SINCLAIR KNIGHT MERZ

SKM

Water Resources Management – Sharing the Australian Experience

Malaysia Water Resources Management Forum 2012

Perbadanan Putrajaya, 26-27 November 2012

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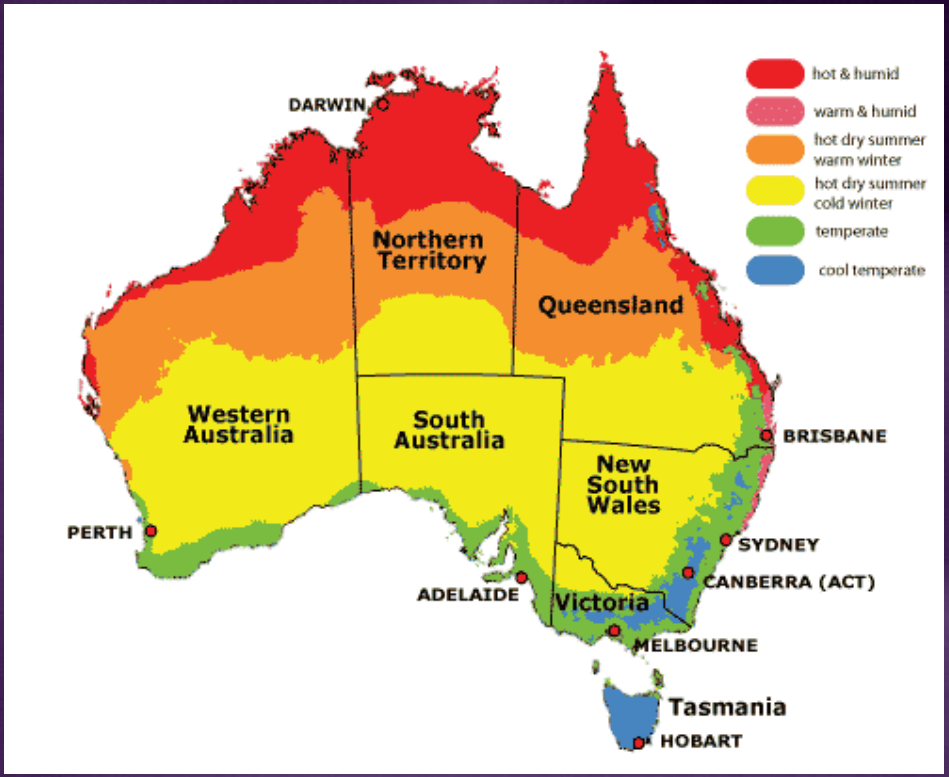
achieve outstanding client success

Objective

- To share the Australian Experience in Water Resource Management.



Outline

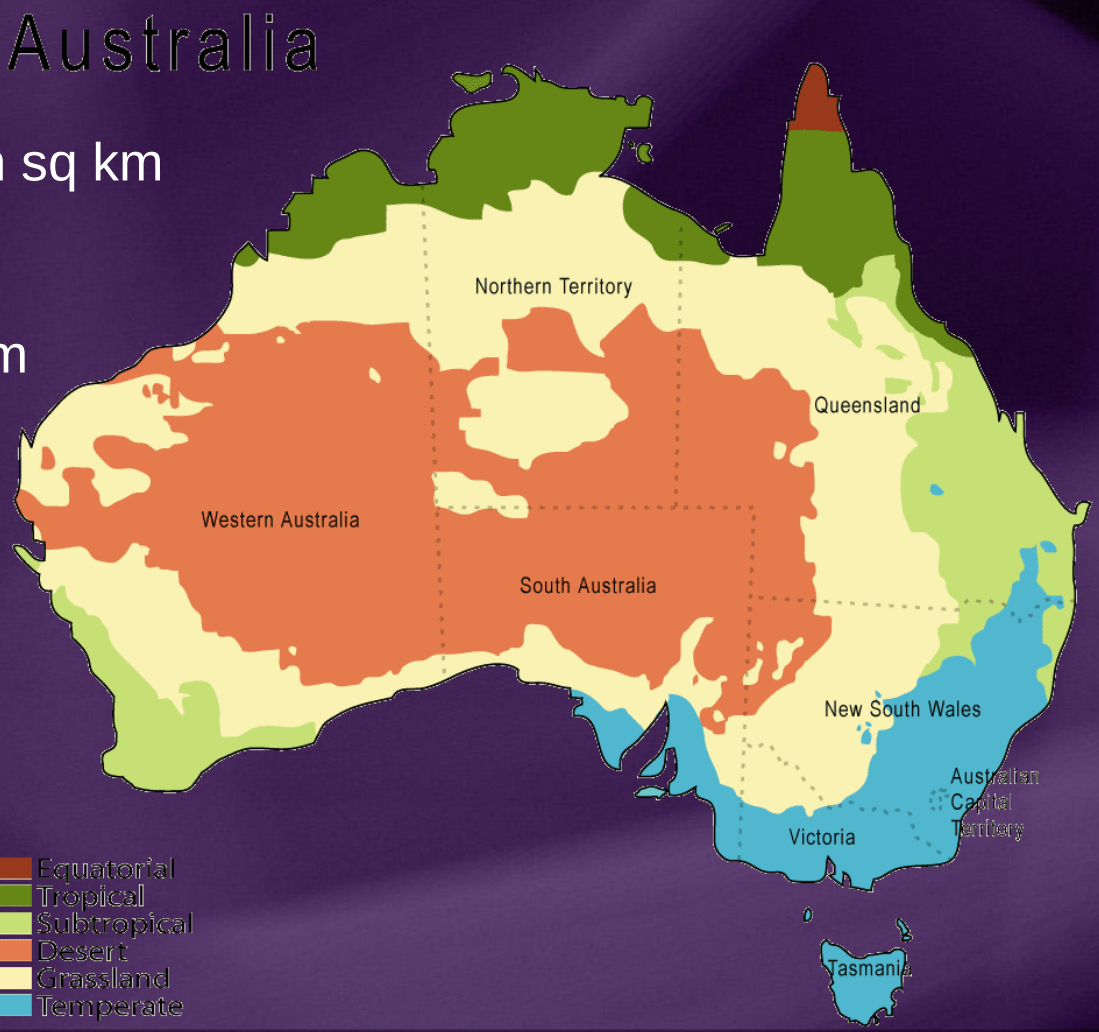
- Introduction
- Key Water Resources Management Phases
- Drivers for Water Resources Management Reforms
- Managing Australia's Water Resources
- Lessons Learned
- Way forward to the Future
- Conclusion

Introduction

- Australia is one of the most arid countries in the world.
- Australians consume more than 24,000 gigalitres of water a year. More than 70 per cent of this is used for irrigation while a further 21 per cent goes to urban and industrial uses. The rest is used in other rural activities.
- Water resources management in Australia has changed considerably with time, and particularly over the last twenty to thirty years.
- Like many countries, it has been reforming water resources management practices and policies in order to meet the needs of a maturing water economy.

Introduction (cont'd)

- Total area = 7.7 million sq km
- Population = 23 million
- Annual rainfall = 600mm



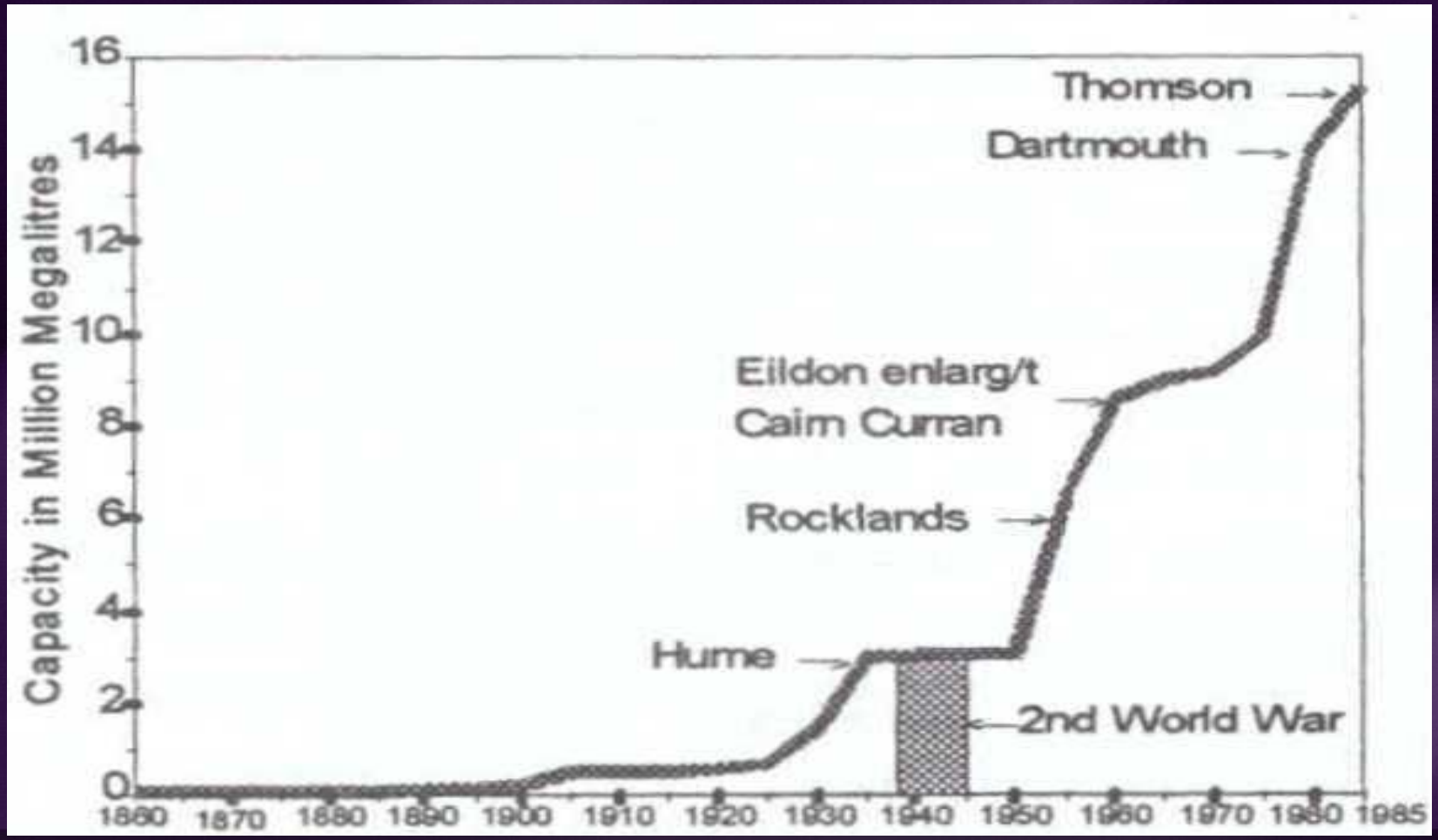
Key Water Resources Management Phases

1. Development Phase
   - late 1880s to the late 1970s
2. Management Phase
   - 1980 to 2000
3. Adjustment Phase
   - 2000 to present (and ongoing)

The Development Phase

- 1900s – 1940s:
  - Irrigation industry establishment and growth
- 1950s – 1970s: Post W.W. II expansion
  - Massive dam building program to provide water
  - Major Water Rights upgrade issued in 1964
  - Irrigation systems upgraded to deliver increased volumes
  - Water prices didn't cover costs to operate and maintain systems

Victorian Water Storage – Cumulative Capacity 1865 - 1985



Management Phase

- *1980s Problem Awareness*
  - Salinity and Drainage issues
  - Cost pressures
  - Financial viability of irrigation/water supply systems
  - Asset management and service development
  - Water right anomalies
- *1990s Managing Mature Systems*
  - Clearer definition of Water rights
  - Water trading and move to higher value uses
  - A cap on surface water diversions
  - The first round of Water reforms are agreed
  - Water quality management plans
  - Full cost recovery pricing
  - Organisational reform of infrastructure ownership

Adjustment Phase

- *2000s Adjustment for Sustainability*
  - A cap on Groundwater
  - Water savings
  - Improving environmental flows
  - Controls on dams
  - A second round of water reform
  - Expanded water trading
  - Tariff reforms
  - Asset reconfiguration and modernisation

Adjustment Phase (cont'd)

- Direct Commonwealth involvement in water issues
  - Water entitlement buy back
  - Water savings through infrastructure upgrades
  - Referral of powers by the states and a new Water Act 2007
  - A whole of Basin Plan – in final stages of consultation
- Adapting to climate change
  - Possible 40% reductions to inflows by 2055
  - Sustainable Water Strategies set policy

Drivers for Water Resources Management Reforms

- Drought and water shortage
  - Often highlights problems with status-quo
- In earlier development phase
  - Response was often to build infrastructure
  - Harvest and deliver more water
  - Issue new rights
- Approaching (or exceeding) sustainable diversion limits required new approaches
  - Improved planning, water sharing, clear entitlements
  - Caps, markets, trade, sustainable use

Managing Australia's Water Resources

- The Australian Government is working with all states, territories and communities to improve the way to manage Australia's water resources.
- As Australia prepares for a future with less water it is important to improve water use and infrastructure, and restore the health of our rivers.
- To help with this, the Australian Government has passed legislation and established the following initiatives and programs. Several Australian Government agencies are working together to help deliver this package of water reforms.

Managing Australia's water resources

Entities

Murray-Darling Basin Authority	Department of Sustainability Environment, Water, Population and Communities
National Water Commisssion	Commonwealth Environmental Water Holder
Australian Competition and Consumer Commission	Bureau of Meteorology

Other players

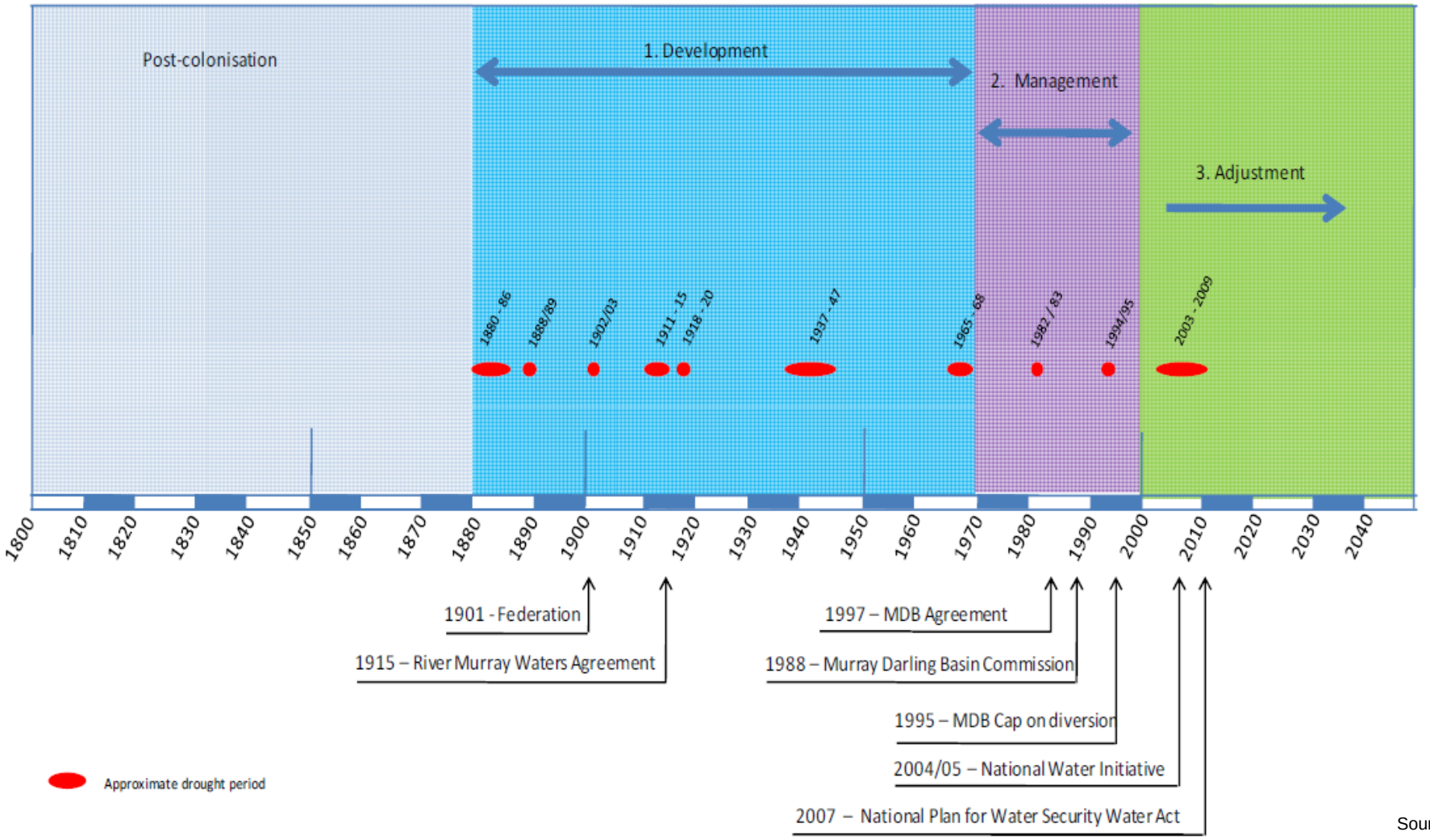
Department of Agriculture, Fisheries and Forestry	Department of Regional Australia, Regional Development and Local Government

Water for the future initiative

- Driving Reform in the Basin
- Restoring the Balance
- Sustainable Rural Water Use and Infrastructure

Source: MDBA

Australia's Water Policy Development History
(general phases of development)



Source: DG

National Water Initiative

- The NWI is the blueprint for water reform across Australia. This agreement between all states and territory governments and the Commonwealth has been in place since 2004.
- The NWI represents a shared commitment by all our governments to increase the efficiency of Australia's water use and includes commitments to reform water markets and trading, and deal with over-allocated or stressed water systems.

National Water Initiative (cont'd)

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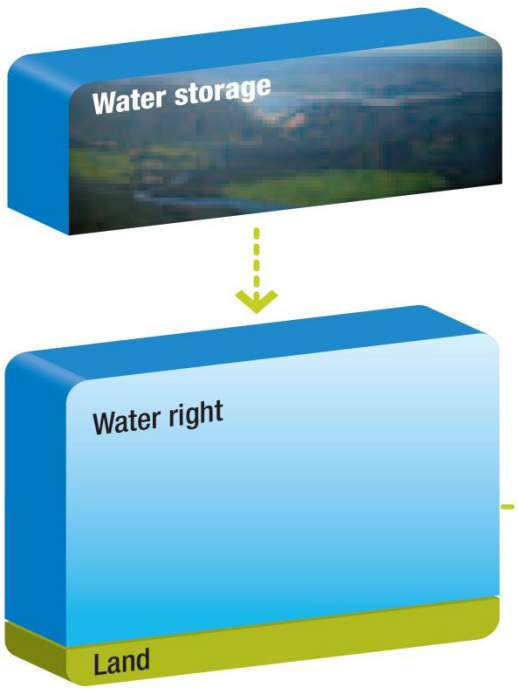
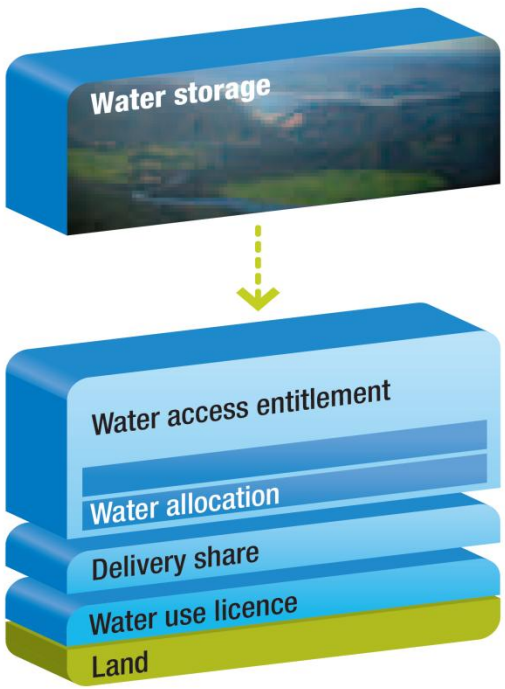
Pre-water reform



Unbundling

NWI reforms



Traditional water right
a right to an annual volume of water, subject to available water in storage. Inseparable from land.

Water use licence
the rights and obligations relating to the use of water on a specific parcel of land.

Delivery share
a share of capacity in an irrigation supply channel or a water course.

Water access entitlement
a perpetual or ongoing entitlement to a share of water from a specified consumptive pool as defined in the relevant water plan.

Water Allocation
the specific volume of water allocated to water access entitlements in a given season.

Source: NWC

The Water Act

- The Australian Government passed the Water Act in 2007 to help implement the National Water Initiative.
- The Water Act introduced new powers that help the Australian Government coordinate a national approach to water management and meet the challenges facing water management in the Murray–Darling Basin.
- Importantly, the Water Act established the Murray–Darling Basin Authority to prepare a Basin Plan for the sustainable management of water across the whole of the Murray–Darling Basin.

Murray–Darling Basin Authority

- The objective of the Murray–Darling Basin Authority (in partnership with governments and communities) is to put water use on a sustainable footing to ensure vibrant communities, a viable irrigation industry, secure water for cities and towns, and to restore the health of the environment of the Basin.
- MDBA is responsible for preparing a management plan (the Basin Plan) that will include a new sustainable diversion limit (SDL) in the Murray-Darling Basin to ensure enough water is allocated to the environment to maintain important ecosystems and river health.

Water for the Future Initiative

- The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) implements the Water for the Future initiative.
- This ten-year, multi billion dollar program, aims to secure the water supply for all Australians. Water for the Future has four priorities:
  - using water wisely
  - supporting healthy rivers
  - taking action on climate change
  - securing water supplies.
- Important elements of Water for the Future are investing in water infrastructure to make our water use more efficient; buying back water from willing sellers (using it to meet core environmental needs); and supporting other reforms.

A modern delivery system (2000's onwards)

FlumeGates – offtake structures

FlumeGates - regulators

Type 1 single-bay structure

Type 1 multi-bay structure

Channel rehabilitation – HDPE lining

Start

Desilting

Replacing Meters

- Dethridge wheel under measured by between 8% to 12%
- Flume gates and magnetic flow meters accurate to within ±5% with no bias

Driving Reform in the Basin program

- The Driving Reform in the Basin program supports Australian Government contributions to the operation and water reform functions of MDBA, including those under the Water Act.
- This program also gives the National Water Commission (NWC) and Australian Competition and Consumer Commission (ACCC) specific roles and functions under the Water Act.

Sustainable Rural Water Use and Infrastructure program

- The Australian Government is also investing $5.8 billion in modernising irrigation infrastructure and improving water use efficiency.
- The Restoring the Balance in the Murray–Darling Basin program and the Sustainable Rural Water Use and Infrastructure program are helping by returning water to the environment and in the transition to the implementation of the Basin Plan. Both programs are administered by SEWPaC.

Restoring the Balance in the Murray–Darling Basin program

- Under the $3.1 billion Restoring the Balance in the Murray–Darling Basin program, the Australian Government is buying water entitlements to help restore the Murray–Darling Basin's environment.

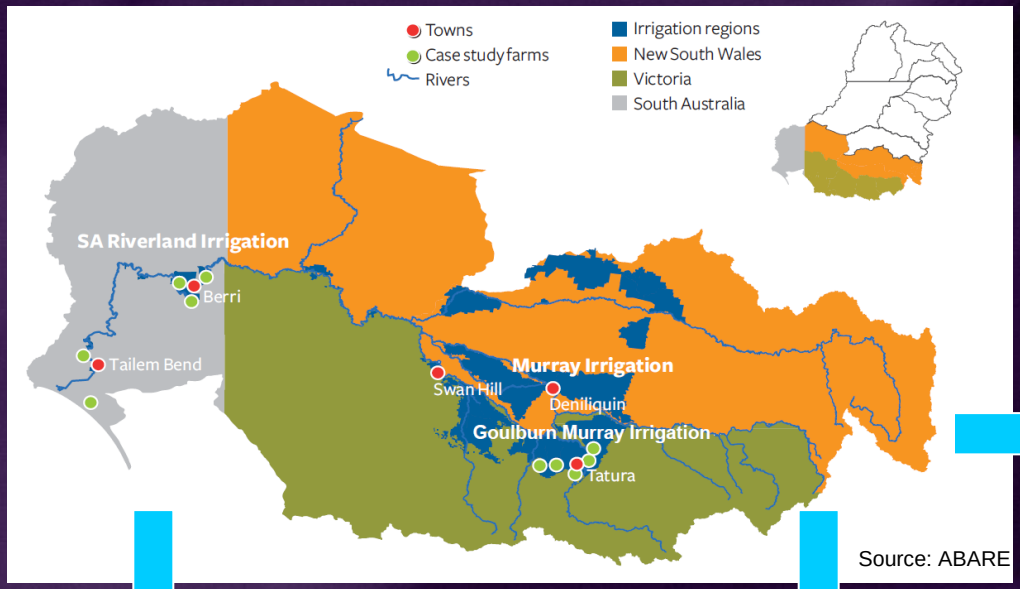
Carpark Lagoons in the Katarapko Floodplains prior to the environmental watering in March 2009, SA (DEWHA & M Mohell)

Carpark Lagoons in the Katarapko Floodplains after the environmental watering in March 2009, SA (DEWHA & M Mohell)

Commonwealth Environmental Water Holder

- The Commonwealth Environmental Water Holder manages water purchased by the Australian Government for environmental purposes across Australia.
- This water will be used to protect and restore key environmental sites, including the health of rivers and wetlands in the Murray–Darling Basin.

Tier 1
Rights held by State
(Waterways, groundwater & overland flow)



Tier 2
Rights granted to Authorities & environment

Bulk Entitlements

Environmental Reserve

Tier 3
Rights granted to individuals

Licences

Water Shares

Supplies by Agreement

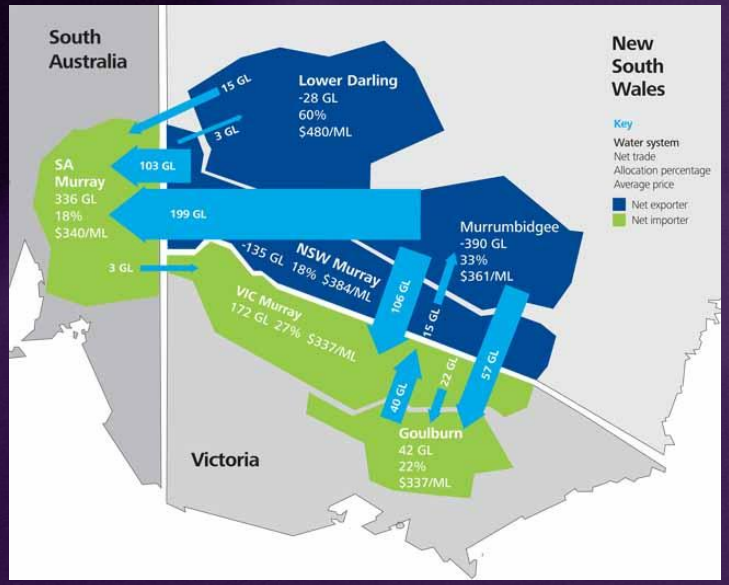
Private Rights
- Rainfall
- Riparian

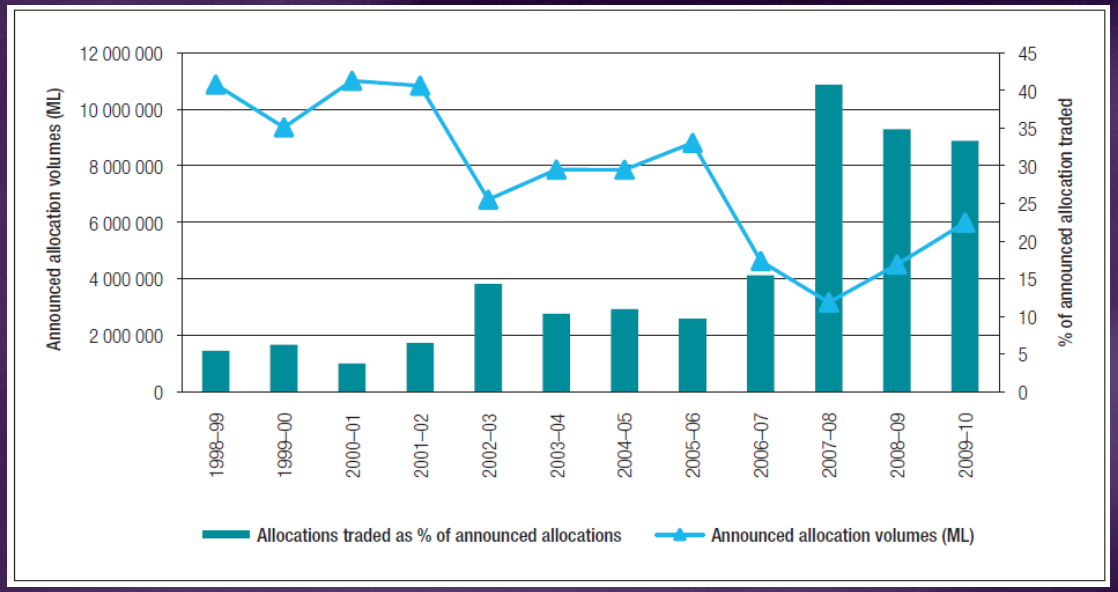
National Water Commission (NWC)

- NWC was established to oversee implementation of the National Water Initiative and report on progress to the Australian Government.
- All state and territory governments have lodged plans for how they will implement the National Water Initiative's requirements.
- The National Water Commission will also be responsible for auditing the effectiveness of the implementation of the Basin Plan and Water Resource Plans.

Australian Competition And Consumer Commission (ACCC)

- Under the Water Act, ACCC advises the Commonwealth Water Minister on water charge and water market rules. ACCC are advising MDBA on trading rules for inclusion in the Basin Plan.

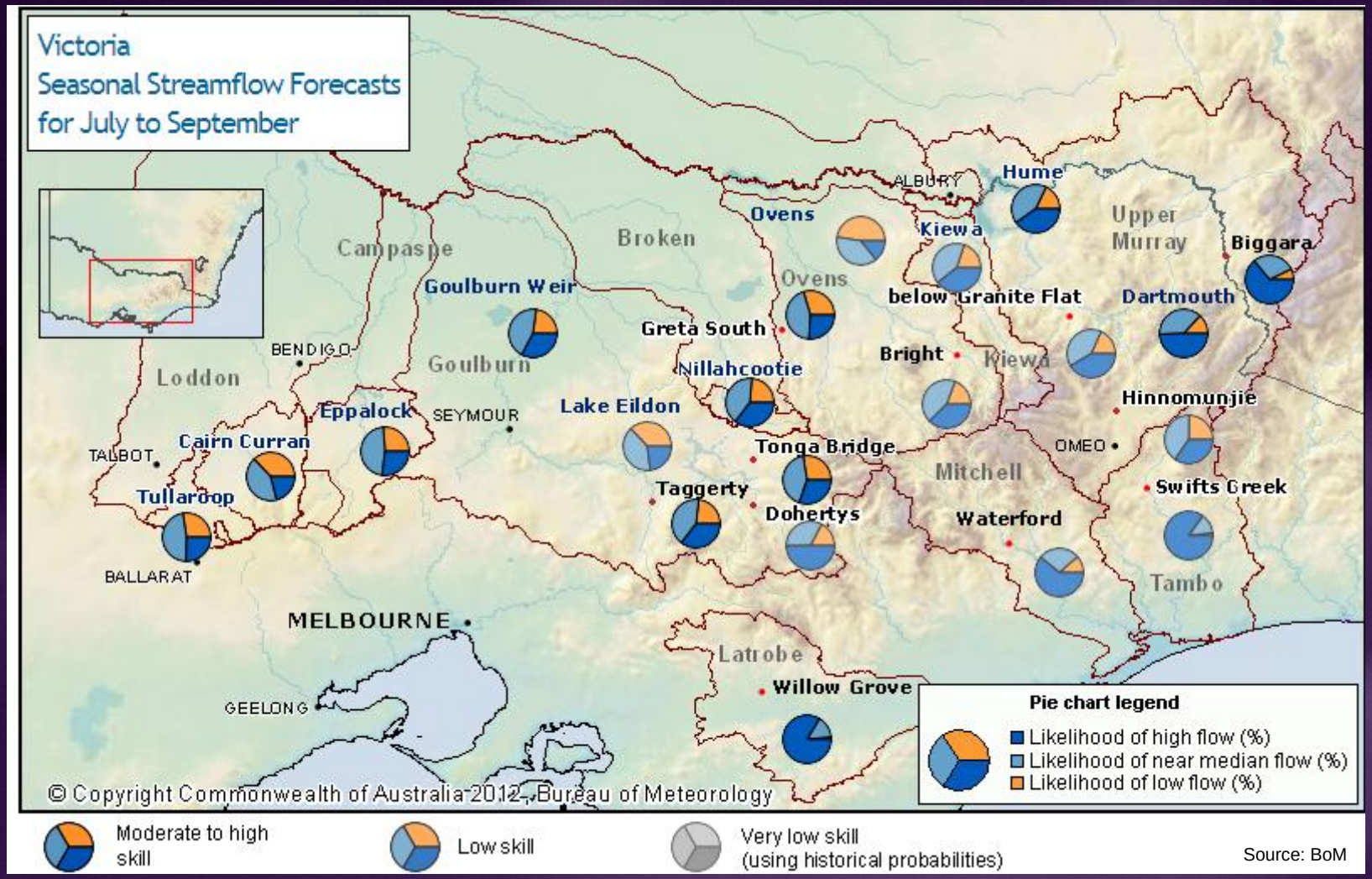




Bureau Of Meteorology

- The Bureau has the responsibility, through the Water Act, for compiling and delivering consistent water information across all of Australia.
- The Bureau's functions include:
  - conducting regular national water resources assessments
  - publishing an annual National Water Account
  - providing regular water availability forecasts.

Seasonal forecasts from the BoM

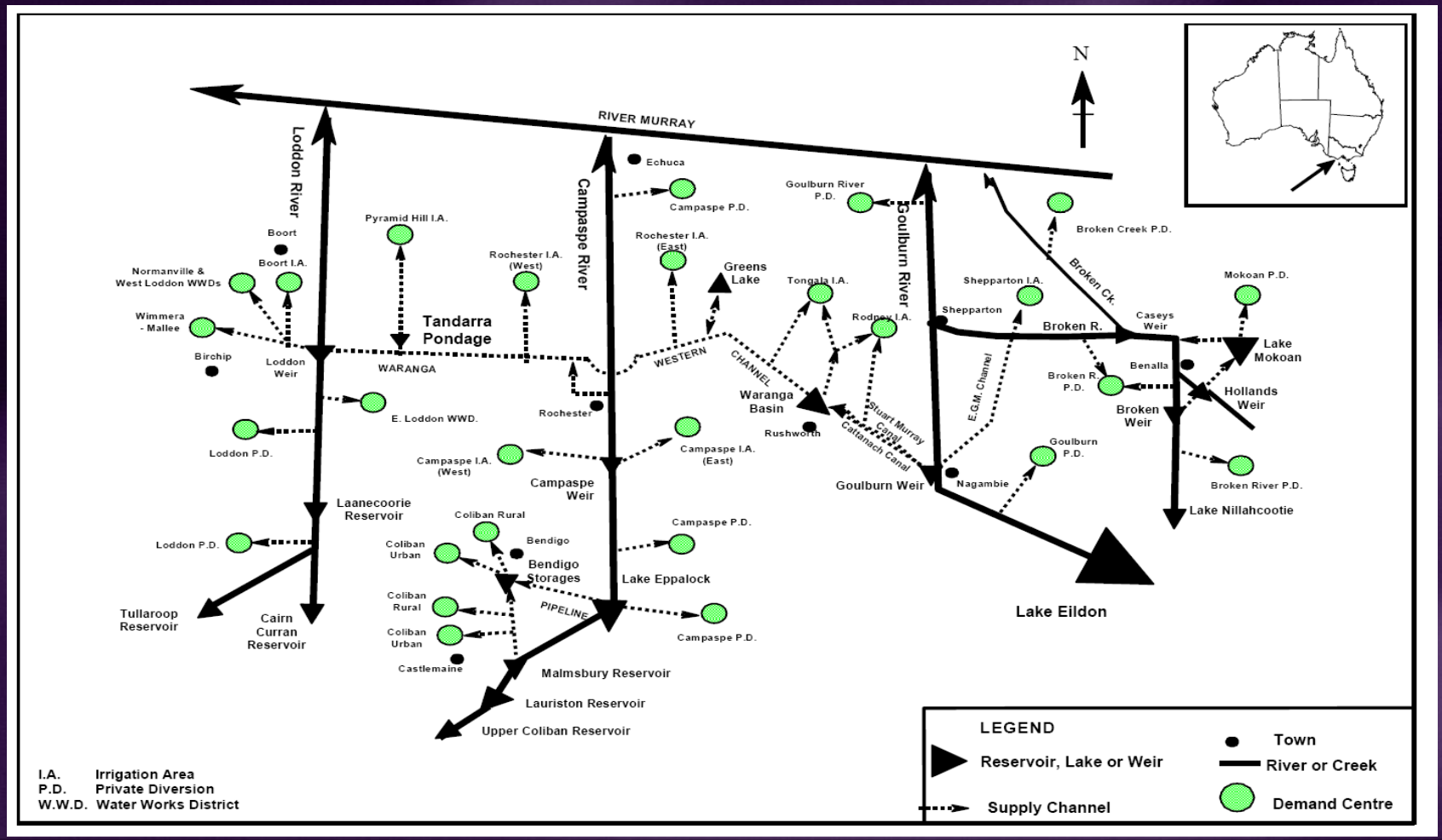


Water Resources Models and Decision Support Systems (DSS)

Water resources

- How much water is available? (Australian rule of thumb only 30%)
- What will climate change do to water availability? How do we increase resilience?
- What is the best way to share the available water between the different users (e.g. hydropower, environment, industry, urban, irrigation)?
- How much should we pump from groundwater versus using surface water?
- What is the right balance between supply augmentation and demand management in urban areas?
- Should we allow water to be traded between different users?
- How do we optimise the shares during drought?
- When should water restrictions be introduced for the different users?

Goulburn Broken Simulation Model



Whole farm planning and laser grading (1980s)

Lessons Learned

- A number of important lessons have been learnt during our reform process, including:
  - water resource management must account for the total water cycle, recognising the connectivity between surface and ground water systems, if it is to ensure security for consumptive users and the environment;
  - must address a range of cross-cutting issues such as: large scale impacts of land use on the water-balance of catchments, increased water efficiency, and the impact of upstream activities on downstream water quality and availability;

Lessons Learned (cont'd)

- effectively balancing management of the environment and the need for certainty of access for water users is essential for ongoing reform - water users need sufficient certainty and confidence about on-going access to the resource to enable investment, particularly in water efficient technologies and practices;
- water markets and water trading provide mechanisms for the more efficient use of water. However, we still face impediments to water trading, include the many different types of water access rights regimes that exist between states and regions, and the restrictions placed by water authorities on trading upstream and downstream;

Lessons Learned (cont'd)

- continual improvement of data and scientific information is needed to support decisions and actions, although it is likely we will never have all the information we would prefer; and
- extensive public consultation engaging all stakeholders is essential for effective decision making.

Way forward to the future

- A new wave of investment on farm
- Remote sensing of water use using satellites
- Continued effort to implement Water Reforms
- Implementation of the Murray Darling Basin Plan
- The environment will be the biggest user of water in the Basin
- Managing all water intercepting activities
- R&D to increase the resilience to respond to climate change
- Conjunctive management of surface water and ground water
- Improved management of groundwater including trade
- Managed aquifer recharge to enhance water supplies.
- Understanding the impacts of coal seam gas and large scale coal mining.
- Securing supplies to support coal seam gas and coal mining within the existing water regulatory framework.

Conclusion

- Water resources management in Australia has changed considerably with time, and particularly over the last twenty to thirty years.
- Like many countries, it has been reforming water resources management practices and policies in order to meet the needs of a maturing water economy.

Acknowledgement

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- Murray-Darling Basin Authority
- Bureau of Meteorology
- Australian Competition and Consumer Commission

Thank you