



Traversing the Bridges Between SAS[®] and ESRI[®] ArcMap[®]

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What is ESRI?

- The World Leader in Geographic Information Systems
- Several Core Products
 - ArcMap
 - ArcView
 - ArcEdit
 - ArcInfo
 - ArcGIS Server
 - ArcSDE
 - ArcIMS
 - Being phased out
 - Does not support SAS Bridge





Why Would We Want to Bridge Them?

- SAS GMAP Mapping Capabilities are limited
- ESRI does not have powerful data processing features
- Your data may already be in SAS
- ESRI does not have many of the Analytic and Statistical Tools that SAS has.
- Base SAS does not have geographic Analysis capabilities
- SAS GIS appears to be on the back burner



Ways they can be bridged

- SAS/ESRI Bridge
- SAS Access engine for MS Access (PC File Formats)
- SAS Access engine for ODBC
- SAS reading of .DBF files
- Text Files

A decorative graphic on the left side of the slide, featuring a dark brown branch with several leaves. The leaves are elongated and have a mix of green and brownish-red colors, suggesting autumn foliage. The branch and leaves are positioned vertically, extending from the bottom to the top of the slide.

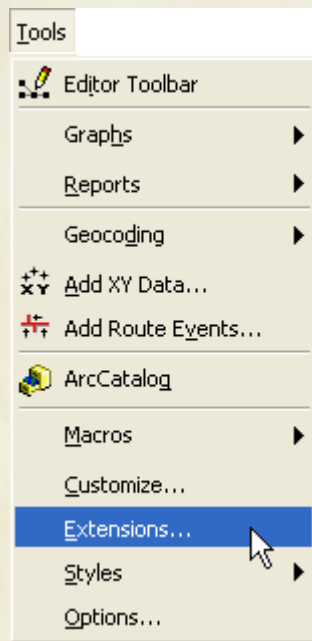
Linking ArcMap to SAS Using SAS/ESRI Bridge

- Requires SAS Bridge for ESRI extension to SAS
- Better option for production solutions and applications
- Appears to have been designed to mostly be used from ESRI
- Code Based interface using Visual Basic and SAS via OLE DB
- Allows access between SAS Integration Technology and ArcGIS Server

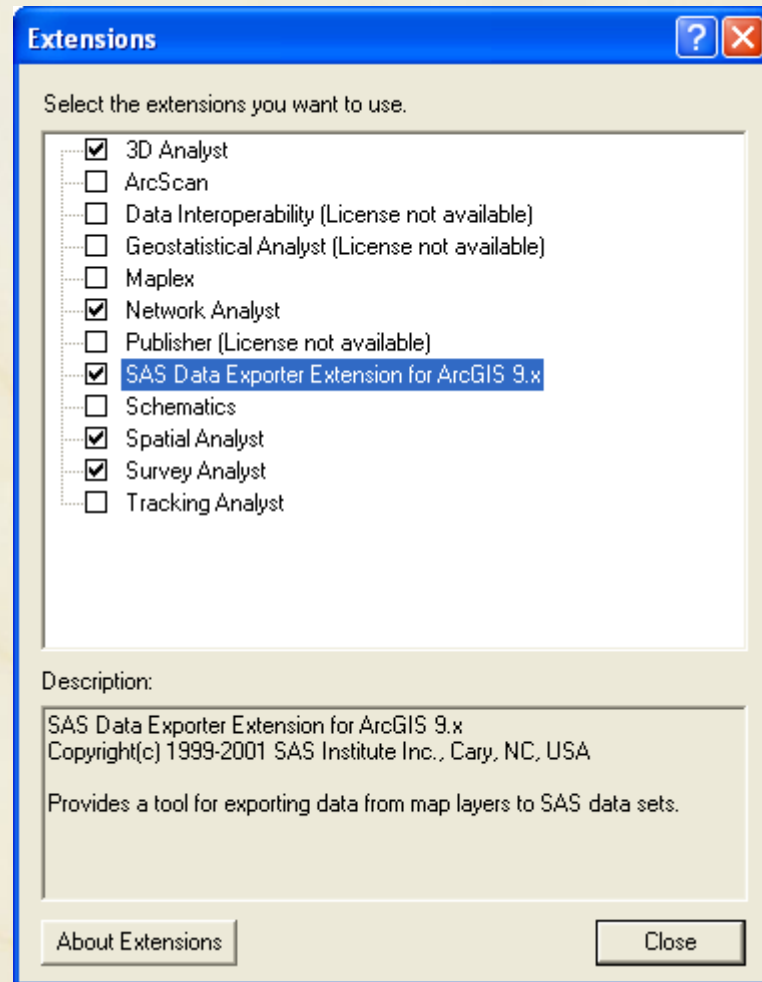


Setting up SAS/ESRI Bridge

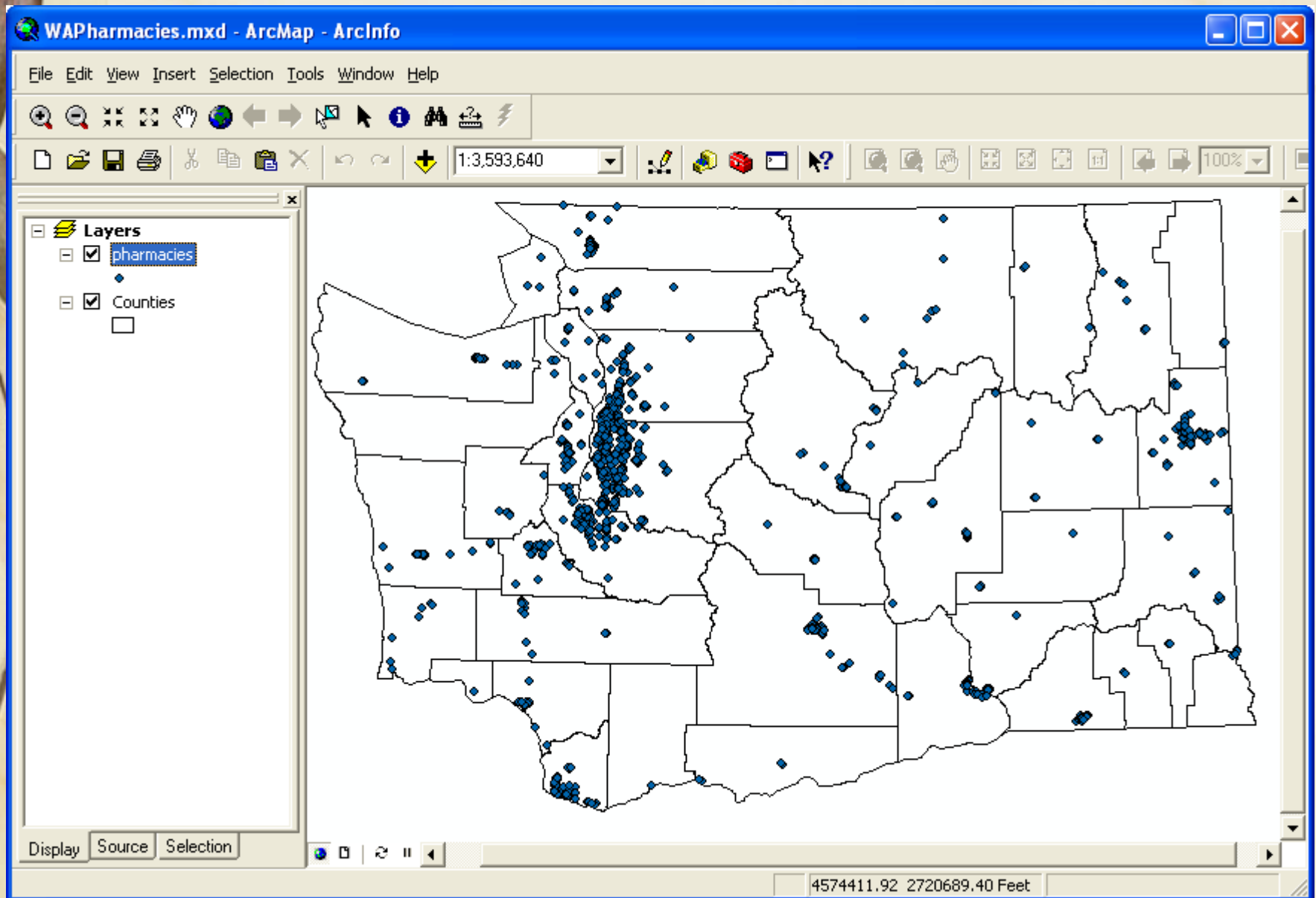
- Purchase SAS/ESRI Bridge License
- Need SAS Installed locally or on a remote server
- Need ESRI ArcMap Desktop
- Update License (SetInit)
- Install SAS/ESRI Bridge



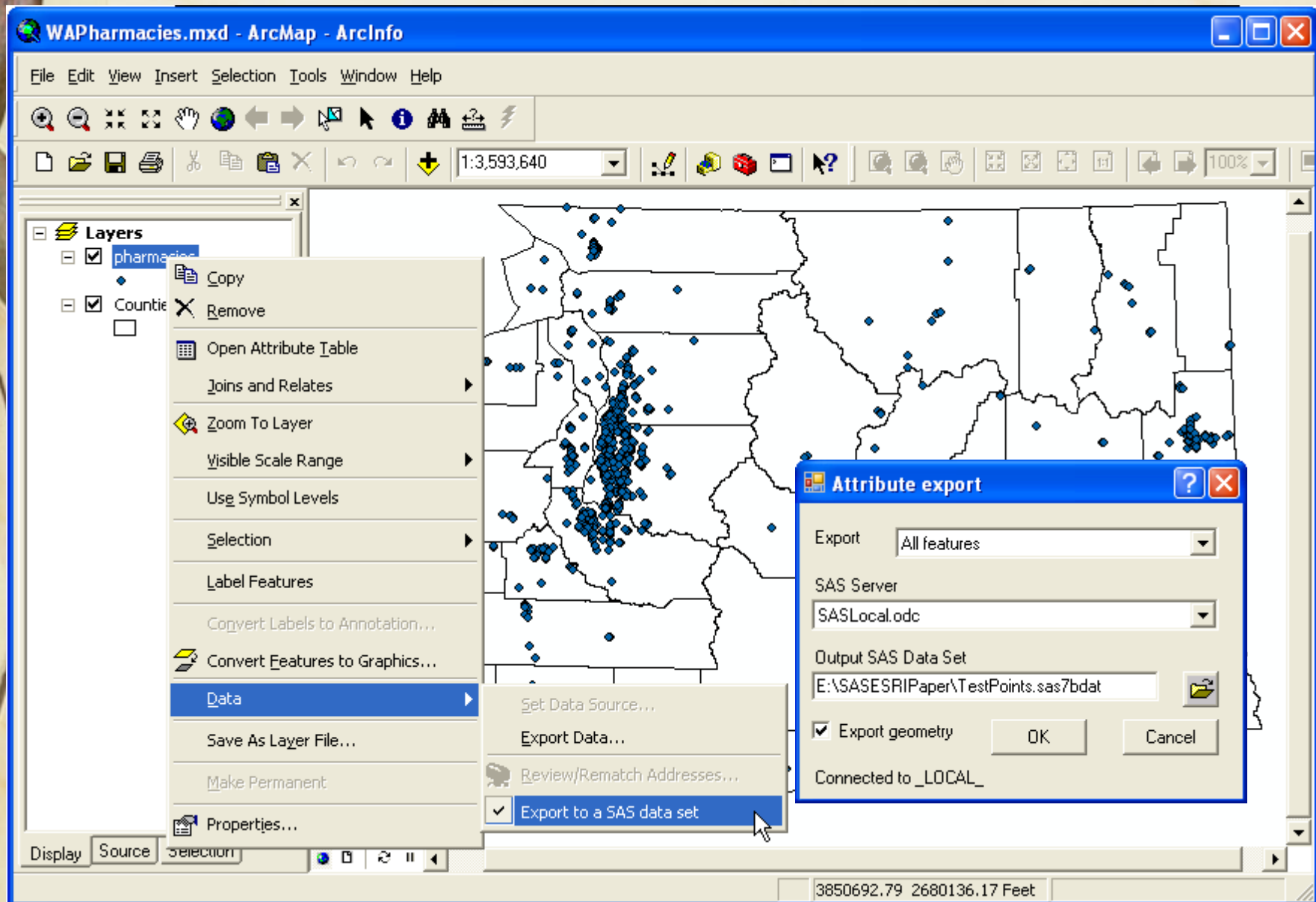
Enable the SAS Data Extension



Example Data: Pharmacies in WA



Exporting a Layer File to SAS



Main Resulting SAS Dataset

SAS - [VIEWTABLE: Sasesri.Testpoints]

File Edit View Tools Data Solutions Window Help

	LICTYPE	NAME	ADDRESS	CITY	ZIP	ZIP4	OBJECTID	INURBAN
1	HF	AIRWAY HEIGHTS CORRECTION CTR	W 11919 SPRAGUE AVE	AIRWAY HEIGHTS	99001	1899	1	1
2	CF	ALBERTSON'S PHARMACY #242	NORTH 12312 STATE RTE #395	SPOKANE	99218		2	1
3	CF	BREWSTER DRUG INC	811 HWY 97 BOX 798	BREWSTER	98812		3	0
4	CF	DAVENPORT PHARMACY	525 MORGAN ST	DAVENPORT	99122		4	0
5	HF	EASTERN STATE HOSP PHCY-ESTLKE	PO BOX A	MEDICAL LAKE	99022	0045	5	0
6	HF	ENUMCLAW COMMUNITY HOSPITAL	PO BOX 218	ENUMCLAW	98022		6	1
7	CF	FRICKS DRUGS	609 SEQUIM VILLAGE CENTER	SEQUIM	98382		7	0
8	CF	GROSS DRUG	2520 FOSTER AVE	BRIDGEPORT	98813		8	0
9	CF	HEDDENS PHARMACY INC	196 W SUSSEX	TENINO	98589		9	0
10	CF	INCHELIUM HEALTH CTR PHARMACY	PO BOX 290	INCHELIUM	99138		10	0
11	CF	KELLEY-ROSS PHARMACY	1120 HAVARD AVE	SEATTLE	98122		11	1
12	CF	KETTLE FALLS PHARMACY	HIGHWAY 395	KETTLE FALLS	99141		12	0
13	CF	LA CONNER DRUG STORE	708 E MORRIS ST	LA CONNER	98257	0477	13	0
14	CF	LAKE CHELAN PHARMACY INC	223 E JOHNSON	CHELAN	98816		14	0
15	CF	LINCOLN COUNTY PHARMACY	621 MORGAN ST	DAVENPORT	99122	0458	15	0
16	HF	MASON GENERAL HOSPITAL PHCY	901 MOUNTAIN VIEW DR	SHELTON	98584		16	0
17	HF	MCNEIL ISLAND CORR CTR PHCY	PO BOX 88900	STEILACOOM	98388	0900	17	0
18	CF	MILL CREEK PHARMACY	1025-153RD ST SE #104	MILL CREEK	98012		18	1
19	CF	MOSES LAKE PROFESSIONAL PHCY	835 E COLONIAL AVE	MOSES LAKE	98837		19	0
20	CF	OCEAN PARK PHARMACY	P O BOX 206	OCEAN PARK	98640	0206	20	0
21	HF	OKANOGAN-DOUGLAS CTY HOSP PHCY	P O BOX 577	BREWSTER	98812	0577	21	0
22	HF	PULLMAN MEMORIAL HOSP PHARMACY	WASHINGTON AVENUE	PULLMAN	99163		22	0
23	CF	RAYMOND DRUG COMPANY	707 WILLAPA PL	RAYMOND	98577	1718	23	0
24	CF	DAVE PHARMACY	TEMPLE CENTER	EASTCOUND	98245		24	0

Output - (Untitled) Log - (Untitled) Editor - Untitled1 surveyselect.sas * Explorer VIEWTABLE: Sas...

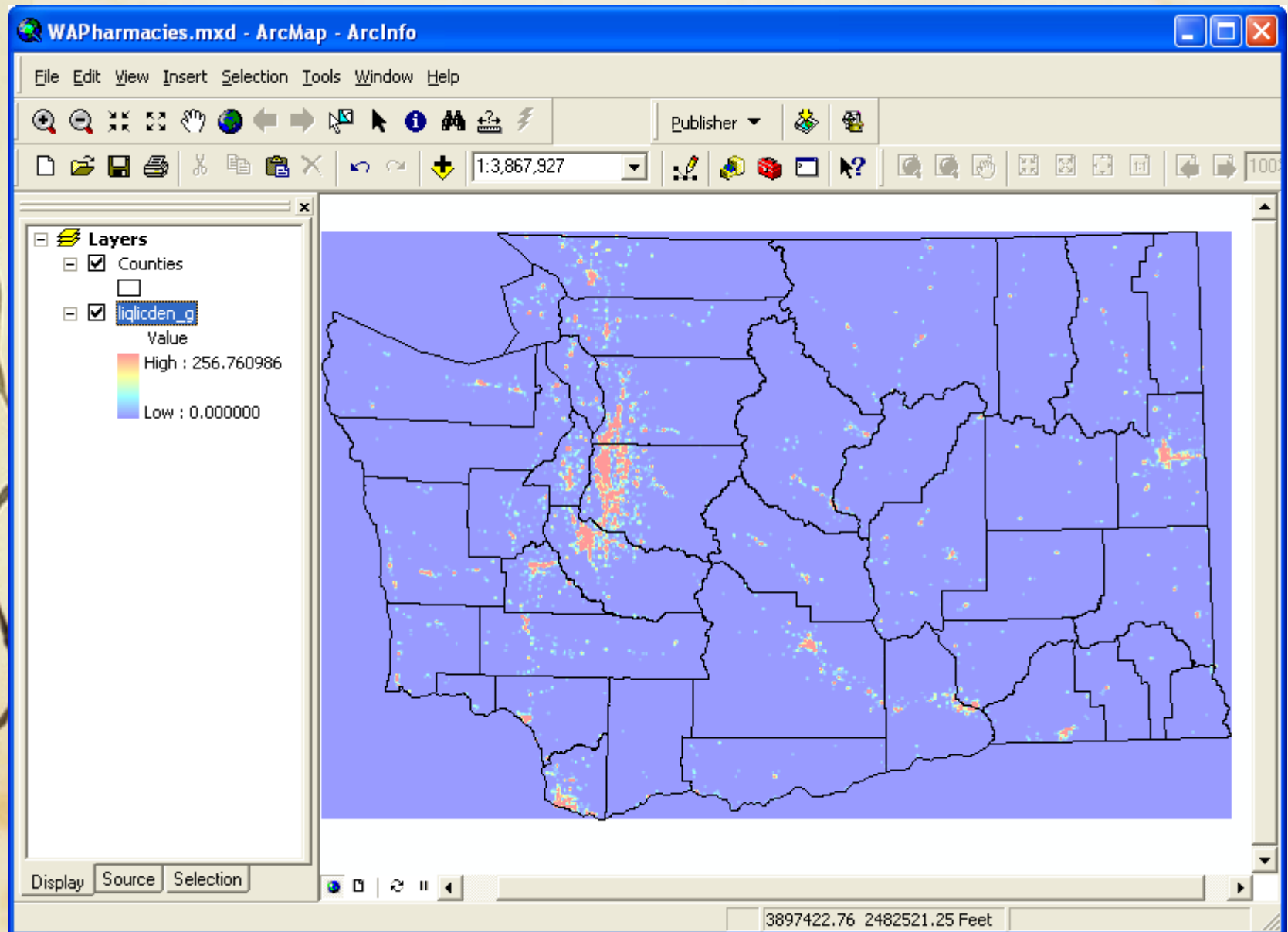
C:\Documents and Settings\Curtis

Supporting Resulting SAS Dataset

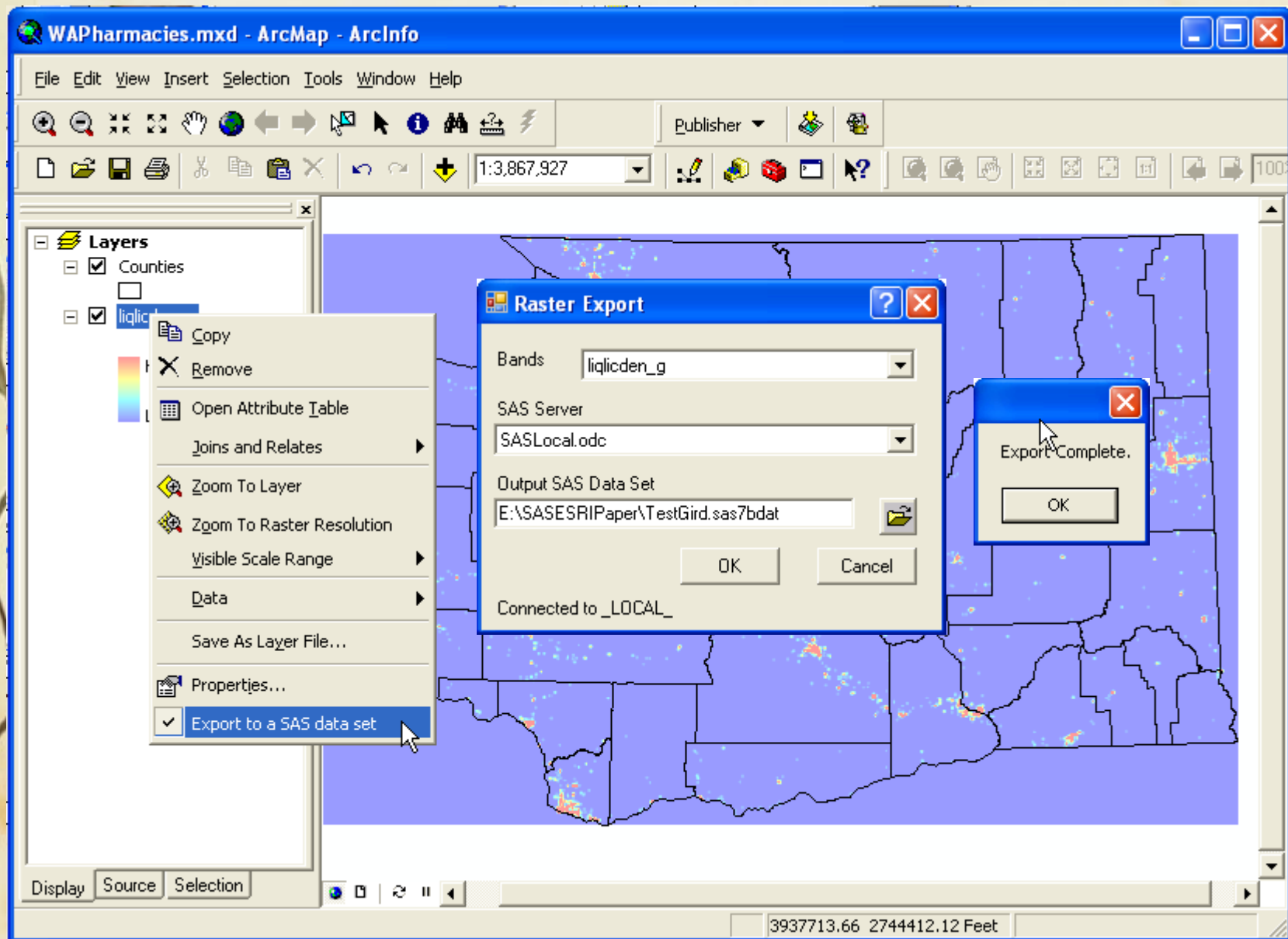
VIEWTABLE: Sasesri.Testpoints_xy_meta		
	Projected Coordinate System Name	Planar Distance Units
1	NAD_1983_HARN_StatePlane_Washington_Sout	Foot_US

VIEWTABLE: Sasesri.Testpoints_xy			
	ObjectID	X	Y
1	1	2442643.2509	864086.06265
2	2	2407798.2512	904530.74902
3	3	1814550.3756	1010294.3106
4	4	2221483.2492	855082.31326
5	5	2332800.999	828628.56348
6	6	1270453.3736	687131.50197
7	7	1000664.6235	1012607.502
8	8	1846042.873	973824.50141
9	9	1052030.4993	564625.49943
10	10	2201539.5016	1089187.6247
11	11	1191113.874	836401.56317
12	12	2230628.9987	1204574.8735
13	13	1157108.6239	1121840.2486
14	14	1759322.0005	914946.93847
15	15	2219530.7515	854691.25176
16	16	990928.50113	699364.68931
17	17	1103336.2498	687308.6253
18	18	1219560.25	925372.18827
19	19	1946453.3763	658342.31129
20	20	746846.25117	442524.0629
21	21	1813968.252	1034738.0016
22	22	2476342.2512	526152.93875
23	23	827176.7493	512751.93675

Example GRID File



Exporting a GRID File to SAS



Resulting GRID SAS Dataset

VIEWTABLE: Sasesri.Testgird

	liqlicden_g
21980	0.0005290449
21981	0.008131453
21982	0.01898996
21983	0.02751931
21984	0.03042608
21985	0.02670869
21986	0.01765737
21987	0.006854185
21988	0.0001730512
25713	0.01074294
25714	0.03623915
25715	0.06632656
25716	0.09312807
25717	0.1110584
25718	0.1168242
25719	0.1094239
25720	0.09014759
25721	0.06257746
25722	0.03258738
25723	0.008343096
26971	0.0003100345
26972	0.0003674209

VIEWTABLE: Sasesri.Testgird_meta

	Projected Coordinate System Name	Geographic Coordinate System Name	Planar Distance	Number of rows	Number of columns	X cell size	Y cell size	Upper Left x-coordinate	Upper Left y-coordinate	Lower Right x-coordinate	Lower Right y-coordinate
1	NAD_1983_HARN_Lambert_	GCS_North_American_19	Foot_US	2412	3734	528	528	579553	1355372	2551105	81836



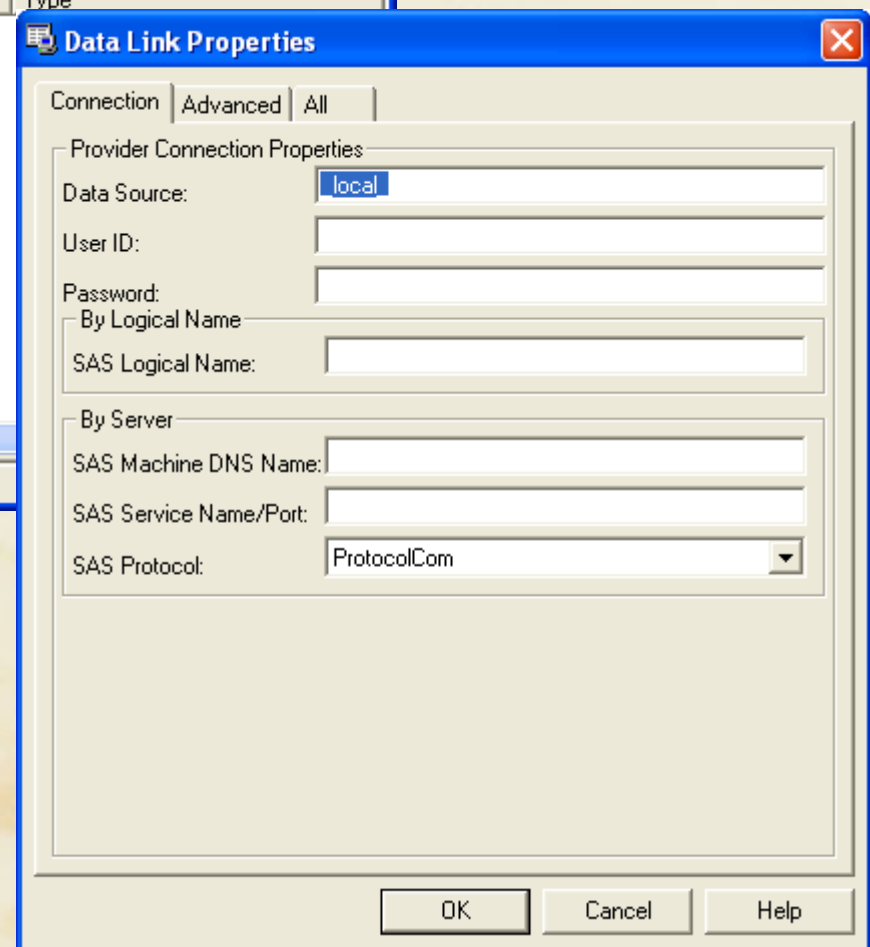
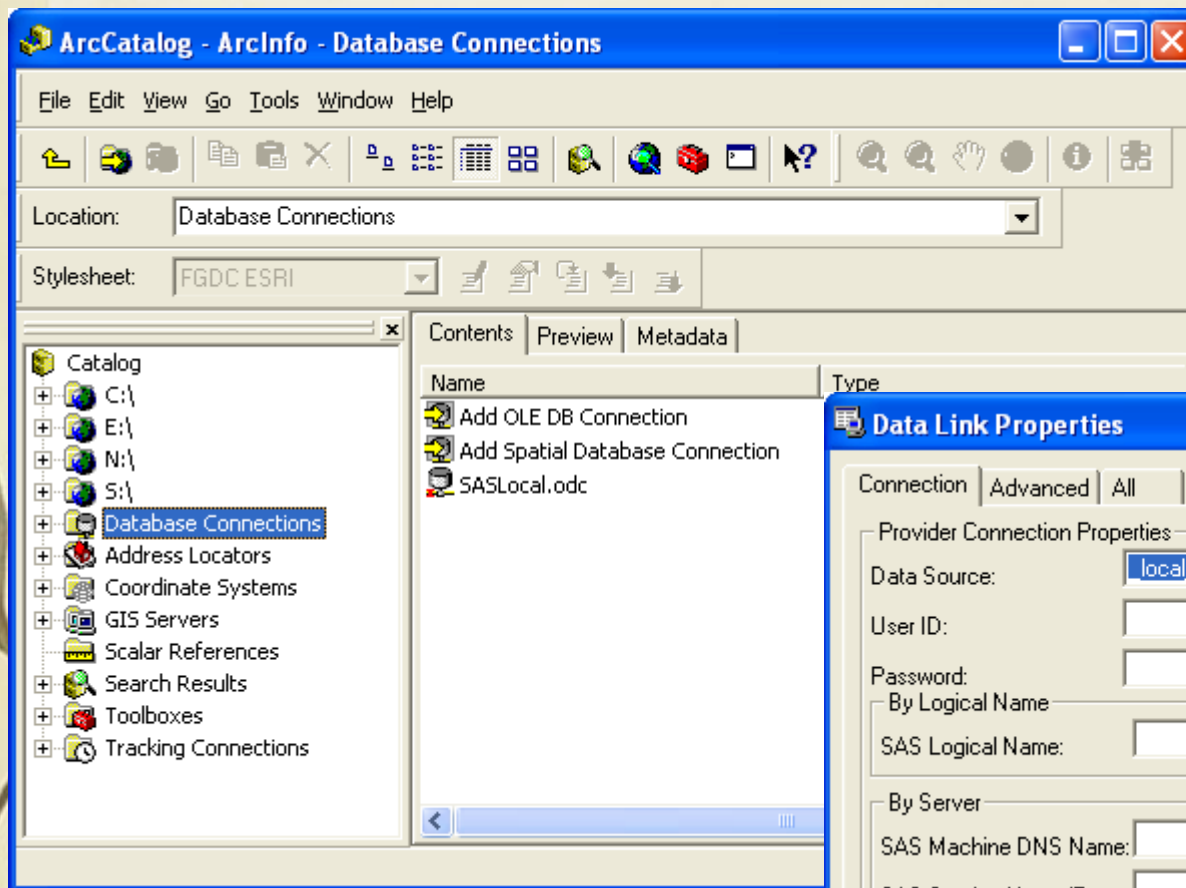
Further Setup of SAS/ESRI Bridge

- Modify the SAS Config file to call an AutoExec file which establishes the needed libraries.
- If connecting to SAS Metadata Server, those defined libraries will be available



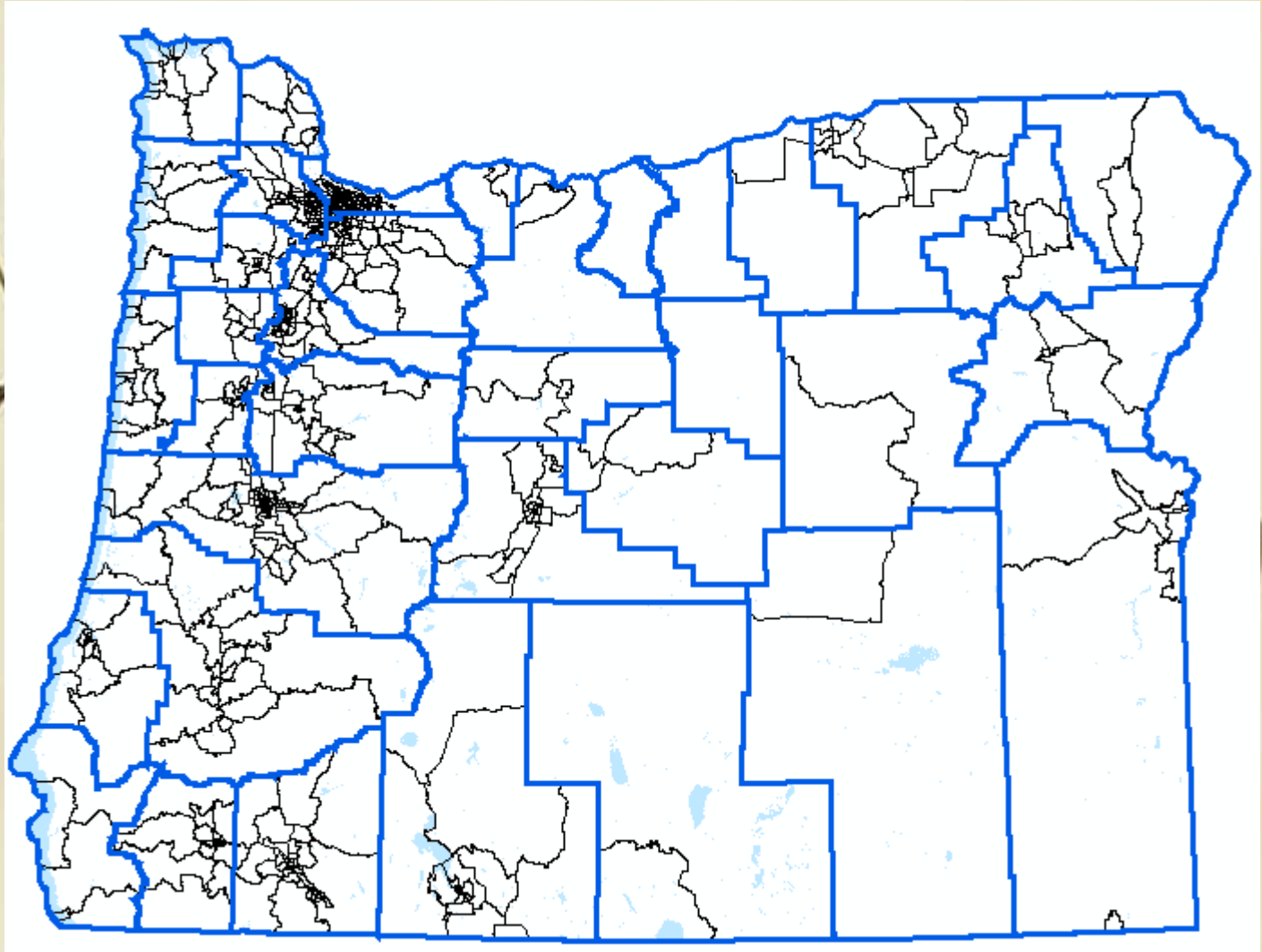
Adding Libraries to the Default SAS Environment

- The SAS Config file is typically in the following location
`C:\Program Files\SAS\SAS 9.1\sas.exe" -CONFIG "C:\Program Files\SAS\SAS 9.1\nls\en\SASV9.CFG`
- To check this right click on the icon with which you start SAS and select properties. It can be found in the “Target” field, after the parameter “-CONFIG”.
- Edit this file and add something like this to the end of the file:
`-AUTOEXEC "?CSIDL_PERSONAL\ESRISASAutoExec.sas";`
- The name and location of this `ESRISASAutoExec.sas` is up to you. This path will look in your “My Documents” folder for the file.
- Create the file referenced in the Config file, and add libname statements like the following:
`libname ESRIData 'C:\arccgis\SASData';`



Establish an
OLE DB
Connection to local
SAS

Example Data: Oregon Census Tracts



Joining a SAS Table to a Map Layer

ArcCatalog - ArcInfo - Database Connections\SASLocal.odc

File Edit View Go Tools Window Help

Location: Database Connections\SASLocal.odc

Stylesheet: FGDC ESRI

Contents Preview Metadata

Name	Type
ESRIDATA.ORTRACTDATA	SAS Table
SASHELP.ACCBW	SAS Table
SASHELP.ACCBWMT	SAS Table
SASHELP.ACCPEO	SAS Table
SASHELP.ADOMSG	SAS Table
SASHELP.ADSMSG	SAS Table
SASHELP.AFMSG	SAS Table
SASHELP.AIR	SAS Table
SASHELP.ASSCMGR	SAS Table
SASHELP.AUTHLIB	SAS Table
SASHELP.BUY	SAS Table
SASHELP.BVCHelp	SAS Table

Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

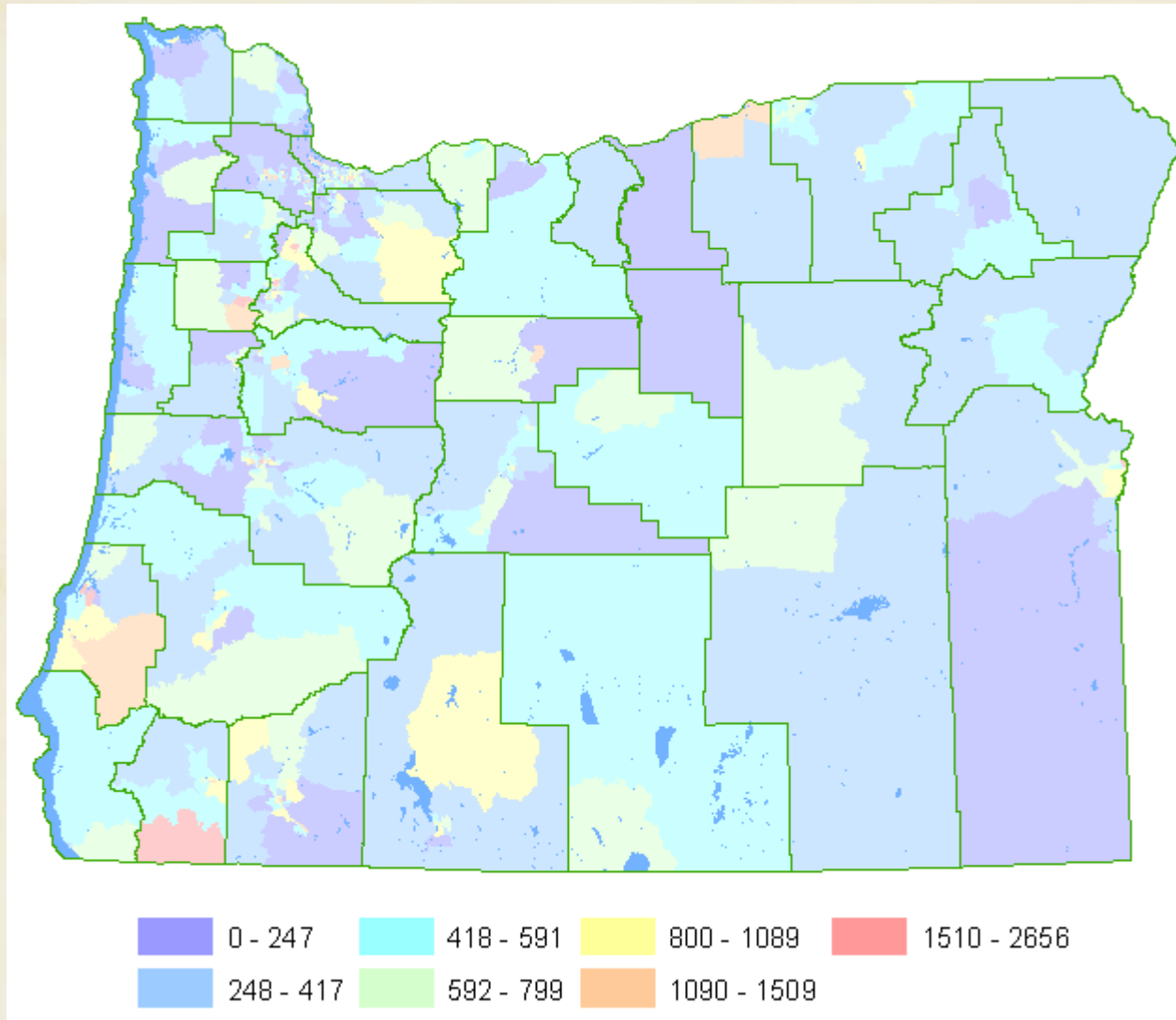
Join attributes from a table

1. Choose the field in this layer that the join will be based on:
TractId
2. Choose the table to join to this layer, or load the table from disk:
ESRIDATA.ORTRACTDATA
☒ Show the attribute tables of layers in this list
3. Choose the field in the table to base the join on:
TractId

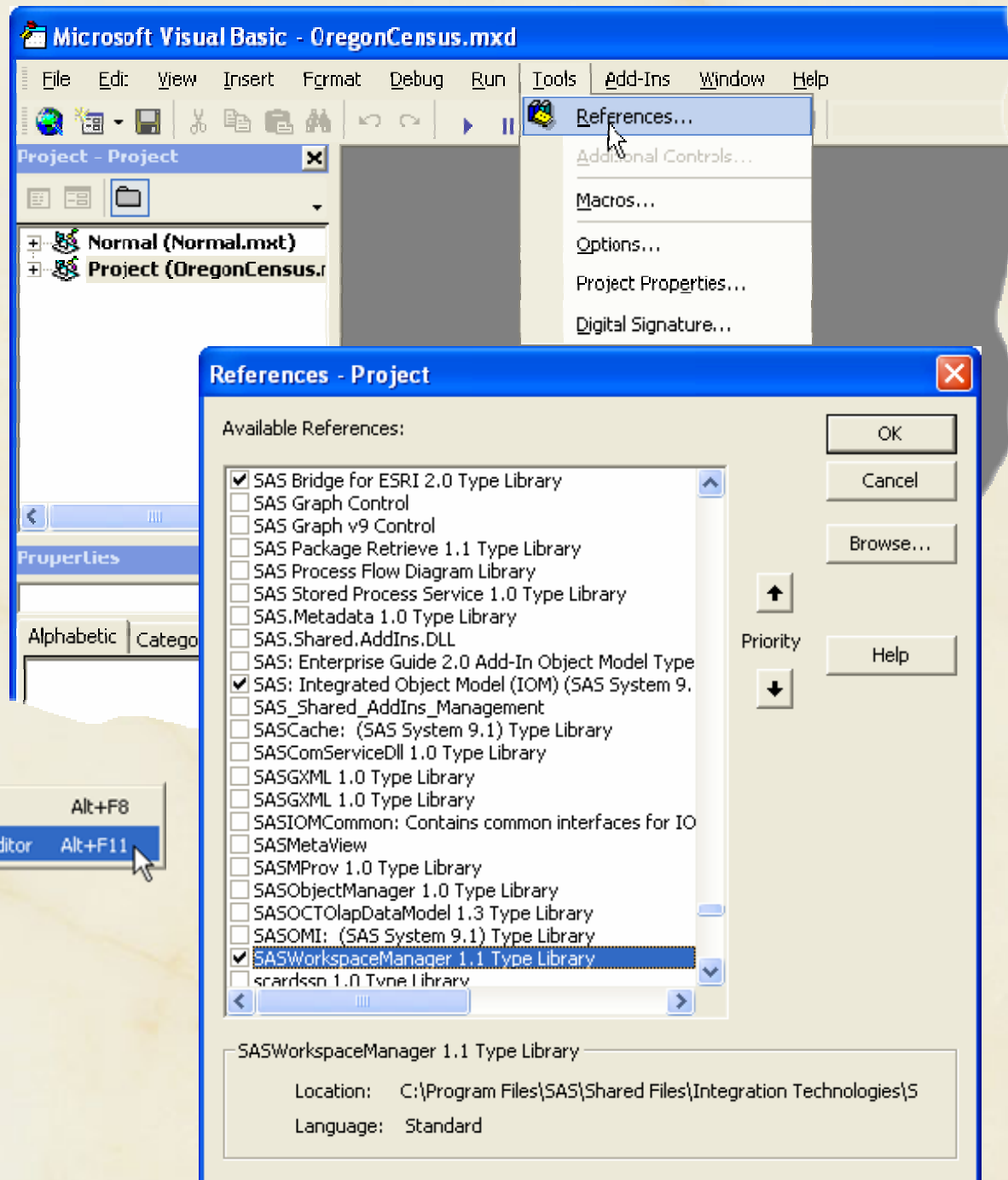
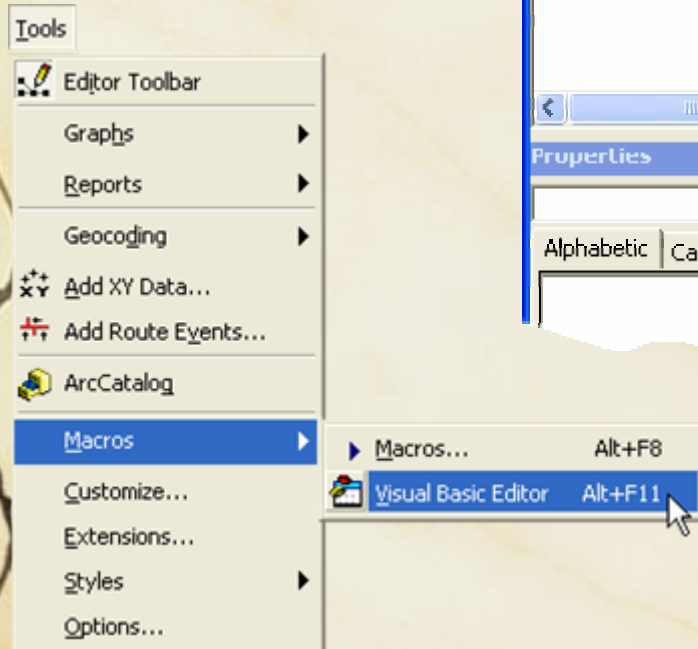
Advanced...

About Joining Data OK Cancel

Map Tract Population from a SAS Table



Enabling SAS Bridge in ArcMap Visual Basic



Executing A SAS Program From ArcMap

```
Sub passDSName()  
    Rem Start the SAS server  
    Dim SASws As SAS.Workspace  
    Dim SASwsm As New SASWorkspaceManager.WorkspaceManager  
    Dim strError As String  
    Set SASws = SASwsm.Workspaces.CreateWorkspaceByServer _  
        ("MySAS", VisibilityProcess, Nothing, "", "", strError)  
  
    Rem Run the stored process  
    Dim SASproc As SAS.StoredProcessService  
    Set SASproc = SASws.LanguageService.StoredProcessService  
    SASproc.Repository = "file:C:\Arcinfo\SAS_code\SASBridge"  
    SASproc.Execute "ChangeOrMapValue.sas", "formula=P87i10/P8i1"  
  
    Rem Shut down the SAS server  
    SASwsm.Workspaces.RemoveWorkspaceByUUID SASws.UniqueIdentifier  
    SASws.Close  
    Set SASws = Nothing  
End Sub
```

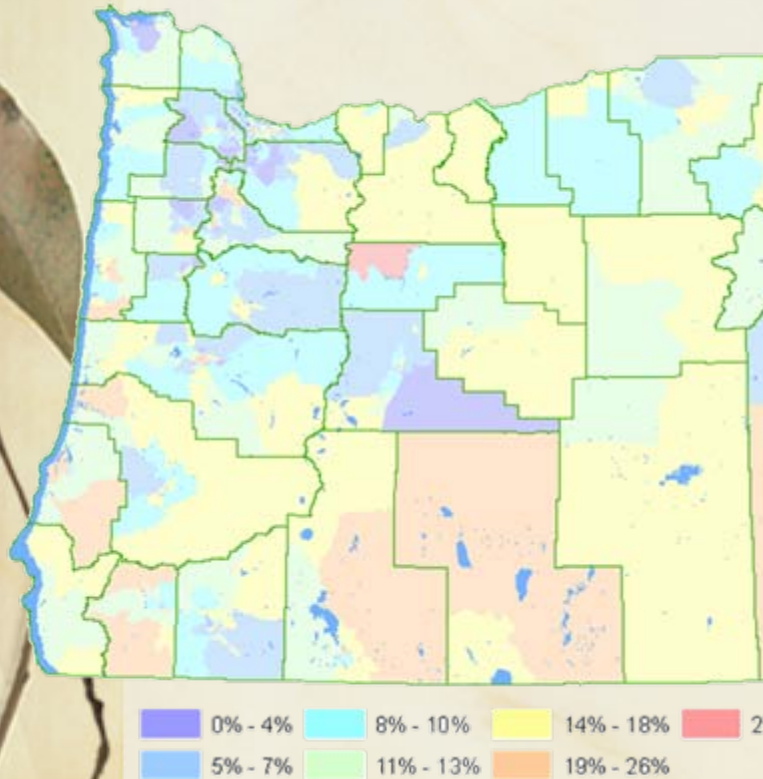
VB Program
to Call
SAS Program

SAS Program
to Modify
the Joined
SAS Table

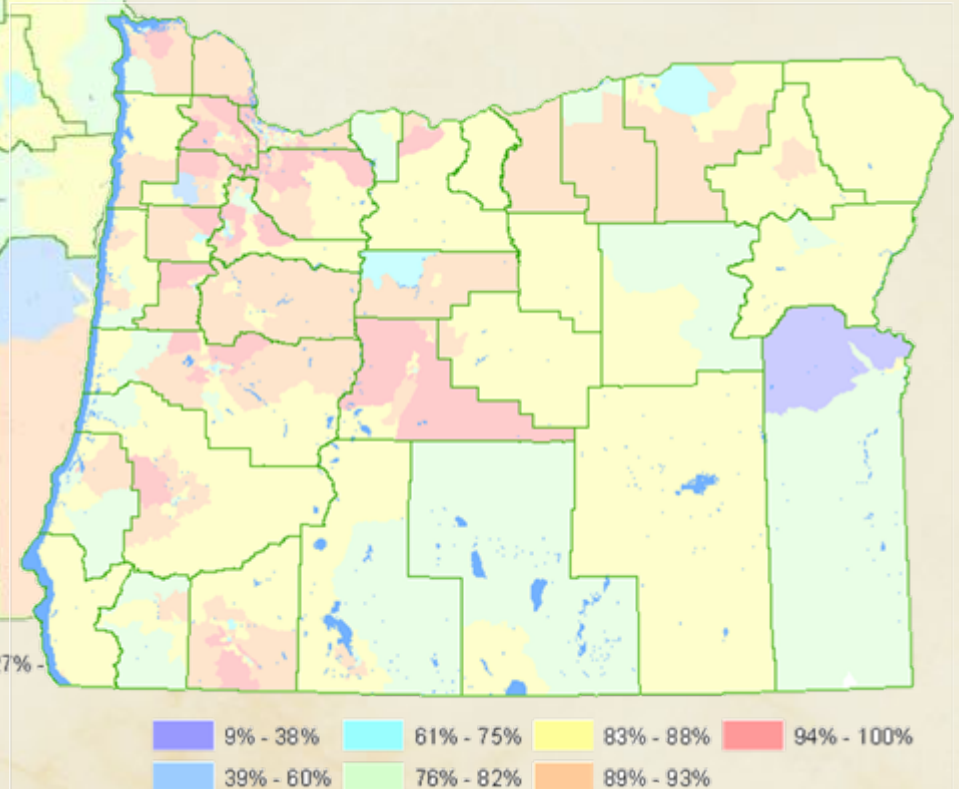
```
%let formula=;  
/* *Processbody; is required */  
*Processbody;  
proc sql;  
    update ESRIData.OrTractData  
        set mapvalue = &formula;  
quit;
```

Two Calls Too Our Program

formula=P87i2/P8i1



formula=P87i10/P8i1



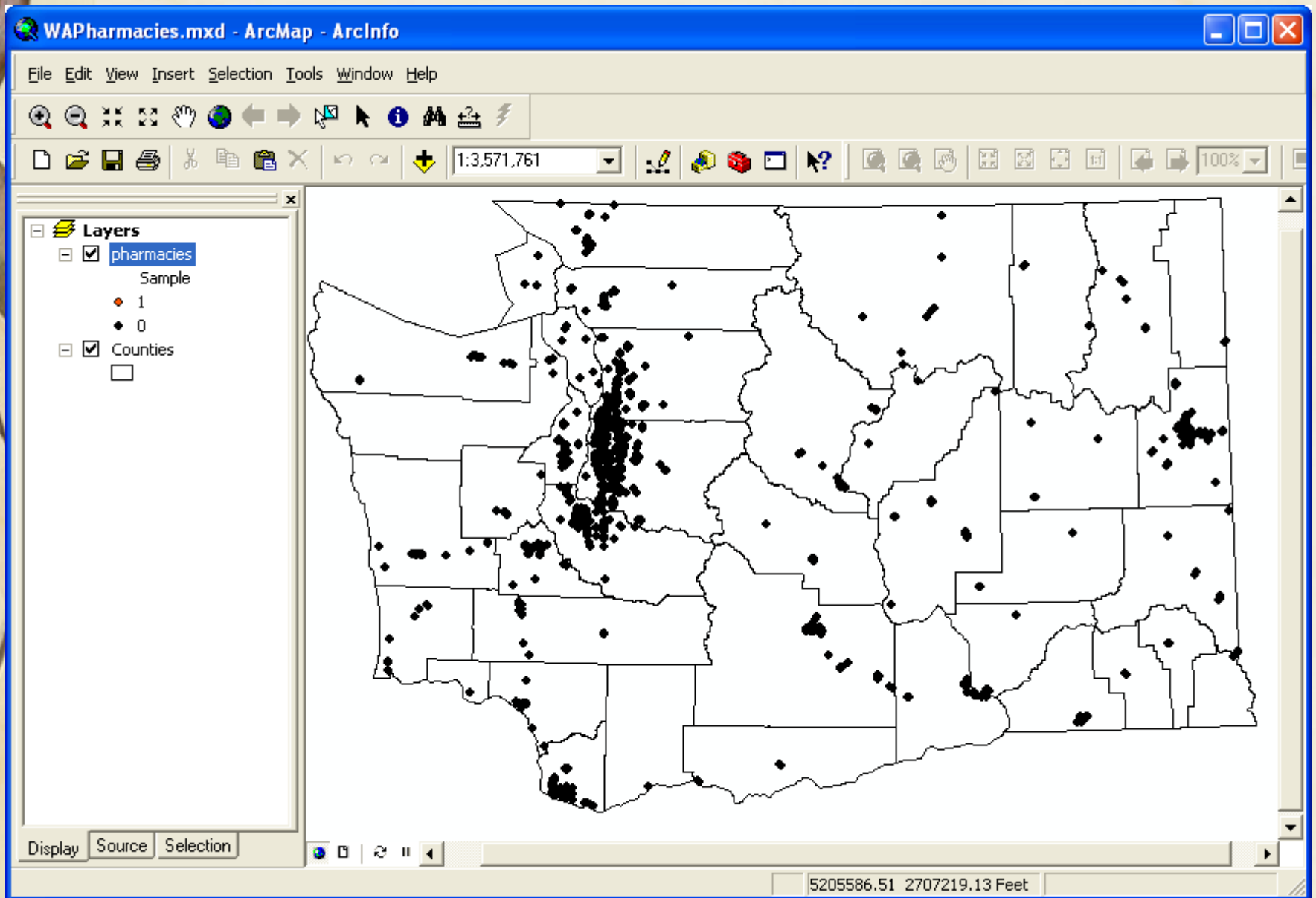
Note: These examples required the user to manually change the code, re-run the macro, and re-class the choropleth ranges. These steps could also be handled automatically with VB code.



Linking ArcMap to SAS Using SAS Access to PC File Formats

- Uses “SAS Access to PC file formats” or “SAS Access to ODBC”
- Simple piece of Python script calls SAS
- Easier to implement and understand for SAS programmers.
- Requires ESRI Data is Stored as Geodatabases because they use MS Access

Pharmacies in WA Again

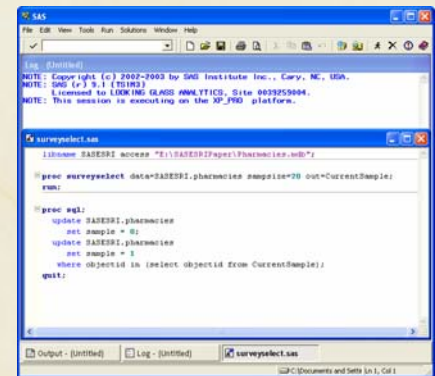


SAS Program to Modify The Microsoft Access Table of the Geodatabase Layer

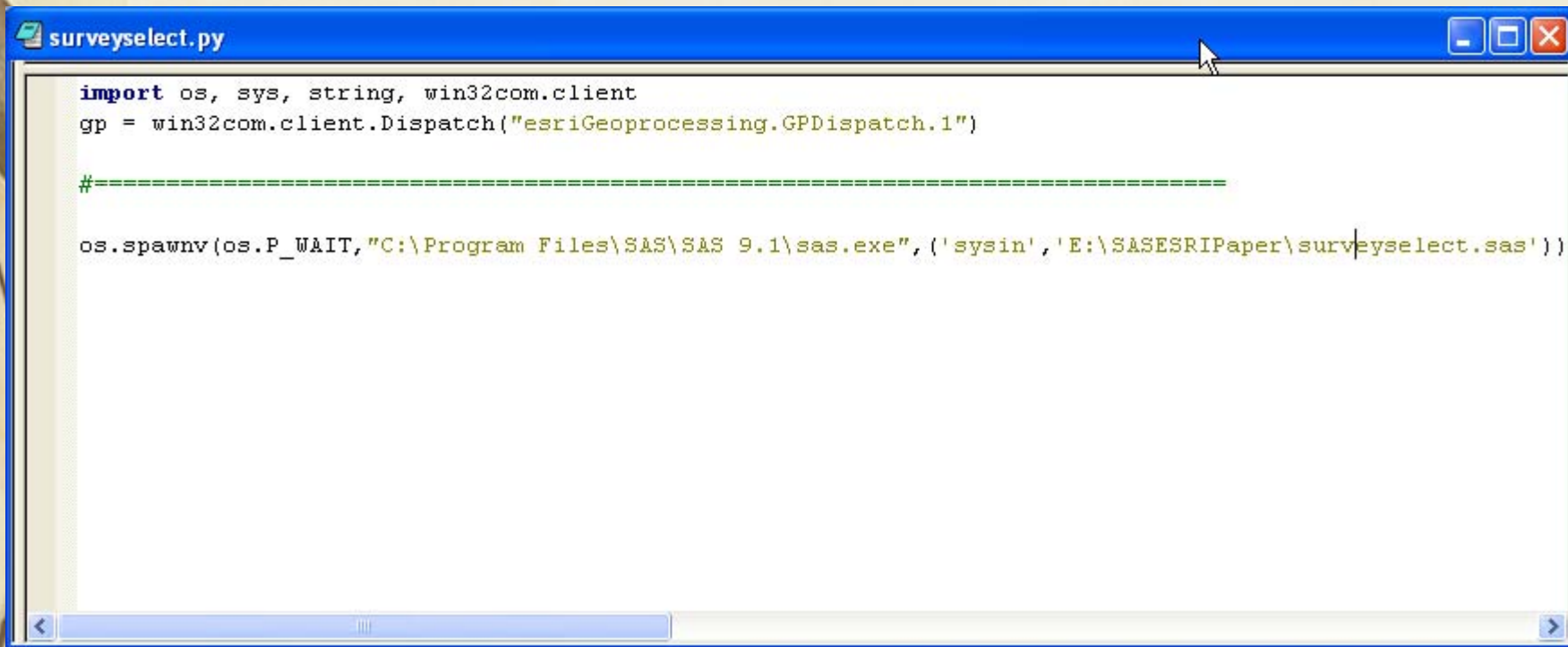
*This is the Key. Use the ACCESS engine to point at the ESRI Geodatabase table;
libname SASESRI access "E:\SASESRIPaper\Pharmacies.mdb";

```
proc surveyselect data=SASESRI.pharmacies sampsize=20  
out=CurrentSample;  
run;
```

```
proc sql;  
  update SASESRI.pharmacies  
    set sample = 0;  
  update SASESRI.pharmacies  
    set sample = 1  
    where objectid in (select objectid from CurrentSample);  
quit;
```



Python Script to Execute the SAS Program From Within ArcMap

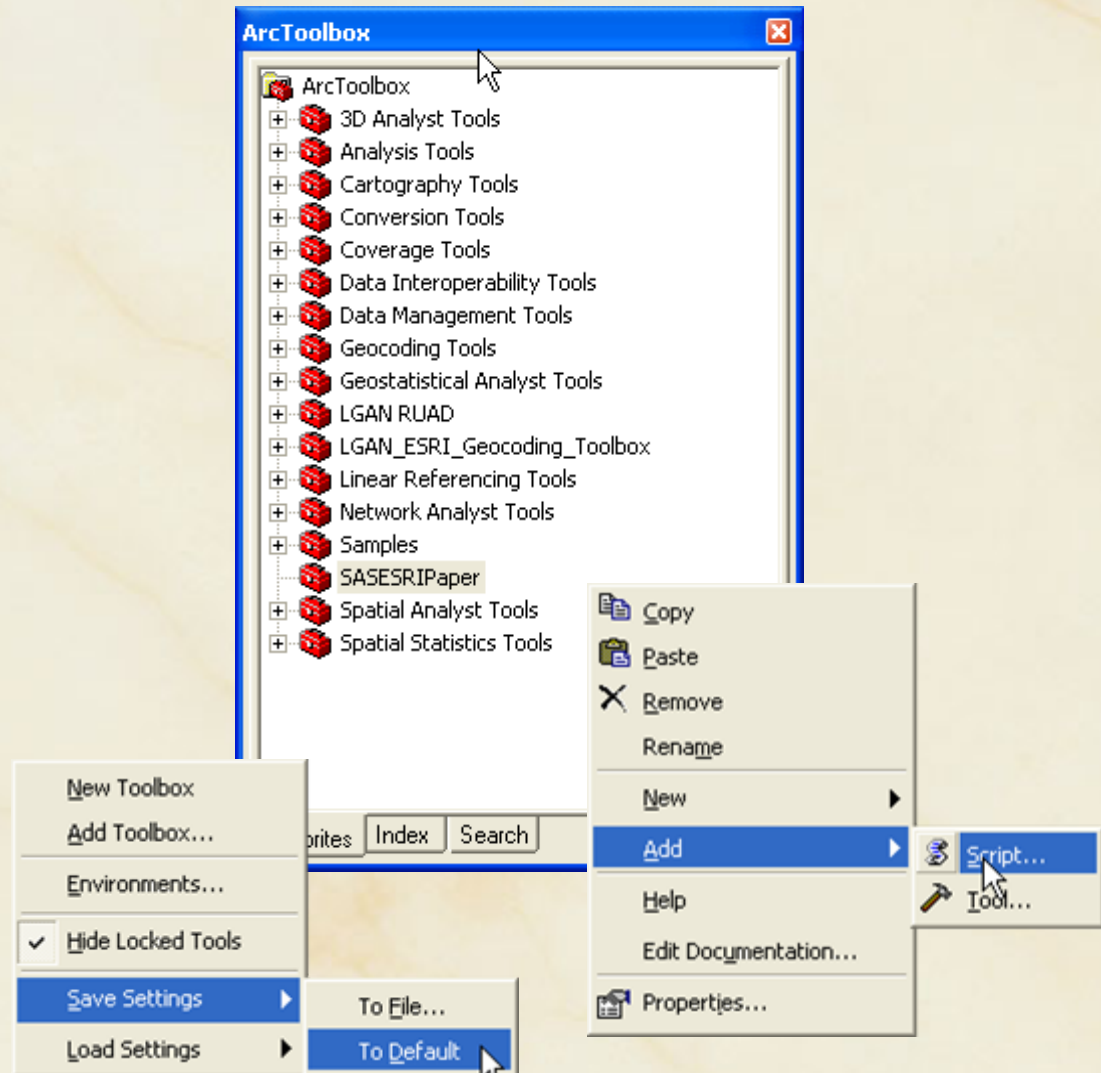
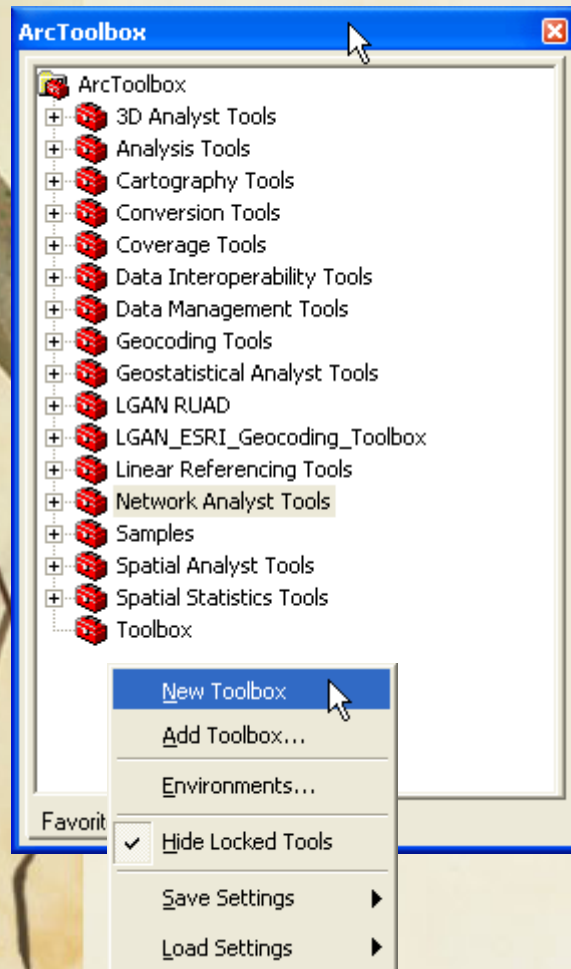


```
import os, sys, string, win32com.client
gp = win32com.client.Dispatch("esriGeoprocessing.GPDispatch.1")

#=====

os.spawnv(os.P_WAIT, "C:\\Program Files\\SAS\\SAS 9.1\\sas.exe", ('sysin', 'E:\\SASESRIPaper\\surveyselect.sas'))
```

Add the Python Script to the ArcMap Toolbox



Add the Python Script to the ArcMap Toolbox (continued)

Add Script [?] [X]

Name:
SampleSelect

Label:
Sample Select

Description:
Select a random sample of 20 pharmacies.

Stylesheet:
[] []

☐ Store relative path names (instead of absolute paths)

< Back Next > Cancel

Add Script [?] [X]

Script File:
E:\SASESRIPaper\surveyselect.py []

☐ Show command window when executing script

< Back Next > Cancel

Add the Python Script to the ArcMap Toolbox (continued)

Add Script

Display Name	Data Type

↑

↓

Click any parameter above to see its properties below.

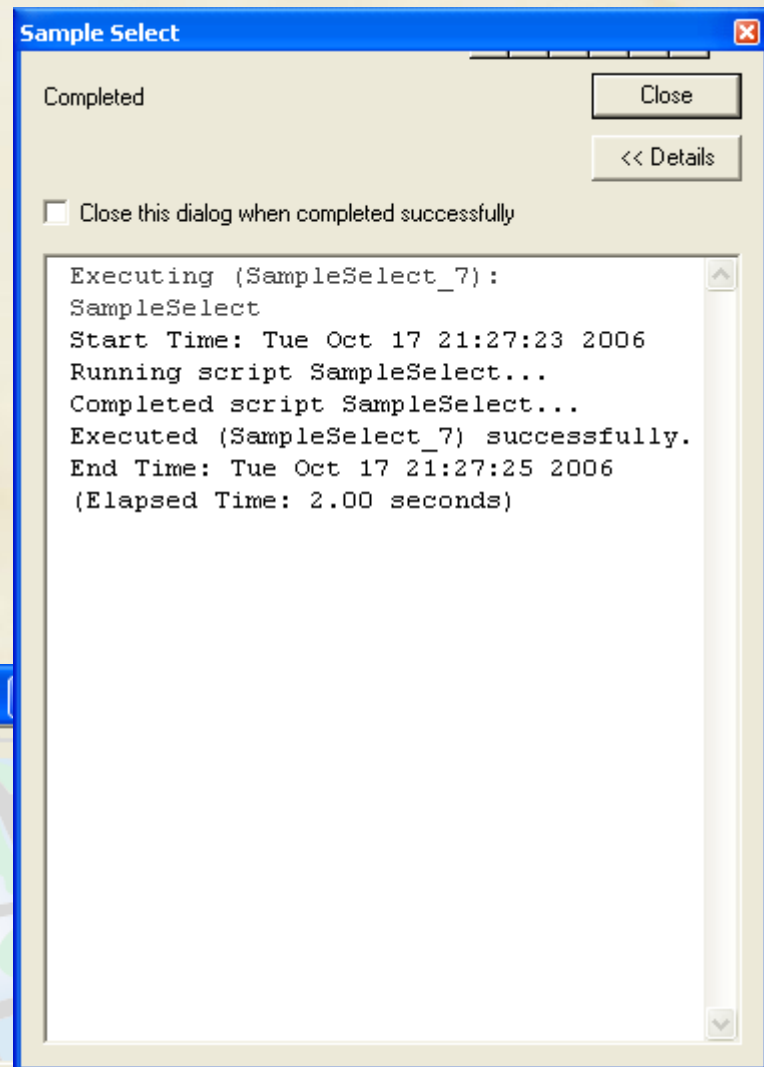
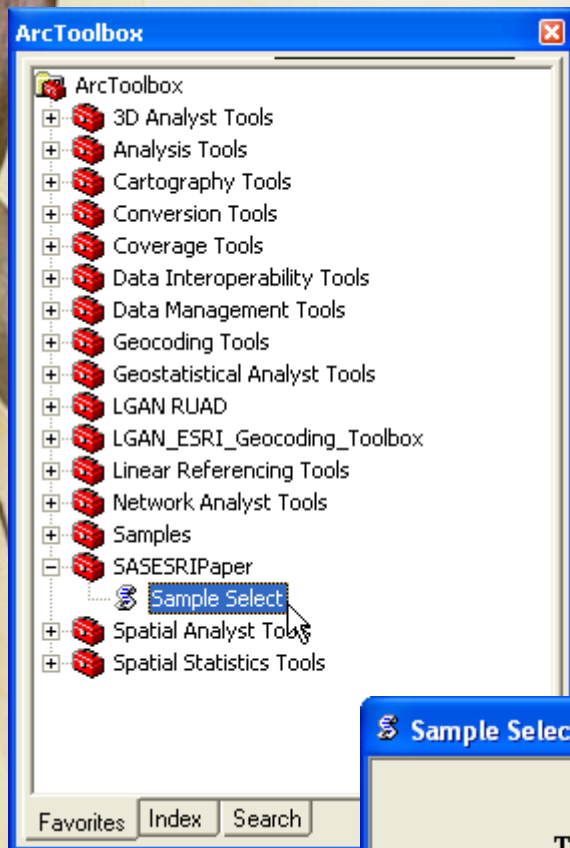
Parameter Properties

Property	Value

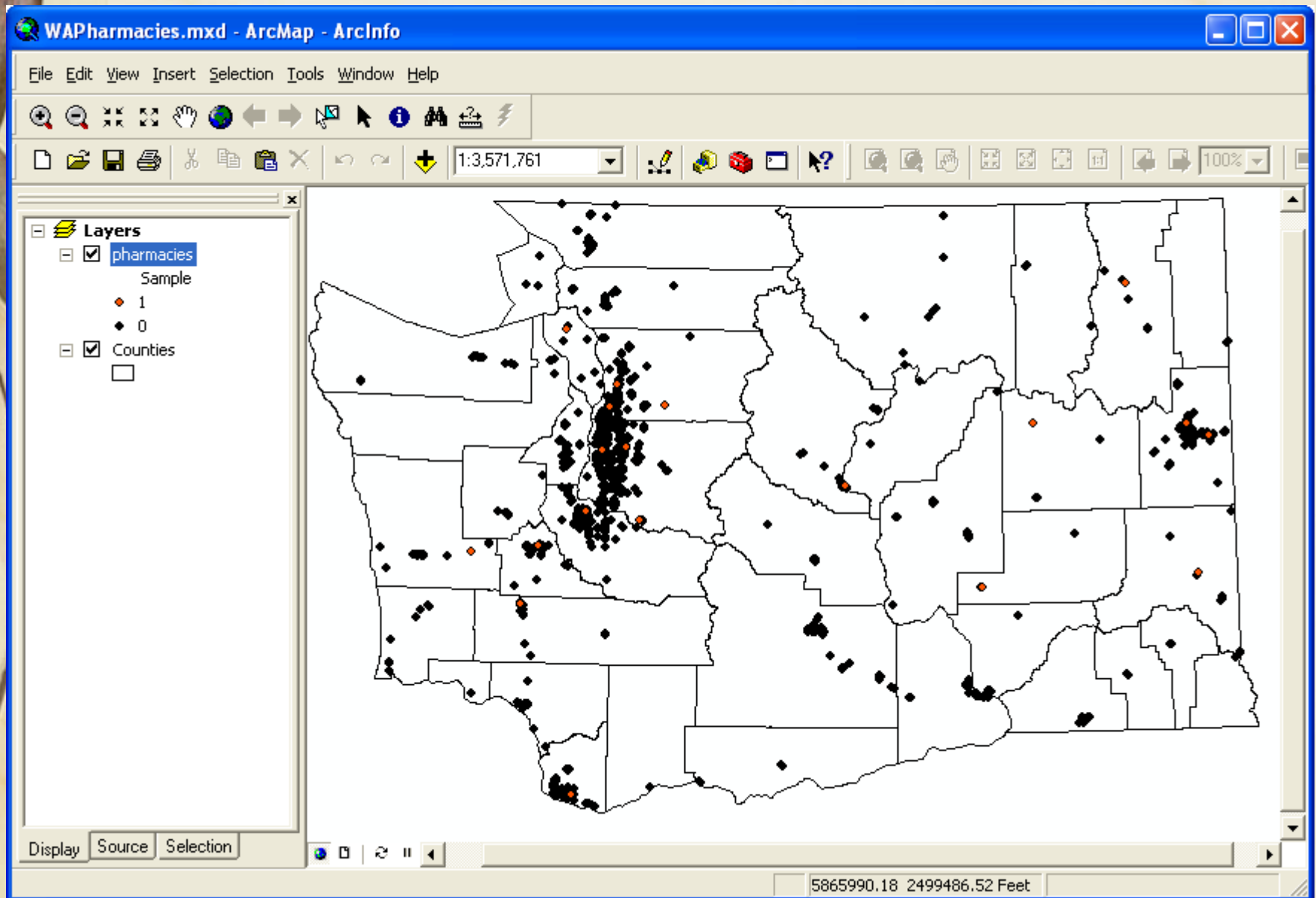
To add a new parameter, type the name into an empty row in the name column, click in the Data Type column to choose a data type, then edit the Parameter Properties.

< Back Finish Cancel

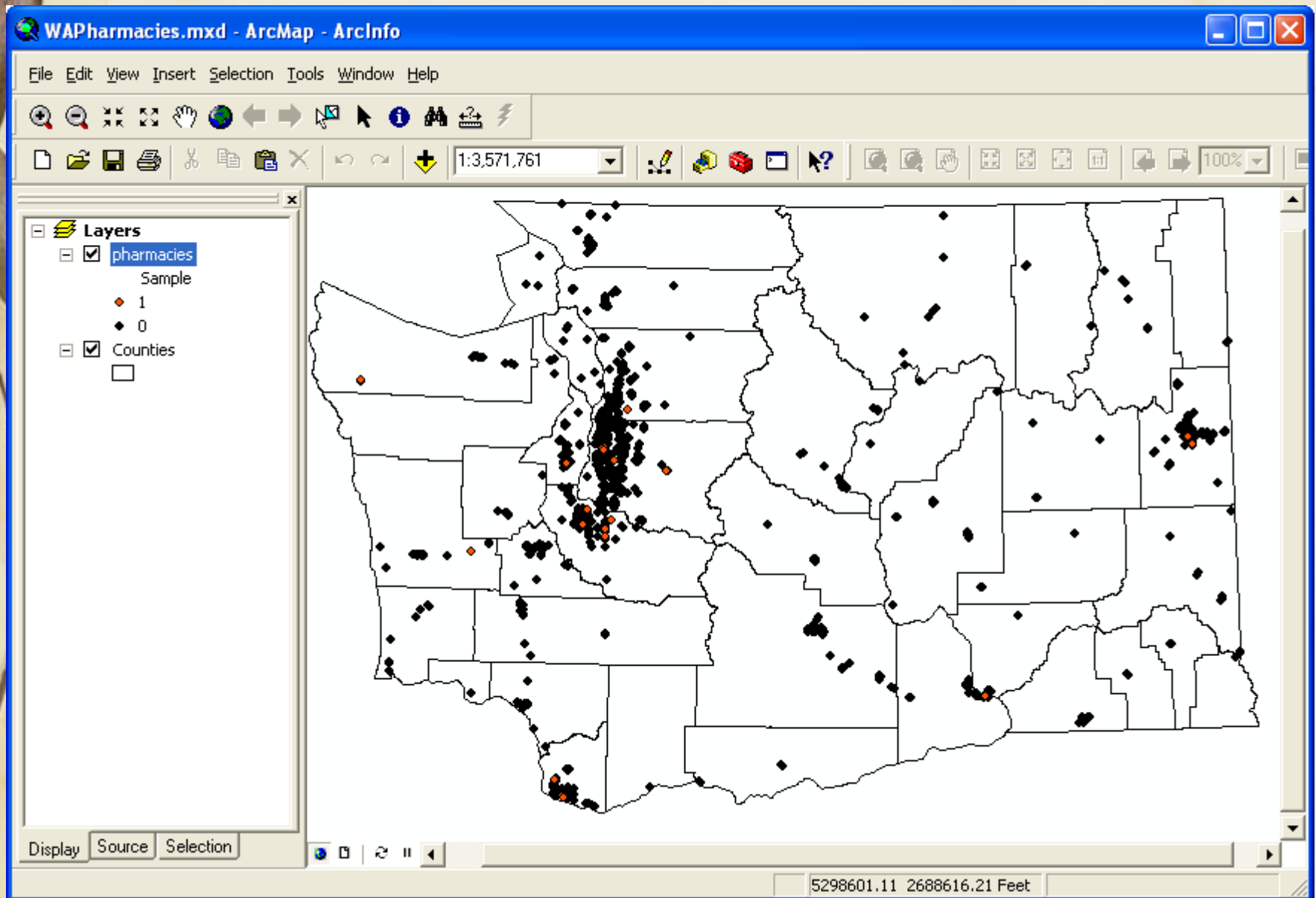
Calling The New Function



First Call Gives Use This Map



Second Call Gives Use This Map



A decorative graphic of a leafy branch is positioned on the left side of the slide, extending from the top to the bottom. The leaves are brown and green, and the branch is dark brown.

Linking SAS to ArcMap Using SAS Access to PC File Formats

- This Technique Works Both Ways
- Can be done using easier ESRI ModelBuilder Code Generator instead of Visual Basic
- SAS calls ArcMap using SYSEXEC



Using SAS Access To Read an ESRI Geodatabase

SAS Access to PC File Format “ACCESS” engine

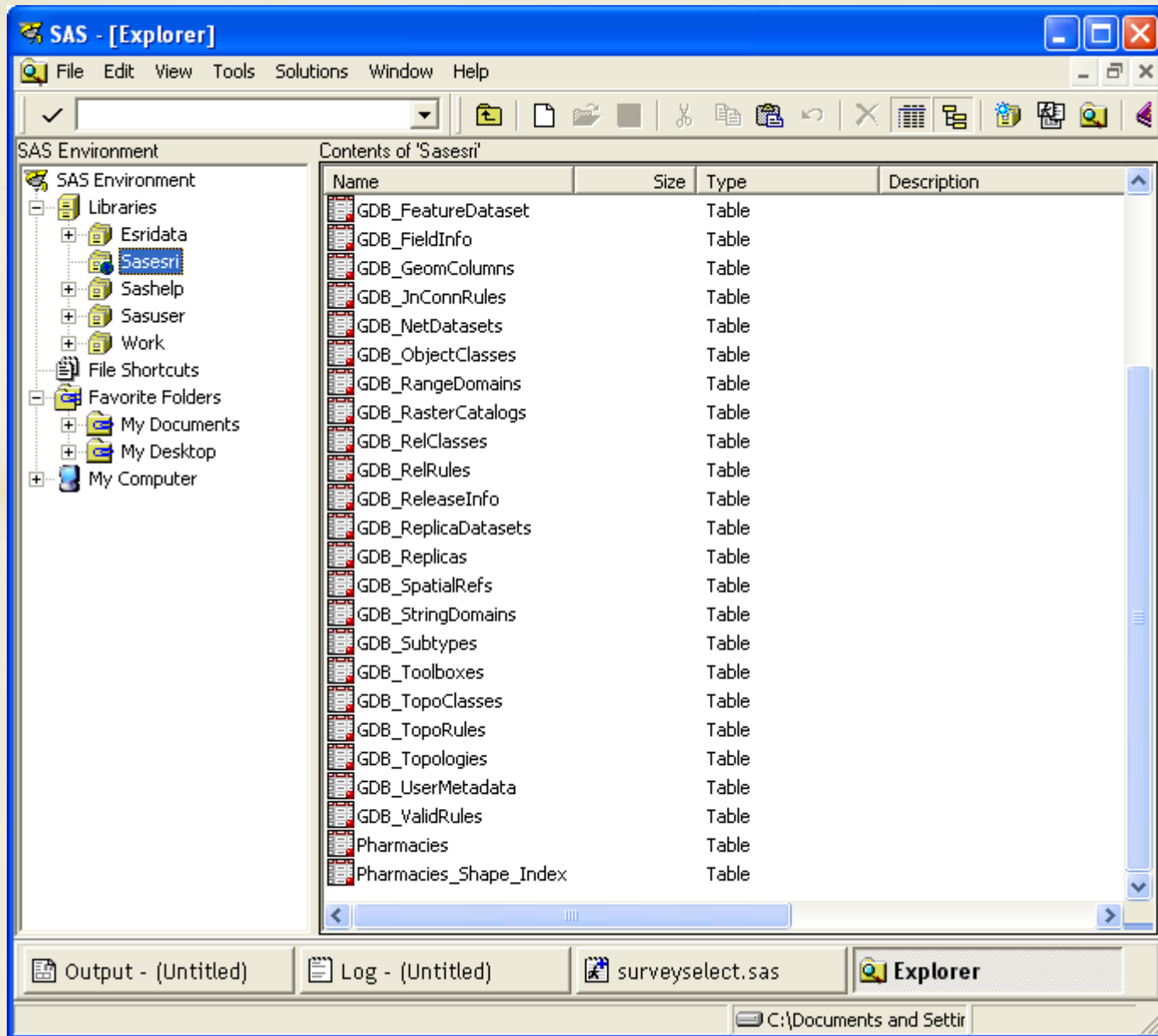
```
libname SASESRI access "E:\SASESRIPaper\Pharmacies.mdb";
```

SAS Access to ODBC engine

```
libname SASESRI odbc noprompt="driver={microsoft access driver (*.mdb)};  
dbq=E:\SASESRIPaper\Pharmacies.mdb";
```

SAS Access to the native database of an SDE Installation

Browse the ESRI Created Tables



Contents of the Main Table of the Layer

SAS - [VIEWTABLE: Test.Pharmacies]

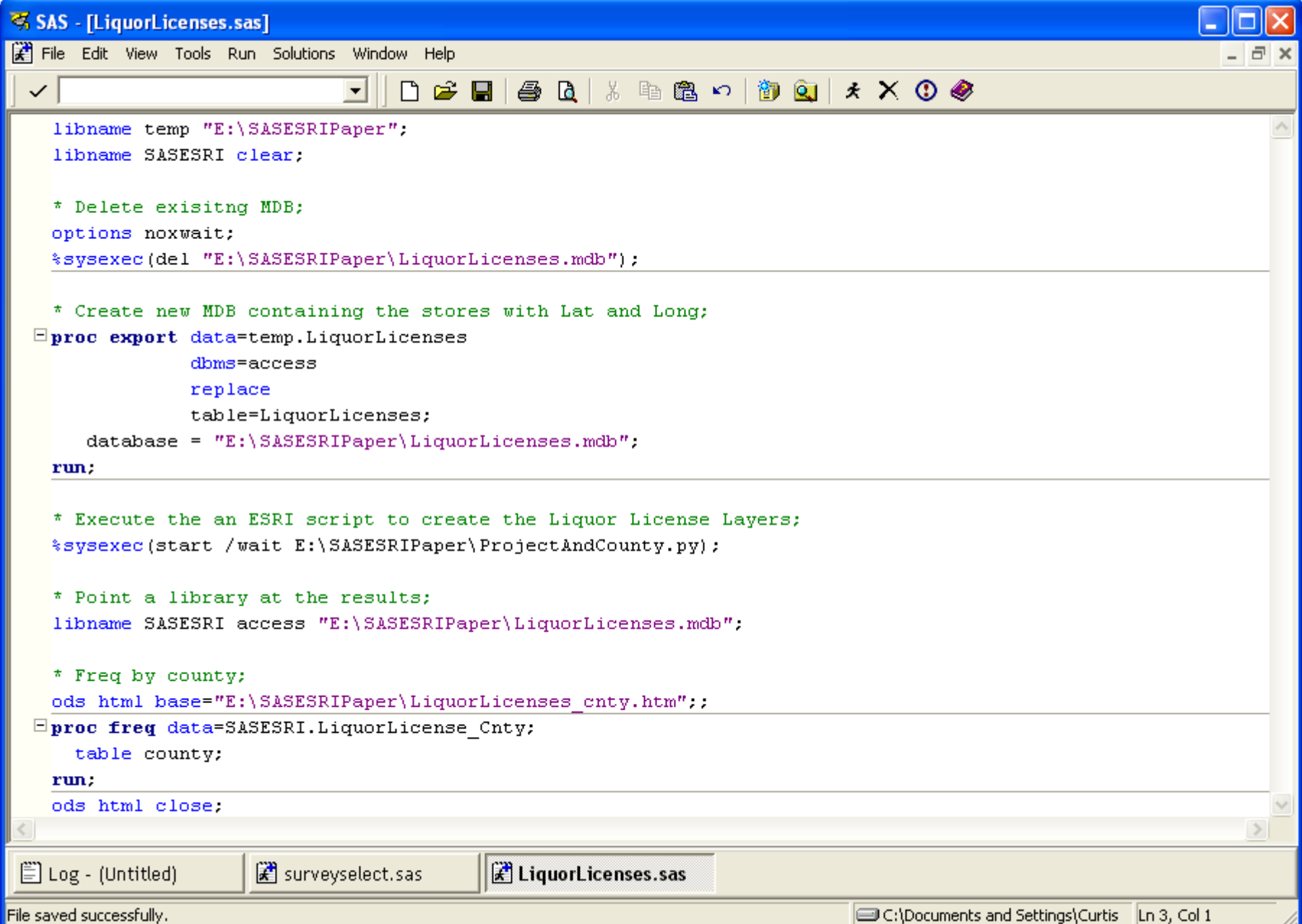
File Edit View Tools Data Solutions Window Help

	OBJECTID	Shape	LICTY	NAME	ADDRESS	CITY	ZIP	ZIP4	IN
1	1	01000000FF671DA	HF	AIRWAY HEIGHTS CORRECTION CTR	W 11919 SPRAGUE AVE	AIRWAY HEIGHTS	99001	1899	1
2	2	010000001FD4262	CF	ALBERTSON'S PHARMACY #242	NORTH 12312 STATE RTE #395	SPOKANE	99218		1
3	3	01000000CABA246	CF	BREWSTER DRUG INC	811 HWY 97 BOX 798	BREWSTER	98812		C
4	4	010000004753E49F	CF	DAVENPORT PHARMACY	525 MORGAN ST	DAVENPORT	99122		C
5	5	01000000A4FDBDF7	HF	EASTERN STATE HOSP PHCY-ESTLKE	PO BOX A	MEDICAL LAKE	99022	0045	C
6	6	01000000360DA35	HF	ENUMCLAW COMMUNITY HOSPITAL	PO BOX 218	ENUMCLAW	98022		1
7	7	01000000183D3C3	CF	FRICKS DRUGS	609 SEQUIM VILLAGE CENTER	SEQUIM	98382		C
8	8	0100000052C87CD	CF	GROSS DRUG	2520 FOSTER AVE	BRIDGEPORT	98813		C
9	9	0100000086EACF7	CF	HEDDENS PHARMACY INC	196 W SUSSEX	TENINO	98589		C
10	10	0100000059E232C	CF	INCHELIUM HEALTH CTR PHARMACY	PO BOX 290	INCHELIUM	99138		C
11	11	0100000098A4BDD	CF	KELLEY-ROSS PHARMACY	1120 HAVARD AVE	SEATTLE	98122		1
12	12	01000000FB59D47	CF	KETTLE FALLS PHARMACY	HIGHWAY 395	KETTLE FALLS	99141		C
13	13	01000000F471B89F	CF	LA CONNER DRUG STORE	708 E MORRIS ST	LA CONNER	98257	0477	C
14	14	01000000C2BC1E0	CF	LAKE CHELAN PHARMACY INC	223 E JOHNSON	CHELAN	98816		C
15	15	01000000D1CF306	CF	LINCOLN COUNTY PHARMACY, INC	621 MORGAN ST	DAVENPORT	99122	0458	C
16	16	010000001C089400	HF	MASON GENERAL HOSPITAL PHCY	901 MOUNTAIN VIEW DR	SHELTON	98584		C
17	17	0100000084A6F53	HF	MCNEIL ISLAND CORR CTR PHCY	PO BOX 88900	STEILACOOM	98388	0900	C
18	18	010000008ABEFC3	CF	MILL CREEK PHARMACY, INC	1025-153RD ST SE #104	MILL CREEK	98012		1
19	19	0100000072875260	CF	MOSES LAKE PROFESSIONAL PHCY	835 E COLONIAL AVE	MOSES LAKE	98837		C
20	20	0100000058E39980	CF	OCEAN PARK PHARMACY	P O BOX 206	OCEAN PARK	98640	0206	C
21	21	01000000FAAF854	HF	OKANOGAN-DOUGLAS CTY HOSP PHCY	P O BOX 577	BREWSTER	98812	0577	C
22	22	010000009FEB282	HF	PULLMAN MEMORIAL HOSP PHARMACY	WASHINGTON AVENUE	PULLMAN	99163		C
23	23	010000006CD7A37	CF	RAYMOND DRUG COMPANY	707 WILLAPA PL	RAYMOND	98577	1718	C
24	24	01000000C205F4FF	CF	RAY'S PHARMACY	TEMPLIN CENTER	EASTSOUND	98245		C
25	25	01000000A679843F	CF	REPUBLIC DRUG STORE	N 6 CLARK ST	REPUBLIC	99100		C

Output - (Untitled) Log - (Untitled) Editor - Untitled1 surveyselect.sas * Explorer VIEWTABLE: Test...

C:\Documents and Settings\Curtis

SAS Program to Add County to Points



The screenshot shows the SAS IDE window titled "SAS - [LiquorLicenses.sas]". The menu bar includes File, Edit, View, Tools, Run, Solutions, Window, and Help. The toolbar contains various icons for file operations and execution. The main editor area displays the following SAS code:

```
libname temp "E:\SASESRIPaper";
libname SASESRI clear;

* Delete exisitng MDB;
options noxwait;
%sysexec(del "E:\SASESRIPaper\LiquorLicenses.mdb");

* Create new MDB containing the stores with Lat and Long;
proc export data=temp.LiquorLicenses
    dbms=access
    replace
    table=LiquorLicenses;
    database = "E:\SASESRIPaper\LiquorLicenses.mdb";
run;

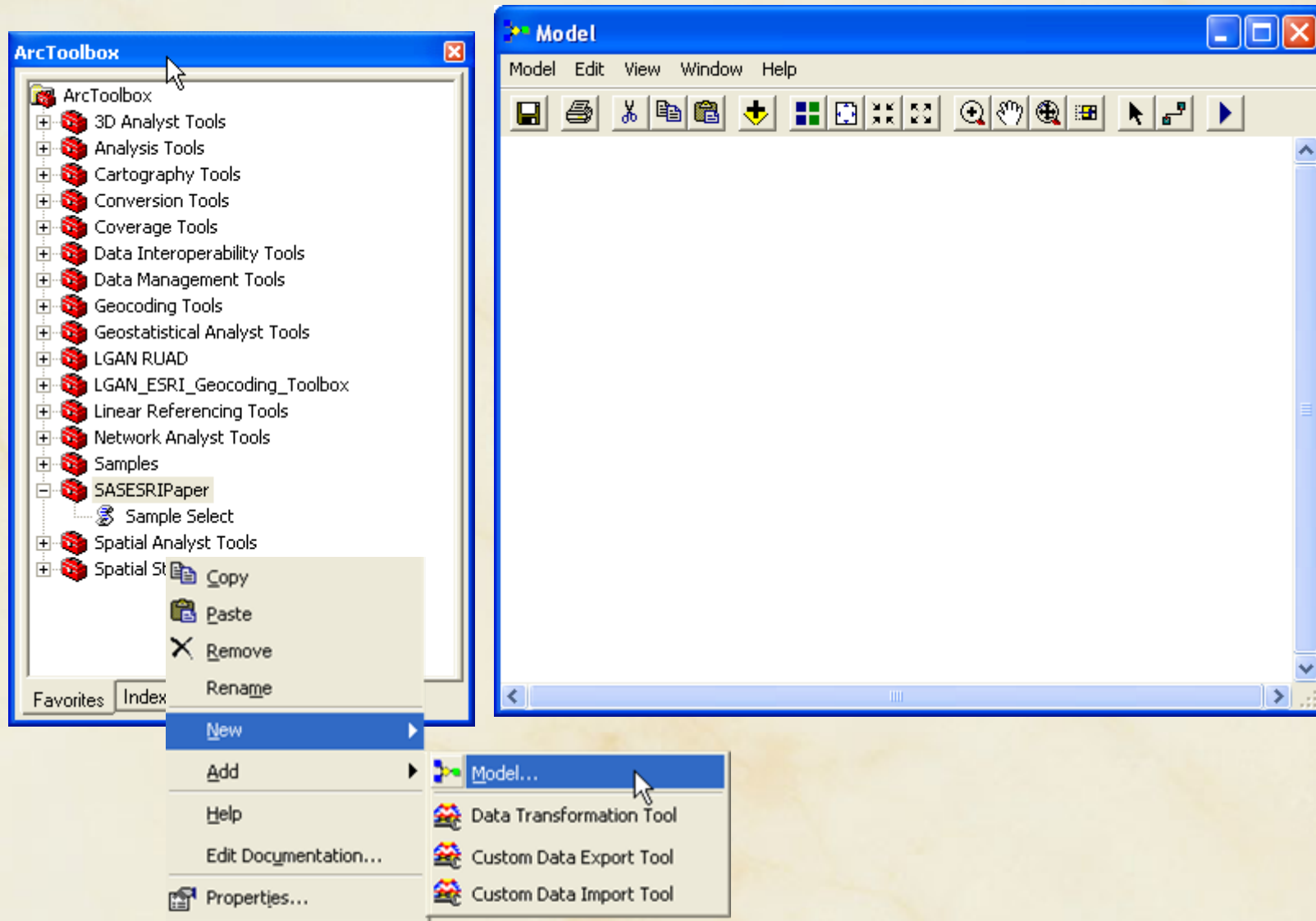
* Execute the an ESRI script to create the Liquor License Layers;
%sysexec(start /wait E:\SASESRIPaper\ProjectAndCounty.py);

* Point a library at the results;
libname SASESRI access "E:\SASESRIPaper\LiquorLicenses.mdb";

* Freq by county;
ods html base="E:\SASESRIPaper\LiquorLicenses_cnty.htm";;
proc freq data=SASESRI.LiquorLicense_Cnty;
    table county;
run;
ods html close;
```

The status bar at the bottom shows "File saved successfully." and the current file path "C:\Documents and Settings\Curtis". The cursor is at line 3, column 1.

Create a New ESRI Model



Write ESRI Model Process

Make XY Event Layer

XY Table
SESRIPaper\LiquorLicenses.mdb\LIQUORLICENSES

X Field
Longitude

Y Field
Latitude

Layer Name or Table View
LIQUORLICENSES_Layer

Spatial Reference (optional)
GCS_North_American_1983_HARN

OK Cancel

Project (3)

Input Dataset or Feature Class
LIQUORLICENSES_Layer

Output Dataset or Feature Class
E:\SASESRIPaper\LiquorLicenses.mdb\LiquorLicenses_Proj

Output Coordinate System
NAD_1983_HARN_StatePlane_Washington_South_FIPS_46

Apply Show Help >>

Identity

Input Features
LiquorLicenses_Proj

Identity Features
Counties

Output Feature Class
E:\SASESRIPaper\LiquorLicenses.mdb\LiquorLicense_Cnty

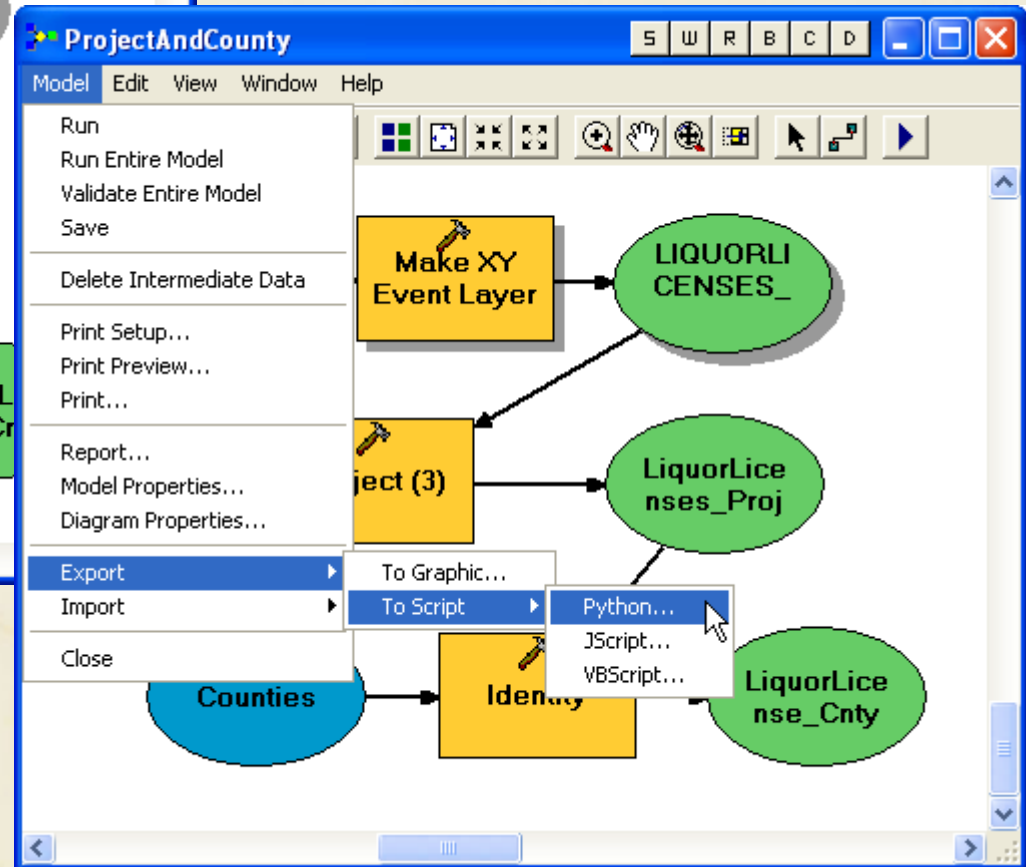
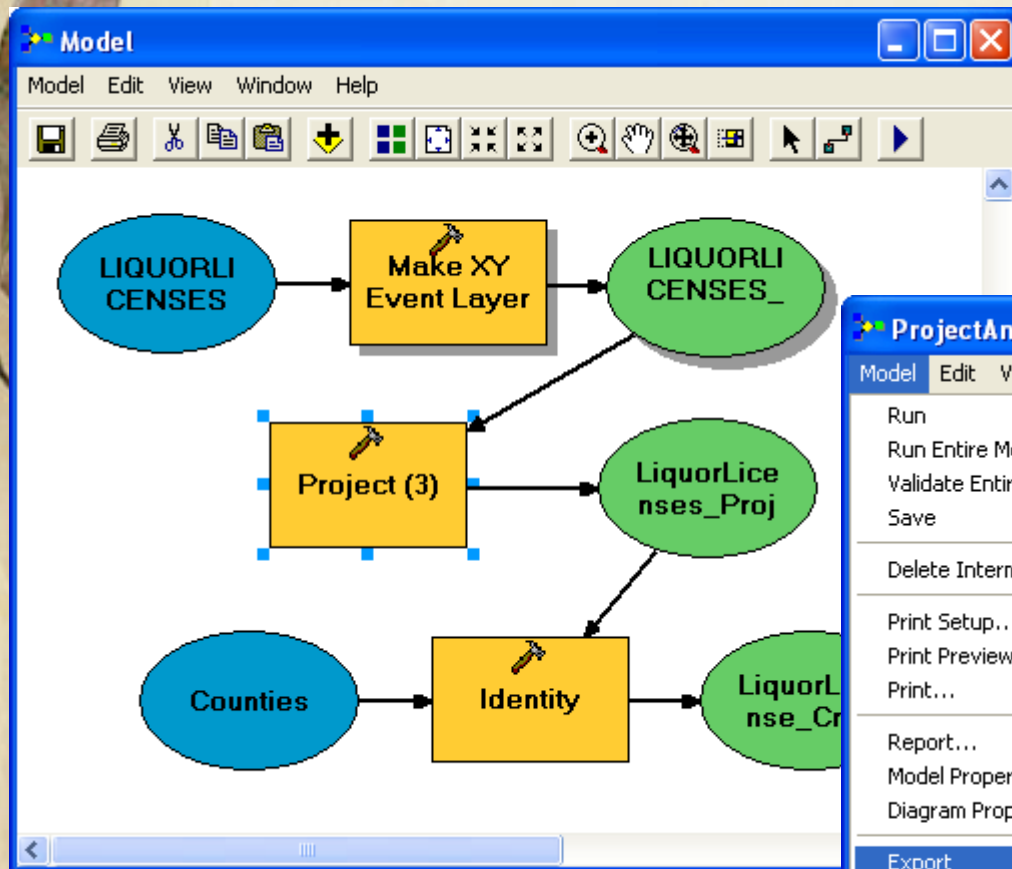
JoinAttributes (optional)
ALL

Cluster Tolerance (optional)
Feet

☐ Keep relationships (optional)

OK Cancel Apply Show Help >>

Export the Model to a Python Script





```
# -----  
# ProjectAndCounty.py  
# Created on: Tue Oct 17 2006 11:04:59 PM  
# (generated by ArcGIS/ModelBuilder)  
# -----
```

```
# Import system modules  
import sys, string, os, win32com.client
```

```
# Create the Geoprocessor object  
gp = win32com.client.Dispatch("esriGeoprocessing.GpDispatch.1")
```

```
# Set the necessary product code  
gp.SetProduct("ArcInfo")
```

```
# Load required toolboxes...  
gp.AddToolbox("C:/Program Files/ArcGIS/ArcToolbox/Toolboxes/Data Management Tools.tbx")  
gp.AddToolbox("C:/Program Files/ArcGIS/ArcToolbox/Toolboxes/Analysis Tools.tbx")
```

```
# Local variables...  
LIQUORLICENSES_Layer = "LIQUORLICENSES_Layer"  
LIQUORLICENSES = "E:\\SASESRIPaper\\LiquorLicenses.mdb\\LIQUORLICENSES"  
LiquorLicenses_Proj = "E:\\SASESRIPaper\\LiquorLicenses.mdb\\LiquorLicenses_Proj"  
LiquorLicense_Cnty = "E:\\SASESRIPaper\\LiquorLicenses.mdb\\LiquorLicense_Cnty"  
Counties = "Counties"  
county00_shp = "N:\\Generic\\GIS\\county00.shp"
```

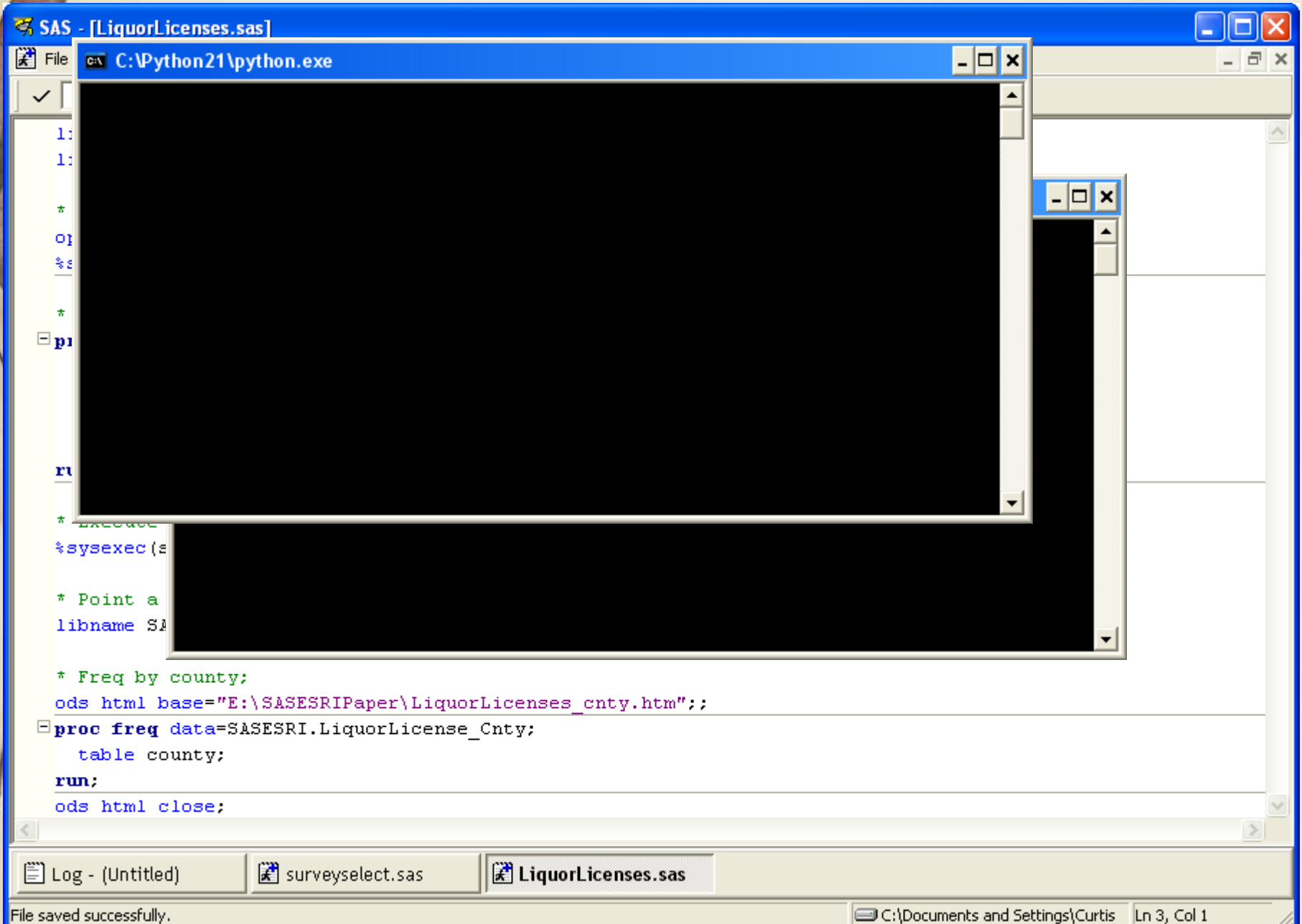
```
# Process: Make XY Event Layer...  
gp.MakeXYEventLayer_management(LIQUORLICENSES, "longitude", "latitude", LIQUORLICENSES_Layer,  
"GEOGCS['GCS_North_American_1983_HARN',DATUM['D_North_American_1983_HARN',SPHEROID['GRS_1980',6378137.0,298.257222  
101]],PRIMEM['Greenwich',0.0],UNIT['Degree',0.0174532925199433]];-10000 -10000 100000;0 100000;0 100000")
```

```
# Process: Project (3)...  
gp.Project_management(LIQUORLICENSES_Layer, LiquorLicenses_Proj,  
"PROJCS['NAD_1983_HARN_StatePlane_Washington_South_FIPS_4602_Feet',GEOGCS['GCS_North_American_1983_HARN',DATUM['D  
_North_American_1983_HARN',SPHEROID['GRS_1980',6378137.0,298.257222101]],PRIMEM['Greenwich',0.0],UNIT['Degree',0.017453292  
5199433]],PROJECTION['Lambert_Conformal_Conic'],PARAMETER['False_Easting',1640416.6666666667],PARAMETER['False_Northing',0.  
0],PARAMETER['Central_Meridian',-  
120.5],PARAMETER['Standard_Parallel_1',45.833333333333334],PARAMETER['Standard_Parallel_2',47.333333333333334],PARAMETER['L  
atitude_Of_Origin',45.333333333333334],UNIT['Foot_US',0.3048006096012192]]", "")
```

```
# Process: Identity...  
gp.Identity_analysis(LiquorLicenses_Proj, county00_shp, LiquorLicense_Cnty, "ALL", "", "NO_RELATIONSHIPS")
```

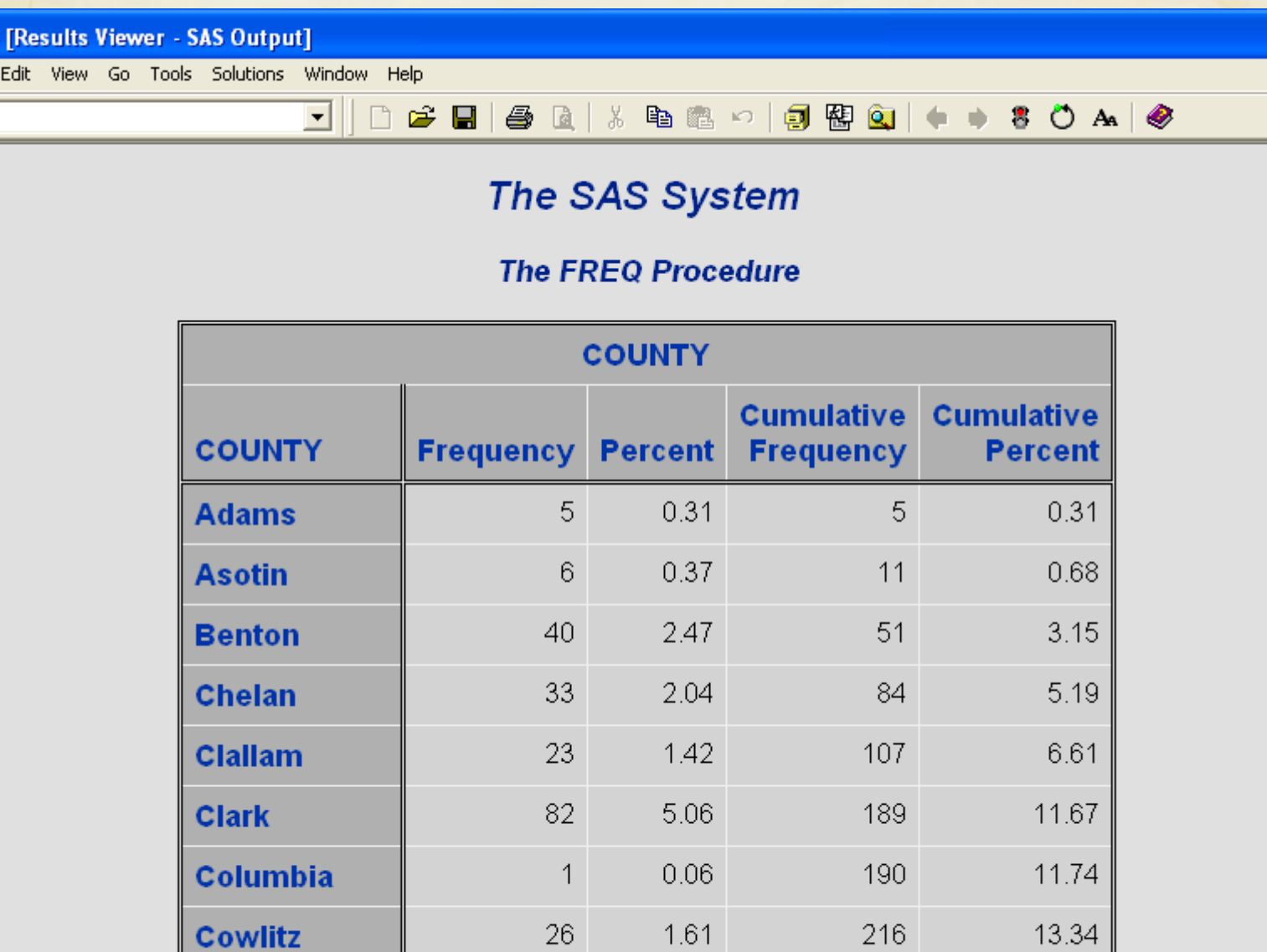
The Resulting Python Script

Run the SAS Program



A screenshot of the SAS File menu. The menu is open, showing options like 'File', a checkmark, and a 'Log' button at the bottom. The background is a close-up of a plant stem with a dried leaf.

Resulting Counts by County



The screenshot shows the SAS Results Viewer window. The title bar is "SAS - [Results Viewer - SAS Output]". The menu bar includes File, Edit, View, Go, Tools, Solutions, Window, and Help. The toolbar contains various icons for file operations and editing. The main content area displays the following text:

The SAS System

The FREQ Procedure

COUNTY				
COUNTY	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Adams	5	0.31	5	0.31
Asotin	6	0.37	11	0.68
Benton	40	2.47	51	3.15
Chelan	33	2.04	84	5.19
Clallam	23	1.42	107	6.61
Clark	82	5.06	189	11.67
Columbia	1	0.06	190	11.74
Cowlitz	26	1.61	216	13.34

The status bar at the bottom shows "Done" and the path "C:\Documents and Settings\Curtis". The taskbar at the very bottom shows several open windows: "Log - (Untitled)", "surveyselect.sas", "LiquorLicenses.sas *", and "Results Viewer - SA...".



Other Ways to Link Them

- ESRI Shape Files
 - This format uses .DBF files which can be read by PC File Formats.
 - Only suggested for reading because it is easy to destroy a Shape File
 - DBF has 10 character variable name limit
- ASCII Files
 - Many extra steps
 - Only requires base SAS.



Summary

- SAS/ESRI Bridge with VB code
 - Best option for robust production
 - Requires Additional License
 - More difficult object oriented coding
- SAS Access with Python Code
 - Uses familiar Coding style
 - Most SAS installations have one of these SAS/Access engines
 - Works with older technologies (Like My Brain ☺)



Thanks For Coming!

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Looking Glass Analytics
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