

# Property rights & water buyback in the Murray-Darling Basin



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# Presentation plan



- Background
- Context for the research issue
- State-continent analysis and the RSMG MDB model
- Scenarios considered
- Results and discussion
- Concluding comments

# Background



- Started off as my Honours thesis in 2010
- We have taken the work further since the MDBA has released the Guide to the Basin Plan: overview
- Issues that came out of the RSMG water policy workshop
- We know a buyback will be used to return water to the Basin. But how do we ensure that the money spent will deliver the environment we want, once we know exactly what that is.

# Context for the research issue



- Water buyback has been government policy since November 2007
- A rolling tender has been used to purchase water in different parts of the Basin
- There are no 'cuts'; the Government will bear 100% of the cost of reducing water use
- Implementing the minimum recommended reduction of 3,000GL represents a reduction in diversions of surface water of 27%.

# State-contingent analysis



- State-contingent analysis is useful for the current research issue
- Using a state-contingent approach we can observe the tradeoffs that occur between states of nature
- Public analysis has focused on the Sustainable Diversion Limits (SDLs), but detailed analysis has been conducted on the flow events required for environmental sustainability
- Flow events are described in terms of a number of characteristics
  - Choices about how often flow events should occur and in what seasonal conditions are choices about which states of nature they should occur in

# Modelling a water buyback



- Options have been introduced for producers to sell water rather than use it to irrigate
- Three different types of entitlements are represented: high security, general security, and supplementary
- High security entitlements receive their full allocation in the wet and normal states, and 75% in the drought state. General security entitlements receive most of their allocation in the wet and normal states, and far less in the drought state. Supplementary entitlements receive their full allocation in the wet state only, none in drought, and a small amount in the normal state
- Entitlement pricing

# Scenarios considered

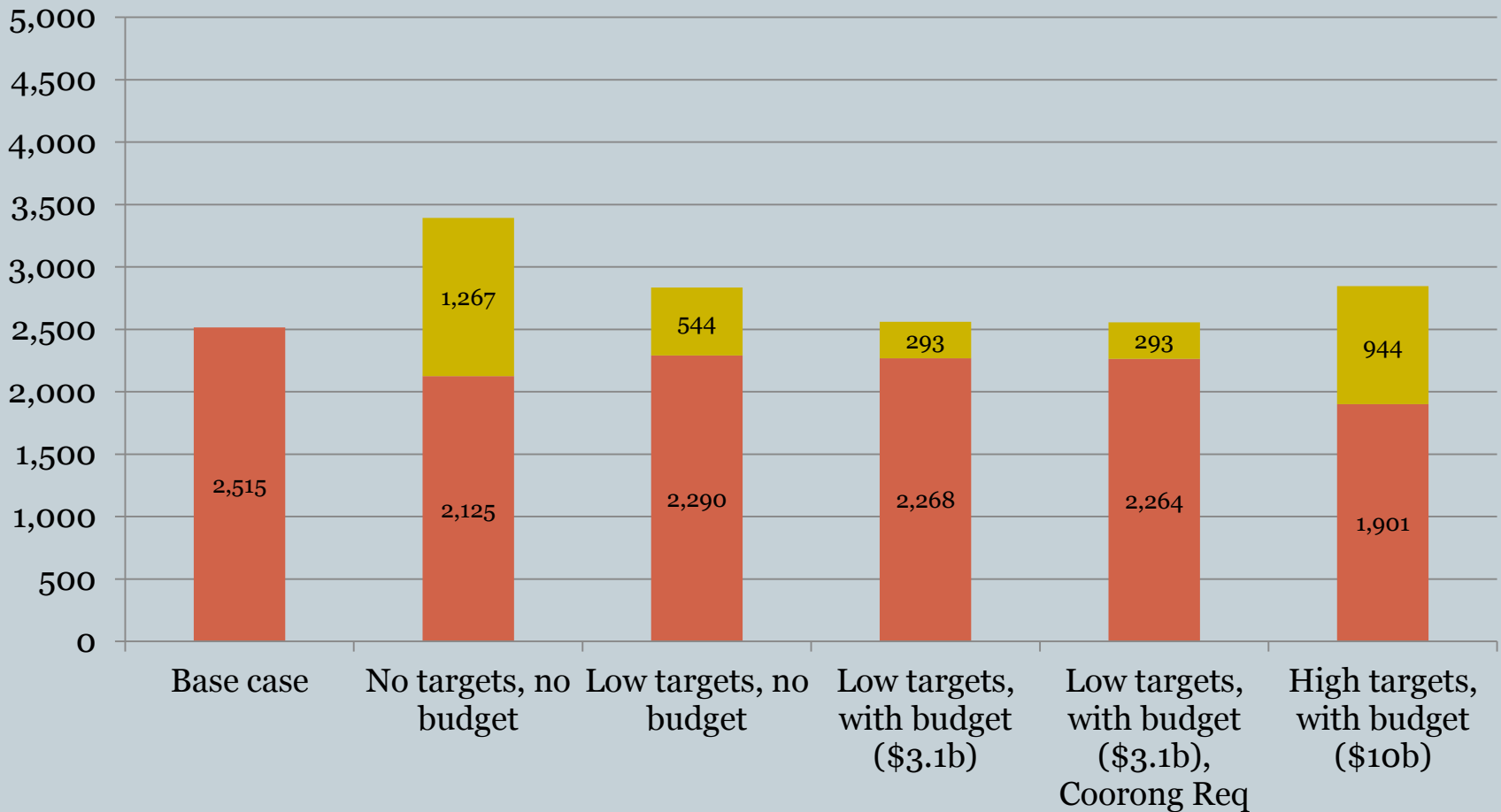


- Scenario 1: Base case
- Scenario 2: No targets, no budget
- Scenario 3: Low targets, no budget
- Scenario 4: Low targets, \$3.1 billion budget
- Scenario 5: Low targets, \$3.1 billion budget, Coorong flow constraint
- Scenario 6: High targets, \$10 billion budget

# Income, average (\$m)



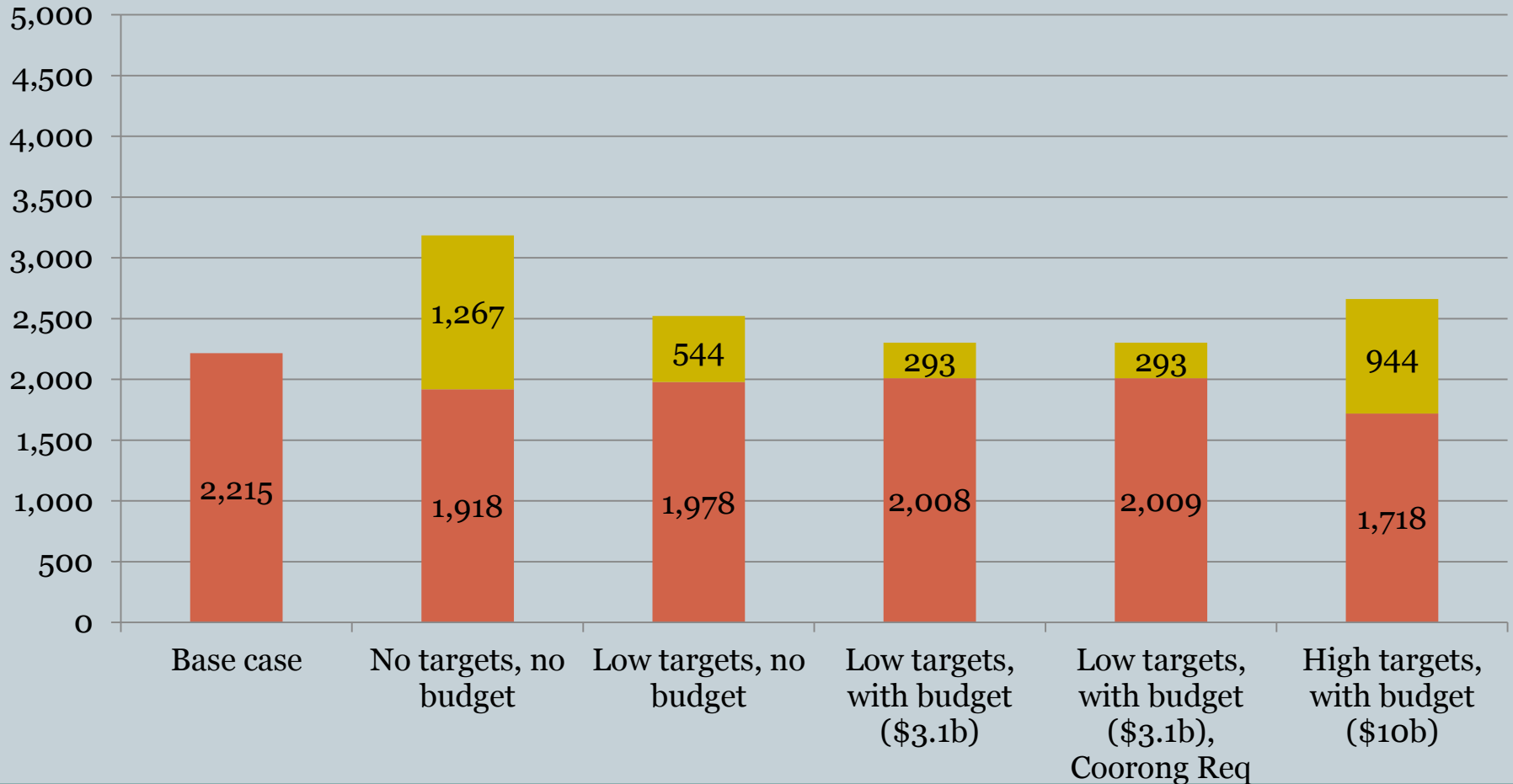
■ Agriculture ■ Water sales



# Income, normal state (\$m)



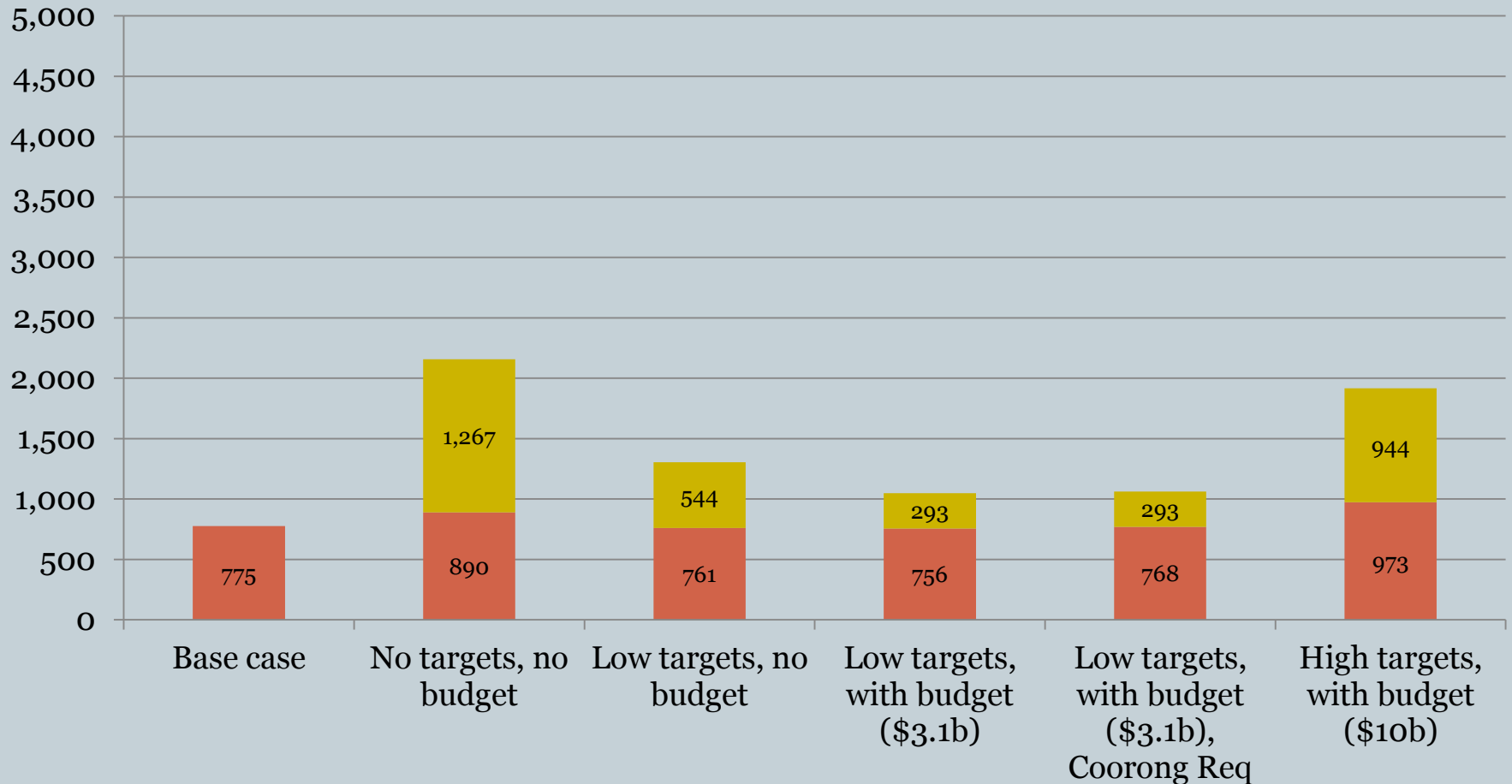
■ Agriculture ■ Water sales



# Income, drought state (\$m)



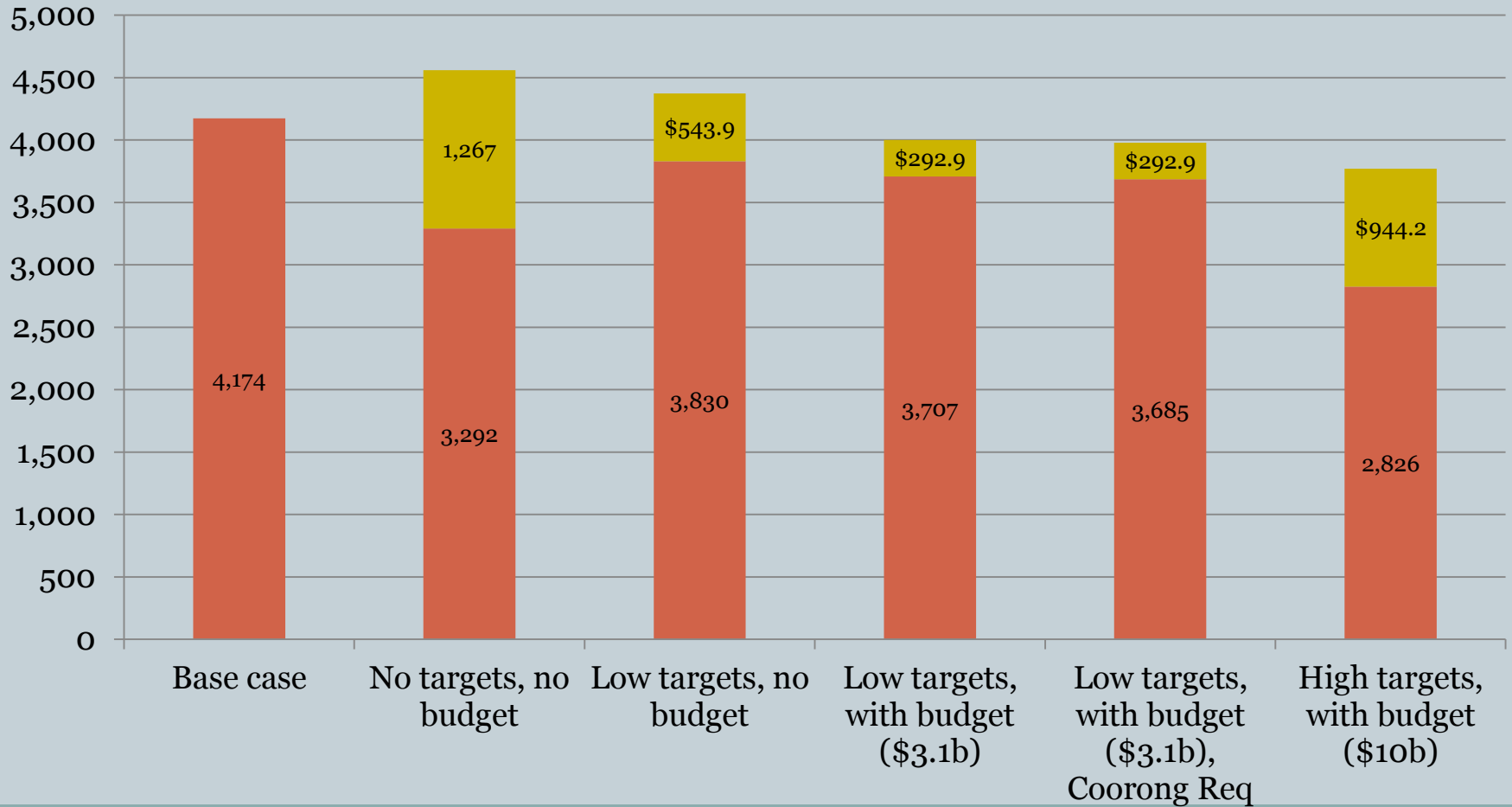
■ Agriculture ■ Water sales



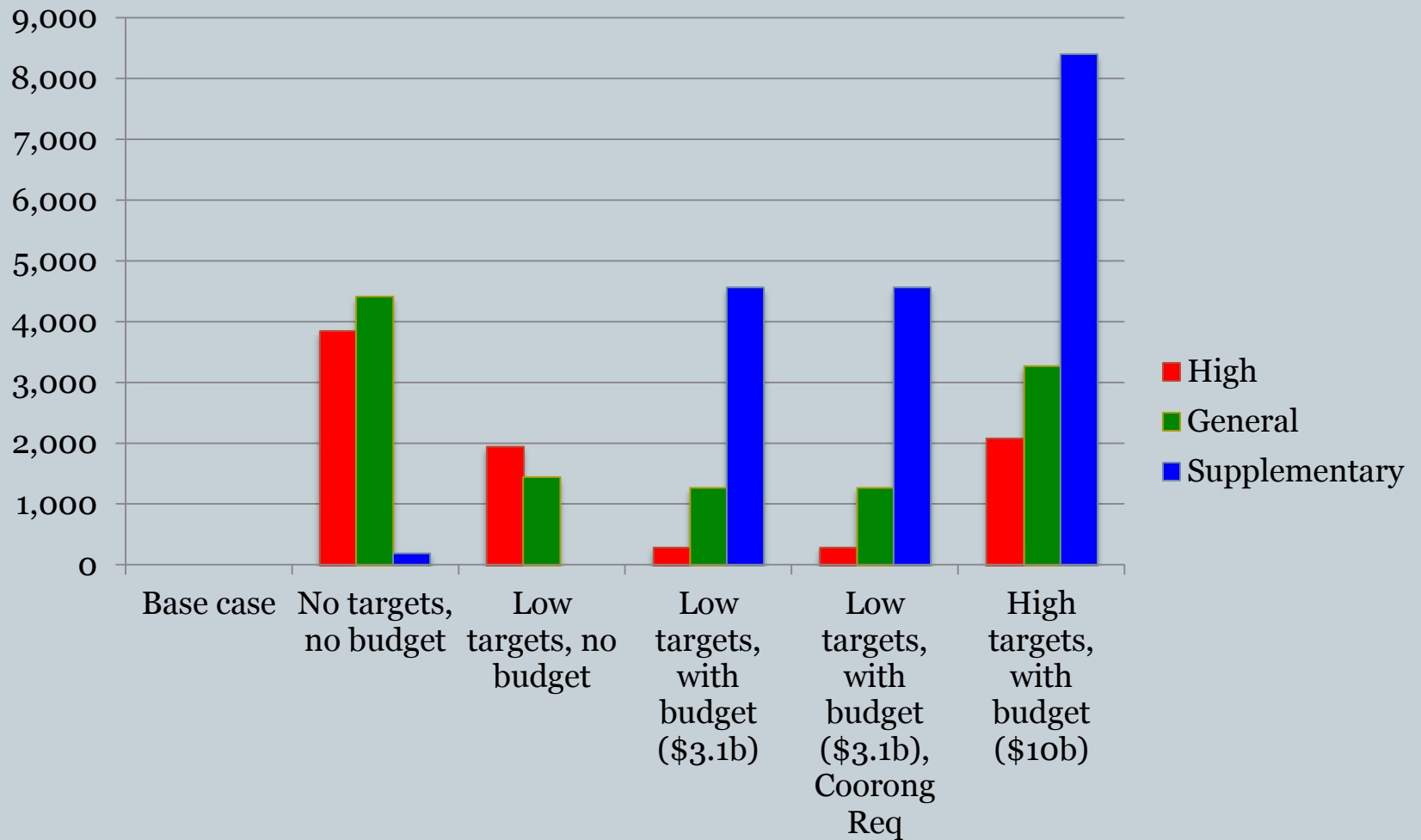
# Income, wet state (\$m)



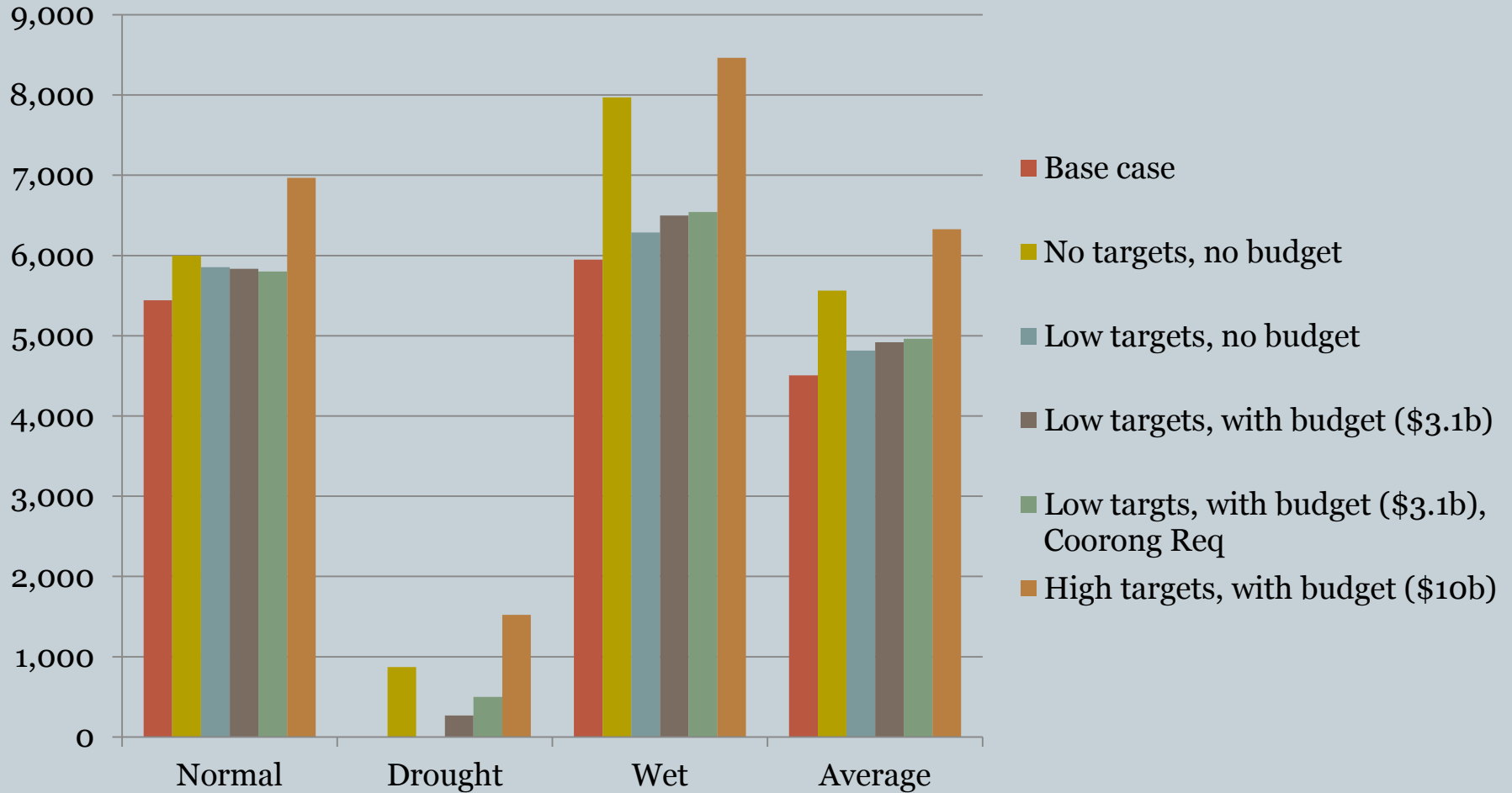
■ Agriculture ■ Water sales



# Entitlements purchased, by type (GL)



# Flows to Coorong, by state (GL)



# Discussion

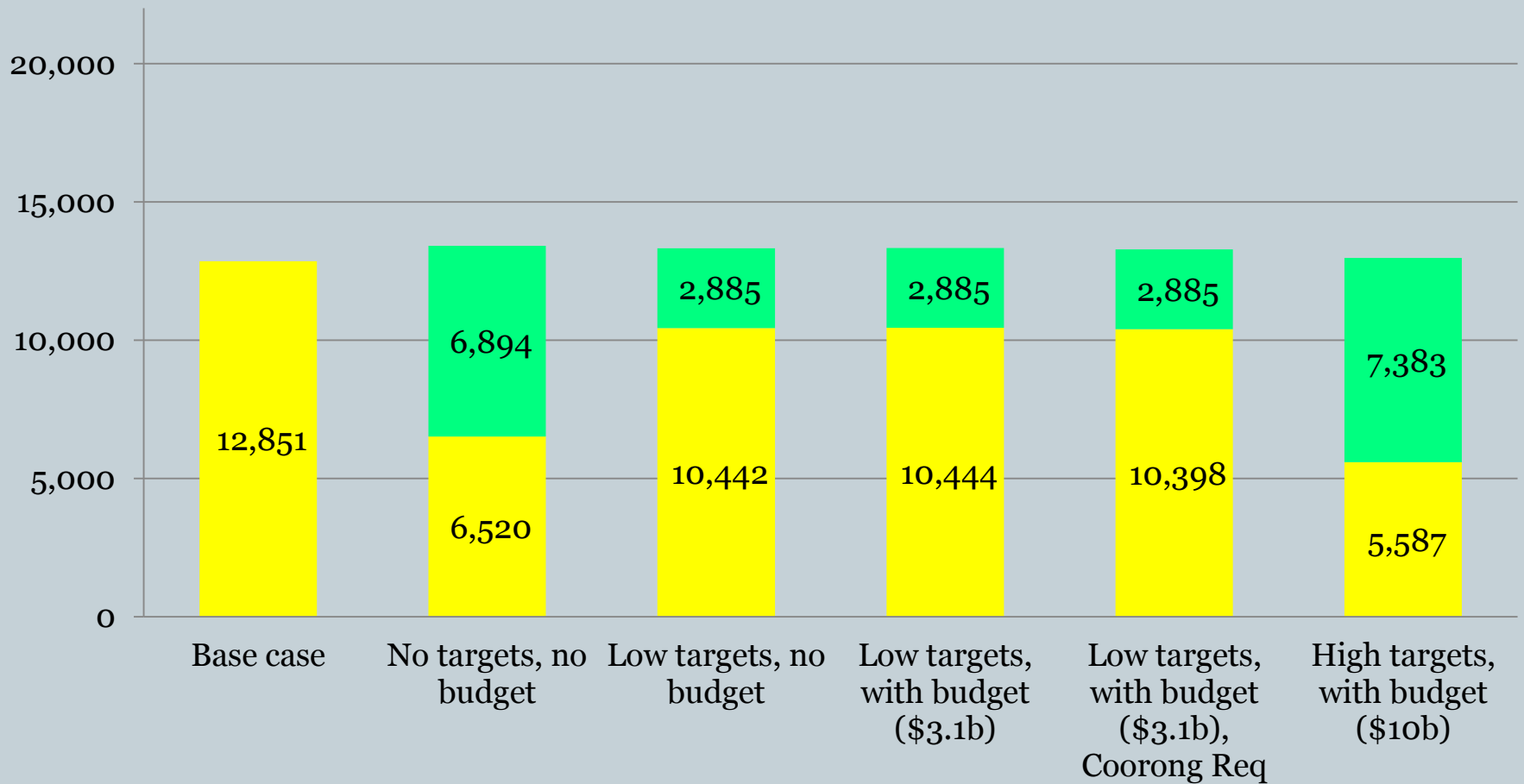


- Based on the historical prices paid for environmental water, there is a lot of water that can be purchased
- Even spending nearly \$6 billion in Scenario 3 does not secure flows to the Coorong in the drought state
- Comparing scenarios 3 and 4, it is clear that with a target specified as a long-term average, there are multiple ways a buyback could proceed
- High targets may be achievable if there is an adjustment of the government program spending allocations

# Water use, average (GL)



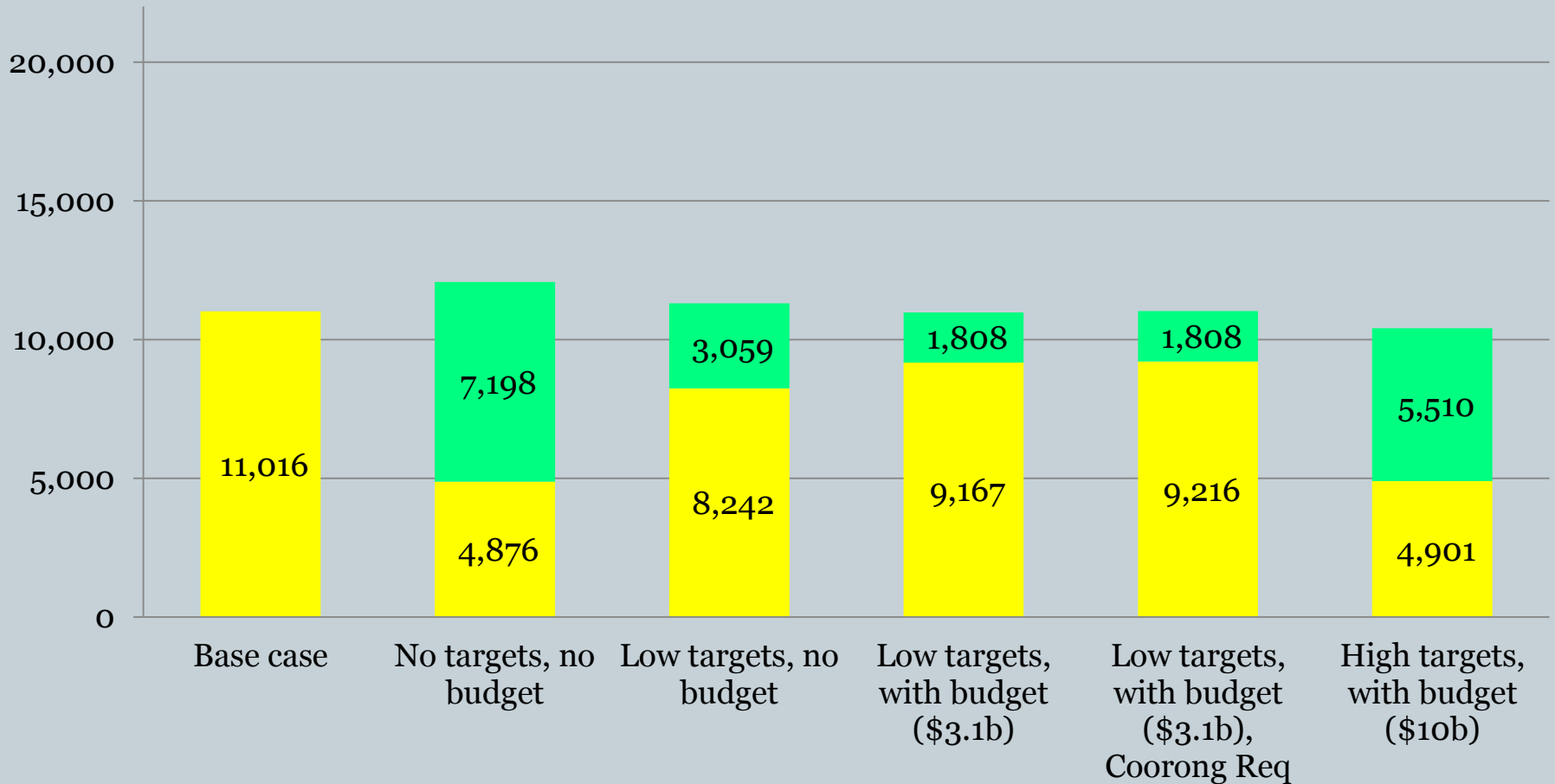
■ Irrigation ■ Environment



# Water use, normal state (GL)



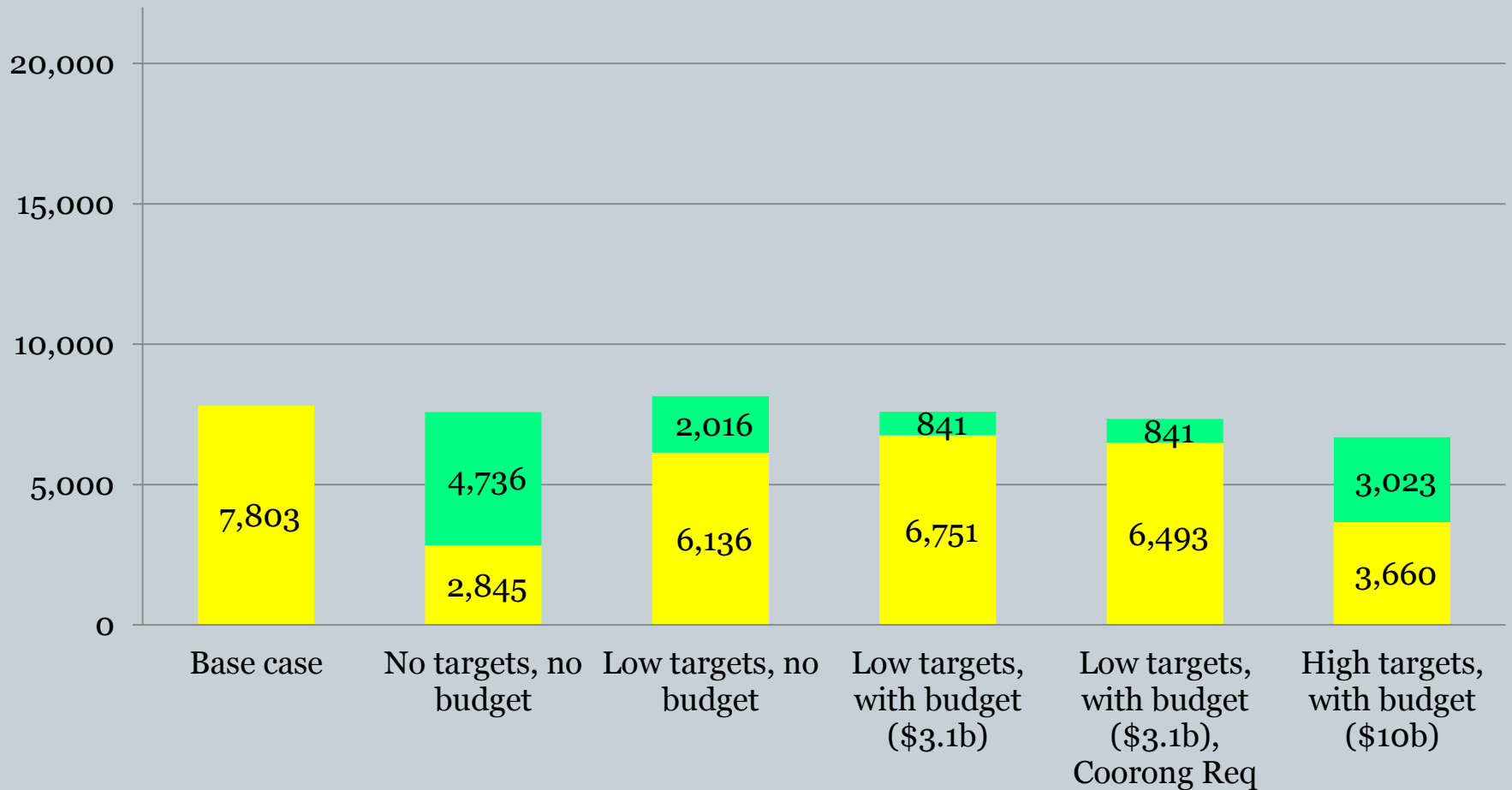
■ Irrigation ■ Environment



# Water use, drought state (GL)



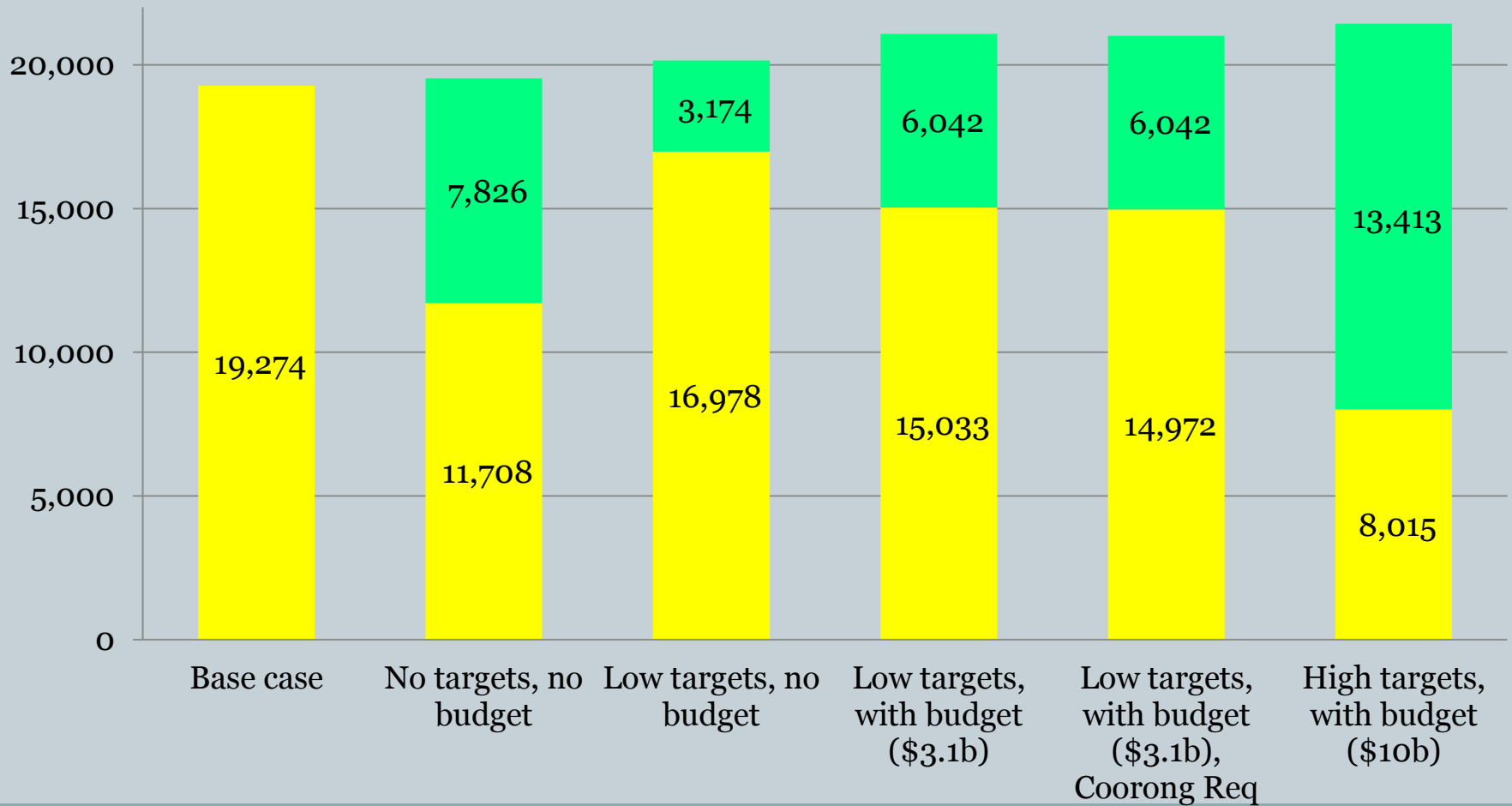
■ Irrigation ■ Environment



# Water use, wet state (GL)



■ Irrigation ■ Environment



# Limitations and future improvements



- Only long-term average SDL flow targets are currently used
- No prioritisation of environmental objectives
- The model is annually calibrated
- The model cannot in any way represent a change in the temporal profile of storage and release in the Basin, which may be part of the changes desired by society
- No measure of the benefits
- No measure of additional costs

# Key points



- There are a number of ways a buyback can run
- Environmental targets must be specified
- Operating with or without a budget constraint and with or without targets can result in very different government expenditures and environmental outcomes
- Water buyback is consistent with multiple outcomes, so other management instruments may be needed
- A significant reallocation of current program funding would be required to reach higher targets

Thank you for listening

Question time