



Urban Salinity

Update 2010

8th - 9th June

The Sebel Hotel, Parramatta, NSW

Dr John Williams – Commissioner, NSW Natural Resources Commission

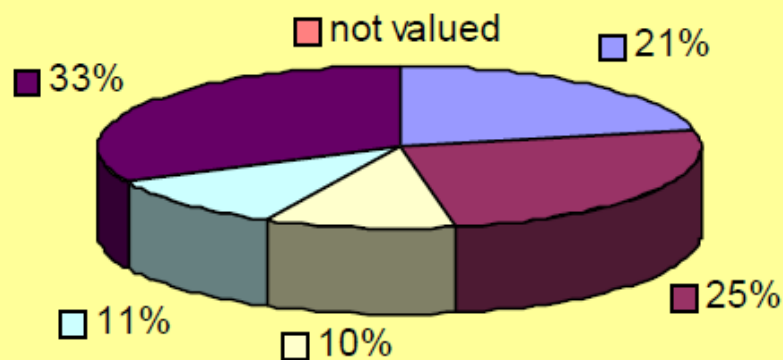
Some Sobering Statistics

- Current extent of urban salinity in NSW estimated to be 954 ha (increase to 3,646 ha by 2050)
- South-western NSW - high watertables impacting 34% of state roads & 21% of national highways = annual repair costs of \$9M
- MDB - 220 rural towns & cities exhibit urban salinity damage
- HN CMA - 168 ha of built up areas impacted by urban salinity & 60 ha in the Hunter CMA
- Fivefold increase over the next 50 years of length of roads & railways impacted in NSW

Urban Salinity Costs - MDB

- Total urban salinity costs = \$204 million (67%)

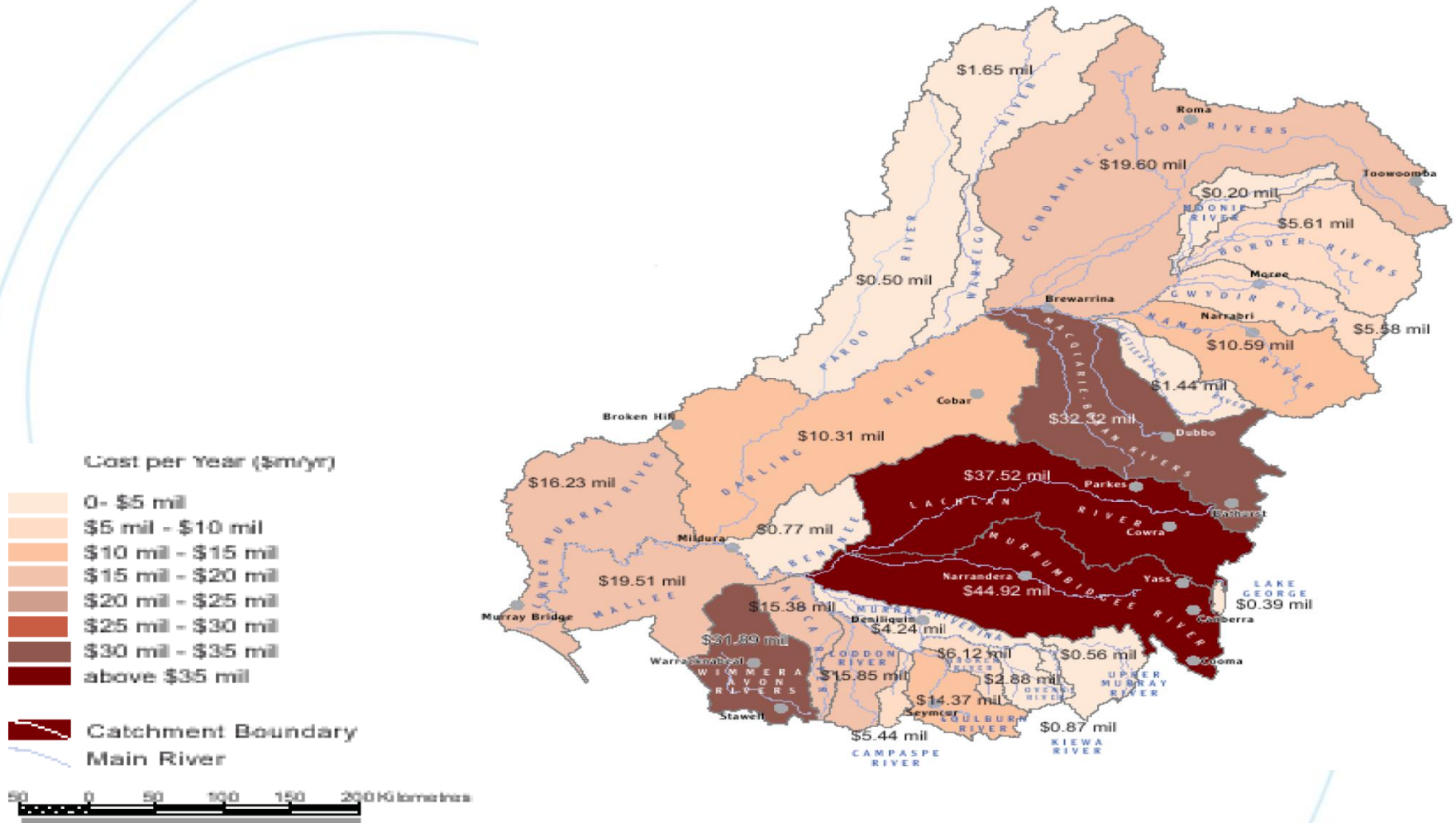
Total dryland and urban salinity impact costs (\$/yr)



- Commerce and industry
- Households
- Local Government
- State Government agencies and utilities
- Dryland agricultural producers
- Environment & cultural heritage

Total : \$304.73 million per year
(excludes environmental and cultural heritage costs)

MDB - Total annual costs (\$M) of Urban & Dryland Salinity

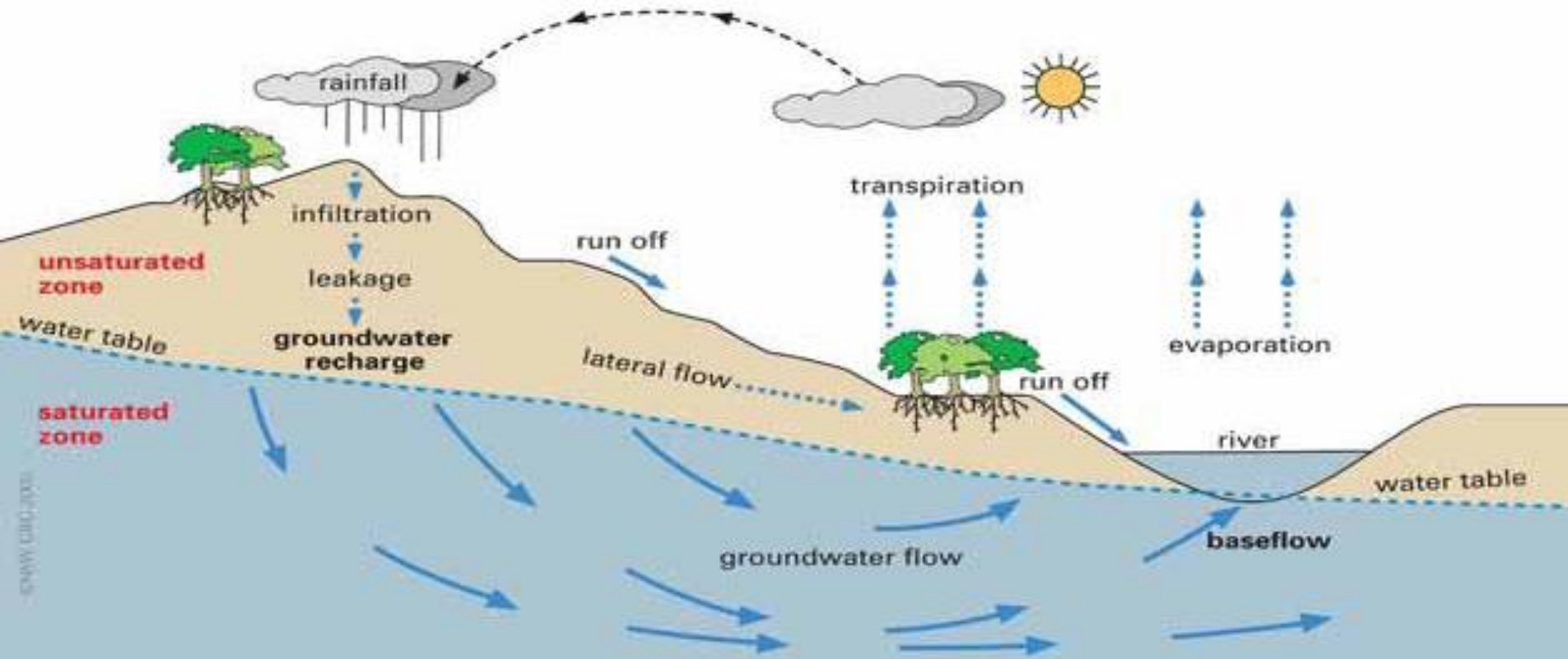


What is Urban Salinity?

- Accumulation of salts in soil or water to levels that impact on human & natural assets
- Salt is a natural part of the Australian landscape
- Development can contribute to & be impacted by salinity
 - Area of high salinity potential (geology, groundwater, climate, etc)
 - Urban irrigation

Hydrological Cycle

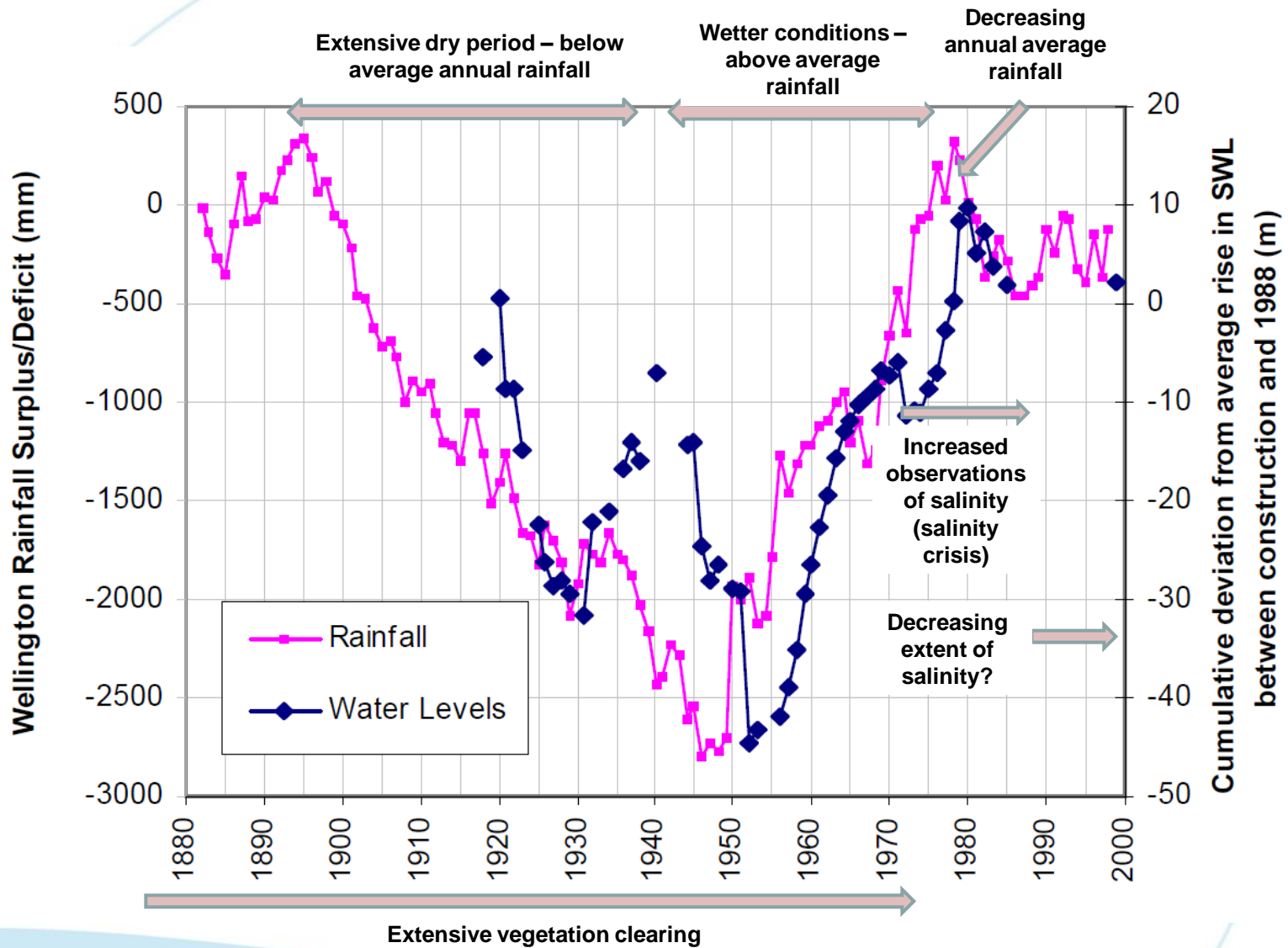
- Water plays a critical role in mobilising & transporting salt through the landscape



What is Driving Urban Salinity?



Climate - rainfall



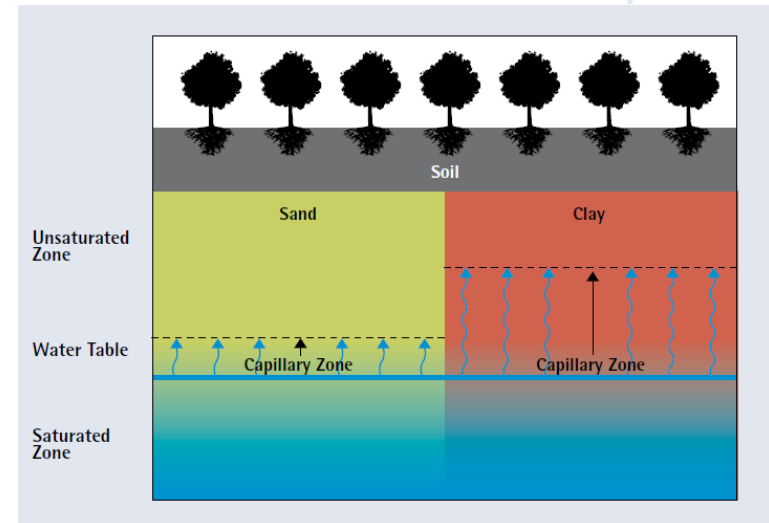
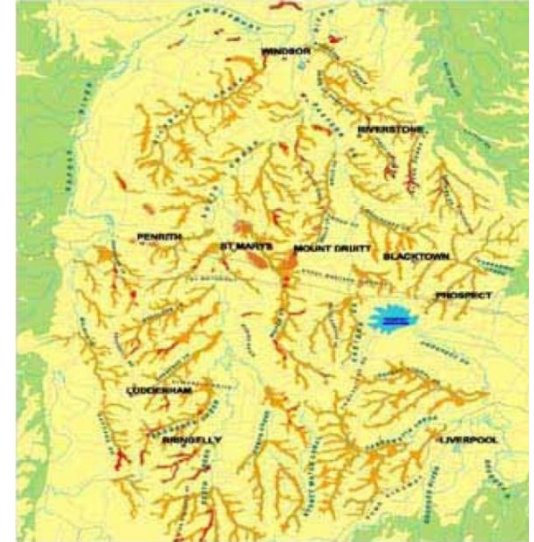
Land Clearing

- Impacts on urban areas from land clearing in nearby agricultural regions (e.g. West Australia, Narranderra)




Geological setting of urban catchment

- Many urban areas located in areas with high salinity potential
- E.g. Western Sydney
 - Salinity first observed in 1800s
 - Wianamatta shales – high salt content
 - Rainfall delivers 12-15 kg salt / ha / yr



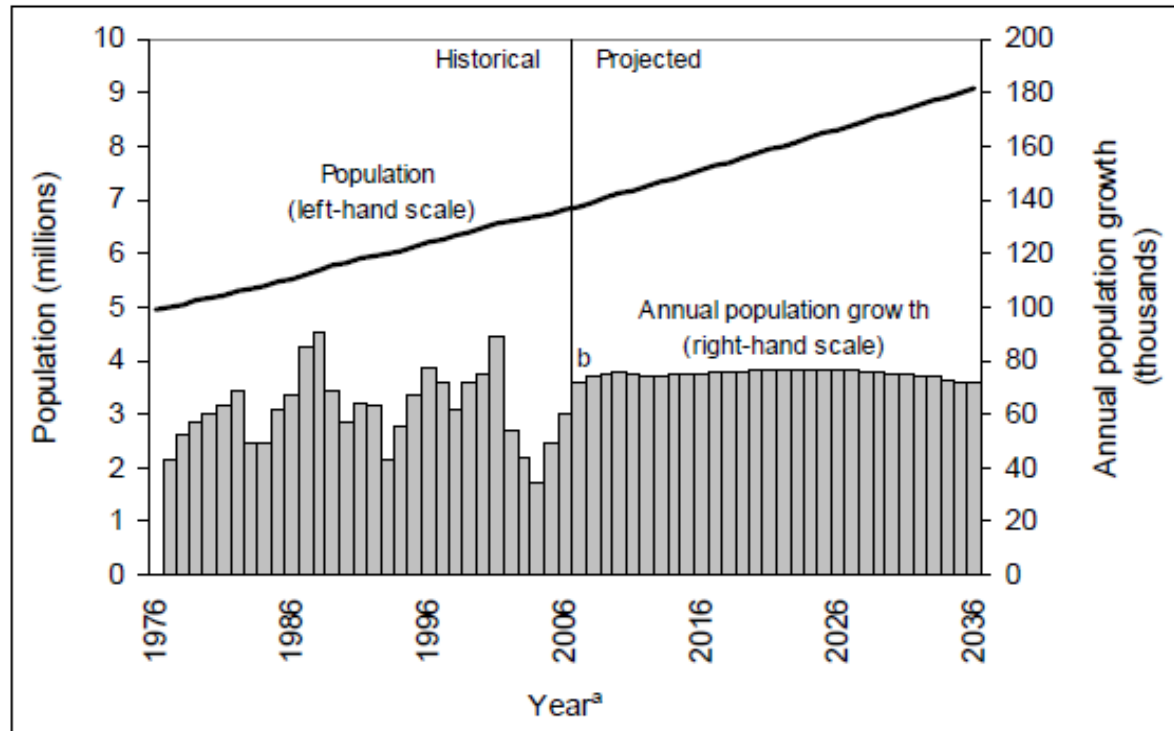
Application of water & storm water

- Excessive water use =  recharge
- Wagga Wagga
 - 47% of total GW recharge from leaking pipes
 - Daily water use = 340 L/person



Population Growth

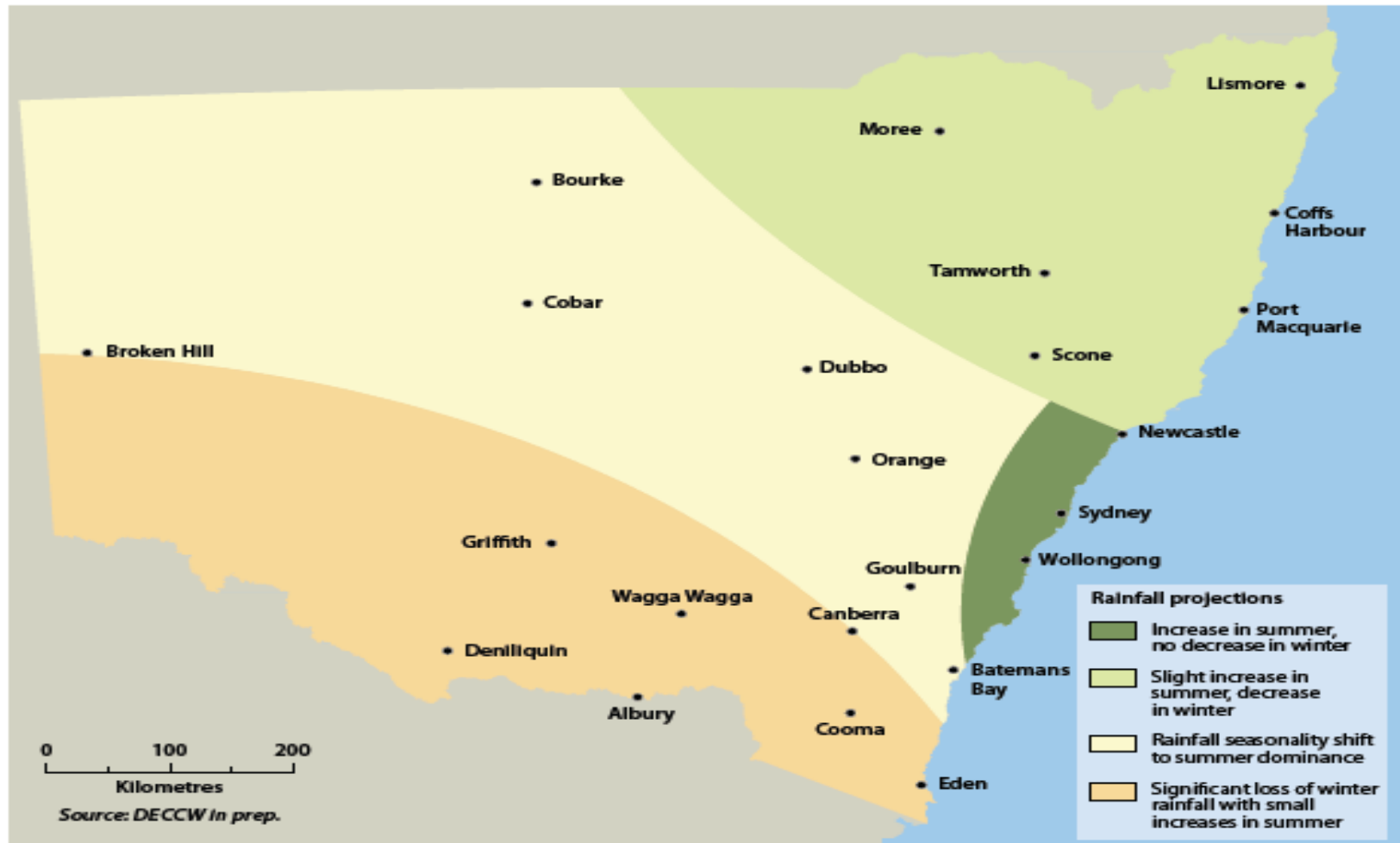
- NSW – Pop of 9.1 million by 2036 (↑ 33%)
- Increased impact to high salinity potential areas (e.g. Western Sydney + Hunter)



Climate Change

- Projected changes in rainfall (↓ over Southern Australia (winter + spring))
- ↑ in intense rainfall events
- ↑ in sea levels of 40cm by 2050, 90cm by 2100
- Recharge – increase or decrease???
- Sea water intrusion – potential increase in impact of urban salinity in coastal towns/cities

Climate Change - NSW Rainfall



Causes & impacts of Urban Salinity

recharge area

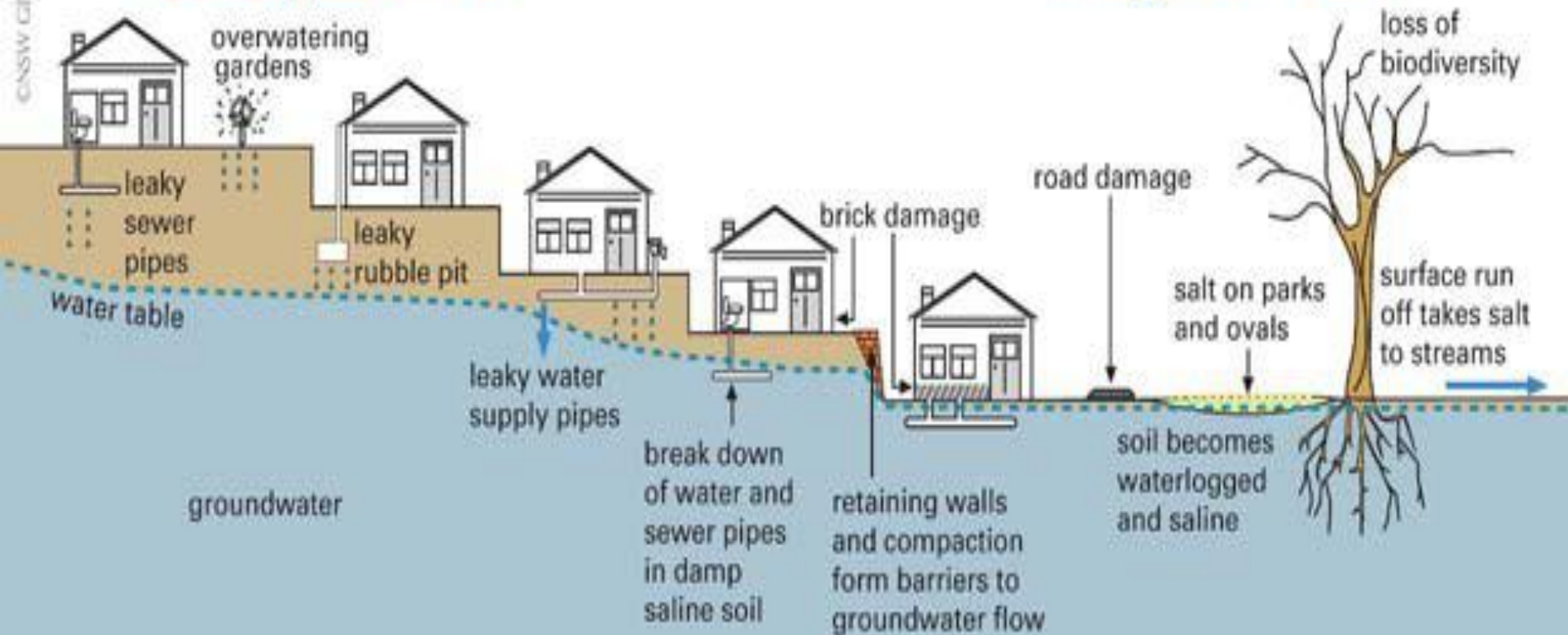
- too much water seeping into the ground
- barriers to groundwater flow

→ water table rise →

discharge site

- saline waterlogged soil
- damage to infrastructure

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Property Impacts

- Rising damp, brick, mortar and concrete deterioration
- Hot water systems, plumbing, appliances
- Dubbo – total cost of saline water supplies = \$1.47M



Infrastructure Impacts

- Increased capital & operational costs
- Wagga – cost of rebuilding one block of salt affected road = \$300K & 1km of Hwy = \$700K
- MDB – 416 km of railway impacted by shallow water tables by 2050

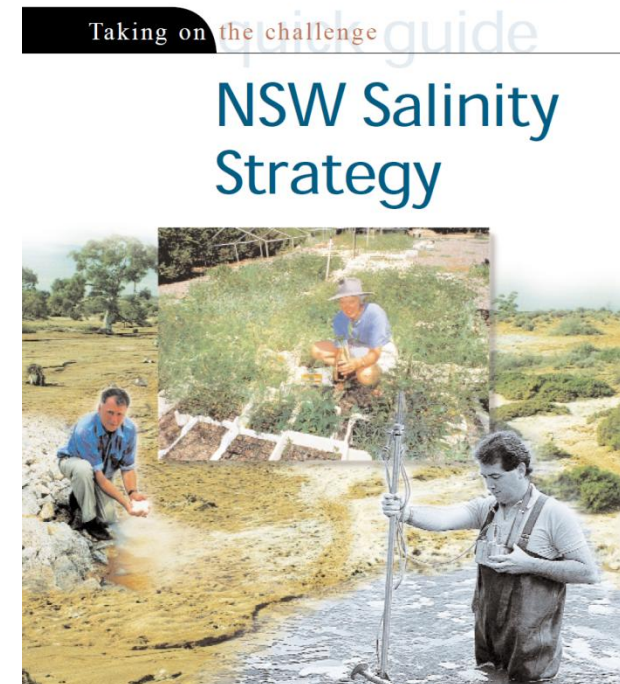


Tackling the Problem



Government Policy

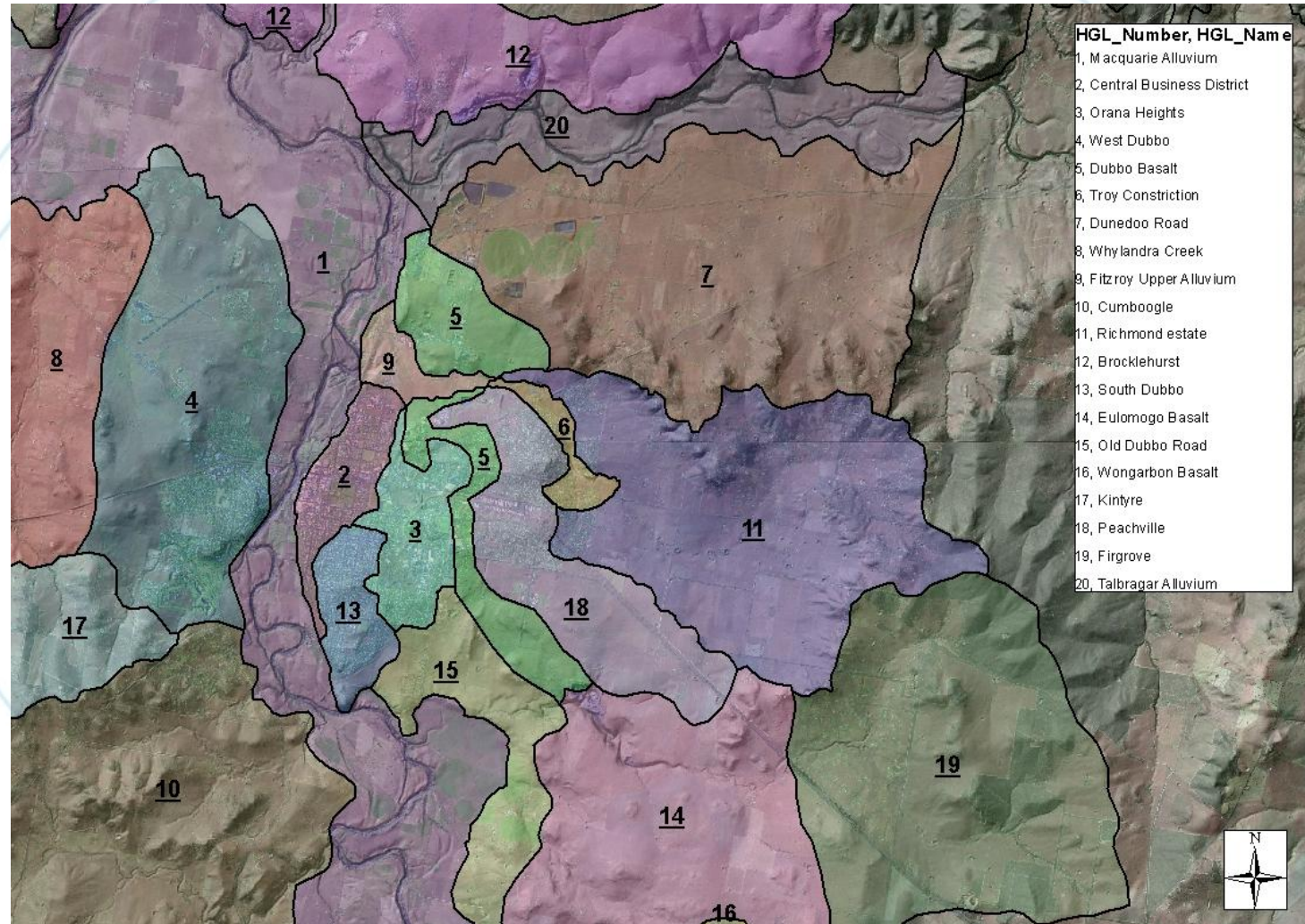
- NSW Salinity Strategy (2000)
 - Local Gov Salinity Initiative (LGSI)
 - Model planning guidelines
 - Specialist action teams
- NSW Salinity Statement (to be released 2010)



Mapping, Modelling & Monitoring

- Salinity potential mapping (2002)
- Dubbo – GW level monitoring (1km grid)
- Salinity audits – various
- Hydrogeological landscape (HGL) framework developed & applied to Western Sydney, Dubbo, Sydney Metro
- Framework applied to Dubbo, combined with DEM & GW level monitoring

Dubbo HGL Output



Planning

- Catchment Action Plans (CAPs)
- Regional and Local Environment Plans
- Salinity Policy and Development Control Plans
 - e.g. Camden, Junee and Fairfield LGAs
- *Best Practice Guidelines for Greener Subdivisions: Western Sydney*
- *Western Sydney Salinity Code of Practice (2003)*
- Local gov't stormwater, salinity & water management plans

Effective Design & Engineering

- Options for discharge management
 - GW pumping – (e.g Wagga dewatering strategy)
 - Deep drainage – (e.g. Junee Council installed drainage systems beneath new playing fields)
- Building Code of Aust
 - Requirements for building and infrastructure design in high salinity potential areas
- *Building in a Saline Environment – An awareness course for NSW*
- Guide – site investigations for urban salinity

Key Challenges

- Salt proofing future greenfield developments
- Increasing knowledge of interactions between groundwater, hydrology, and climate
- Facilitating a pro-active and co-ordinated response across government
- Raising awareness of urban salinity