The Australian Soil Resource Information System

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Presentation outline

Background

- Soil survey in Australia compared to the United States

The Elements of ASRIS

- Architecture
- Data model
- Data delivery

Future Directions

References

Background

Soil Survey in Australia

- States and Territories are responsible for the soil survey coverage
- Coverage is not complete, is mostly broad scale, and varies in quality
- Considerable experimentation with new methods (e.g. airborne gamma-ray spectroscopy, DEMs, climate surfaces) to fill data gaps
- The Australian Collaborative Land Evaluation Program (ACLEP) is developing standards and better methods for acquiring and using soil information

The elements of ASRIS

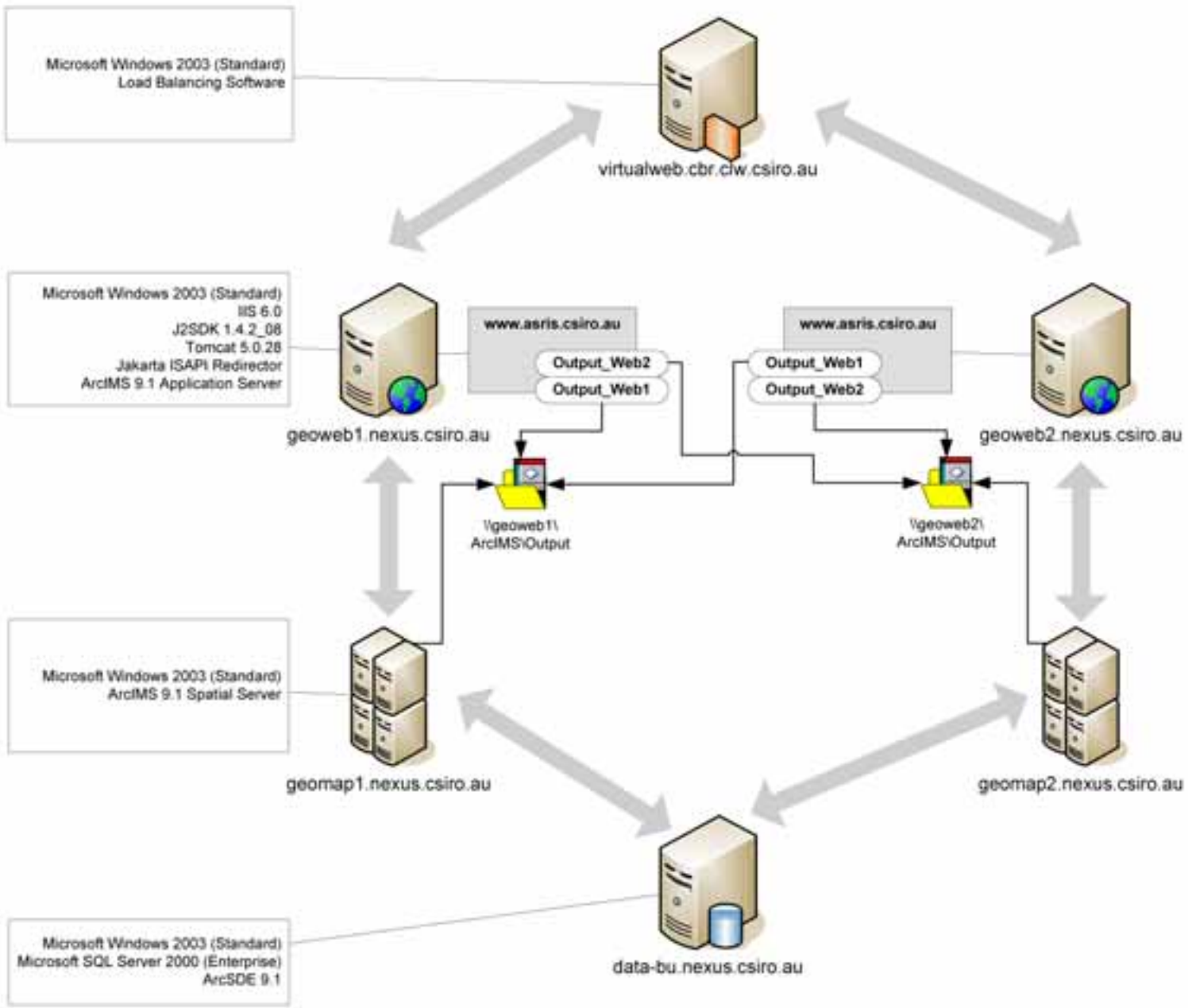
ASRIS is an online geographic information system and it:

- Provides access to the best available soil and land resource information across Australia
- Combines the best of qualitative mapping with new quantitative information
- Integrates soil and land information from many sources
- Opens many new possibilities for monitoring and forecasting the condition of Australia's soils and landscapes
- Focuses on providing estimates of functional soil attributes (e.g. soil pH, electrical conductivity, available water capacity) and uses soil classification as a means of communication

The architecture of ASRIS

ASRIS operates in the following hardware environment:

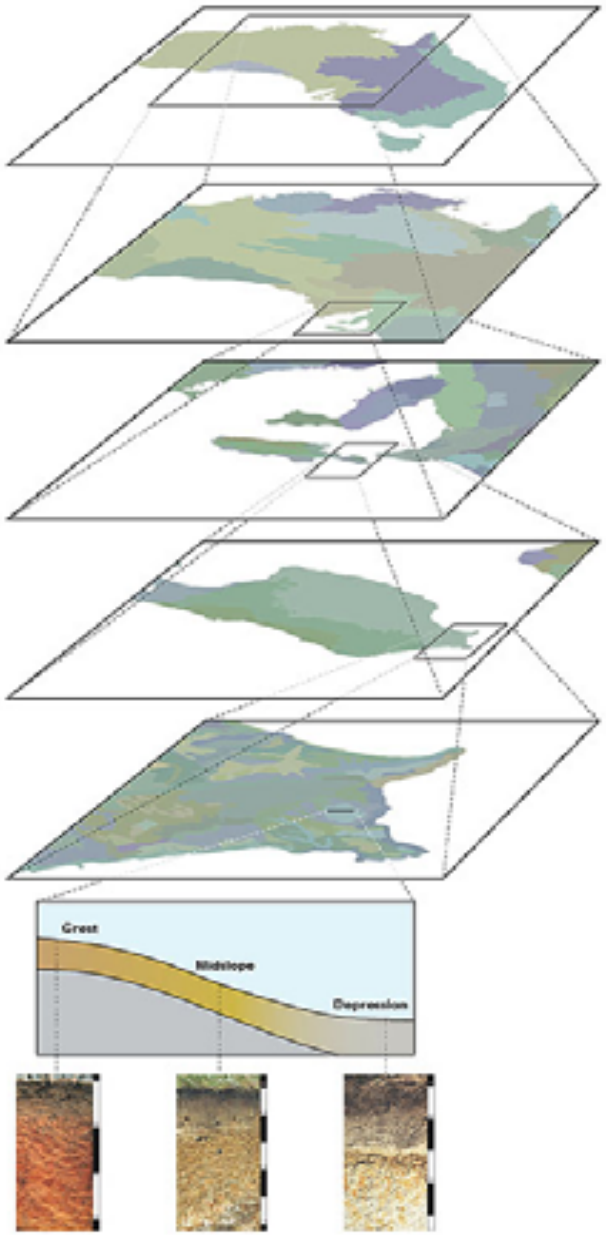
- 5 Windows 2003 servers
- ArcIMS 9.1
- ArcSDE 9.1 for SQL Server
- Network load balancing cluster


Microsoft Windows 2003 (Standard)
Load Balancing Software
virtualweb.cbr.clw.csiro.au
Microsoft Windows 2003 (Standard)
IIS 6.0
J2SDK 1.4.2_08
Tomcat 5.0.28
Jakarta ISAPI Redirector
ArcIMS 9.1 Application Server
www.asris.csiro.au
Output_Web2
Output_Web1
www.asris.csiro.au
Output_Web1
Output_Web2
geoweb1.nexus.csiro.au
geoweb2.nexus.csiro.au
\\geoweb1\
ArcIMS\Output
\\geoweb2\
ArcIMS\Output
Microsoft Windows 2003 (Standard)
ArcIMS 9.1 Spatial Server
geomap1.nexus.csiro.au
geomap2.nexus.csiro.au
Microsoft Windows 2003 (Standard)
Microsoft SQL Server 2000 (Enterprise)
ArcSDE 9.1
data-bu.nexus.csiro.au

The ASRIS data model

The key elements:

- A spatial hierarchy of land units with seven levels of generalization
  - The upper three levels provide general descriptions of soils and landscapes across the continent.
  - Lower levels provide detailed information for regions where mapping is complete
- A consistent set of soil attributes (e.g. soil depth, permeability, water storage)
- Soil attributes are presented for idealised soil profiles that have five contiguous soil horizons
- A soil profile database of fully characterised sites that are representative of significant areas and environments
- Estimates of uncertainty for soil attributes to encourage formal analysis of the uncertainty of predictions generated

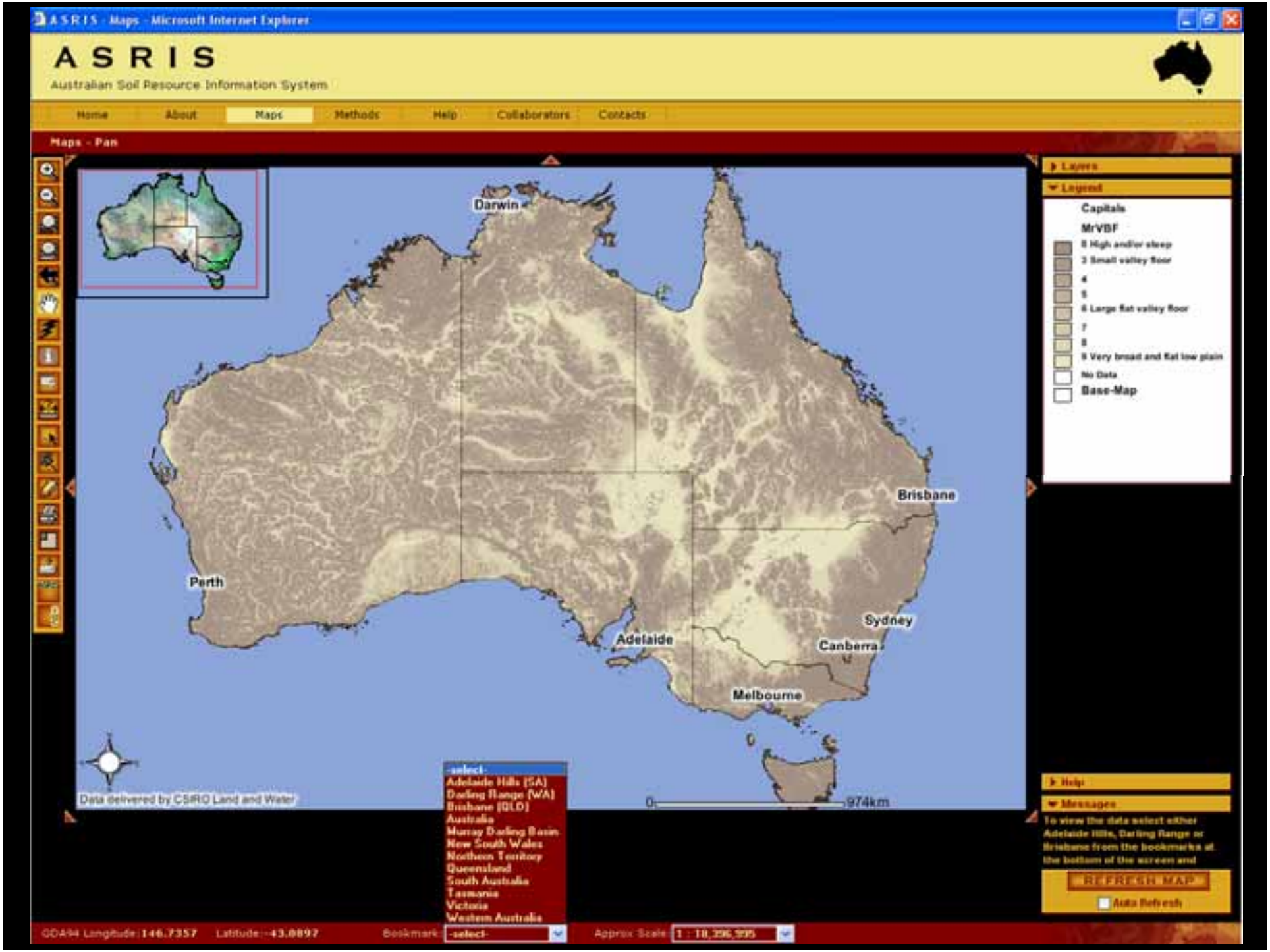


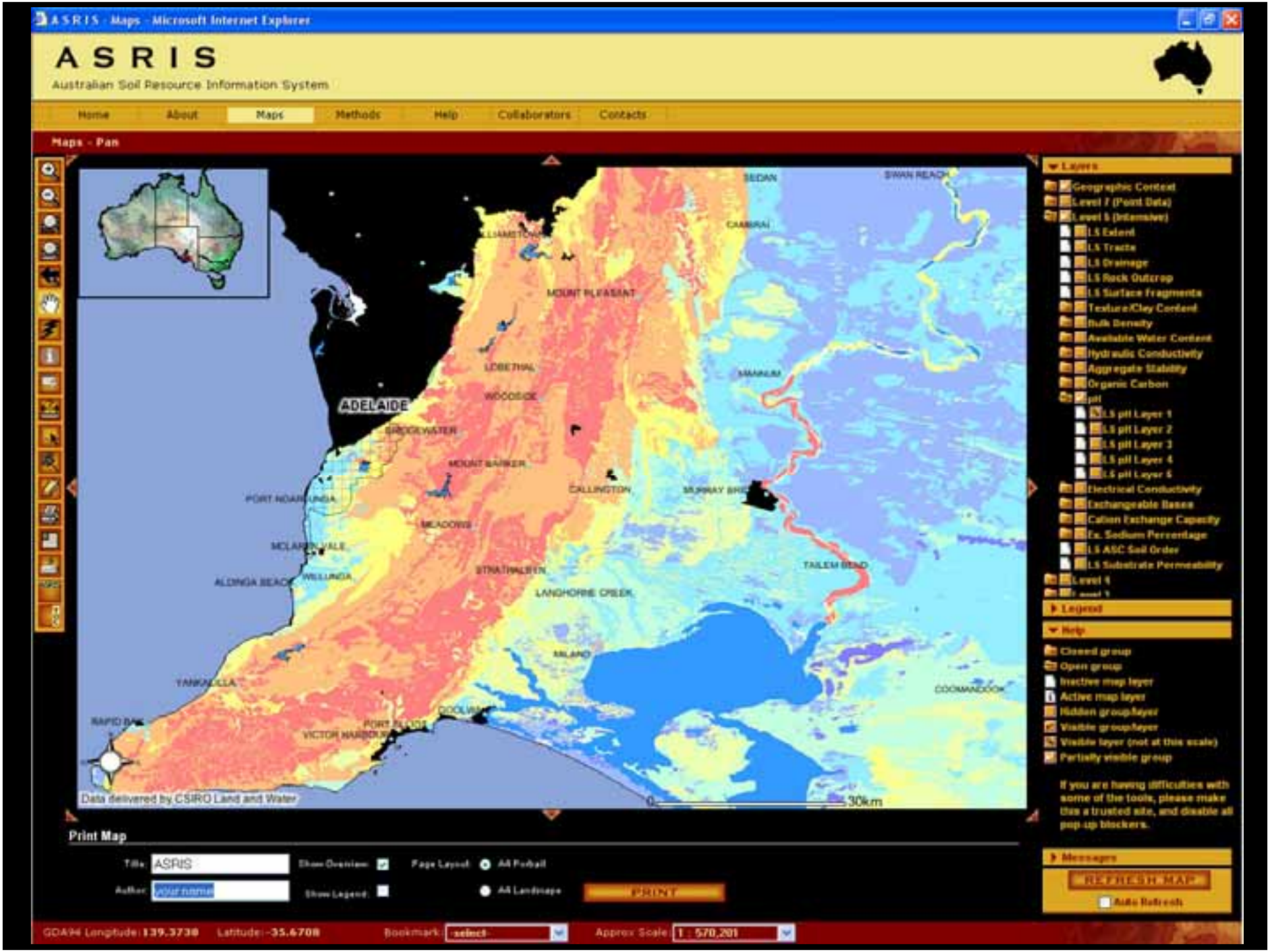
Level and tract name	Mapping window	Main attributes used for mapping	Typical uses for the information
Level 1 Division	30 km	Broad physiography (slope and relief)	Broad geographic context
Level 2 Province	10 km	Water balance, physiography	National natural resource policy
Level 3 Zone	3 km	Substrate lithology, water balance, physiography	Regional natural resource policy
Level 4 District	1 km	Groupings of geomorphically related systems	Catchment planning, location of new industries
Level 5 System	300 m	Local climate, relief, slope, lithology, drainage network, soil profile class	Catchment management, hydrological modelling, land conservation, infrastructure planning
Level 6 Facet	30 m	Slope, aspect, land curvature, soil profile class	Farm management, land-use planning, on-ground works
Level 7 Site	10 m	Soil properties, surface condition, microrelief	Precision agriculture, site development

ASRIS data delivery (1)

ASRIS delivers data via a modified ArcIMS 4.01 HTML Viewer with the following features.

- Expanding and contracting layer list
- Scrolling message featuring the latest data updates
- Drill-down identify tool (including raster layers)
- Toggle frame tools for maximising the map viewing area
- Bookmark selector to zoom to defined regions
- Scale selector to zoom to defined scales (and display current scale)
- Customised print tool
- Soil sites hyperlinked to detailed PDF reports


ASRIS - Maps - Microsoft Internet Explorer
ASRIS
Australian Soil Resource Information System
Home
About
Maps
Methods
Help
Collaborators
Contacts
Maps - Pan
Darwin
Brisbane
Perth
Sydney
Adelaide
Canberra
Melbourne
Layers
Legend
Capitals
MrVBF
8 High and/or steep
3 Small valley floor
4
5
6 Large flat valley floor
7
8
9 Very broad and flat low plain
No Data
Base-Map
Data delivered by CSIRO Land and Water
0
974km
-select-
Adelaide Hills (SA)
Darling Range (WA)
Brisbane (QLD)
Australia
Murray Darling Basin
New South Wales
Northern Territory
Queensland
South Australia
Tasmania
Victoria
Western Australia
Help
Messages
To view the data select either Adelaide Hills, Darling Range or Brisbane from the bookmarks at the bottom of the screen and
REFRESH MAP
Auto Refresh
GDA94 Longitude: 146.7357
Latitude: -43.0897
Bookmark
-select-
Approx Scale
1 : 18,286,395


ASRIS - Maps - Microsoft Internet Explorer
ASRIS
Australian Soil Resource Information System
Home
About
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Methods
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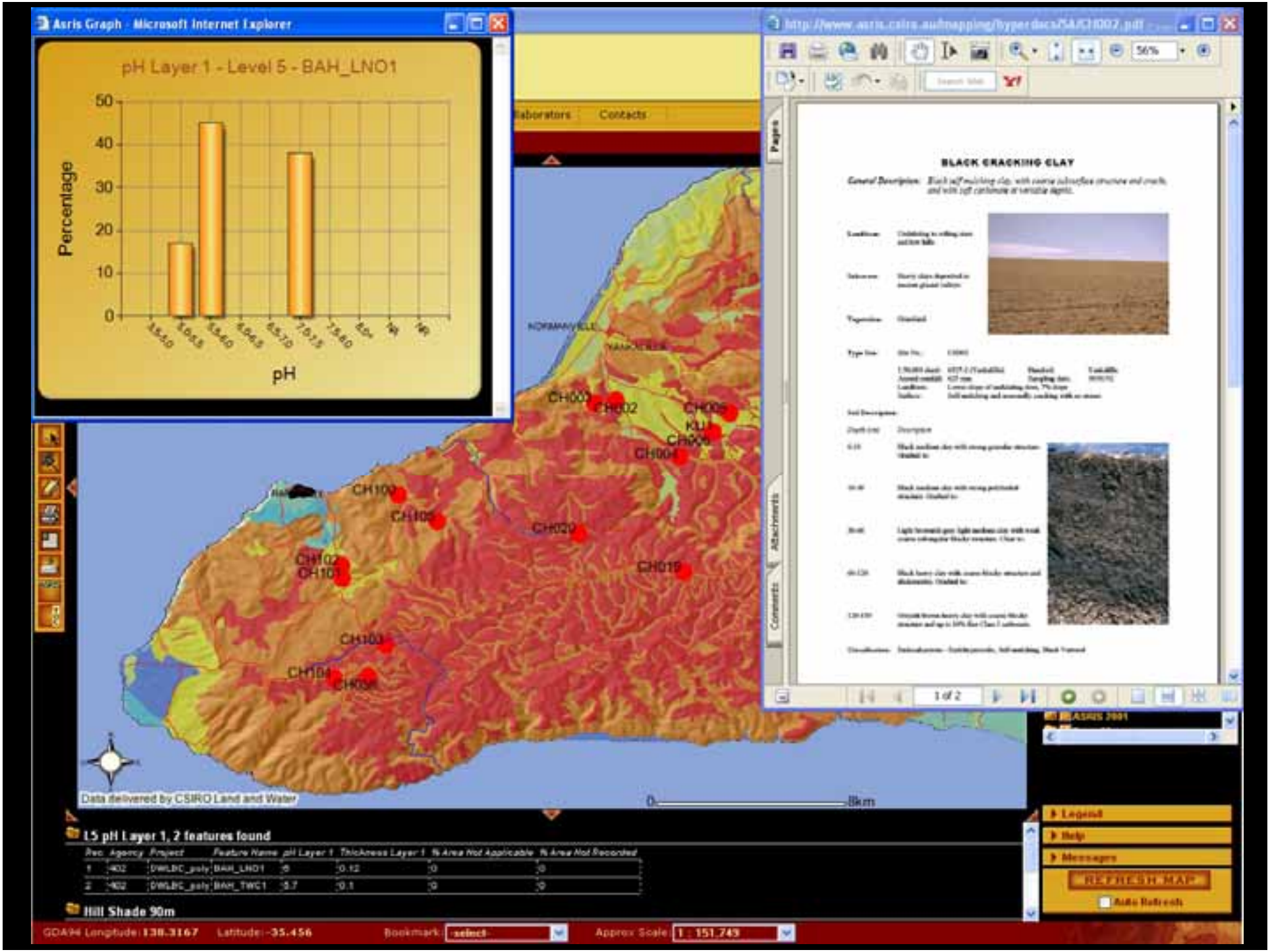
Contacts
Maps - Pan
ADELAIDE
MOUNT PLEASANT
LOBETHAL
WOODSIDE
BRIDGEWATER
MOUNT BARKER
CALLINGTON
MEADOWS
STRATHALBYN
LANGHORNE CREEK
MILANG
SEDAN
SWAN REACH
CAMBRAI
MANNUM
MURRAY BRIDGE
TAILEM BEND
COOMANDOOK
Data delivered by CSIRO Land and Water
30km
Layers
Geographic Context
Level 7 (Point Data)
Level 5 (Intensive)
LS Extent
LS Tracts
LS Drainage
LS Rock Outcrop
LS Surface Fragments
Texture/Clay Content
Bulk Density
Available Water Content
Hydraulic Conductivity
Aggregate Stability
Organic Carbon
pH
LS pH Layer 1
LS pH Layer 2
LS pH Layer 3
LS pH Layer 4
LS pH Layer 5
Electrical Conductivity
Exchangeable Bases
Cation Exchange Capacity
Ex. Sodium Percentage
LS ASC Soil Order
LS Substrate Permeability
Level 6
Legend
Help
Closed group
Open group
Inactive map layer
Active map layer
Hidden group/layer
Visible group/layer
Visible layer (not at this scale)
Partially visible group
If you are having difficulties with some of the tools, please make this a trusted site, and disable all pop-up blockers.
Messages
REFRESH MAP
Auto Refresh
Print Map
Title
ASRIS
Author
your name
Show Overview
Show Legend
Page Layout
A4 Portrait
A4 Landscape
PRINT
GDA94 Longitude: 139.3738
Latitude: -35.6708
Bookmark:
select
Approx Scale
1 : 570,201

ASRIS data delivery (2)

The ASRIS viewer links to a number of web applications developed in the .NET framework including:

- Layer metadata hyperlinked to layer name
- Extract tool with user registration and usage history which features both public and private layers
- Soil attribute layers hyperlinked to histograms for map units
- Levels 1–3 land units linked to dynamic web pages containing summaries of terrain, climate and regolith
- Data streaming of Level 5 soil attribute information in ASCII format


Asris Graph - Microsoft Internet Explorer
pH Layer 1 - Level 5 - BAH_LNO1
Percentage
pH
50
40
30
20
10
0
3.5-4.0
4.0-5.5
5.5-6.0
6.0-6.5
6.5-7.0
7.0-7.5
7.5-8.0
8.0+
NR
NR
Laboratories
Contacts
CH007
CH002
CH005
KLJ
CH006
CH004
CH100
CH105
CH020
CH102
CH101
CH019
CH103
CH104
CH008
Data delivered by CSIRO Land and Water
0
8km
BLACK CRACKING CLAY
General Description:
Pages
Attachments
Contents
1 of 2
ASRIS 2001
Legend
Help
Messages
REFRESH MAP
Auto Refresh
15 pH Layer 1, 2 features found
Rec. Agency Project Feature Name pH Layer 1 Thickness Layer 1 % Area Not Applicable % Area Not Recorded
1 402 DWLBC_poly BAH_LNO1 6 0.12 0 0
2 402 DWLBC_poly BAH_TWC1 5.7 0.1 0 0
Hill Shade 90m
GDA94 Longitude: 138.3167
Latitude: -35.456
Bookmark: select
Approx Scale: 1 : 151,743

ASRIS - Microsoft Internet Explorer

ASRIS

Australian Soil Resource Information System

Dataset: Geomorphic Framework (Department of Primary Industries, Victoria)

Feature Name: 1

Geographic Name: Eastern Uplands

Feature Description:

The main divide in eastern Victoria. This mountain range separates the streams draining inland to the Murray-Darling Basin from the streams flowing into the sea.

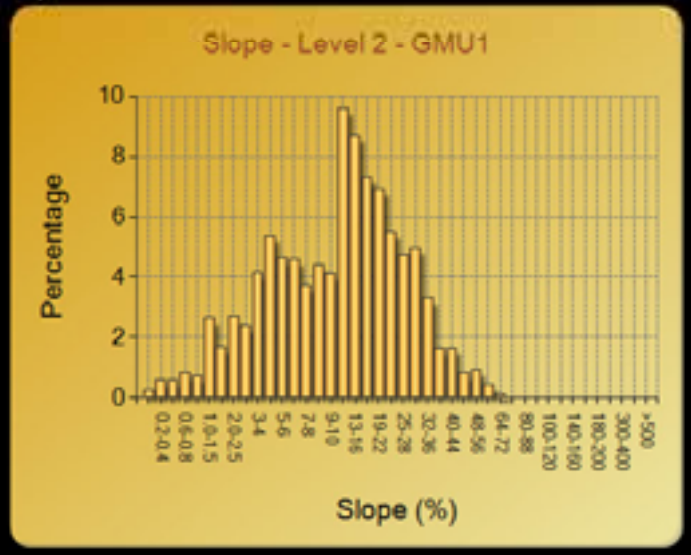
Australian Soil Classification:

Dermosols (> 50%), Kurosols (20 - 50%) and Organosols (< 20%)

Regolith Materials:

Weathered in-situ regolith (> 50%), alluvial sediments (< 20%) and colluvial sediments (< 20%)

Slope:



Contacts

Layers

Geographic Context
Level 7 (Point Data)
Level 5 (Intensive)
Level 4
Level 3
Level 2
L2 Provinces
L2 Tracts
Level 1 (Broadscale)
Australian Frameworks

BOURNE

ASRIS - Metadata - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Australian Soil Resource Information System

ASRIS Level 2 Tracts

Citation

Title	ASRIS Level 2 Tracts
ANZLIC Identifier	Pending
Custodian	
Jurisdiction	Australia

Collapse All

Description

Abstract

ASRIS Level 2 Tracts is a spatial dataset of mapped soil units with attribution of ASRIS level 5 descriptors as stated in the ASRIS Technical Specification. The dataset will cover the parts of Australia where 1:100 000 (approximately) soil survey has been undertaken. The area covered will include land-uses of high and moderate intensity of a predominately agricultural nature.

Search word(s)

Spatial Domain

Geographic Extent Name (GEN)

GEN Category	Australia
GEN Custodial Jurisdiction	Australia
GEN Name	AUSTRALIA EXCLUDING EXTERNAL TERRITORIES

Trusted sites

GDA94 Longitude: 145.9248 Latitude: -41.8435 Bookmark: -select- Approx Scale: 1 : 3,106,771

Future Directions

Australian agencies are implementing standards for interoperability of natural resource information systems. Immediate tasks are:

- Complete the UML/abstract model for soil information and produce an XML/GML community schema (Natural Resources Markup Language – NRML)
- Serve salient soil monitoring and evaluation datasets using the XML community schema via WFS

References

McKenzie NJ, Jacquier DW, Maschmedt DJ, Griffin EA, Brough DM (2005) 'The Australian Soil Resource Information System: technical specifications.' Version 1.5. National Committee on Soil and Terrain Information/Australian Collaborative Land Evaluation Program, Canberra <http://www.asris.csiro.au>.

Pitman C (2006) 'CSIRO GIS Environment. Installation and Configuration.' Report to CSIRO, ESRI Australia Pty Ltd. <http://www.asris.csiro.au>.

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Thank You

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