

Australian Landscape Water Balance

The AWRA-L model

Dr Andrew Frost

Bureau of Meteorology

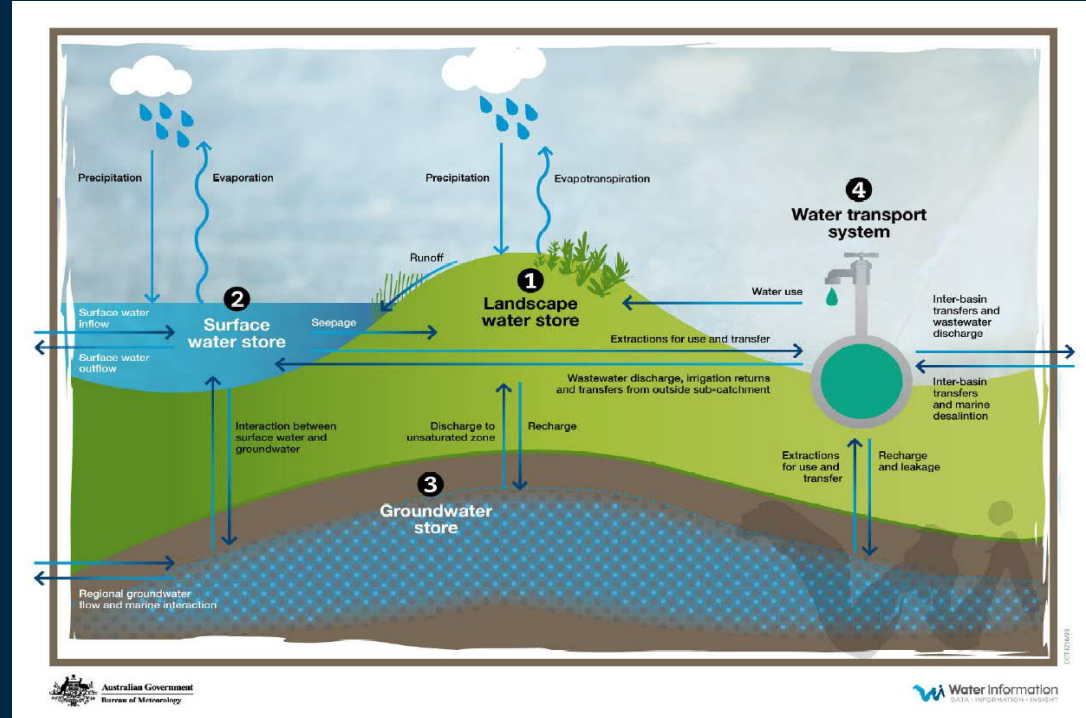
Overview

- **Background**
 - Development
 - Outputs
 - Landscape Water Balance Website
 - Users
- **AWRA-L**
 - Model and inputs
 - Testing
 - Future



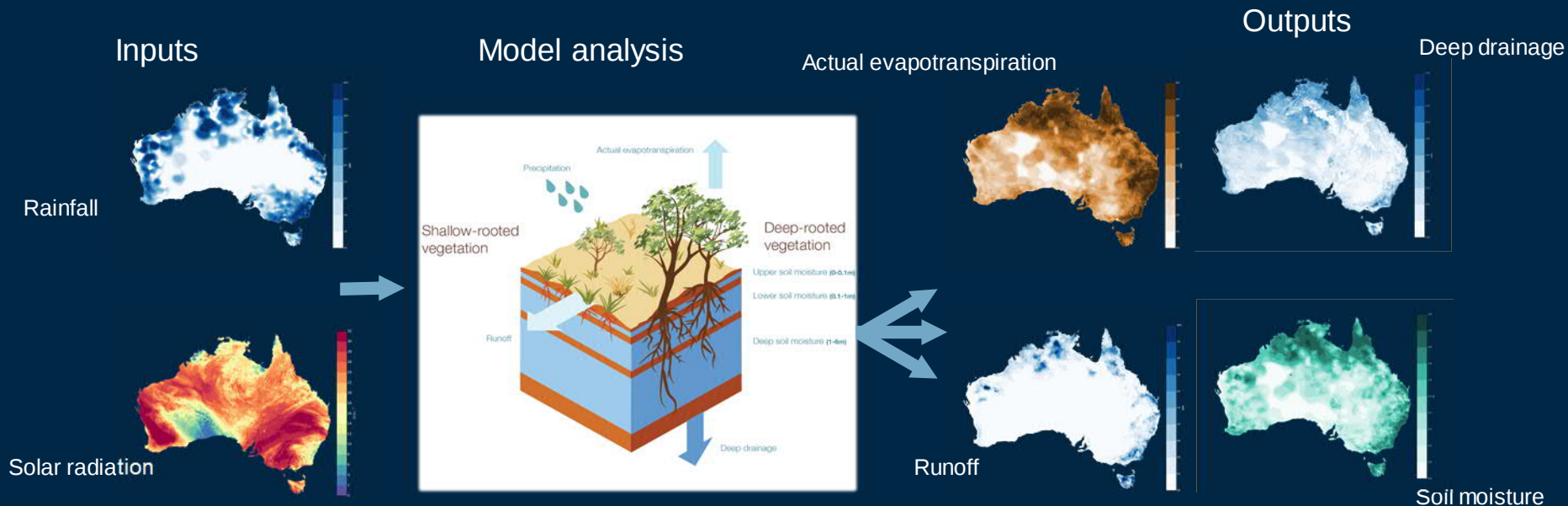
Background

- Bureau Water Division formed 2008 reporting on Water nationally
 - Collation and publication of water data
 - Water Resource Assessments and Accounts
 - Use observations else modelling
- CSIRO and Bureau developed the AWRA-L model
 - Australian Water Resources Assessment Landscape Model
 - Now operational within the Bureau



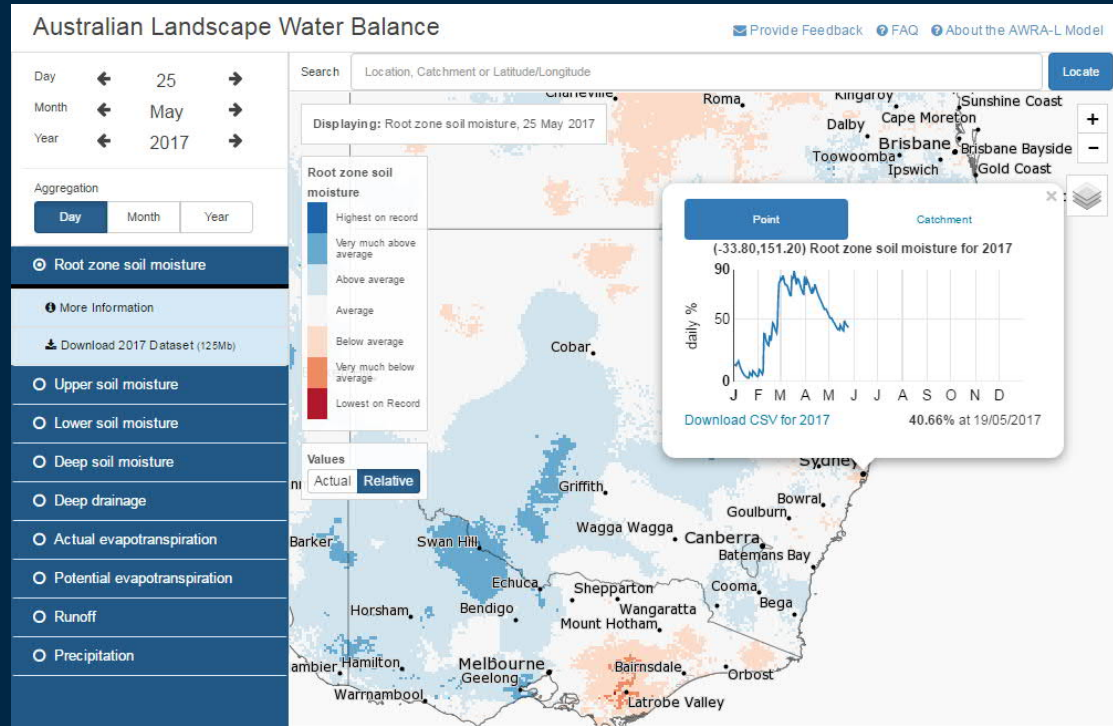
Operational continental landscape water balance model

AWRA-L: national, daily time-step, 5 km resolution



Australian Landscape Water Balance web application

- A unique service!
- Updated daily
- See all variables at daily, monthly or annual time slices
- Download the grids at a resolution of 5km x 5km
- Past 10 years data available to all
- Registered users access >100 years and tailored products



<http://www.bom.gov.au/water/landscape>

AWRA-L Deep Drainage

Deep drainage - annual total 2011



Deep drainage - mean annual total for 1911 - 2015



Users

- BoM:
 - National Water Account www.bom.gov.au/water/nwa
 - Water In Australia: www.bom.gov.au/water/waterinaustralia
 - Flood warning – initial conditions
- Many agencies for situational and annual reporting
- MDBA
 - Basin watering outlook
 - Under trial for other purposes
- ABARES
- NSW DPI, DEDJTR, Vic Ag, SEQ Water, WA Dept. of Ag and Food

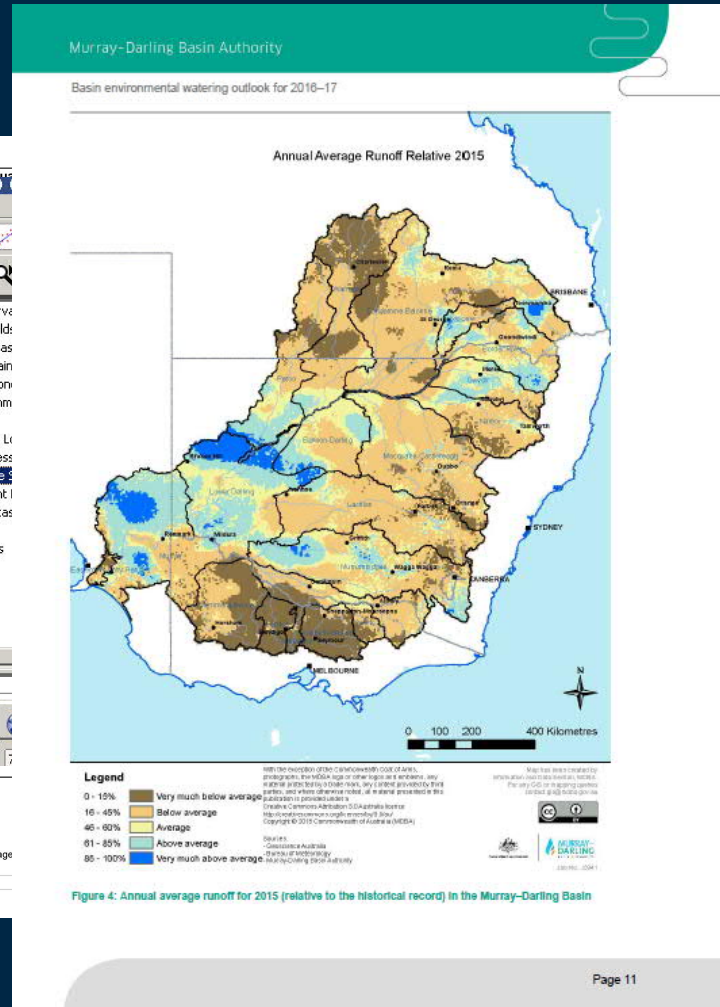
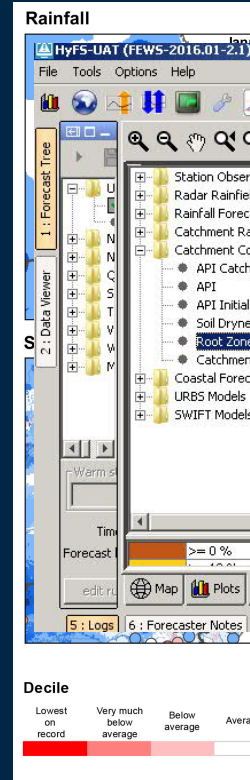
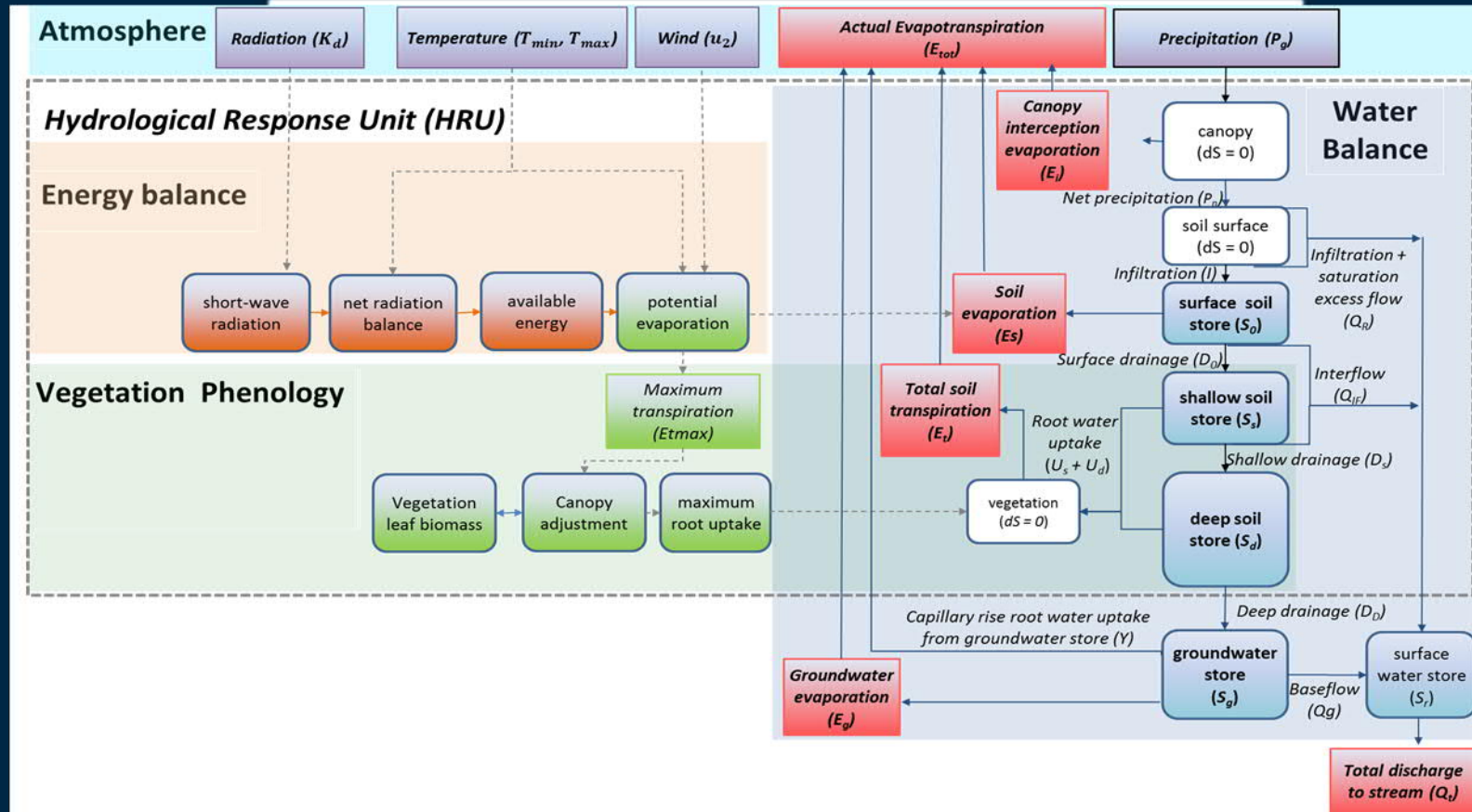
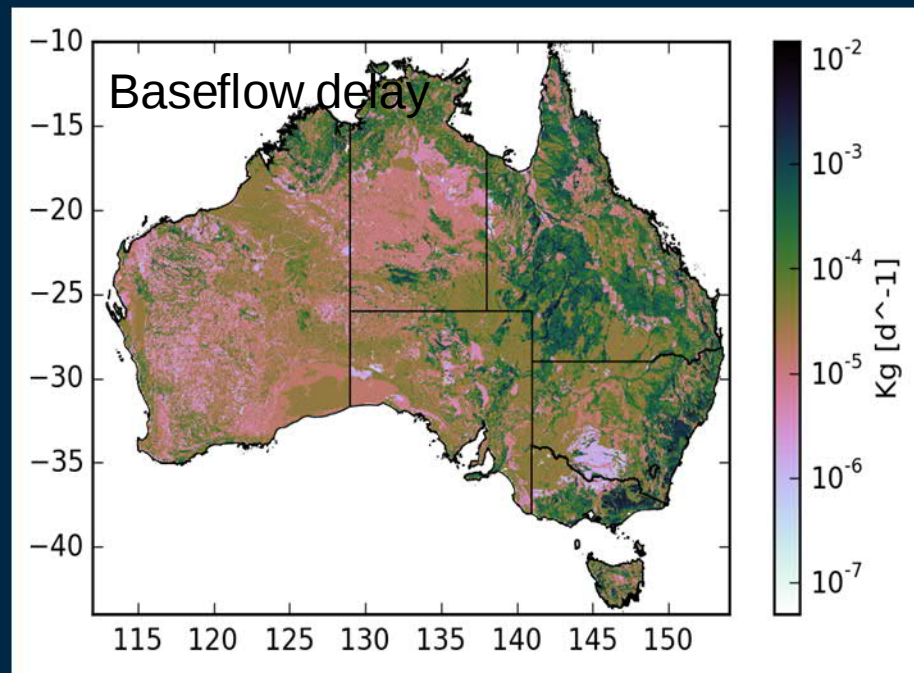
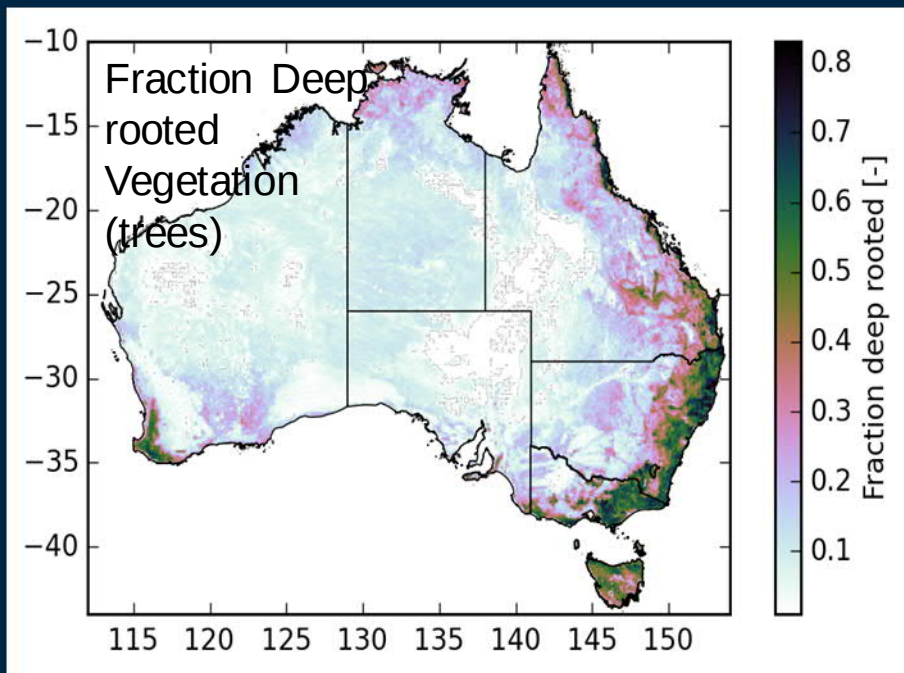


Figure 4: Annual average runoff for 2015 (relative to the historical record) in the Murray-Darling Basin

The AWRA-L model



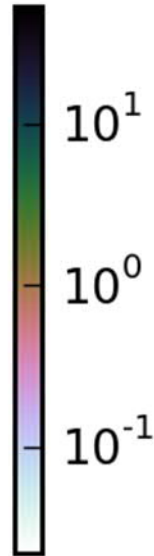
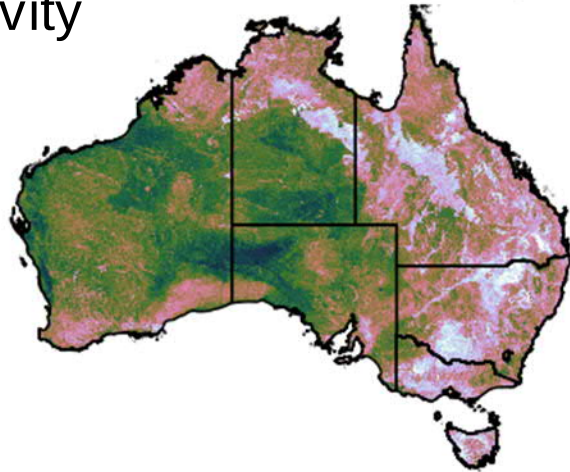
Various static spatial inputs



Soil drainage properties

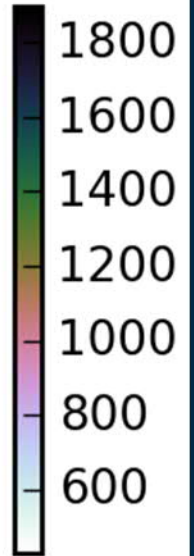
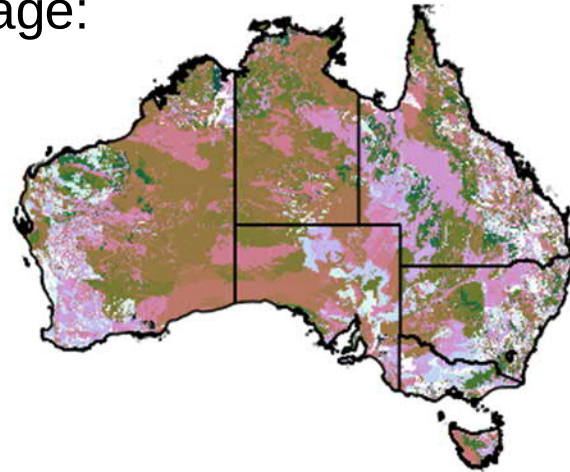
Saturated
conductivity
rate:

Kdsat [mm/day]



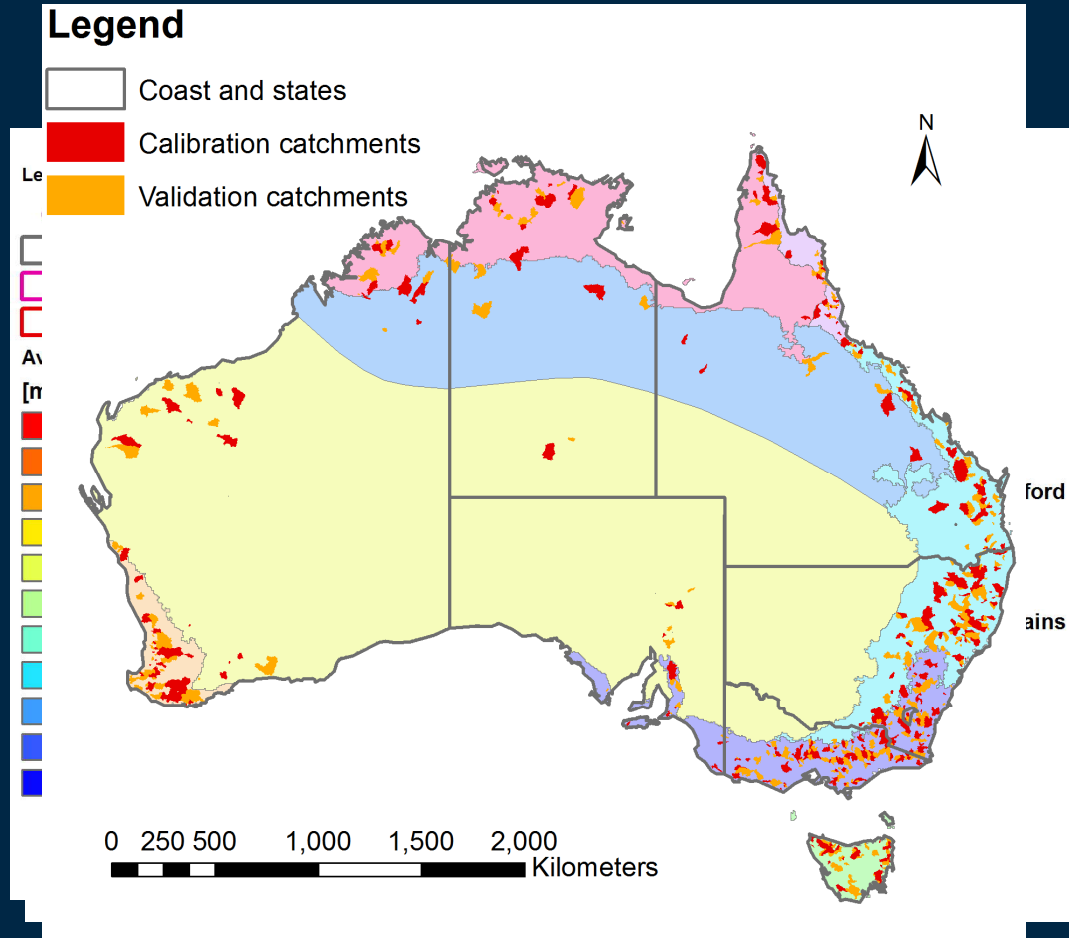
Maximum
storage:

Sdmax [mm]



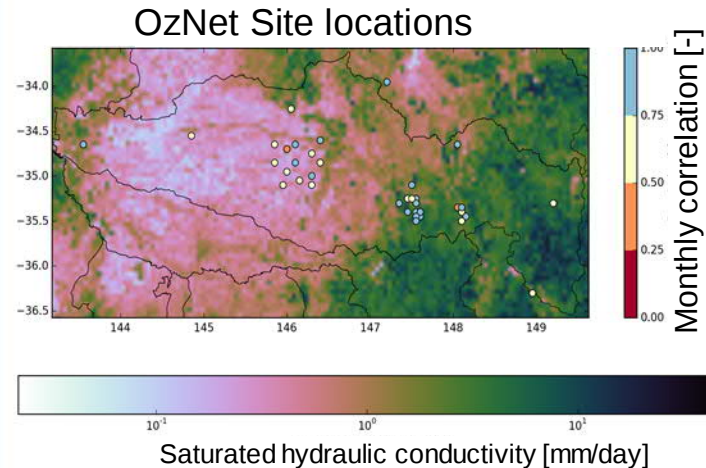
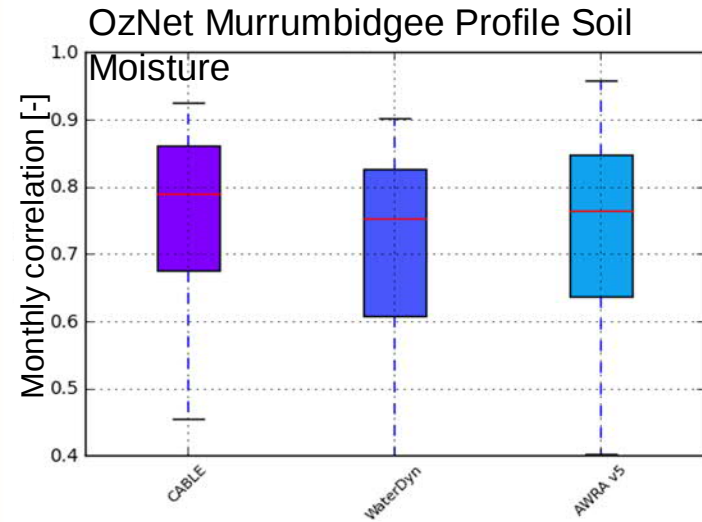
Calibration and Benchmarking

- Unimpaired catchment testing
 - Streamflow – 295 cal and 291 val
 - Satellite Evapotranspiration and Soil moisture
- Point testing
 - Evapotranspiration – OzFlux
 - Soil moisture
 - OzNet Murrumbidgee
 - SASMAS Upper Hunter
 - Recharge data



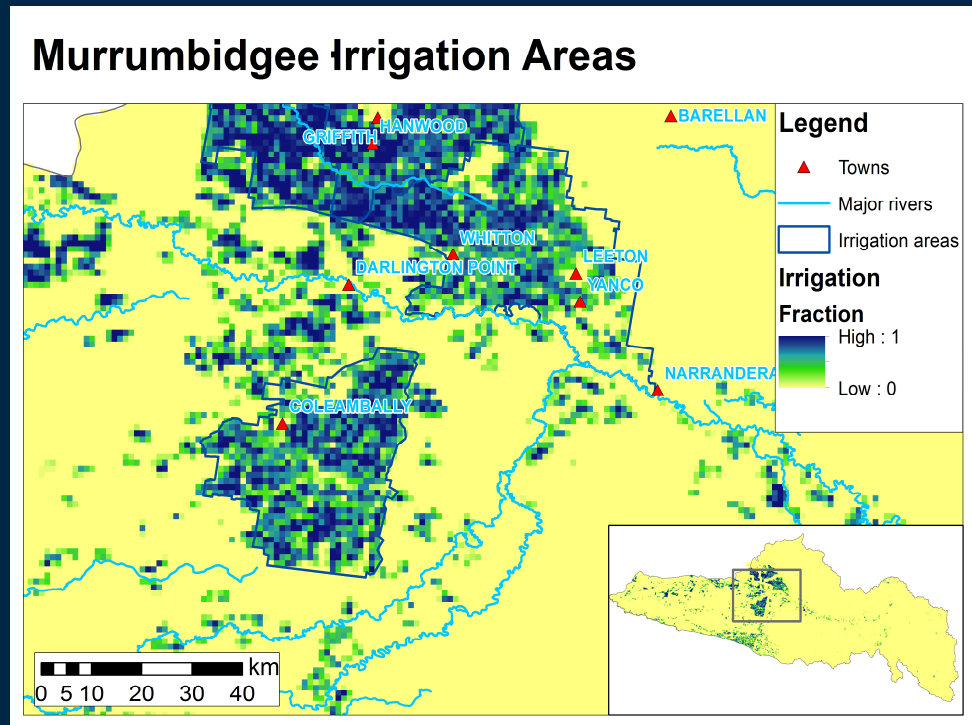
Calibration and Verification

- Calibrated to:
 - Streamflow, satellite ET and SM
- Performs well in validation
 - For streamflow compared to peer national *and* locally calibrated rainfall runoff models
 - For profile 0-90cm soil moisture
 - Overall for water balance



Ongoing Development

- AWRA released a s a community model
 - https://github.com/awracms/awra_cms
 - Code, Modules, Data, Documentation
 - Enables development by you!
- Improving the model:
 - 1km resolution
 - Urban and irrigation HRUs
 - Better calibrations including groundwater surfaces
- Scenario modelling



Thank you

Questions?

andrew.frost@bom.gov.au

awrams@bom.gov.au