Australian Government
Bureau of Meteorology

Water Information
DATA › INFORMATION › INSIGHT

Water Reporting Services: Model Data Fusion requirements

Andrew Frost, Amgad Elmahdi, Luigi Renzullo, Carl Daamen, David Barratt

11 May 2010

Australian Government
Bureau of Meteorology

Background

- BoM has a new role in providing water information
  - A result of the *Water Act 2007*
- Water Division has three functional branches:

Data	Reporting	Forecasting
• Aggregating nationwide water data • Making it available	• National Water Account • Water Resource Assessment	• Flood warning • Seasonal flow forecasting + more

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

Data & Forecasting

- Data: *The water regulations*
  - Precipitation, streamflow, groundwater, transfers, dam storages, allocations etc…
  - First AWRIS product online this month: dam storage levels
  - Geofabric: 1 sec DEM and blue line network
- Forecasting:
  - Flood forecasting: MDF (soil moisture, streamflow)
  - Seasonal Streamflow forecasting: MDF for predictors

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

Reporting

BoM is legislatively required to produce:

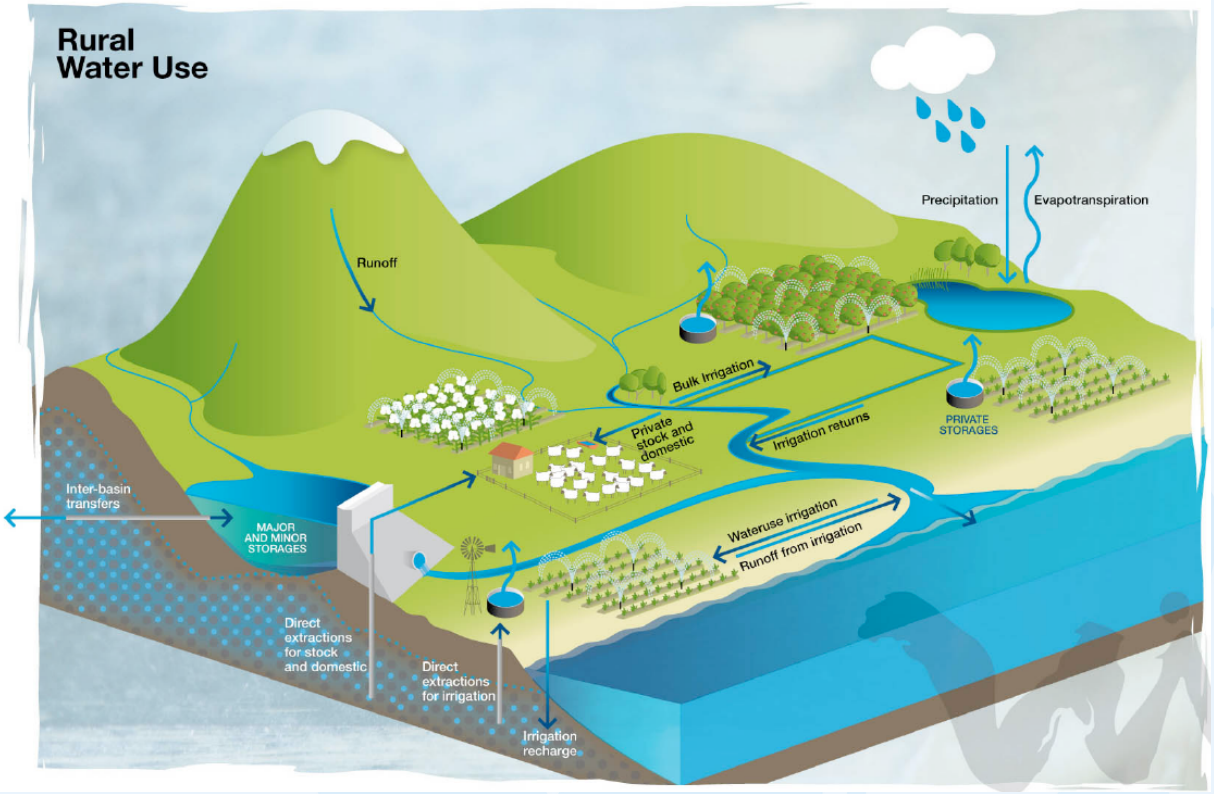
- An Annual National Water Account (NWA)
  - how much water was available and used in a region? (see www.bom.gov.au/water/nwa for first attempt)
- Periodic Water Resource Assessments (AWR)
  - The changing availability and condition of water for:
    - Broad regions broken into:
    - Supply systems: urban, agricultural
    - Environment: significant sites, environmental flows

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

A Water Balance in retrospect…

Underpins National Water Account & Water Resource Assessment



www.bom.gov.au/water/about/publications/methods

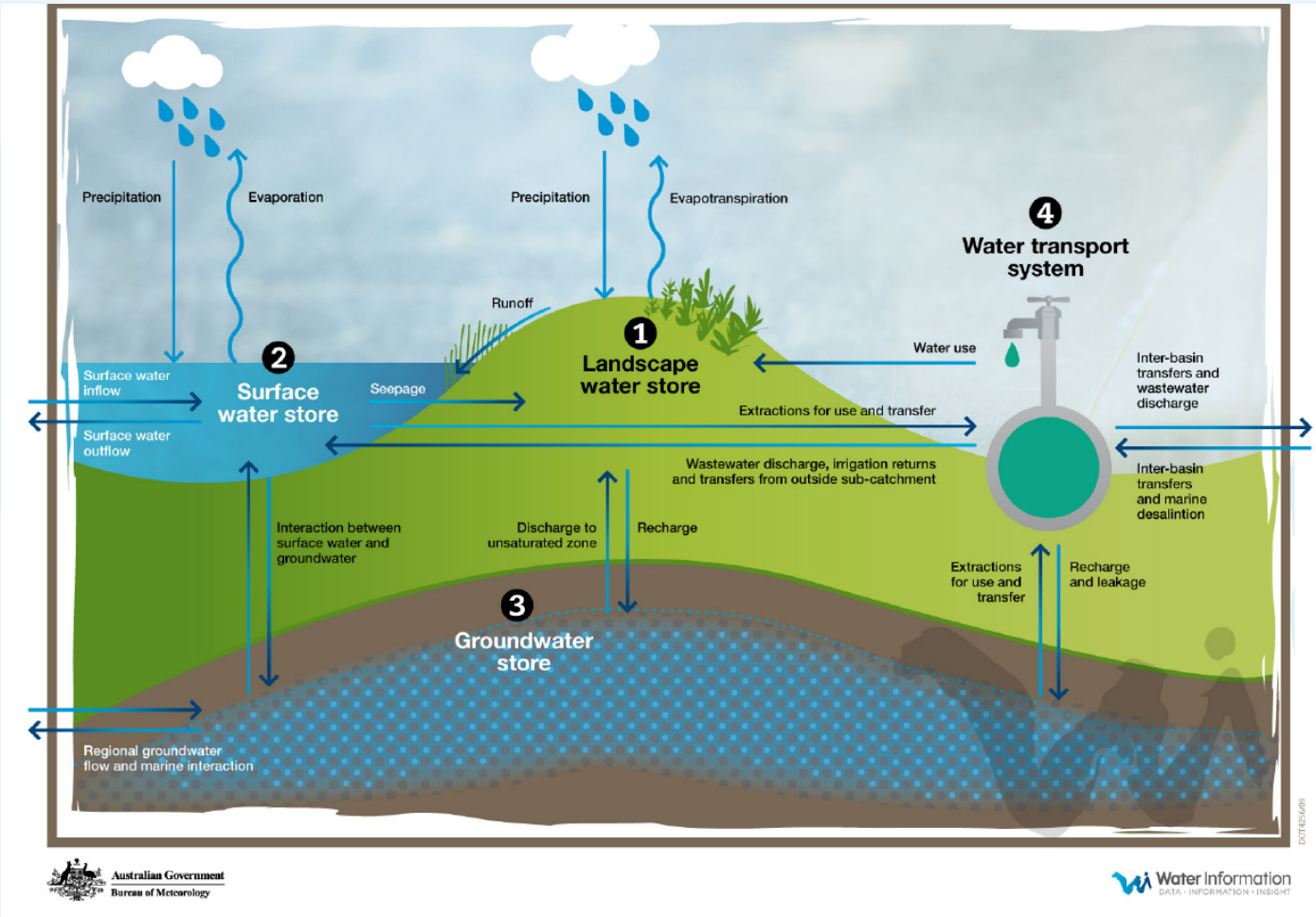
Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

Water balance

Stores/fluxes

- Precipitation
- ET
- Soil moisture
- Runoff/river flow
- Deep drainage



Australian Government
Bureau of Meteorology

MDF: the plan

- Have a range of data
  - Gauged precipitation, groundwater bore, river flow measurements, dam storage from regulations
  - Satellite precipitation, ET, soil moisture & groundwater estimates
- Have a range of modelling choices
  - Start with simple column water balance (bounded by other processes)
  - Add routing & water use

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

In the beginning there was…

- WIRADA and AWRA-Landscape:
  - Basic soil water balance model
- Other components being added to include flow processes, regulation, groundwater
- Assimilation seems the best way of ensuring the models match the observations
  - Start with soil moisture and ET processes and work from there

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

In the future we need…

- To include:
  - Precipitation, ET, soil moisture and streamflow ***operationally*** would be a good start
  - Urban effects (eg. concrete) & water use
- to work on assimilation/models collaboratively
  - given the WIRADA funding framework
- To link assimilation to the Bureaus Hydrological Modelling System

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

Questions

- Data: What data is required for a standard MDF test set?
- Models: CABLE vs AWRA vs WaterDyn vs… Need a bake off & consistent model framework (CABLE-BHMS?)?
- Assimilation: Can we pool resources to work on general assimilation tools and models?
- How much is enough? Joint assimilation of NWP, water, energy, carbon…

Water Information
DATA › INFORMATION › INSIGHT

Australian Government
Bureau of Meteorology

Water Information
DATA › INFORMATION › INSIGHT

Thank you…

Andrew Frost
02 9296 1517
a.frost@bom.gov.au