

Washington State Department of Revenue

**Comparison of Three Common Statistical Programs Available to
Washington State County Assessors: SAS, SPSS and NCSS**

February 2008

Abstract:

This summary compares three common statistical software packages available to county assessors in Washington State. This includes SAS, SPSS and NCSS. The majority of the summary is formatted in tables which allow the reader to more easily make comparisons. Information was collected from various sources and in some cases includes opinions on software performance, features and their strengths and weaknesses. This summary was written for Department of Revenue employees and county assessors to compare statistical software packages used by county assessors and as a result should not be used as a general comparison of the software packages. Information not included in this summary includes the support infrastructure, some detailed features (that are not described in this summary) and types of users.

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General software information

Information in this section was collected from various resources, including software vendors and websites. In addition, some of the information on SAS and SPSS was collected from a report completed by Michael Mitchell, a UCLA statistical consultant. The complete report can be found on UCLA's website, and can be downloaded at http://www.ats.ucla.edu/stat/technicalreports/Number1/ucla_ATSstat_tr1_1.0.pdf. Mitchell has worked with more than a dozen statistical packages, and has spent more than 20 years learning them. The report concentrates on his experiences using general purpose statistical software in his work as a statistical consultant. Specifically, the report compares SAS, SPSS and STATA. The report also includes thoughts and suggestions from a variety of other professionals. The only negative aspect on Mitchell's report is his preference to using the syntax mode in executing procedures.

	SAS	SPSS	NCSS
Acronym	Not official, but most sources state either Statistical Analysis System or Statistical Analysis Software	Statistical Package for the Social Sciences	Number Crunching Statistical System
Website	http://www.sas.com/index.html	http://www.spss.com/	http://www.ncss.com/ncss.html
Interface—syntax mode (a command line interface—CLI) or point-and-click (a graphical user interface—GUI).	SAS is primarily used in syntax mode. It also has some limited point-and-click procedures.	SPSS relies heavily on point-and-click procedures, but does allow the user to use the syntax mode.	NCSS only allows point-and-click procedures.
Information online involving CAMA/assessors office	No information available	Available at https://www.spss.com/pdfs/mass_valuation_wit_h_spss.pdf	Available at http://www.ncss.com/appraisal.html
CAMA software that has integrated with the statistics software ¹	Manatron	Manatron True Automation Colorado Customware Microsolve TerraScan	Manatron TerraScan

¹ Information collected from CAMA vendors.

General software information (continued)			
	SAS	SPSS	NCSS
Product documentation	SAS documentation is available online for free, but the documentation can be difficult to use. ² There are over 30 products that can be searched, and it can be difficult to find what the user needs. ² Most of the information available is for using the syntax mode, but a fair amount includes instructions using point-and-click procedures.	The SPSS package includes a CD with documentation files. They have been found to be nicely constructed and written. ² Almost all their instructions are geared for point-and-click procedures.	NCSS documentation information can be found in a CD, which is included with the software, and also in the help files. All instructions are for point-and-click procedures.
Help menus within the software	SAS software includes a step-by-step help menu designed for programmers or for those who have a programming background.	SPSS software includes a step-by-step help menu designed for those familiar with general statistics concepts. Learning to use the SPSS software does not require a programming background.	NCSS software includes a step-by-step quick start manual which is included in the help menu. Learning to use the NCSS software does not require a programming background.
Online help and step-by-step online tutoring	SAS's online help within the SAS website has been found to be even harder to use than the documentation section. ² The online tutoring covers topics such as data management and creating reports. Most of these topics are generally taught using the syntax mode, not point-and-click. SAS offers many online training courses. They also offer live online training at various locations throughout the U.S.	SPSS's online help focuses on providing information for point-and-click usage. It also includes a tutorial, statistics coach, and case studies (example studies). These are generally targeted towards beginners and often towards people who are not familiar with statistics. ² A negative aspect of the online help is that the user has to provide a user ID and password to access the help features. It can often be a burden to remember an ID and password if the user does not regularly use the online help features.	NCSS offers many step-by-step manuals that anyone can download from their website. The manuals are saved as very large pdf files, but are very detailed and easy to follow.

² Mitchell, M. N. (2005). Strategically using General Purpose Statistics Packages: A Look at Stata, SAS and SPSS (Technical Report Series, Report Number 1, Version Number 1). Statistical Consulting Group: UCLA Academic Technology Services. Available at http://www.ats.ucla.edu/stat/technicalreports/Number1/ucla_ATSstat_tr1_1.0.pdf

General software information (continued)			
	SAS	SPSS	NCSS
Hands-on training— teachers perspective	SAS is a power user program, and as a result has proven to be one of the most challenging programs to teach. ² Those that do not have any computer science background will often have trouble with the syntax (generating errors). ²	Generally, over the short term one can master SPSS faster than SAS. As with most point-and-click applications it can be difficult to teach a large group SPSS. ² The reason is that students need to follow along at the same pace as the teacher. If they fall behind, they oftentimes have a difficult time catching up.	It appears that NCSS would be easier to master than both SPSS and SAS, based on the step-by-step manuals available on their website. As with most point-and-click applications it can be difficult to teach a large group NCSS. ² The reason is that students need to follow along at the same pace as the teacher. If they fall behind, they oftentimes have a difficult time catching up.
Hands-on training— availability of training	There are many seminars and courses available to new and experienced users of SAS across the U.S.	There are many seminars and courses available to new and experienced users of SPSS across the U.S.	At this time limited, if any, training was available. NCSS does offer consulting services for training people how to use their software (training available for \$150/hour).
Training—appraisal specific	No training was found for appraisal specific procedures.	IAAO offers a course in utilizing SPSS. It is stated on the IAAO website that “SPSS is one of the most popular software packages used in the valuation process.” ³ SPSS has created a short manual showing users how to utilize SPSS in mass appraisal. The manual is available at https://www.spss.com/pdfs/mass_valuation_wit_h_spss.pdf .	There are not any courses available in utilizing NCSS and appraisal techniques, but they do offer procedures built specifically for mass appraisal. A list of the procedures is available at http://www.ncss.com/appraisal.html .
Available books and outside references	SAS has its own publishing arm, and as a result there is an abundance of books and reports available for users who need help. ²	SPSS does not have its own publishing arm, but there is an abundance of online resources, reports and also books available for purchase.	NCSS does not have its own publishing arm, and it does not have many books or other resources available for purchase. This is most likely because NCSS isn’t as widely used as SPSS or SAS.

³ IAAO. Downloaded December 18th, 2007 from <http://www.iaao.org/sitepages.cfm?Page=26>

General software information (continued)			
	SAS	SPSS	NCSS
Syntax mode vs. point-and-click	SAS almost has no limitations, assuming the user becomes fluent in the syntax language. SAS commands have a common command structure, but it's not the simplest available. ² Many of the commands come in the form of coding that can require more than one statement. Oftentimes this requires lots of typing.	SPSS stresses its point-and-click interface as a primary means of working with SPSS. A negative is that it is often more difficult to replicate analysis. To repeat an analysis the user has to repeat the entire point-and-click process, making the analysis more prone to errors. SPSS does allow the user to create macros to repeat analysis, but it is not as powerful as using a syntax language. Users can access syntax, but appears to be more difficult to use than SAS syntax.	NCSS stresses its point-and-click interface as a primary means of working with NCSS, and does not allow the user to run procedures in a syntax mode. A negative of this is that it is oftentimes more difficult to replicate analysis. To repeat an analysis the user has to repeat the entire point-and-click process, making the analysis more prone to errors. NCSS does not offer the use of macros.
User interface windows	<p>SAS defaults to load three windows:</p> <p>The Explorer window provides a central access point to data. It is similar to Microsoft Office's explorer window.</p> <p>The Editor window gives the user an area to enter procedures (syntax).</p> <p>The Log window allows the user to review program statements that are submitted to SAS, review system messages and errors, and review program speed and resource usage figures.</p> <p>In addition to these windows SAS also provides the user with dozens of additional screens that can be pulled up depending on the analysis.</p>	<p>SPSS defaults to four windows:</p> <p>The Data Editor, which is a spreadsheet system for defining, entering, editing, and displaying data.</p> <p>The Syntax Editor is a text editor system for syntax composition.</p> <p>The Output Navigator is a results window. Output and errors are displayed in this window.</p> <p>The Script Editor allows the user to automate tasks using point-and-click procedures.</p>	<p>NCSS has three components:</p> <p>NCSS Data Window contains the data that is currently being analyzed. This window allows the user to view, modify, and save their data.</p> <p>The Procedure window lets the user set options for a particular analysis.</p> <p>The Output Window displays the output from the statistical and graphics procedures.</p>

Below is a summary of assessor offices in Washington State and their status of acquiring SPSS and NCSS.

Washington State Assessors Using SPSS or NCSS in 2008/2009			
County	Revaluation Cycle in 2008	Have SPSS?	Have NCSS?
Adams	Annual	No	No
Asotin	4 Year	No	No
Benton	Annual	No	No
Chelan	4 Year	next year with True Automation	No
Clallam	Annual	next year with True Automation	No
Clark	Annual	next year with True Automation	Yes
Columbia	4 Year	No	No
Cowlitz	Annual	No	Yes
Douglas	2 Year	No	No
Ferry	4 Year	No	No
Franklin	Annual	No	No
Garfield	Annual	No	No
Grant	4 Year	No	No
Grays Harbor	4 Year	No	No
Island	Annual	anticipate SPSS	No
Jefferson	4 Year	No	No
King	Annual	No	Yes
Kitsap	Annual	No	No
Kittitas	4 Year	No	No
Klickitat	4 Year	No	No
Lewis	4 Year	No	No
Lincoln	Annual	No	No
Mason	4 Year	No	No
Okanogan	4 Year	No	No
Pacific	4 Year	No	No
Pend Oreille	4 Year	No	No
Pierce	Annual	No	No
San Juan	3 Year	No	No
Skagit	Annual	next year with True Automation	No
Skamania	Annual	No	No
Snohomish	Annual	Yes	No
Spokane	Annual	No	No
Stevens	4 Year	No	No
Thurston	Annual	Yes	No
Wahkiakum	4 Year	No	No
Walla Walla	Annual	No	No
Whatcom	4 Year	Yes	No
Whitman	Annual	No	No
Yakima	Annual	Yes	No
Summary	Count of Yes	4	3
	Count of anticipate	5	0
	Count of No	30	36
	Total	39	39

Statistics and Procedures Components

This section summarizes some statistical procedures (calculations) that are assumed to be important to county assessor offices. Some offices may not currently utilize all the procedures, but it is assumed they may consider using them in the future (specifically, the hybrid regression appraisal models).

	SAS	SPSS	NCSS
Websites showing detailed listing of available statistical procedures (not necessarily official websites)	http://library.stanford.edu/services/social_sci_data_soft/docs/software_docs_SAS_Win.pdf	http://www.spss.com/spss/alpha.htm	http://www.ncss.com/ncss_procedures.html
Descriptive Statistics (Mean, median, mode, min, max, charts, tables, percentiles, etc)	Yes	Yes	Yes
Non-parametric tests (Chi-square, t-tests, Mann-Whitney, Spearman, etc)	Yes	Yes	Yes
Analysis of Variance (ANOVA)	Yes	Yes	Yes
Forecasting	Yes (using syntax only, not point-and-click)	No (but an extensive module can be purchased separately)	Yes
Proportions (ratio) (Confidence intervals for ratios)	Yes (using syntax only, not point-and-click)	Yes	Yes
Proportions (ratio) (Hypothesis testing for ratios)	Yes (using syntax only, not point-and-click)	No	Yes

Statistics and Procedures Components (continued)

	SAS	SPSS (Base software)	NCSS
“Appraisal” tools (Sales Ratio—weighted mean, COD, PRD)	Yes (using syntax only, not point-and-click)	Yes	Yes
“Appraisal” tools (Comparables—algorithms for finding a set of comparables for a subject property)	No	No	Yes
Simple Linear Regression Analysis	Yes	Yes	Yes
Multiple Linear Regression Analysis	Yes	Yes	Yes
Non-Linear Regression Analysis	Yes (using syntax only, not point-and-click)	No (but an extensive module can be purchased separately)	Yes
Hybrid Appraisal Regression Models	No (but a user could most likely program their own syntax and create their own procedure)	No (but an extensive module can be purchased separately)	Yes
Sample Size (Selecting appropriate sample sizes)	Yes (limited using point-and-click, more extensive using syntax mode)	No (but an extensive module can be purchased separately)	No (but an extensive sampling program can be purchased separately)

Cost Estimates

Below is a summary of costs and purchasing options for each of the three software vendors. The following two pages include cost scenarios based on five years and also ten years of using the software packages. Note that many CAMA systems incorporate the cost of statistics software in the overall purchase price of their CAMA system, and as a result these cost estimates may not apply to county’s who are interested in such CAMA software systems. While cost can be a barrier to purchasing a specific software package, “Using an inappropriate tool to save a modest amount of money is more costly in terms of your time, and more costly in terms of handicapping your ability to put forth the most compelling statistical case possible.”²

Vendor:	SAS	SPSS	NCSS
Vendor pricing website:	http://www.sas.com/nextsteps/index.html or http://techmall.dis.wa.gov/services/sas.aspx	http://www.spss.com/stores/1/?source=homepage&hpzone=nav_bar	http://www.ncss.com/index.htm
Contact:	(206) 682-6084	Stephen Archut ((800) 543-2185 ext 3711)	Chris Hintze (chrish@ncss.com)
Purchasing licenses:	Licenses are purchased each year.	Licenses are purchased each year.	Each user’s computer must be licensed separately.
Site/network license available?	Yes	Yes	No
General pricing:	Each computer can be licensed individually, or be part of a site/network license agreement. Prices are set per license per year (if purchased through TechMall—see link below). Licenses must be paid each year to use SAS software.	Each computer can be licensed individually, or be part of a site/network license agreement. Price depends on the number of users and licenses.	NCSS software is priced per license. Discounted pricing is based on the number of licenses purchased. NCSS does not offer maintenance, but offers discounted upgrades for those who have previously purchased NCSS.
Detailed pricing:	Pricing is set at \$825 per license per year. More information is available at http://techmall.dis.wa.gov/services/sas.aspx (pricing available to local, county and Washington State government agencies). Or call (206) 682-6084.	SPSS starts at \$1,139 per license and is less if multiple licenses are purchased. If a site/network license is purchased the user must also purchase at least one year of maintenance. Government pricing is available at http://www.gsawebblink.com/sps/ , or call Stephen at (800) 543 2185 ext 3711.	NCSS pricing starts at \$499.95 per license and decreases in price based on the number of licenses purchased. Discounts available for 2-packs, 5- packs, 10-packs, and 25-packs. More pricing information is available at https://ssl.icw.com/forms/ncss/ncss_order_government.asp , or by contacting Chris.
Cost for maintenance and upgrades:	Maintenance and upgrades are included in the yearly license fee.	Available for an additional \$400 per license per year.	Maintenance not available. Upgrades are available for a discount.

The following price scenarios are based on five users having access to the software. Both SAS and SPSS offer site/network licenses, which allow users to purchase less licenses than the number of actual users (in this scenario there are five users and three licenses purchased). Please note that these prices only reflect the summary shown and may be different depending on the number of users, licenses purchased, upgrades and maintenance agreement. The scenario below is based on using the software for five years. Estimates do not include potential increases in inflation. Because SPSS offers many different purchasing options, three scenarios are shown for SPSS.

Software	Scenario #	Scenario description	Number of licenses purchased	Number of allowed users	Cost per license	Cost of maintenance per year per license	Initial investment costs
SAS	1	License fee is paid each year. Includes maintenance. Includes upgrades.	3	5	\$ 825	\$ 825	\$ 2,475
SPSS	2	One time site/network license fee. Maintenance fee paid yearly. Includes upgrades.	3	5	\$ 1,139	\$ 400	\$ 3,417
SPSS	3	One time site/network license fee. Maintenance fee paid the first year only. Upgrades require re-purchasing software after the first year.	3	5	\$ 1,139	\$ 400	\$ 3,417
SPSS	4	One time license fee (paid for each user). Upgrades require re-purchasing software.	5	5	\$ 1,139	\$ -	\$ 5,695
NCSS	5	One time license fee (priced at purchasing a 5-pack). Upgrades available at a discount to those who already have software. No maintenance available.	5	5	\$ 2,000	\$ -	\$ 2,000

Software	Scenario #	Maintenance & Upgrade						Total cost for five employees for five years	Total cost per employee for five years	Total cost per employee per year
		1 st year	2 nd year	3 rd year	upgrade	4 th year	5 th year			
SAS	1	\$ 2,475	\$ 2,475	\$ 2,475	\$ -	\$ 2,475	\$ 2,475	\$ 12,375	\$ 2,475	\$ 495
SPSS	2	\$ 1,200	\$ 1,200	\$ 1,200	\$ -	\$ 1,200	\$ 1,200	\$ 9,417	\$ 1,883	\$ 377
SPSS	3	\$ 1,200	\$ -	\$ -	\$ 3,417	\$ 1,200	\$ -	\$ 9,234	\$ 1,847	\$ 369
SPSS	4	\$ -	\$ -	\$ -	\$ 5,695	\$ -	\$ -	\$ 11,390	\$ 2,278	\$ 456
NCSS	5	\$ -	\$ -	\$ -	\$ 1,250	\$ -	\$ -	\$ 3,250	\$ 650	\$ 130

The following price scenarios are based on five users having access to the software. Both SAS and SPSS offer site/network licenses, which allow users to purchase less licenses than the number of actual users (in this scenario there are five users and three licenses purchased). Please note that these prices only reflect the summary shown and may be different depending on the number of users, licenses purchased, upgrades and maintenance agreement. The scenario below is based on using the software for ten years. Estimates do not include potential increases in inflation. Because SPSS offers many different purchasing options, three scenarios are shown for SPSS.

Software	Scenario #	Scenario description	Number of licenses purchased	Number of allowed users	Cost per license	Cost of maintenance per year per license	Initial investment costs
SAS	1	License fee is paid each year. Includes maintenance. Includes upgrades.	3	5	\$ 825	\$ 825	\$ 2,475
SPSS	2	One time site/network license fee. Maintenance fee paid yearly. Includes upgrades.	3	5	\$ 1,139	\$ 400	\$ 3,417
SPSS	3	One time site/network license fee. Maintenance fee paid the first year only. Upgrades require re-purchasing software after the first year.	3	5	\$ 1,139	\$ 400	\$ 3,417
SPSS	4	One time license fee (paid for each user). Upgrades require re-purchasing software.	5	5	\$ 1,139	\$ -	\$ 5,695
NCSS	5	One time license fee (priced at purchasing a 5-pack). Upgrades available at a discount to those who already have software. No maintenance available.	5	5	\$ 2,000	\$ -	\$ 2,000

Software	Scenario #	Maintenance & Upgrades													Total cost for five employees for ten years	Total cost per employee for ten years	Total cost per employee per year
		1 st year	2 nd year	3 rd year	upgrade	4 th year	5 th year	6 th year	upgrade	7 th year	8 th year	9 th year	upgrade	10 th year			
SAS	1	\$2,475	\$2,475	\$2,475	\$ -	\$2,475	\$2,475	\$2,475	\$ -	\$2,475	\$2,475	\$2,475	\$ -	\$2,475	\$ 24,750	\$ 4,950	\$ 495
SPSS	2	\$1,200	\$1,200	\$1,200	\$ -	\$1,200	\$1,200	\$1,200	\$ -	\$1,200	\$1,200	\$1,200	\$ -	1,200	\$ 12,000	\$ 2,400	\$ 240
SPSS	3	\$1,200	\$ -	\$ -	\$3,417	\$1,200	\$ -	\$ -	\$3,417	\$1,200	\$ -	\$ -	\$3,417	\$1,200	\$ 15,051	\$ 3,010	\$ 301
SPSS	4	\$ -	\$ -	\$ -	\$5,695	\$ -	\$ -	\$ -	\$5,695	\$ -	\$ -	\$ -	\$5,695	\$ -	\$ 17,085	\$ 3,417	\$ 342
NCSS	5	\$ -	\$ -	\$ -	\$1,250	\$ -	\$ -	\$ -	\$1,250	\$ -	\$ -	\$ -	\$1,250	\$ -	\$ 3,749	\$ 750	\$ 75

Other Statistics Software

A list of some other software packages not discussed in this summary is shown below. The list is shown to give the reader an idea of how many other statistics software packages are available for use. Some of these packages are programmed for specific fields of research, such as biology or social sciences. The list was downloaded from Wikipedia on December 26, 2007 (see http://en.wikipedia.org/wiki/Comparison_of_statistical_packages#Reviews_of_statistical_packages).

Product (includes links to Wikipedia)	Developer (includes links to vendor sites)	Latest version date	Interface
MacAnova	Gary W. Oehlert and Christopher Bingham	Aug 29, 2005	GUI
Dataplot	Alan Heckert	March 2005	CLI/GUI
SalStat	Alan James Salmoni	Feb 2007	GUI
Primer	Primer-E	Feb 2007	GUI
ASReml	VSN International	Feb 2007	CLI/GUI
AcaStat	Acastat		GUI
Analyse-it	Analyse-it		GUI
BioStat	AnalystSoft	January 8, 2007	GUI
BrightStat	Daniel Stricker	September 17, 2007	GUI
EasyReg	Herman J. Bierens		GUI
Epi Info	Centers for Disease Control and Prevention	July 9, 2007	CLI/GUI
EViews	Quantitative Micro Software	March 2007	CLI/GUI
GAUSS	Aptech system	2006	CLI
GenStat	VSN International	July 2006	CLI/GUI
gretl	The gretl Team	November 27, 2007	CLI/GUI
JMP	SAS Institute	November 1, 2005	GUI/CLI
Mathematica	Wolfram Research	June 20, 2005	CLI/GUI
MedCalc	Frank Schoonjans	March 7, 2007	GUI
modelQED	[marketingqed]	June 15, 2007	GUI
Minitab	Minitab Inc.	January 10, 2007	CLI/GUI
NCSS	NCSS Statistical Software		GUI
OpenEpi	A. Dean, K. Sullivan, M. Soe	September 2007	GUI
Origin	OriginLab		GUI
Ox programming language	OxMetrics, J.A. Doornik	October 2007	CLI
OxMetrics	OxMetrics, J.A. Doornik	October 2007	CLI/GUI

Product (includes links to Wikipedia)	Developer (includes links to vendor sites)	Latest version date	Interface
Origin	OriginLab		GUI
Partek	Partek	June 2007	GUI
PSPP	Psppt	August 3, 2005	CLI
R	R Foundation	April 24, 2007	CLI
R Commander^[2]	John Fox	August 1, 2006	CLI/GUI
RATS	Estima	October 1, 2007	CLI/GUI
RKWard	RKWard Community	February 15, 2007	GUI
SAS	SAS Institute	April, 2006	CLI/GUI
SOCR	UCLA	November 30, 2006	GUI
Stata	Statacorp	July 13, 2006	CLI/GUI
Statgraphics	StatPoint	June, 2005	GUI
STATISTICA	StatSoft		GUI
StatIt	StatIt		GUI
StatPlus	AnalystSoft	January 7, 2007	GUI
SPlus	Insightful Inc.	2005	CLI
SPSS	SPSS Inc.	2007	GUI
StatsDirect	StatsDirect		GUI
Statistix	Statistix		GUI
SYSTAT	Systat Software Inc.	February 21, 2007	CLI/GUI
UNISTAT	Unistat Ltd	March 15, 2005	GUI, Excel
VisualStat	VisualStat Computing		GUI
Winpepi	J. H. Abramson	Sep 2007	GUI
XLStat	Kovach Computing		Excel
XploRe	MD*Tech	2006	GUI