Enabling Community Access to Climate Change Rainfall and Runoff Projections; a spatial perspective

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NSW Office of Water

FIG Sydney
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Scope

Quick overviews of;

1. Background of the Future Climate Data set
2. Overview of the vision of this project
3. Potential products of the project
4. A case study of using the data

Background

- Genesis from the CSIRO *et al* Murray Darling Basin Sustainable Yields Project 2007-8
  - Commonwealth Government wanted information on MDB wide water availability under current and future climatic conditions.
  - Rainfall, Potential Evapo-Transpiration (PET) and runoff were estimated within a very short time frame.
  - Chiew et al (2008). *Climate data for hydrologic scenario modelling across the Murray-Darling Basin.* (www.csiro.au/mdbsy).
- Post MDBSY: Analysis extended to coastal parts of NSW by Jai Vaze, Jin Teng.

Rainfall and runoff for NSW using A1B scenario (~2030 climate).

http://water.nsw.gov.au/Water-Management/Modelling/Climate-change/Climate-change/default.aspx

"a consistent future climate and runoff dataset across NSW and ACT which can be used by all state government agencies and industries to plan for and adapt to the impacts of climate change."

David Harriss

Basic data characteristics

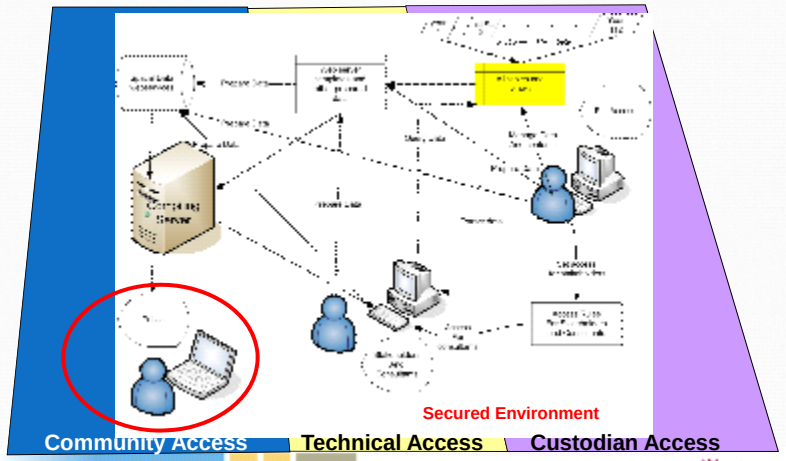
- **Spatial**
  - State-wide
  - 0.05° x 0.05° cell resolution (~5km x 5km) (~30,696 cells)
- **Temporal**
  - 112 years data available
  - Historical period 1895-2006
  - Daily time step
- **Variables**
  - Rainfall and PET
  - Runoff (*2) (total of 64 parameters)

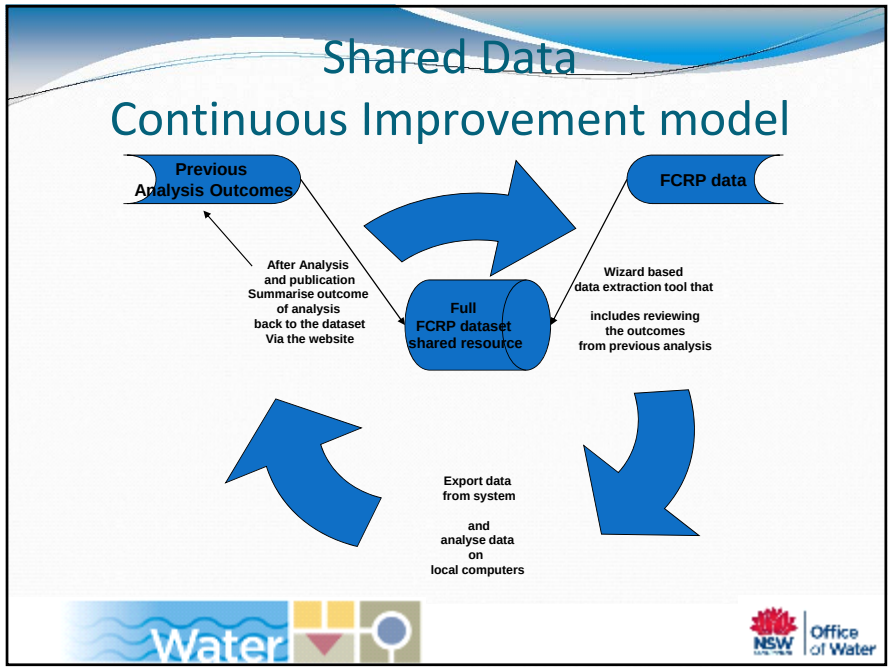
Soon to include up to another 64 temperature parameters)

1.255 billion rows of Data

- **Scenarios**
  - 15 GCM
  - Historical (observed/modelled)
  - 2030 Climatic conditions under A1B emission scenario
- **Cell Grouping categories**
  - Regional planning boundary's,
  - CMA's,
  - Stream Gauge's,
  - Individual Cell's,
  - Inflows to water storages,
  - Water Sharing Plans areas, and
  - Any other combination.

Conceptual stakeholder model




Shared Data
Continuous Improvement model
Previous Analysis Outcomes
FCRP data
After Analysis and publication Summarise outcome of analysis back to the dataset Via the website
Full FCRP dataset shared resource
Wizard based data extraction tool that
includes reviewing the outcomes from previous analysis
Export data from system
and analyse data on local computers
Water
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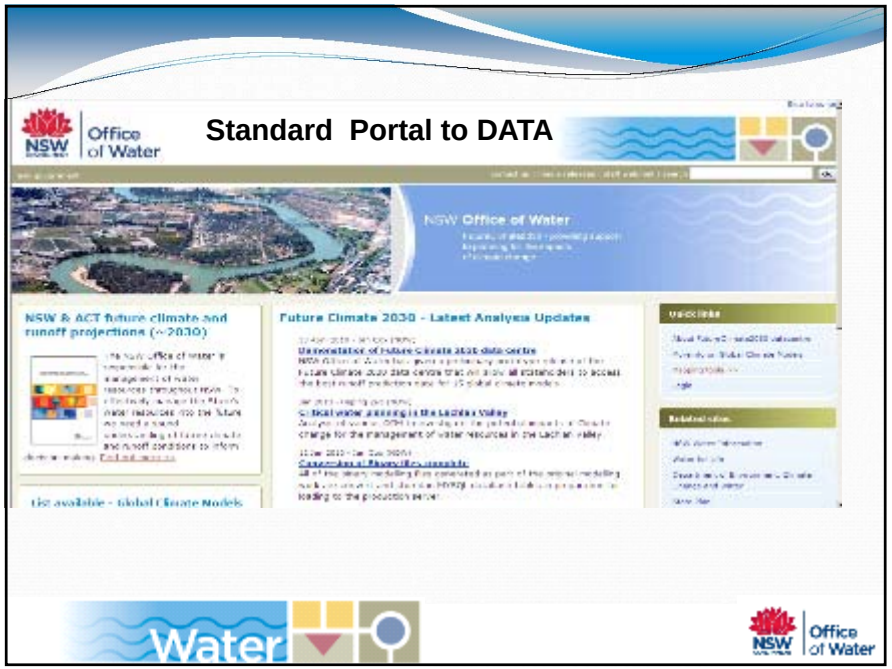
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Standard Portal to DATA
NSW Office of Water
NSW & ACT future climate and runoff projections (~2030)
Future Climate 2030 - Latest Analysis Updates
Water
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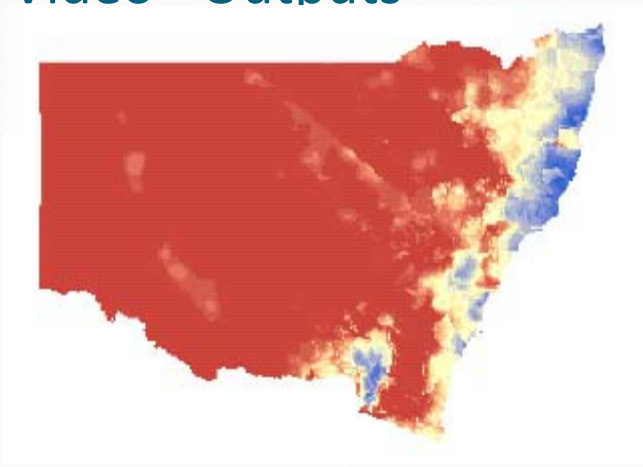
Video - Outputs



Historic Annual Runoff

(derived from Sacramento model)

Simple data analysis communication

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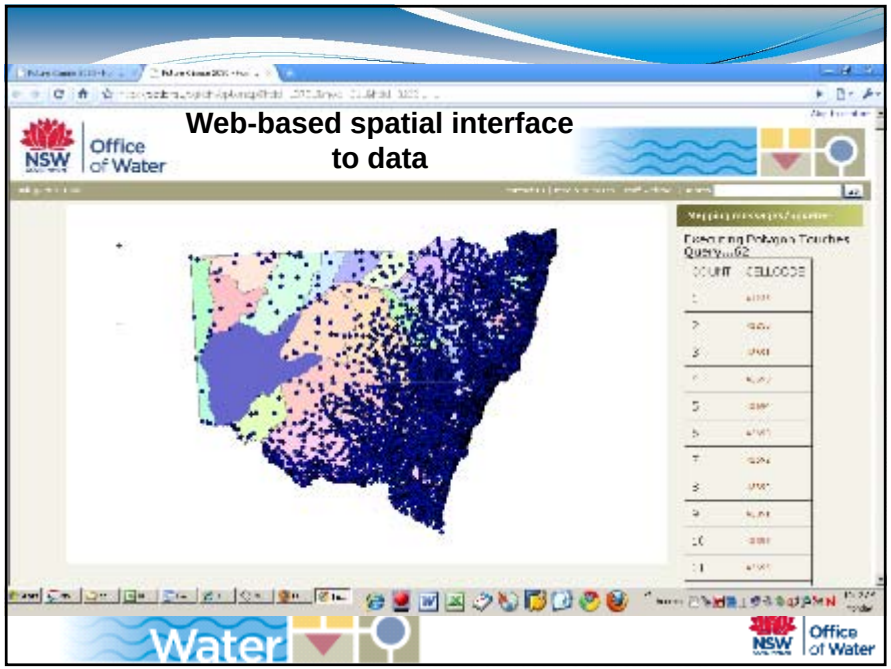

Summary views of data

YEAR	CountOfCELLCODE	Convertby	AvgOfSAC_1	AvgOfSIM_1	AvgOfRAI_1	AvgOfPET_1
1895	9	225000.00	107794.65060000	110768.59575000	744410.95875000	867315.06832500
1896	9	225000.00	110514.11187500	101579.54917500	787349.72677500	819569.67210000
1897	9	225000.00	87860.67795000	66692.15752500	917910.95872500	919349.31487500
1898	9	225000.00	232467.34207500	206619.54525000	656736.11100000	696022.72717500
1899	9	225000.00	102788.56262500	86207.35027500	663488.02395000	622679.64052500
1900	9	225000.00	52947.30127500	48184.90402500	621410.95890000	520678.08202500
1901	9	225000.00	62756.78760000	52963.18492500	393006.84930000	448726.02727500
1902	9	225000.00	4951.80135000	11641.25340000	531945.20542500	595863.01350000
1903	9	225000.00	109571.68465000	97110.76005000	626171.23282500	549965.75332500
1904	9	225000.00	55717.68442500	44831.48895000	545928.96172500	584310.10927500
1905	9	225000.00	28934.84227500	37732.09567500	585164.38342500	552541.09567500
1906	9	225000.00	75672.49297500	76932.07515000	536226.02730000	520417.80810000
1907	9	225000.00	32766.14362500	43313.31495000	513678.08205000	615267.12307500
1908	9	225000.00	70842.90265000	59384.79495000	480157.10370000	471762.29497500

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Case Study: -modelling climate change impact on water resource management in the Lachlan Valley

- Runoff simulated by SIMHYD and the Sacramento model for all 15 GCMs and rainfall was extracted for the FCRP dataset
- This data was used as inputs to the Departmental model (IQQM) to assess the impact of climate change on water resources management in the Lachlan
- The projected median total inflows and inflows to the major Dam in the Lachlan valley will decrease about 10% of the historical average

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Other Data Usage Summary

- The underlying data has also been used for the following projects;
  - Various town water supply studies,
  - DECC regional biophysical impact project,
  - DECCW coastal climate change impacts,
  - ActewAGL rainfall-runoff modelling, and
  - NSW Office of Water river system modelling.

Historic + 15 GCMs Rainfall + PET data (scenario A1B)

2 Runoff depths for each cell for all GCMs modelled

Delivered at any scale as time-series or raster data

Conclusions

- Increasing recognition of the need for climate projection data in planning and natural resource management.
- This project is about making this information available to planners, decision-makers, and the wider community
- The data is still transferring from my development server to the final Production Server.
- A work-in-progress (expected to be available by September 2010). For project updates and access to the data contact:

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