

Environmental Flows on the Lachlan River- 20 years of Policy, Science and Adaptive Management

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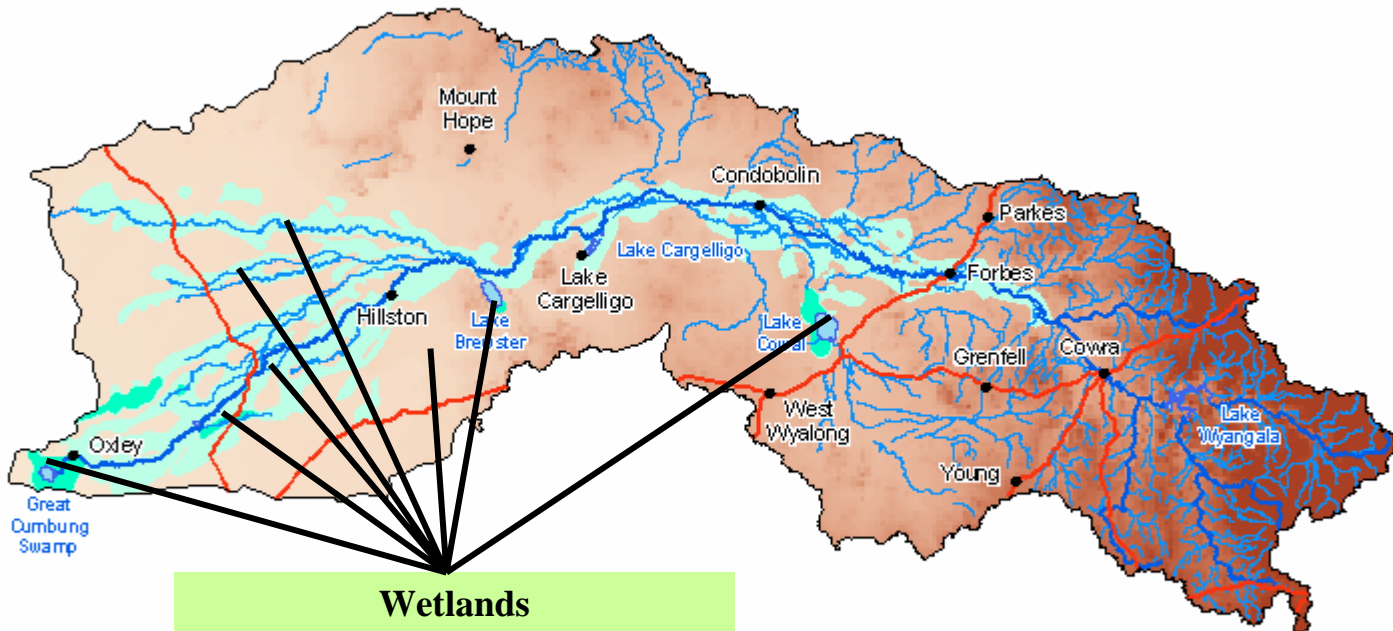
Outline

- 5 Phases of environmental water management + future speculation
- For each Phase:
 - Policy/Legislative framework
 - Environmental flow arrangements/outcomes
 - Scientific support



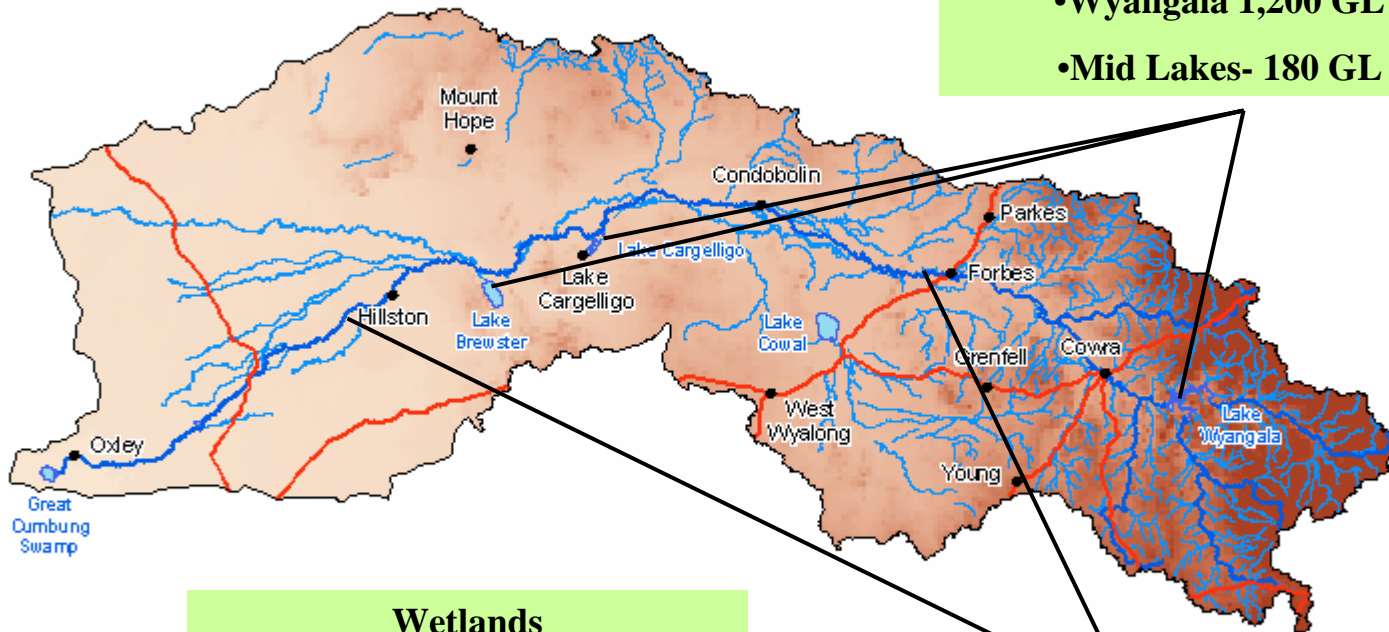
Lachlan River Catchment

- A terminal basin in all but the highest surface flow conditions
- 1400 Km long. Losing river due to effluents
- Highly variable flows. 4% and 550% of average annual
- Average annual flow approx 1350 GL



Wetlands
400,000 Ha
8 Nationally important

Lachlan River Catchment



Regulation Storages

- Wyangala 1,200 GL
- Mid Lakes- 180 GL

Wetlands

400,000 Ha

8 Nationally important

Irrigation- 90,000 Ha

Phase 1 “Dark Ages”- pre 1984

- Policy/Legislation
 - *Water Act 1912*
- Drivers
 - Crown control to reduce water “wars
 - Water resource and economic development
 - Water storage construction and irrigation established
- Environmental flows- None formally in Lachlan
- Science
 - Booligal studies- waterfowl ecology.
 - Vital ecological information but not for eflow needs
 - First wetland assessment- Great Cumbung
 - status and initial flow relationships

Cumbung Swamp - Wet



Phase 2- Age of Awareness 1984-1992

- Policy/Legislation- *Water Act 1912*.
 - No formal requirement for environmental water but awareness commenced
- Drivers
 - 1984 Booligal wetland waterbird event created headlines= embarrassment for Water Agency
 - Had to do something- earth block bank to hold water
- Environmental flows
 - “Booligal care” program- *ad hoc*, reactive water management of breeding colonies
 - Poor knowledge of catchment wetlands and water management needs, including Booligal area

Phase 2 (84- 92) cont

- Environmental flows and outcomes
 - Post 1984- Booligal waterbird breeding support
 - 1989 and 1990 events, water diverted from River
 - 1992 specific storage release from Lake Brewster
 - in 1992, the 1984 Block bank moved and regulators installed

Phase 2 (84-92) cont

■ Science

- Floodplain wetland survey done to establish location and basic hydrology
 - = 400,000 Ha at many locations
 - Variable water needs
- Hydrology & Waterbird breeding studies of Booligal for water management
- Booligal bird breeding water management rules developed
- “Building block” eflow approach

Phase 3- Age of Enlightenment

1992- 1998

■ Policy/Legislation

- *Water Act 1912*
- Formal recognition of need
- 1994 Council of Australian Govts Water Agreement
- 1995 NSW State Environmental Flow Management Policy
- Murray Darling Basin Cap on extractions
- 1996 NSW Government Water Reforms- wide ranging reform package

Phase 3 (92-98) cont.

- Environmental flows
 - 1992- 5 part flows package commenced:
 - Minimum instream flows @ 2 sites (mostly for water quality)
 - Environmental allocation of up 100 GL in Dam for
 - Wetlands
 - Algae, salinity
 - Fish movement over weirs
 - Limit of 30 GL on irrigation extraction of unregulated flows
 - Dam and weir management
 - Removal of weirs

Phase 3 (92-98) cont.

- Environmental flow outcomes
 - Booligal waterbird breeding supported 92, 93 and 96
 - Dam releases for water quality improved Blue-green algae and salinity

- = Reactive management and relatively small vols of water used
 - Max used ~ 15,000 ML out of 100,000 available

Phase 3 (92-98) cont.

■ Science

- Improving knowledge of wetlands and water needs
 - Specific study of Cumbung Swamp established 3000 ML/day flooding threshold
 - Other wetlands- Merrowie, Willandra
 - River salinity studies
 - Lachlan State of the River Report
 - But no formal outcome monitoring

Phase 4- Coming of Age 1998-2004

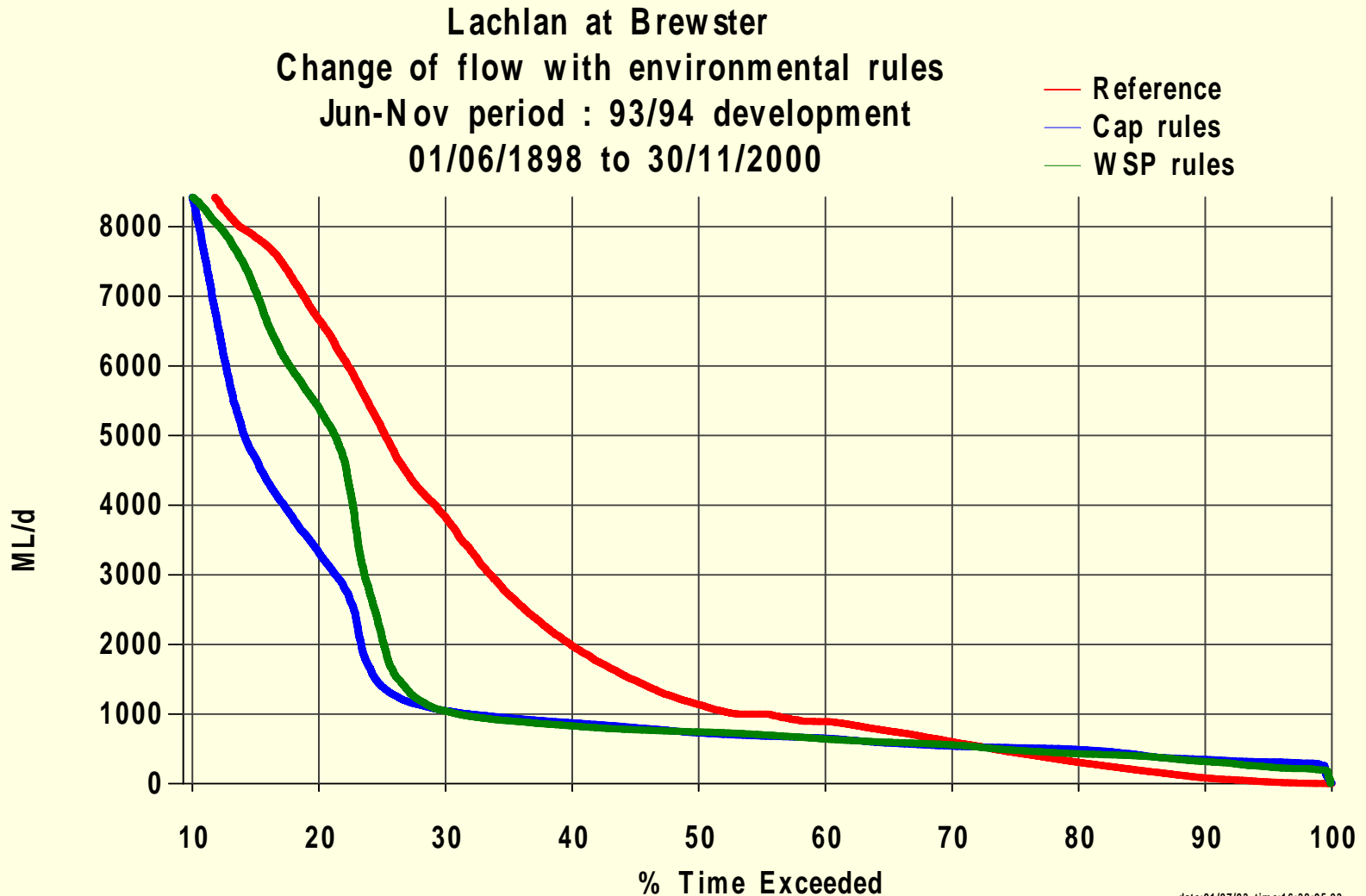
■ Policy/Legislation

- 1998- NSW Water Reforms up to 10% clawback from irrigation extraction
 - Environmental Flow rules required on all reg rivers
- *Water Management Act 2000*- primacy of environmental protection but “balanced”
 - Statutory Water Sharing Plans required
 - Prepared by Community based committees

Phase 4 (98-04) cont.

- Environmental flows
 - 1998 Lachlan Flow Rules
 - Retained some of 5 Part Package
 - ECA's and 30 GL unreg limit
 - Environmental Water becomes ACTIVE via 350,000 ML/yr Translucency when triggers met
 - Restoration of more natural flows in winter/spring
 - Reduces some effects of Dam delaying floods
 - Flow duration curve of change
 - Natural flow paradigm influence

Lachlan- flow changes in winter-spring



Phase 4 (98-04) cont.

- Environmental flow outcomes
 - 1998- flood year
 - 1999- small translucent events, 42 GL
 - 2000- 350 GL (**Miracle**) event
 - Wetland flooding, waterbird breeding, native fish breeding
 - 2001- 105 GL event
 - Irrigation controversy due to rules leads to revision in Water Sharing Plan
 - 2002- current. No environmental flows due to drought
 - ACHIEVED WITH ~3% MEAN ANNUAL REDUCTION IN IRRIGATION EXTRACTIONS!!!
 - Total water extractions= 25% of mean flow
 - But averages are BAD science and resource management

Phase 4 (98-04) cont.

- Science: improved understanding and tools for water management and flow outcomes:
 - Improved hydrology model for scenario testing IQQM
 - Basic wetland models especially Booligal Swamp and Cumbung
 - Outcomes- Integrated Monitoring of Environmental Flows (IMEF) Program
 - water quality management requirements of Lakes Brewster and Cargelligo

Phase 5- The Current Age- 2004 to present

- Legislation/Policy
 - Lachlan Regulated Water Sharing Plan 2004
 - Statutory Plan
 - Similar to 1998 flow rules~3% reduction in irrigation extractions
 - Suspended in 2004 due to drought and priorities change- but not environmental needs
 - 2006 Market based acquisition of environmental water
 - RiverBank and potentially Federal \$\$
 - Water efficiency projects

Phase 5 (2004- current) cont.

- Environmental flows
 - Formal arrangements suspended since 2004
 - 2005/06 “opportunistic environmental water”
 - Achieved some wetland flooding
 - Waterbird breeding @ 2 sites
 - 6650 ML of additional environmental water entitlement purchased in 2006 by RiverBank Program
 - More to come

Merrowie Creek 05- Ibis colony



Summary- Adaptation over the Ages and Future Needs (not NSW Govt Policy)

- Policy and Legislation
 - Paradigm shift from economic/engineered rivers to formal recognition of river health needs
 - New Legislation and Statutory Plans to support
 - Clawback of extraction and more eflows =
 - PAIN for some
 - And **IT WASN'T EASY!!!!!!**
 - Market based purchases of environmental water

Summary- Adaptation over the Ages and Future Needs (not NSW Govt Policy)

- Policy cont.
- Future needs
 - Further shift in the River Management Paradigm
 - Re-engineered, or de-engineered Rivers
 - Not just flow but also land use, water quality and habitat
 - Market recognition of water quality as well as quantity
 - Climate change impacts, expectations and conflicts
 - climate phases already evident
 - Some in community see more dams as the solution

Summary- Adaptation over the Ages and Future Needs

■ Environmental Flows

- From none to a wide ranging package
- Significant changes in river flow regime- closer to natural
- Start of market based purchase of environmental water
- = **important to recognise progress**

■ Future needs

- Further reduction in adverse effects of river regulation and other factors (land use of riverbanks and wetlands)
- Removing the eflow compartmentalisation
- Best management of water by Environmental Water Managers

Summary- Adaptation over the Ages and Future Needs

■ Science

- Much greater understanding of the river/wetland system; location, needs and response to water- but not precise eg Cumbung
- Vastly better tools eg Hydrology model

■ Future needs

- Ecological response predictions linked to hydrology and land uses- for future Planning
- Decision support systems for Environmental Water Managers
 - Priorities for water
 - Efficient use of the water (eg ML/ha)
 - When to trade

Thank you for listening