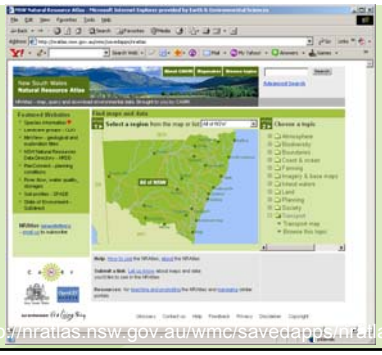
GIS as a communication tool

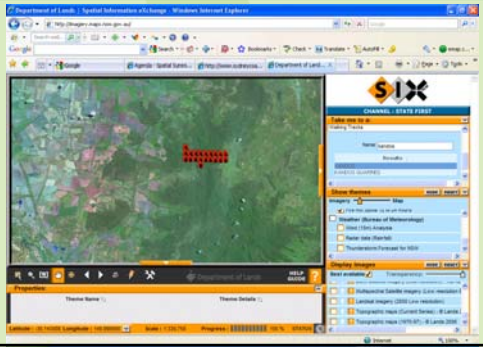
Dr Emma McIntyre
GIS in the Coastal Environment Workshop
9th November 2010

CANRI

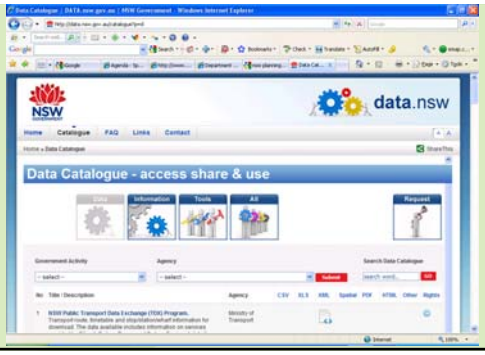


http://mratlas.nsw.gov.au/wmc/savedapps/mratlas

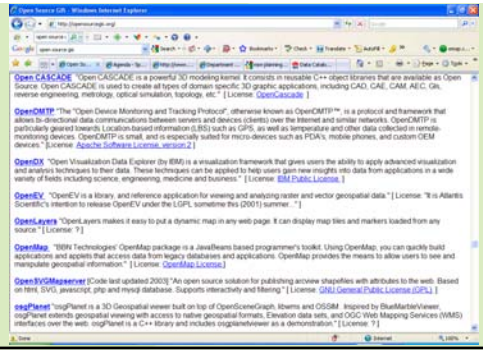
SIX Spatial Viewer



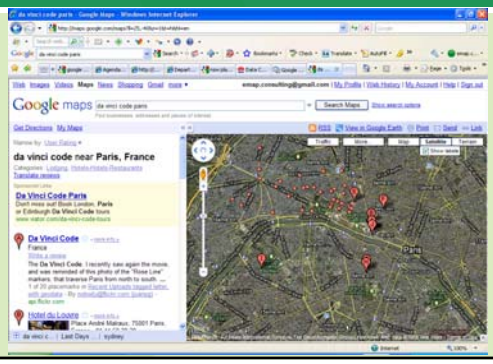
NSW data catalogue



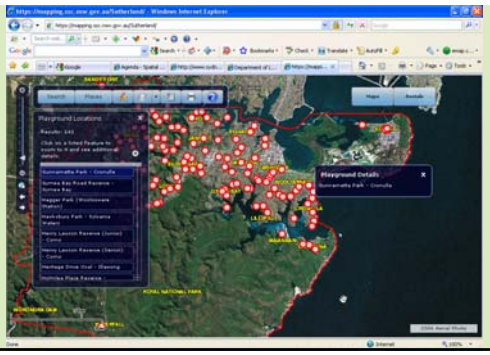
OpenSource GIS



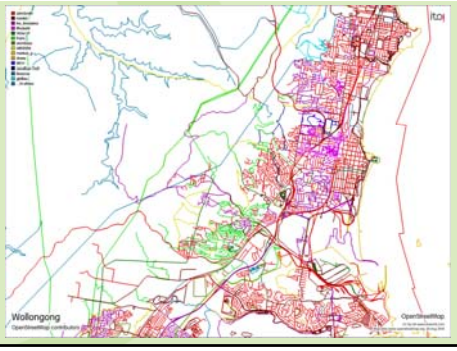
WebGIS



Sutherland Shire Council WebMapping

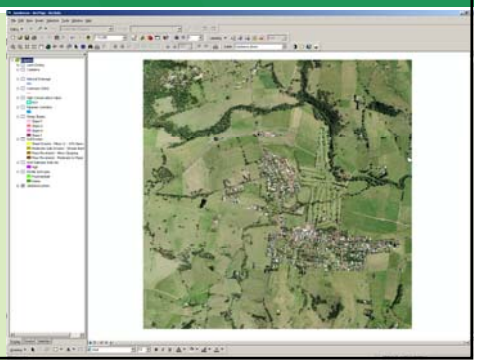


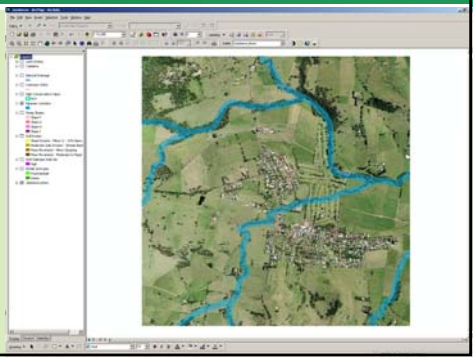
WebGIS: Open Street Map

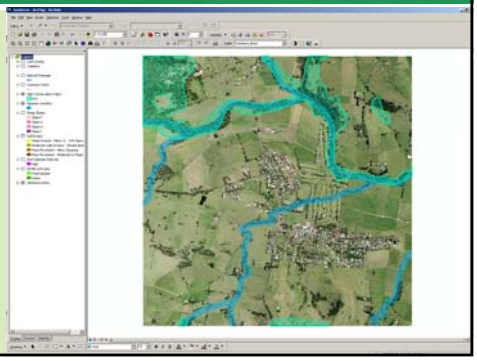


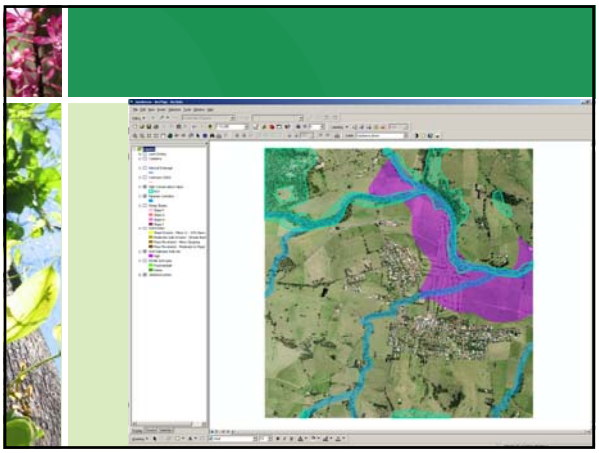
Case Study 1: Jamberoo

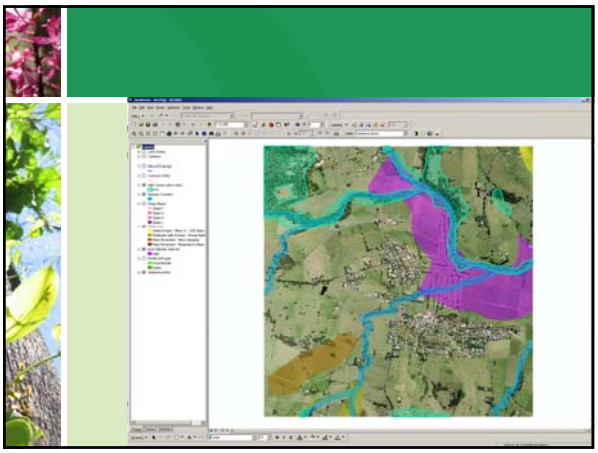
- Planning for future of Jamberoo
- Town meeting: 120 residents
- GIS data presented to illustrate physical limitations to development in Jamberoo.

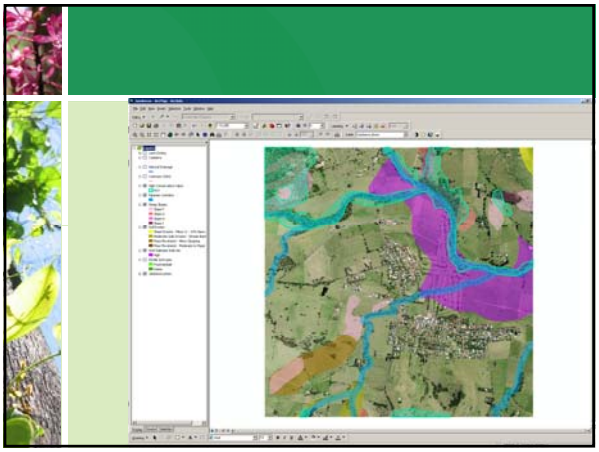


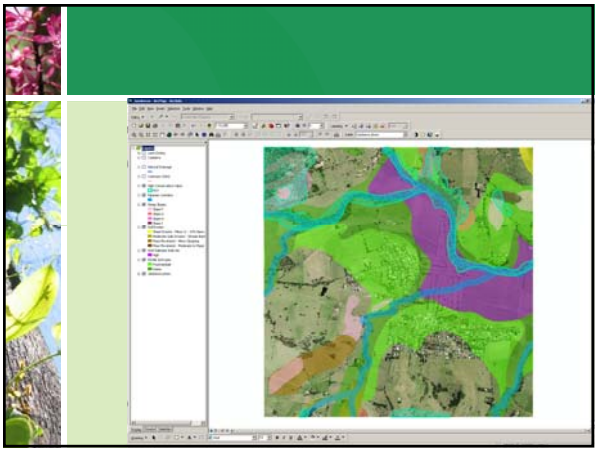












"Gave a good visual overview of issues to be considered in planning"

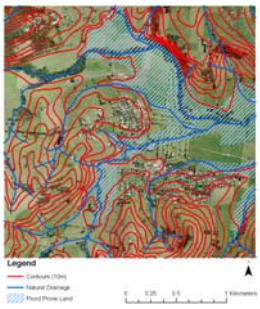
"Extremely useful way to explain all the issues together"

"This is an excellent tool which helps the layman better understand large scale complex issues"

- Focus groups to discuss issues in more detail
- Used GIS to map information that was unavailable

(a) Active Farming Land

(b) Flood prone areas



(c) Walking areas

"We felt as though we had an input to what was going to happen in Jamberoo"

"It was a good way to see feedback"

"This is a must for the proper planning for the future of Jamberoo to allow Council to have the thoughts and feelings of the community"

Case Study 2: Kiama LEP Review

- Community Panel
- 3 days of presentations from 'experts'
- 2 days of deliberations
- Report recommendations to Council for inclusion in the new LEP

- 3 days of presentations
- Role of GIS:

  To present a range of planning related information in a visual format to assist the decision-making process.

- Problems with GIS data provided by Kiama Council:
- No metadata;
- Attribute tables were 'scrambled';
- Incomplete vegetation mapping;
- No land use data available.

Metadata was created (example for 'Soil Erosion' shown here)

Soil Erosion

Original Data Source

Land Resources Survey: Kiama Municipality
Soil Conservation Service of NSW
May 1983

Published Scale

1:25,000

Mapping Methodology

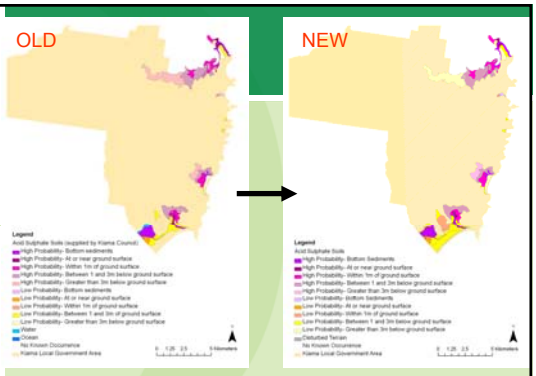
Mapped landforms, land use, erosion, drainage pattern and soils.

Attribute Descriptions

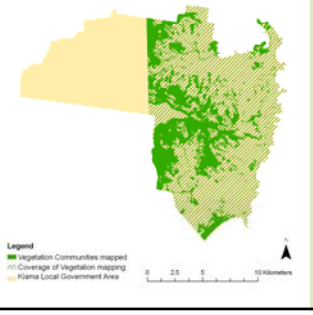
Soil Erosion Class	Description
1. No Appreciable Erosion	
2. Sheet Erosion	2.1 Minor (1-10% bare ground) 2.2 Moderate (11-20% bare ground) 2.3 Severe (20-40% bare ground)
4. Rill Erosion	4.1 Minor 4.2 Moderate 4.3 Severe 4.4 Very Severe
5. Minor Gully Erosion	5.1 Less than 1.5m deep 5.2 1.5-3m deep 5.3 Greater than 3m deep 5.4 Stream bank
6. Moderate Gully Erosion	6.1 Less than 1.5m deep 6.2 1.5-3m deep 6.3 Greater than 3m deep 6.4 Stream bank
7. Severe Gully Erosion	7.1 Less than 1.5m deep 7.2 1.5-3m deep 7.3 Greater than 3m deep 7.4 Stream bank
8. Very Severe Gully Erosion	8.1 Less than 1.5m deep 8.2 1.5-3m deep 8.3 Greater than 3m deep 8.4 Stream bank
9. Mass Movement	9.1 Minor slumping 9.2 Moderate to major slumps 9.3 Rockfall

OLD

NEW

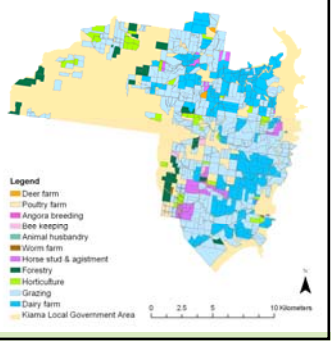


'Scrambled' attribute tables were corrected using original printed maps (example showing Acid Sulphate Soils mapping shown here)



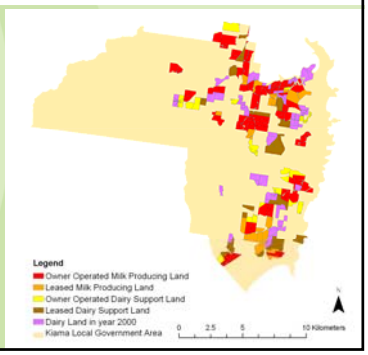
Existing vegetation mapping was digitised, but remained incomplete as remainder of municipality not yet mapped!

'Rural land use' mapped from hard copy map in Honours thesis completed in 1997

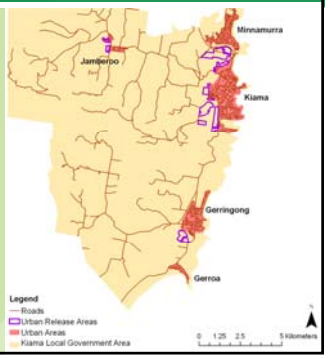


- Presenters invited to request maps for inclusion in presentation to Panel;
- Additional data requested, eg dairy farm land, urban growth areas, viewshed mapping.

Dairy Farm Land



Urban Release Areas



Viewshed mapping

- 2 days of deliberations;
- GIS projected on to a screen;
- Relevant GIS data displayed as requested;
- Panel members created maps to support their case

Evaluation

- GIS easy to understand;
- 'Empowerment' dependent on Panel facilitator;
- GIS impacted on planning decisions;
- Visualisation in group decision-making;
- Ability to assess several issues in one location simultaneously;

Case Study 3: Landcare Illawarra Community GIS

- Represents "bottom-up" approach to providing access to GIS.
- Landcare Illawarra members sought access to GIS;
- Funding provided by Southern Rivers CMA;
- Training provided by me!

- Members of LI invited to participate;
- Project activities:
- Mapping Days
- GPS Training
- Field Days
- GIS Tutorials

- Mapping Days: Record local knowledge for digitising

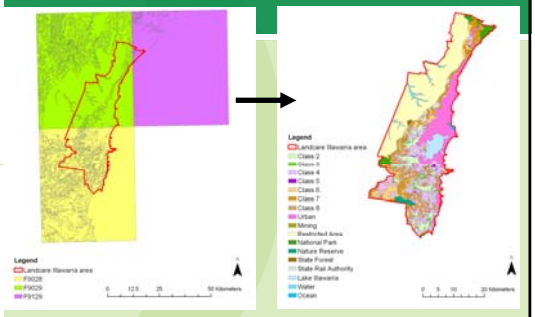
- GPS Training: Participants trained in how to use GPS in the field

- Field Days: Collecting GPS data at project sites for inclusion in GIS

- GIS Tutorials: Series of 4 tutorials to train participants in basic use of GIS.

- Sources of GIS data:
- Wollongong City Council
- Shellharbour City Council
- Kiama Municipal Council
- Department of Natural Resources
- Department of Lands
- Landcare

- Issues:
- Different software formats;
- Different projections;
- Data provided as set of 'tiles'.



'Tiled' data was 'unioned' and 'clipped' to the study area (Land capability example shown here)

Evaluation

- Participants felt 'empowered';
- GIS would impact on project planning;
- Comfortable with the software and data;
- Ability to input data
- Basic data queries
- Create their own maps

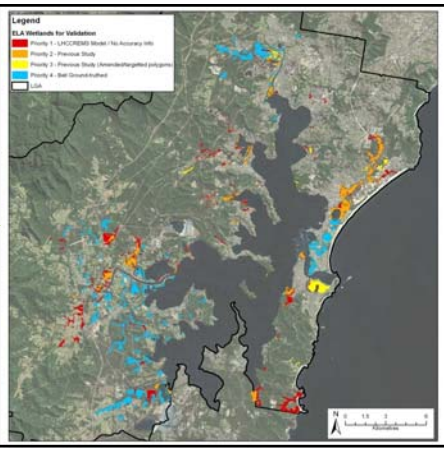
Case Study 4:
Lake Macquarie Wetlands Climate Change Assessment

Project aims:

1. Inventory of wetlands
2. Predict impacts of SLR on wetlands
3. Assess capacity of wetlands to retreat
4. Management recommendations

- Wetlands defined as inundation vegetation communities and can be grouped into forested, freshwater and saline
- Many wetlands in Lake Mac LGA fringe the lake and are very low lying
- NSW Govt adopted SLR projections of 40 cm by 2050 and 90 cm by 2100
- There is very high potential risk of SLR impacts to low-lying wetlands

DRAFT Wetland Inventory

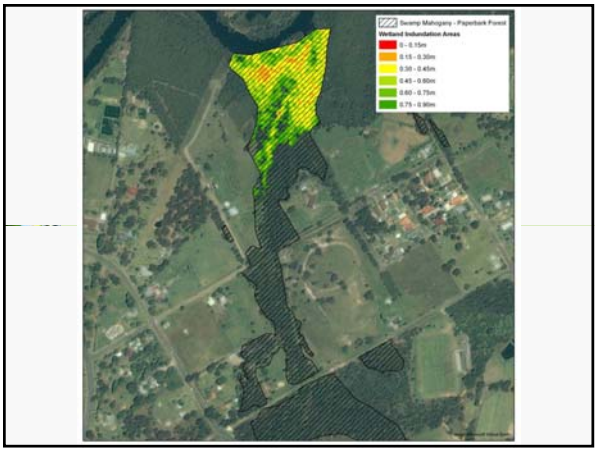


Approx 2,500 ha of wetlands <10m AHD

"Bucket analysis": what wetlands will be inundated if sea level rises x cm?

Key data used in analysis:

- Wetland inventory – wetland location & type
- High resolution DEM – wetland elevation
- SLR projections – 90cm by 2100 (15cm increments)



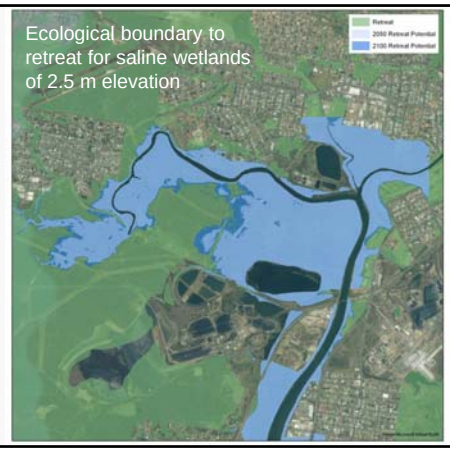
Can wetlands retreat from rising sea levels or will we see “coastal squeeze”?

Identified all areas of potential retreat as:

- non-built environments (e.g. open space, enviro protection, rural) on undisturbed soils OR
- area zoned other than above that have remaining vegetation and undisturbed soils

All other areas classed as having no potential for retreat

Ecological boundary to retreat for saline wetlands of 2.5 m elevation



2050:
2219 ha

2100:
2402 ha

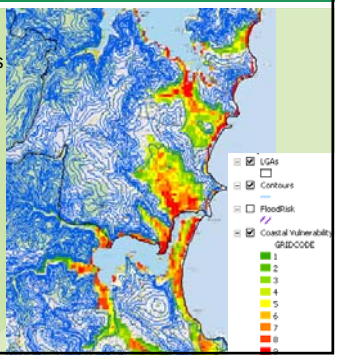
Lost:
190 ha

Gained:
2402 ha

TOTAL:
+ 2211 ha

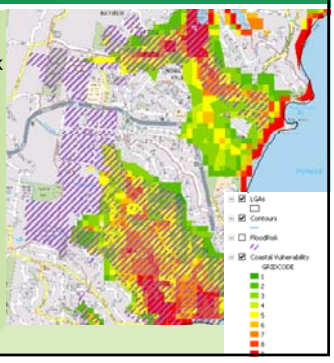
Case Study 5:
SHOROC Regional Planning Strategy

Coastal Vulnerability*
Compared to contours



* Data supplied by Sydney Coastal Councils Group

Coastal Vulnerability*
Compared to flood risk



* Data supplied by Sydney Coastal Councils Group

Conclusions

- Visualisation tool
- Decision-making tool
- Interactive
- Scenario building
- etc