

Spatial Data Analysis Network (SPAN)

NEWSLETTER



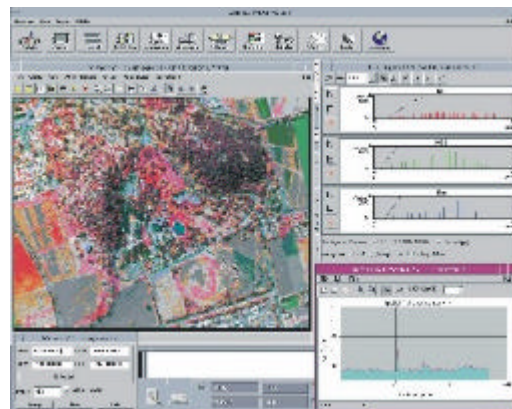
FEBRUARY 2000

Mission Statement: *"To achieve excellence in the application of innovative spatial analysis in support of research, education and community outreach."*

ERDAS Imagine

ERDAS IMAGINE: SPAN's remote sensing users may be aware that Earth Resource Mapping decided late last year to no longer continue development of ERMAPPER for the UNIX environment. As a result SPAN's Board of Management decided that ERDAS Imagine should replace ERMAPPER as our remote sensing software. SPAN has recently received it's ERDAS Imagine 8.4 remote sensing software. The modules SPAN is licensed for are -:

- IMAGINE Essentials
- IMAGINE Advantage
- IMAGINE Professional
- IMAGINE Radar Interpreter
- IMAGINE Vector
- IMAGINE VirtualGIS.



Twelve licenses are available for use by CSU researchers on SPAN's central UNIX system SPANW. All remote sensing users are encouraged to use the new software.

Community Salinity Summit: Solutions to Salinity

SPAN staff recently attended a Community Salinity Summit held at CSU's Wagga Wagga campus (3rd and 4th February, 2000).

Acknowledging the communities role in land management was one of the main focus points of the summit as well as community education and the impacts of salinity in both urban and rural areas. The summit provided the community with an opportunity to express their concerns and ideas about salinity and to play an active role in policy



making before the NSW Government Salinity Summit in Dubbo (16th and 17th March, 2000).

The summit brought together land managers, representatives from Government departments, Universities, research scientists, local Councils, Aboriginal groups, conservation groups and interested members of the public.

Salinity related webpages:

- National Dryland Salinity Program: www.lwrrdc.gov.au/ndsp/
- National Land & Water Resources Audit: www.nlwra.gov.au/
- Murray-Darling Basin Commission Salinity Audit 1999: www.mdbc.gov.au/Issues/Salinity_Audit/
- Mapping and Monitoring Salinity: www.cmis.csiro.au/rsm/research/flyers/mapsal/mapsal.html

SPAN Officer appointed for Bathurst Campus



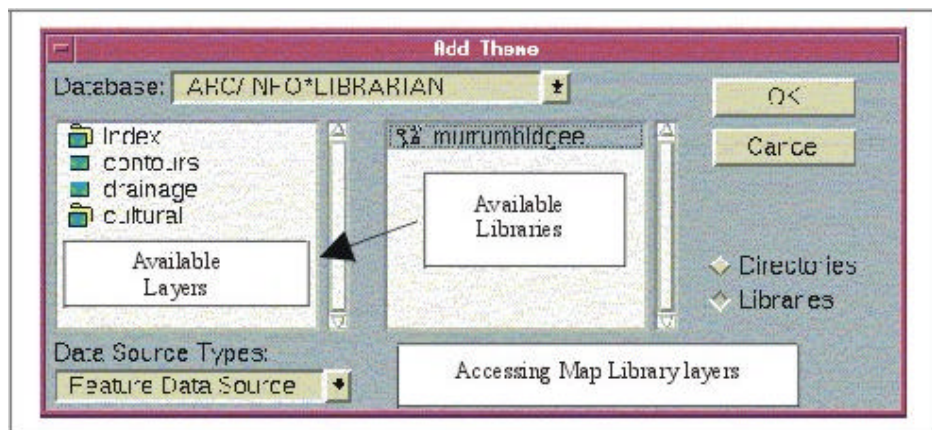
Karen Blackmore has been appointed to the position of Spatial Analysis Officer at Bathurst Campus. Between 1990 and 1998, Karen held administrative positions with Sydney Water, the Environment Protection Authority and the Department of Land & Water Conservation (DLWC). Karen held the position of Administrative Officer to the Illawarra Catchment Management Committee with the DLWC, where she was first introduced to the realms of GIS and remote sensing. During 1999, in addition to full time study, Karen was employed by Bathurst City Council to provide GIS consultative services.

Karen can be contacted on 84676 or via email at kblackmore@csu.edu.au.

Data Conversion and GDA94 Implementation

With GENAMAP licences expiring at the end of March, SPAN staff are currently working to convert all GIS data held in GENAMAP format into ARC/INFO format. As part of this process, SPAN will be adopting the new datum (GDA94)

recommended for Australia by the Intergovernmental Committee on Surveying and Mapping (ICSM).



Following data conversion, SPAN will be storing major datasets using ARC/INFO's Map Library structure. The main advantage of storing data in this way is that the computer's file directory structure remains invisible to data users facilitating quick and easy access to SPAN's datasets (you don't have to know where the data is stored in order to use it!). To access library data (on SPANW) simply select the "Libraries" option in the Add Theme dialog (see above). Each library has an **index layer** which shows the library's extent and a list of the available map layers. For more information on accessing Map Library data, contact your local SPAN representative .



Landsat 7 Imagery

The Land Information Centre (LIC) is currently undertaking the orthorectification of the Landsat 7 imagery and a Business Plan for the distribution of this "baseline data" has been formulated. A meeting of the stakeholders will be held on 29 February 2000, where dates for distribution of the data will be discussed. The LIC has indicated that all stakeholders will be required to "buy into" the scheme at a cost of \$5,400 each.

Additional remote sensing data, Landsat 7, are currently available at a nominal cost of \$200 per scene to cover transfer cost. The current listing comprised of 7 scenes and can be viewed at LIC satellite images can be found at www.csu.edu.au/division/dit/span/spatial_technology/remote_sensing/landsat7.html.

Please note that this list is continuously updated to include new data purchase by other institutions. For further information, LIC has produced a monthly newsletter to inform remote sensing users of the latest data acquisition which can be accessed from SPANs website from www.csu.edu.au/division/dit/span/spatial_technology/remote_sensing.

Statistical information available for CSU researchers and staff

Currently, the following ABS CURFs data are in SPAN:

1. Australians' employment and unemployment patterns 1994-1997
2. National Health Survey 1995
3. Mental Health and Wellbeing of Adults, Australia 1997
4. Time Use Survey 1997
5. Time Use Survey 1992
6. Child Care Survey March 1996

Table submitted for application :
National Nutrition Survey 1995, School of Clinical Sciences, Wagga

Please visit this website www.abs.gov.au for current listing of ABS CURFs tables. For further information on how to obtain existing or new data, please email: [Siti Amri](mailto:Siti.Amri).

The Western Research Institute - Data Collection and Analysis

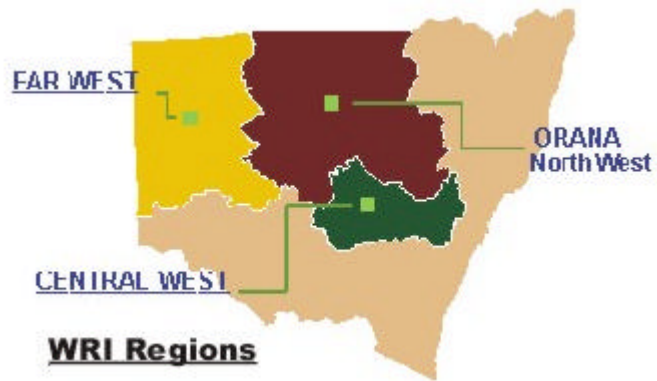
The Western Research Institute (WRI) aims to support business decision-making, strategic planning and economic development. This is conducted through a range of research based activities aimed at developing the economic capacity and performance of the Orana, Far West and Central West Regions.

In addition to ABS statistics, WRI provides economic data and information obtained from:

- Business surveys;
- Skill audits; and,
- Petrol gauges.

WRI data will in the future include input-output tables and economic modelling capacity.

Data is available from the WRI for research purposes, however, the availability and cost of data will be assessed on a project by project basis. The WRI's homepage can be found at www.wri.org.au.



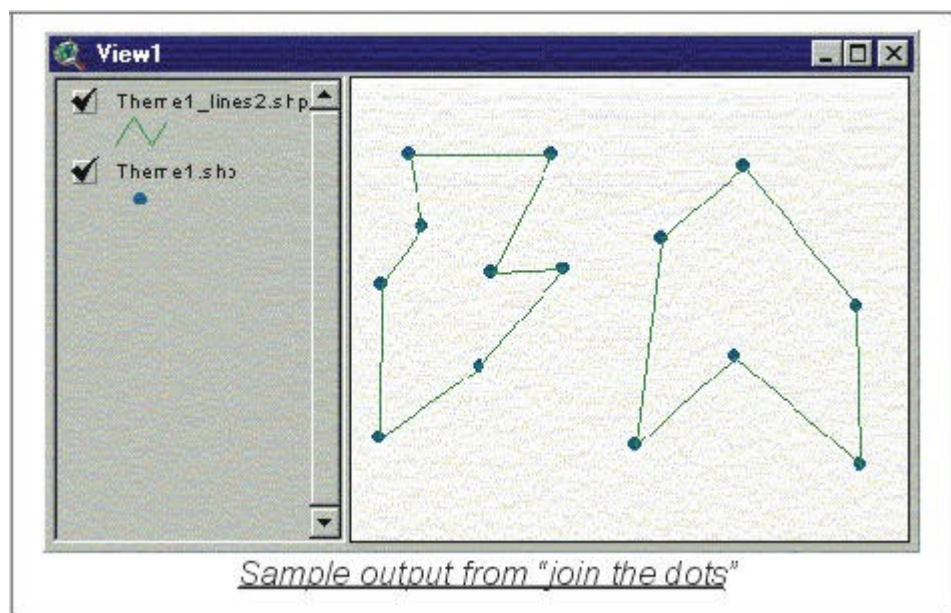
Football and GIS programming - Creating Tools to Assist Research

Leslie Montfort of the School of Environmental and Information Science (Albury) is currently undertaking research into the history of the Victorian Country Football League (VCFL).

You may be wondering what this has got to do with Spatial Analysis.

Throughout the history of the VCFL clubs have formed, merged and folded, all the while moving between different leagues. GIS provides Leslie with a means of visualising and exploring those changes over the years. Chris Medlin (SPAN's Albury representative) has been assisting by providing ArcView programming solutions to some specific research problems. In particular, Leslie was interested in utilising a technique previously used by the VCFL to show which clubs belonged to which league. This technique simply involved drawing a line linking those clubs belonging to the same league. However, Leslie wanted to do this for every year from 1923 to the present a potentially long and laborious manual task. This is where SPAN was able to provide a solution.

Combining "Avenue" programming and some computational geometry, a script was created which allowed Leslie, at the click of a button, to generate the lines showing club membership of the leagues. The script (called "Join the Dots") has since been lodged on ESRI's "ArcScripts" web page



[\(www.esri.com/arcscripts/\)](http://www.esri.com/arcscripts/) where it can be freely downloaded. Leslie's football research is continuing.

Workshops & Training

Proposed workshop dates for 2000 can be found on SPANs website (www.csu.edu.au/division/dit/span/) by following Training Workshop links.

SPAN is also developing GIS training materials in these areas:

1. AML programming (ArcInfo software)
2. Avenue programming (ArcView software)
3. Network analysis

The above modules are at different stages of development. It is anticipated that these new series will be conducted for interested researchers and staff in June, 2000.

NEW!!! Remote Sensing Introductory Workshop

With the arrival of ERDAS IMAGINE

(SPANs Remote Sensing package), the development of a 2-day Remote Sensing workshop has begun. Features of this new workshop will include:



introduction to the IMAGINE interface

displaying data

importing image formats

image registration

unsupervised classification

mapping elements

attribute editing

vector display

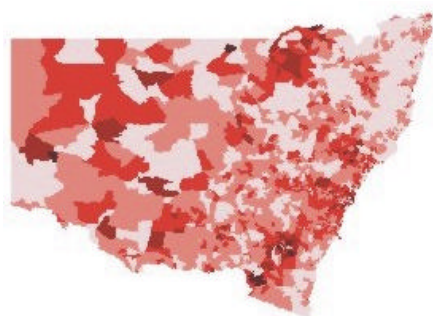
image mosaicing

surface generation

masking

GIS and SPLUS integration

Shown here is an illustration of combination between Splus and Arcview (GIS package). Import and export between Splus and most GIS packages is trivial. The trend picture was created with a local regression in Splus.



The average income for each census district
in NSW

...



The trend of the average incomes in each census
district over NSW

GIS User Meetings

SPAN has initiated a program of introducing GIS User Groups to each of CSU's main campuses.

The aim of these User Groups are to provide staff and researchers with the opportunity to exchange GIS related ideas, experiences, tips, advice and the opportunity to listen to guest speakers. A list of proposed meeting dates and agendas are available from SPANs website at www.csu.edu.au/division/dit/span/user_net/support.html

Research Support

SPAN is analysing **Leisure Use 1992-1997** to assist CSU researchers with comparative analysis of Australian leisure behaviour for these dates. The results will be of benefits to the following researchers:

- Penny Davidson, School of Environmental and Information Sciences
- Lesley Montfort, School of Environmental and Information Sciences
- Ilena Young, School of Business

Information on these two tables is available at www.csu.edu.au/division/dit/span/newsletter/tmu92-97.htm. For further details, contact [Siti Amri](#).

Murrumbidgee Pollution Modelling:

The CSU-DLWC project is nearing completion. Xihua Yang (CSU-SIT) has produced a power point presentation for the AURISA Conference 1999. To view this presentation visit the following website: www.csu.edu.au/division/dit/span/projects.

Conferences and Papers

Information on conferences and papers can be found on SPANs website at www.csu.edu.au/division/dit/span/newsletter/publications.htm.

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Spatial Data Analysis Network (SPAN)

NEWSLETTER: OCTOBER 2000

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GIS Day 2000

Join millions of people worldwide as they celebrate GIS Day 2000. GIS Day is a global event where thousands of users of geographic information system (GIS) technology open their doors to educate others about how GIS technology and geography affect our everyday lives.

GIS Day 2000 will take place on Wednesday, November 15th 2000. Charles Sturt University, in collaboration with the Department of Land and Water (DLWC), the Land and Property Information NSW (LPI) and the Riverina Eastern Regional Organisation of Councils (REROC) will be hosting an information day at both the Bathurst and Wagga Wagga CSU campuses, to demonstrate how GIS is used by organisations within the local community.



GIS helps locate new businesses and track environmental degradation. It helps route garbage trucks and manage road paving. It helps marketers find new prospects, and it helps farmers grow healthier, larger crops. Local stakeholders in the GIS industry, including councils, government agencies and commercial businesses, will be on hand to show how GIS is being used to assist in carrying out their operations.

Bathurst -

When: Wednesday, 15th November 2000

Time: 10am to 2pm

Where: CSU (Gymnasium)

Wagga -

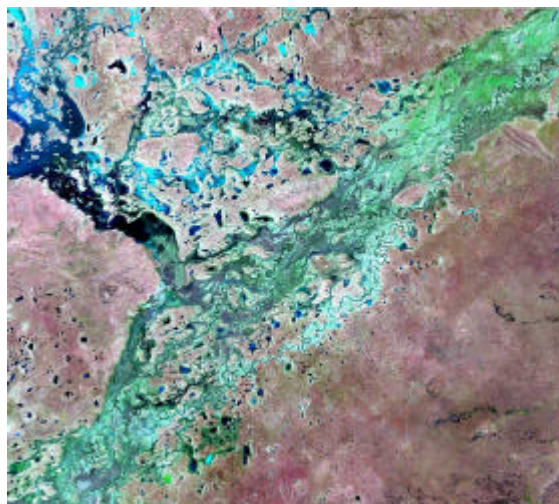
When: Wednesday, 15th November 2000

Time: 10am to 1pm

Where: CSU (School of Science and Technology)

An invitation to attend is extended to all students and staff of CSU. GIS Day represents a unique opportunity to showcase to the community and local schools, how GIS is used in our day to day operations. Please visit the official GIS Day website (www.gisday.com) for details about other events being organised within Australia and around the world. Join us as we demonstrate how geography through the technology of GIS is helping in your community.

Remote Sensing data



To date SPAN has received 16 of 39 Landsat 7 scenes that cover New South Wales. Access to the data will need to be arranged with your nearest SPAN representative. Training materials to assist in learning how to use this data is available online at <http://www.db.csu.edu.au/division/dit/span/training>

Summary of Supply of Landsat 7 Data - NSW Statewide Coverage 2000



Scenes Received

Tibooburra
Fowlers Gap
Buckalow
Lake Victoria
Urisino
White Cliffs
Menindee
Mildura
Yantabulla
Tilpa

Date of Image Capture

28/01/00
28/01/00
28/01/00
28/01/00
05/01/00
05/01/00
05/01/00
05/01/00
05/01/00
02/03/00

Path / Row

96 / 80
96 / 81
96 / 82
96 / 83
95 / 80
95 / 81
95 / 82
95 / 83
94 / 80
94 / 81

Neckarboo	02/03/00	94 / 82
Oxley	02/03/00	94 / 83
Swan Hill	02/03/00	94 / 84
Culgoa River	02/03/00	93 / 80
Byrock	27/04/00	93 / 81
Mt Hope	28/04/00	93 / 82
Booligal	28/04/00	93 / 84
Deniliquin	28/04/00	93 / 83
West Wyalong	28/04/00	92 / 83
Bathurst	12/11/99	90 / 83
Coffs Harbour	02/02/00	89 / 81
Taree	02/06/00	89 / 82
	02/06/00	

Remote Sensing software

A working group comprising Mr Paul Frazier, Dr John Louis, Mr Rodney Rumbachs, Mr Gary McKenzie and Ms Siti Amri was recently convened to evaluate appropriate software for teaching remote sensing within CSU.

The group recommended ENVI as the software for Remote Sensing teaching. SPAN which currently holds one ENVI licence will continue to utilise ERDAS IMAGINE as its main remote sensing software for research support during the next year. During this period a gradual phasing in and retraining of users with ENVI will occur, which will provide a consistency between teaching and research students. Mr Rumbachs will be developing a number of student course materials which will be utilised as training resources for researchers also.

Visit the official ENVI website at <http://www.envi-sw.com>

New Board of Management Member



Professor Mark McFadden (School of Education) has been appointed as a new member to SPANs management committee. Other committee members are Mr Mike Rebebechi, Dr John Louis, Professor David Green, Professor Terry Bossomaier, Mr Tom Murphy, Dr Al Gibbs, Mr Robert Davidson, and Dr Frank Vanclay.

REROC GIS Training



SPAN recently completed the second course of GIS training for the Riverina Eastern Regional Organisation of Councils (REROC) using Mapinfo 5.5 on the 18th-19th October, 2000.

The course which is completed over a two day period, includes topics such as:

Georeferencing imagery
Digitising
Presentation of data / information
Data import / export
Geographic analysis

To date, twenty participants have taken part in the course. Topics covered in the course will assist participants within their own Council operations on a daily basis. Participants have attended from Urana, Junee, Lockhart, Holbrook, Cootamundra, Gundagai, Tumut, Coolamon, Temora and Goldenfields Water.

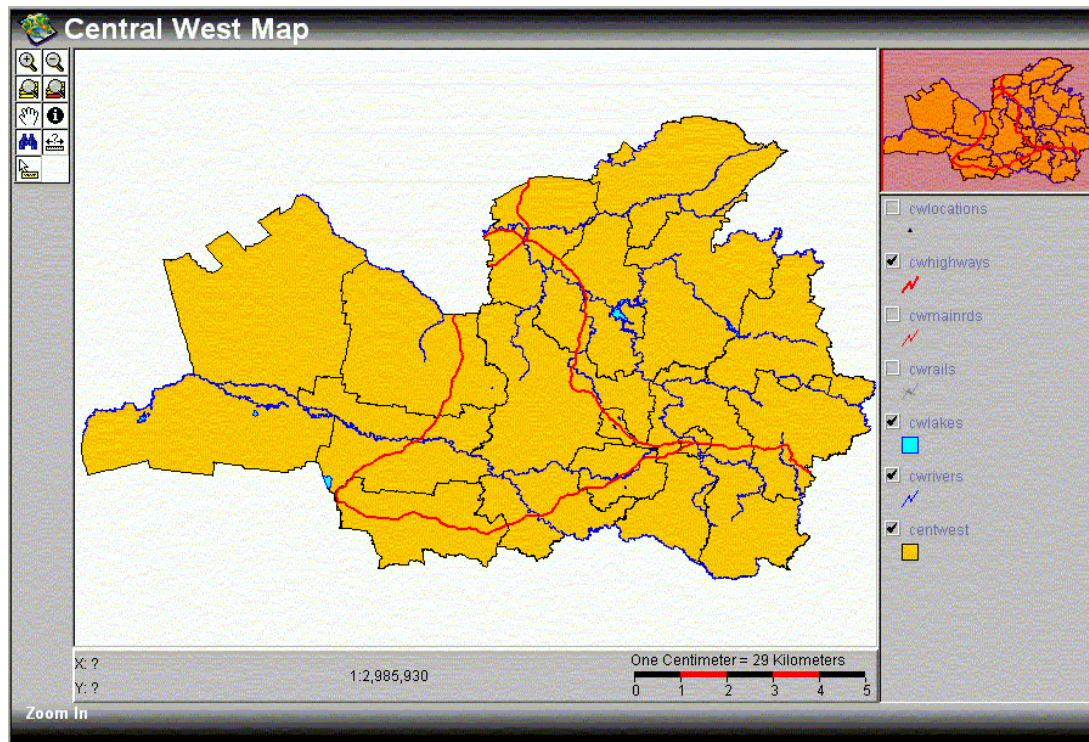
SPAN Internet Map Server (IMS)

SPAN is currently developing an IMS application to allow researchers and staff to browse and query data contained within our databases. The IMS application is being developed using ESRIs ArcIMS 3 software.

ArcIMS provides the foundation for disseminating high-end geographic information systems (GIS) and mapping services via the Internet. ArcIMS is the only software that enables users to integrate local sources with Internet data sources for display, query, and analysis in an easy-to-use Web browser.

ArcIMS revolutionizes the way users can access and interact with Internet mapping and GIS data by delivering distributed GIS to the desktop.

SPAN plans to incorporate the IMS application within its website (www.csu.edu.au/division/dit/span).

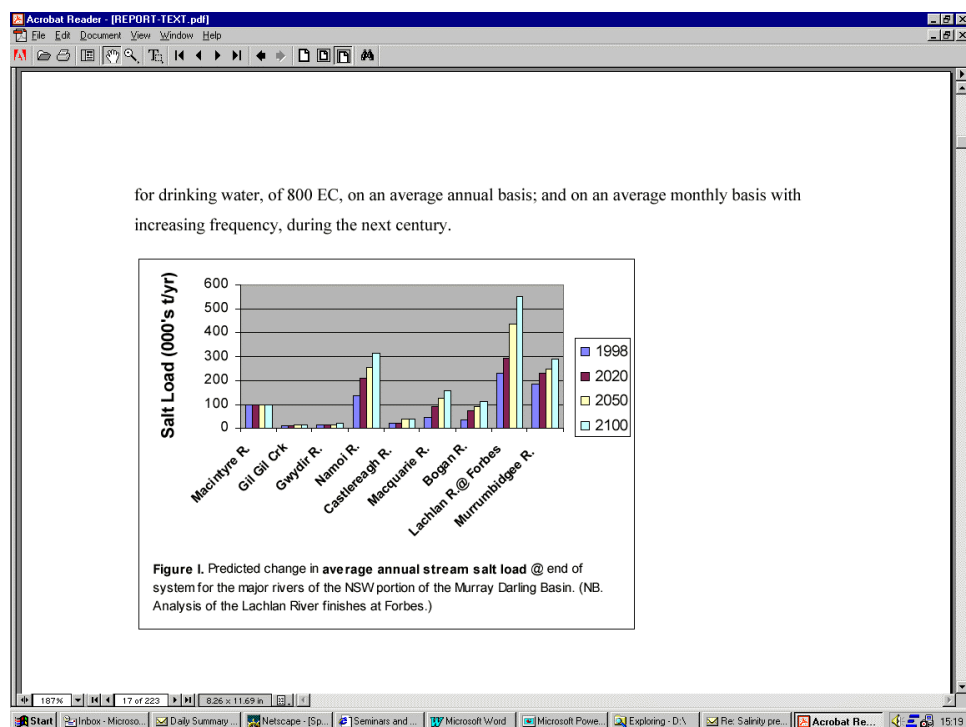


Department of Land and Water (DLWC)

Free Data!!! Over 50 digital datasets are available from DLWC for teaching and research applications. Contact Siti Amri for further info...

Datasets available include:

Soil / Water quality / Salinity / Geology / Vegetation / Wetlands / Wilderness / Geomorphology / Cadastral / Landuse / Groundwater



The Centre for Natural Resources, a research unit within DLWC, has completed a report on Salinity Predictions for NSW rivers within the Murray Darling Basin, dated January 2000. Contact SPAN's staff at your nearest campus to have a look at the CD.

S-PLUS 2000 For Windows

Charles Sturt University has now secured a site license for Mathsoft's S-PLUS. S-PLUS is a high powered statistics package with impressive functionality and flexibility.

Previously only S-PLUS 5.1 for UNIX was available for researchers of the university, through the Spatial Data Analysis Network. Now, under the new site license agreement, S-PLUS 2000 for Windows is available!

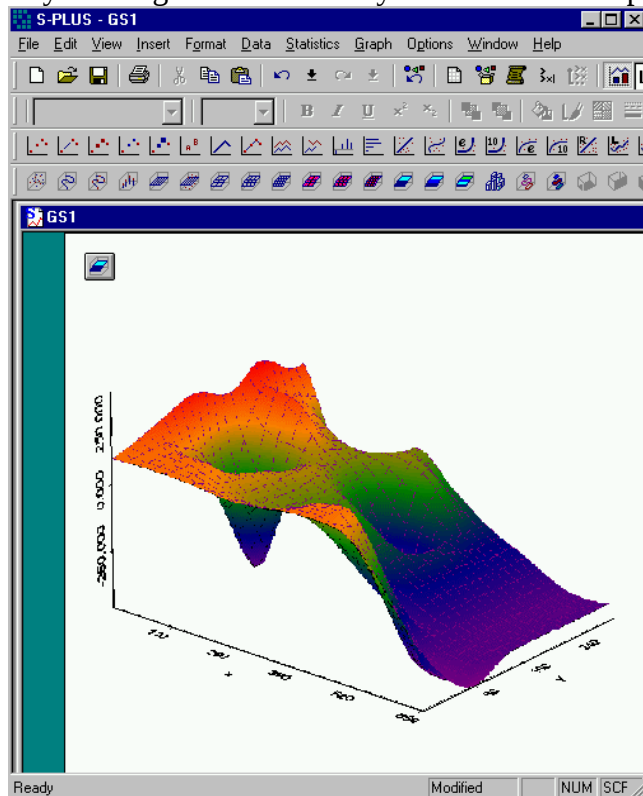
There is no question that the UNIX version of S-PLUS offers incredible power as far as statistics packages are concerned, but many people find the learning curve quite steep. The beauty of the Windows version is that it has a Graphical User Interface (GUI) with the usual Windows help files, point and click type buttons, and menus. This interface will be a lot more familiar to Windows users. Further exciting news is that the UNIX version of S-PLUS (v6) will soon have a GUI as well!

Avid command line users need not be dismayed however, both the UNIX and Windows versions of S-PLUS give the option of a command line interface for hours of scripting bliss.

By having a site license, researchers of the University also have access to the specialised add-in modules 'dox', 'garch', 'wavlets' and 'spatial'.

Your research support unit - The Spatial Data Analysis Network (SPAN), has CD's of S-PLUS available for you to install on your PC's.

Why not enhance the quality of your analysis by utilising the powerful statistical tools available to you and get in touch with your local SPAN representative to loan a copy today?



AURISA 2000

Following are two CSU contributions to the above conference.

GIS in University Admissions: Analysis and Visualisation of Student Flows

Blackmore, K. and Yang, X.

ABSTRACT

Universities within Australia and overseas operate in a competitive market, vying for student preferences through student recruitment and marketing practices. The success of a university rests highly upon its incoming students in light of their quantity, quality and diversity. To remain competitive in this modern business environment, universities must take advantage of new technologies to gain an understanding of the customer base, both in terms of current and potential students. Geographic Information Systems (GIS) are one such technology that can help to provide a solution to some problems currently faced by university admission offices.

This study explores suggested methods for using GIS software and existing data sources to classify students according to course preference patterns and a method for the empirical representation and analysis of student flow patterns. The resulting methods and tools provide significant insights into the current and prospective student base and a means to quickly identify patterns and trends in these large data sources. The resulting patterns and trends provide a basis for marketing decisions and facilitate regional, campus and course comparisons.

KEYWORDS: Geographic information systems, network analysis, interregional flows, marketing

Spatial evaluation of electromagnetic mapping techniques utilising ground based EM-31 equipment.

Miller, M.L., Ellem, B.A., and Eberbach, P.L

ABSTRACT

Salinity is an increasingly important environmental degradation problem affecting the biodiversity and productivity of the Australian landscape. Electromagnetic induction (EM) is a widely used method to identify and monitor salt affected areas in the landscape. EM surveys are relatively inexpensive to conduct when compared to direct methods for quantifying the salt status of the landscape. However, the question arises: "What is the minimum survey intensity that will still provide all the required information?"

The aim of this project was to determine the optimum sampling strategies for particular landscapes based on the spatial statistical analysis of EM data sets from varying regions of NSW. Data sets contributed by collaborating parties from NSW Agriculture and the NSW Department of Land and Water Conservation were analysed using the spatial statistical software package S-Plus. The data sets had been collected from the alluvial floodplains of irrigation areas and volcanic derived soils of undulating and mountainous landscapes. The results from this project indicate that the optimum sampling strategy for the alluvial floodplain areas is a transect distance of no greater than 40m and sampling within transects may be increased to approximate 40m. The determination of the optimum sampling strategy for upland regions is more complex and requires further investigation.