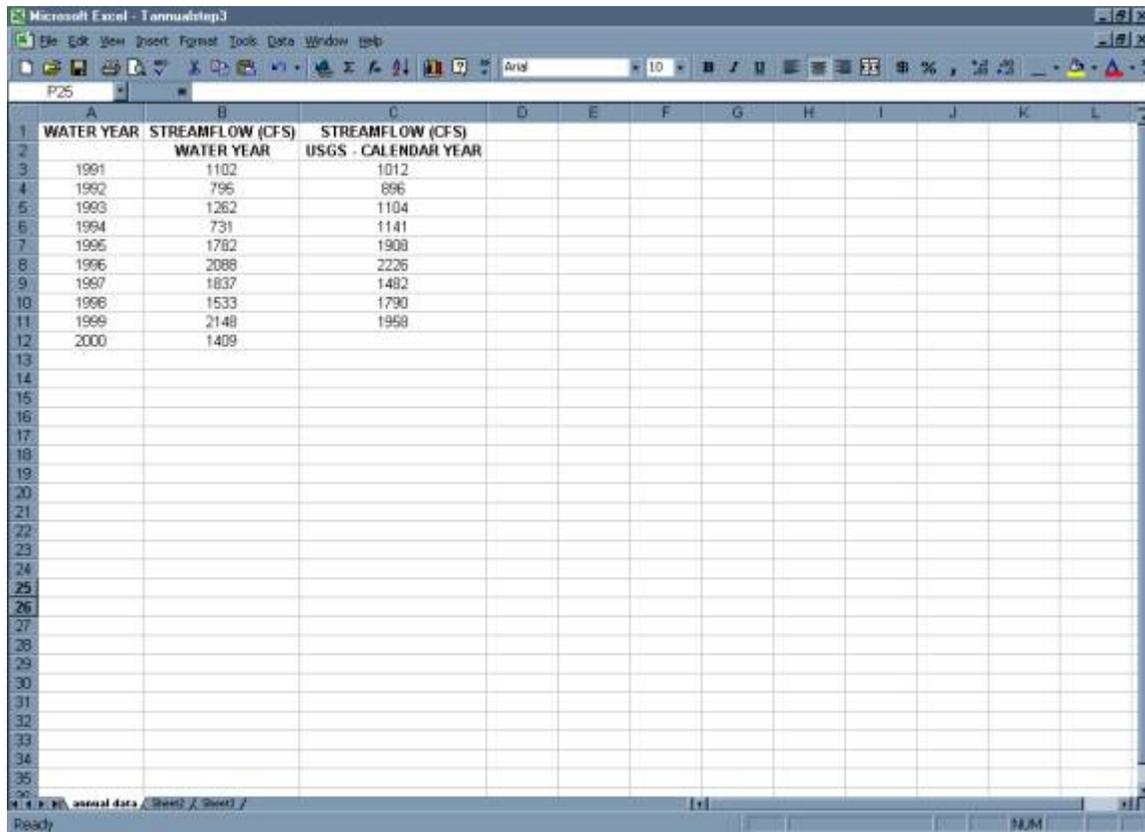
(Annual averages are based on calendar year 1/1/XX – 12/31/XX)

The monthly values can be used to generate mean annual flows by water year.

- Go to <http://oregon.usgs.gov>
- Select Historical Water Data
- Select Surface Water
- Select Statistics (Annual)
- Check box under Site Identifier for Site Name and Submit
- Type in Alsea under Site Name and select match any part and Submit
- In the Retrieve data from boxes enter the date range of "1990-10-01" to "2000-10-01"
- Select Tab-separated data and Display in browser and Submit
- Select gage at TIDEWATER (14306500)

** Data included in this table are for all of the Alsea gages, be absolutely certain that you are using the data for your desired gage (in this case 14306500)

- Select data set for desired gage to copy
Paste Special as text (this will separate the data into columns)



1	WATER YEAR	STREAMFLOW (CFS)	STREAMFLOW (CFS)	D	E	F	G	H	I	J	K	L
2		WATER YEAR	USGS - CALENDAR YEAR									
3	1991	1102	1012									
4	1992	796	896									
5	1993	1262	1104									
6	1994	731	1141									
7	1995	1762	1908									
8	1996	2088	2226									
9	1997	1837	1482									
10	1998	1533	1790									
11	1999	2148	1958									
12	2000	1409										
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