



Environmental demands & the implications for supply reliability

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Structure

- Background on Basin Plan
- Environmental water / water sharing
- Proposals from the Basin Plan
- Looking forward

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The Basin Plan and understanding of the water demands of the environment

- The Guide to the Basin Plan
 - More water for the environment
 - Reduced water for consumptive use - up to 26% less to move from current average diversions to sustainable diversion limits (SDLs)
- Environmental demands
 - Minimum flows, and keeping the Murray mouth open
 - Small and large flood events
- Implementation through the accreditation of state water resource plans (WRPs)
 - Accreditation tests include: 'permitted take' < sustainable diversion limits
 - Also: 'equitable water sharing' between environmental and consumptive needs in dry years

Govt buyback to transition to SDLs

- Commonwealth assurances to support transition to new levels of environmental water provision through the voluntary buyback and water savings projects
- The Guide makes the following statements about the Commonwealth programs (emphasis added):
 - If the gap is fully bridged, *the impact on remaining consumptive users will be nil*. However, some of the economic impact on the community in the area would remain, due to the flow-on impact of less water being available for production. (vol 1, p. 153)
 - The intention of the Government to bridge any remaining gap between what has been returned to the environment under the Water for the Future program, and what is required to be returned under the Basin Plan, by continuing to buy back water from willing sellers substantially reduces, though does not eliminate, *the potential for change in reliability associated* with the implementation of the Basin Plan. (vol 1, pp. 179-80)

Efficiency of tax dollars and equitable compensation

- Economists generally endorse the principle of voluntary exchange
 - Buyback as a mechanism for compensation
 - Leads to conclusions of impacts being modest

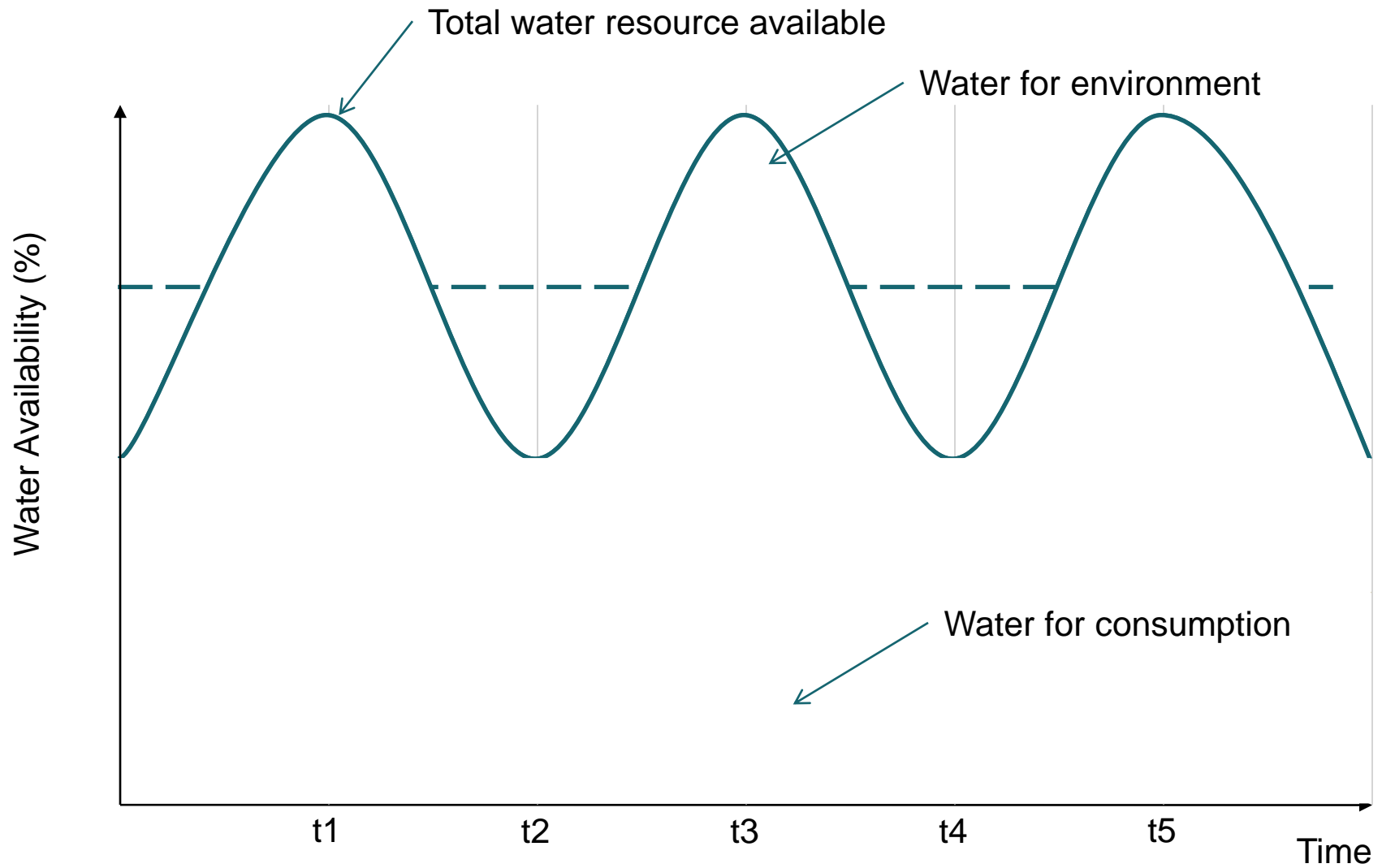
- A range of approaches exist
 - Water planning – compulsory reallocation of water to environment with no compensation
 - Buyback – willing sellers reallocating water to the environment with compensation at prevailing price
 - Water savings – ‘new water’ for the environment, at above-market cost

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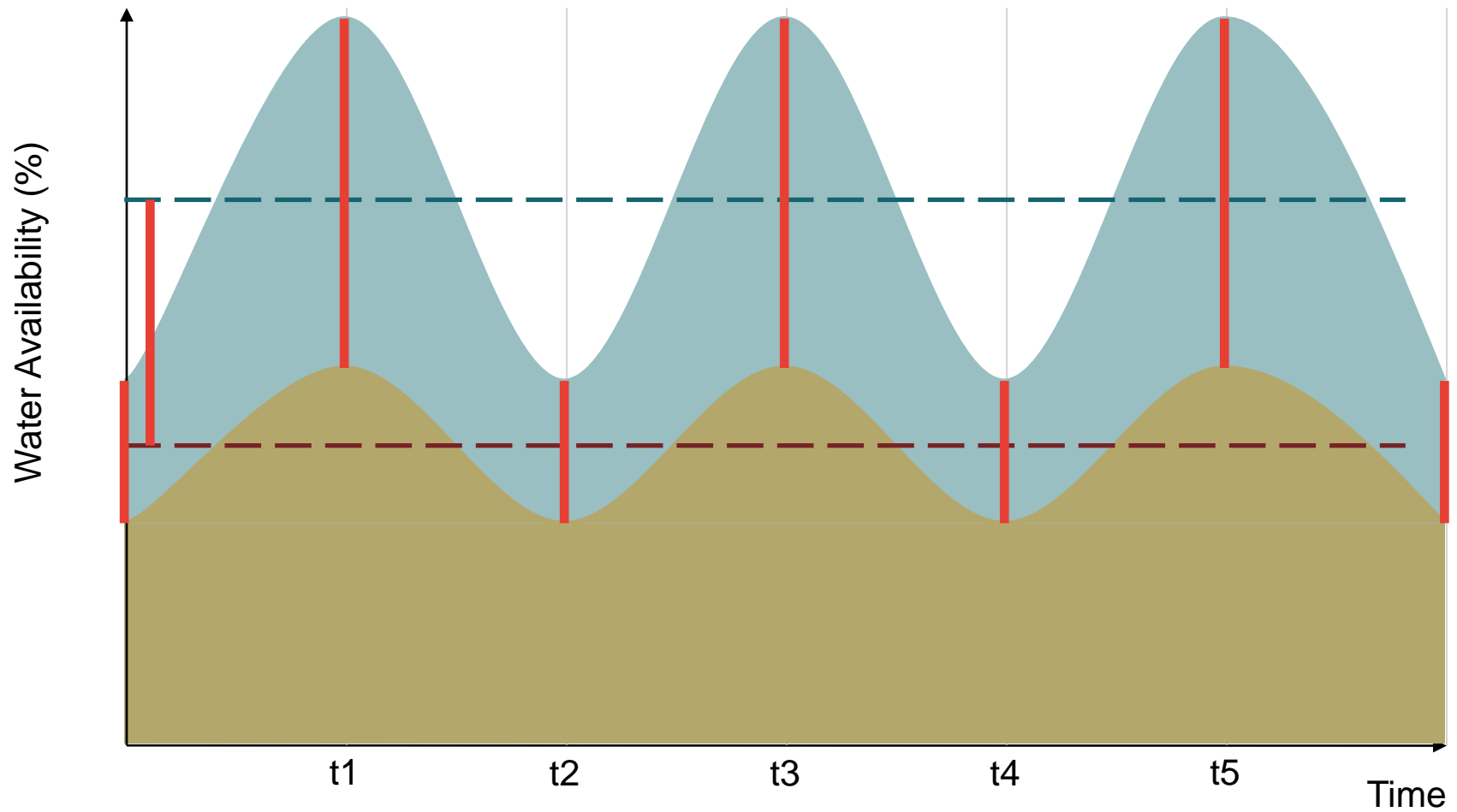
Meeting environmental water demands

- Current sharing of water between consumptive uses and the environment
 - Sharing the available resource, such that both face variability
- Providing an increased average volume for environmental use
 - Proportional reduction
 - Volumetric reduction
 - More water to the environment in dry years (or a lot more)

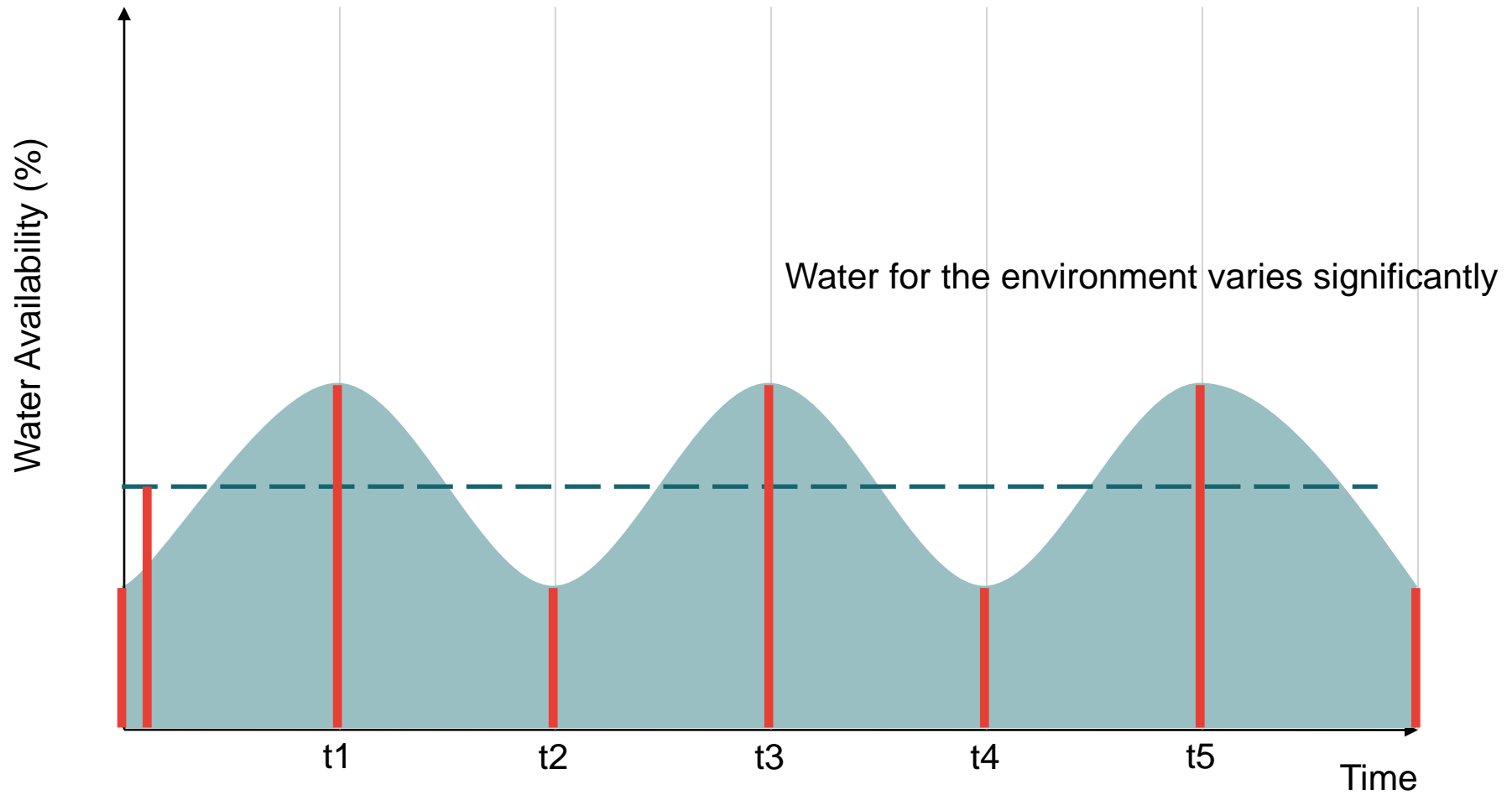
Resource allocation – sharing



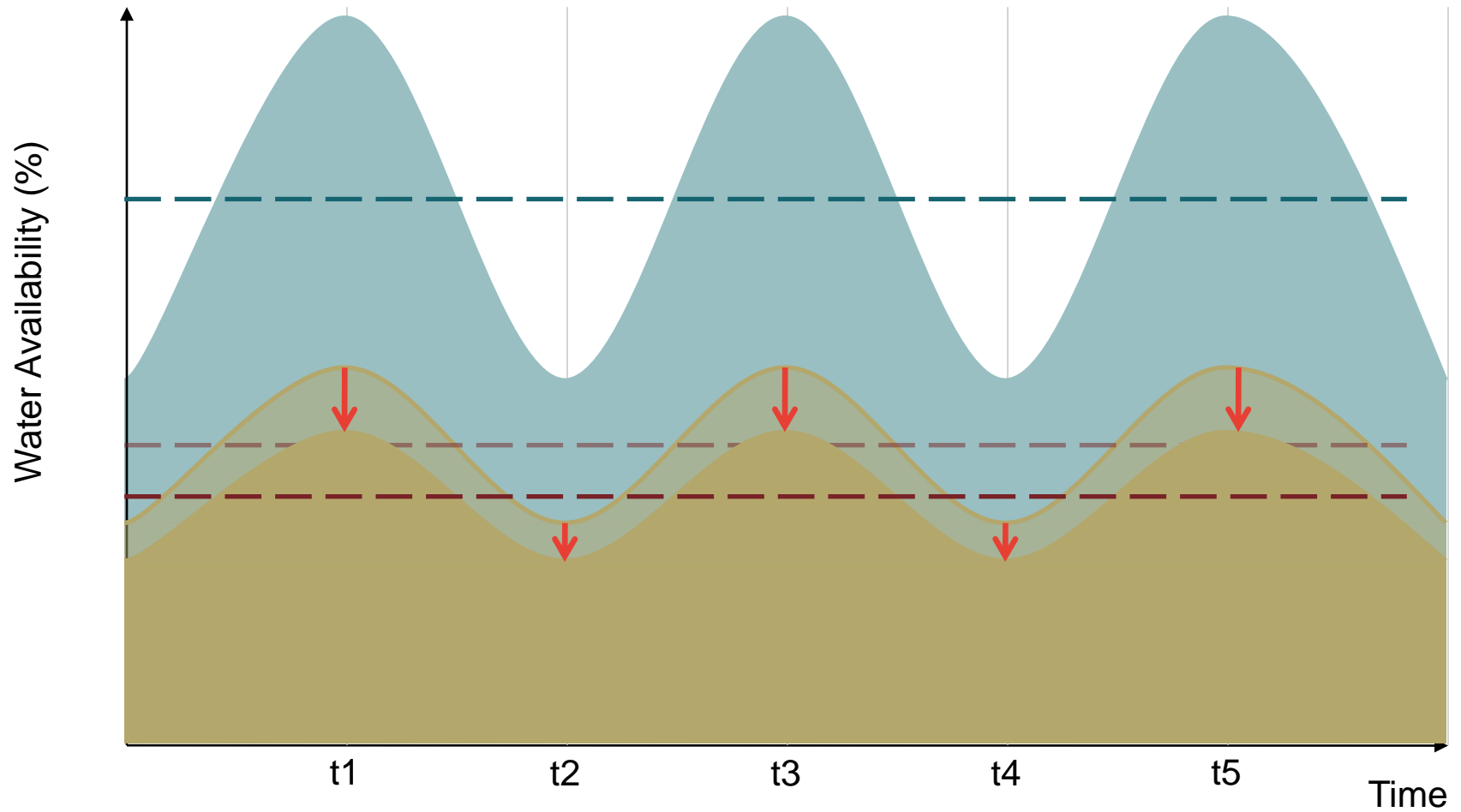
Resource allocation



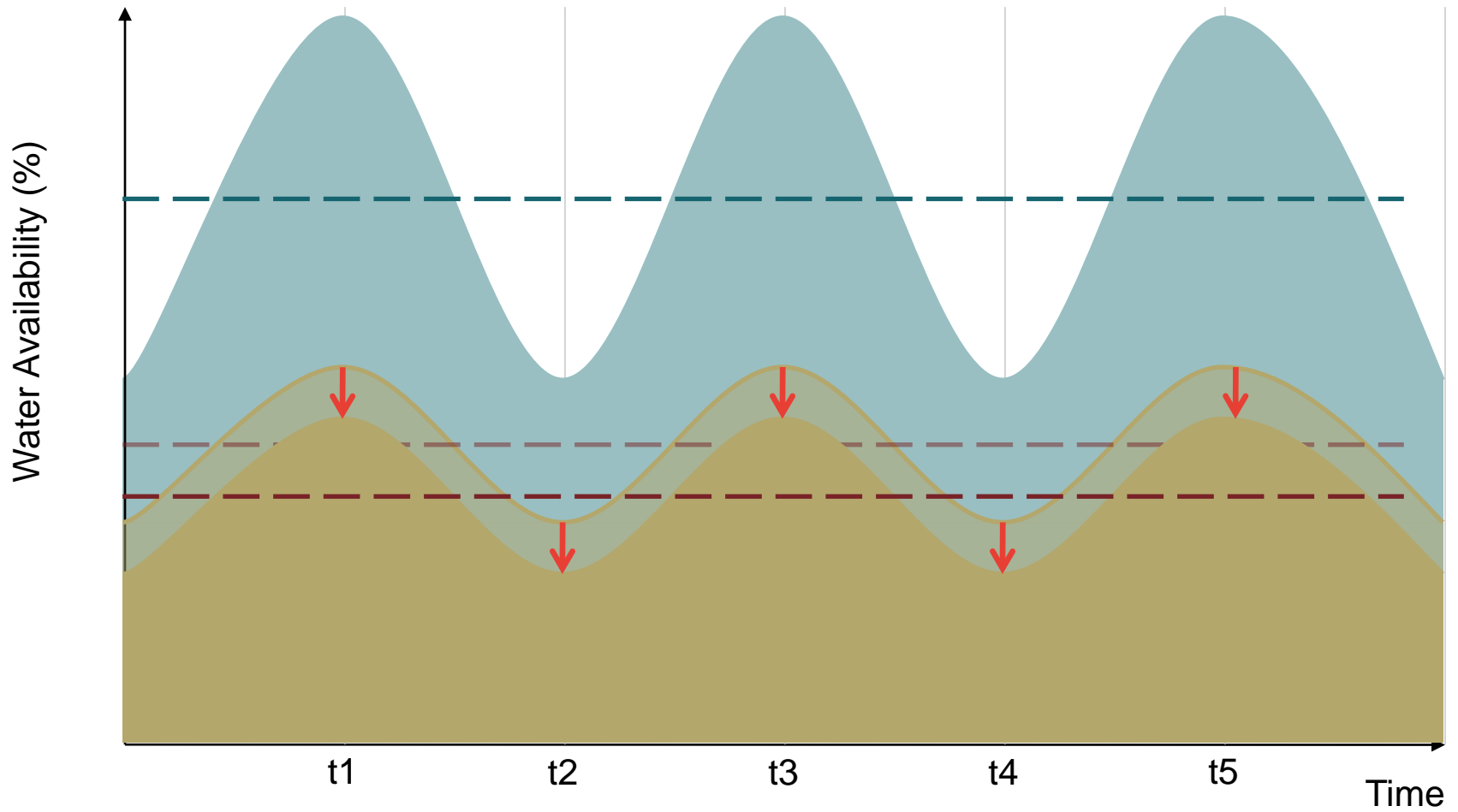
Resource allocation to the environment



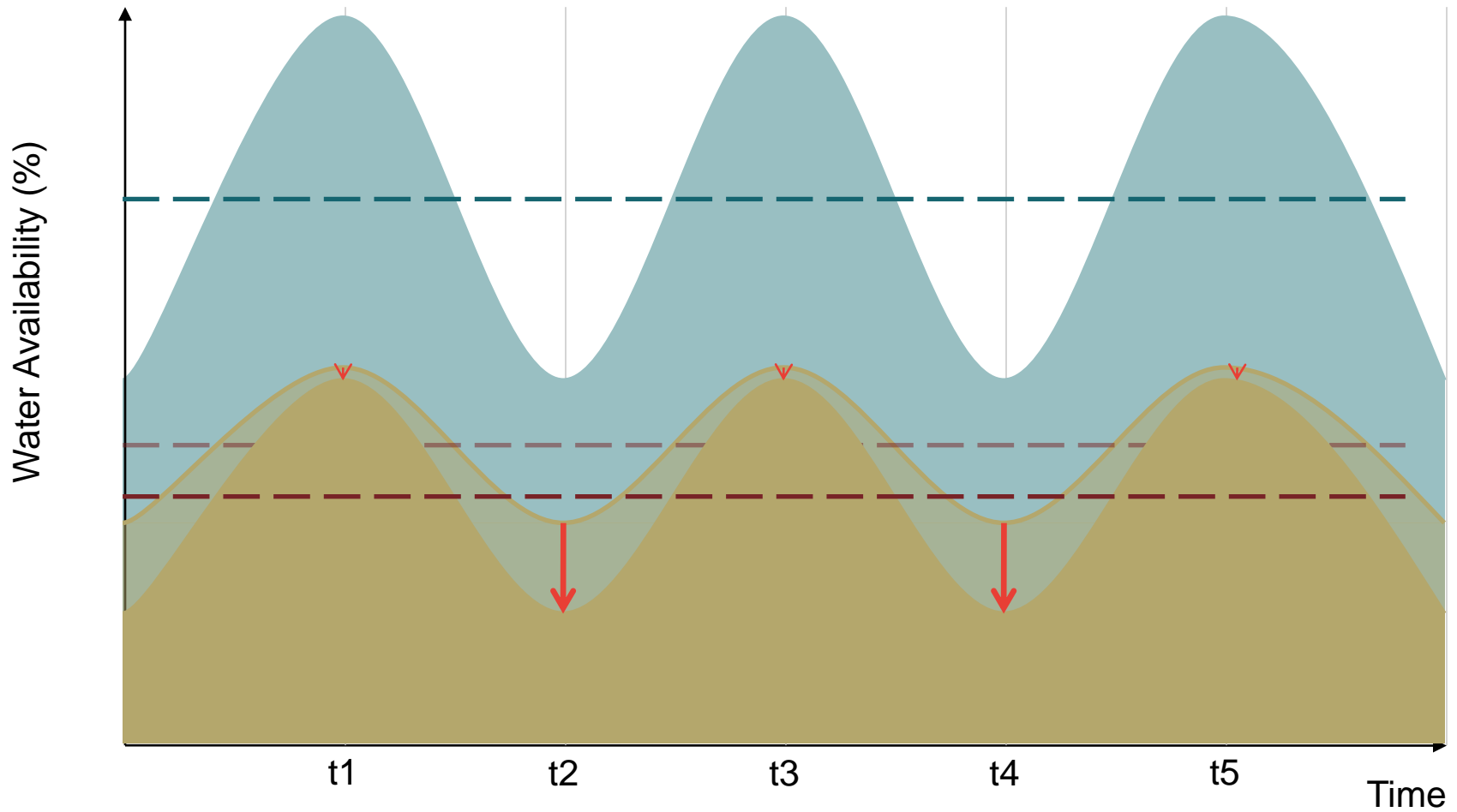
Proportion reduction



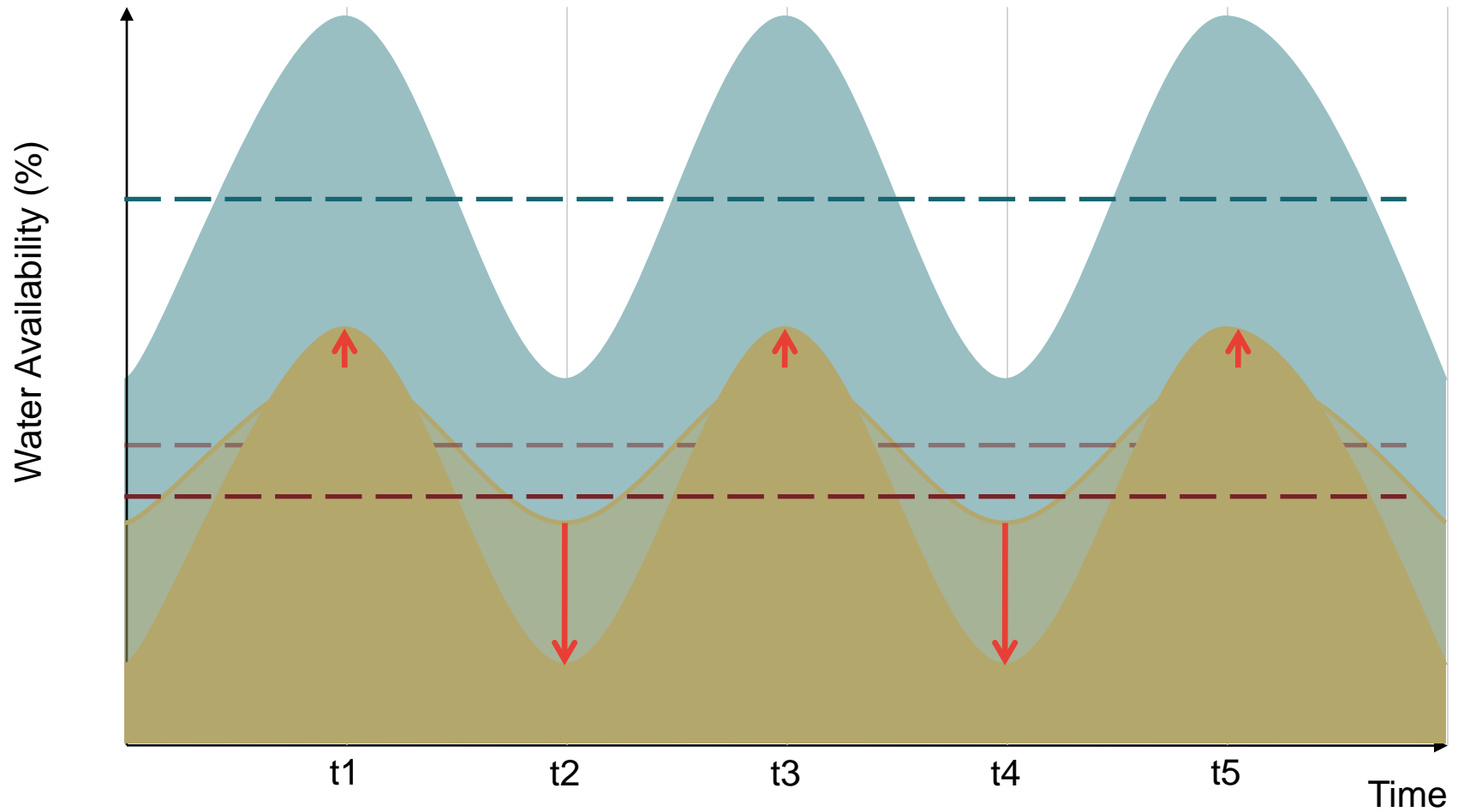
Volumetric reduction



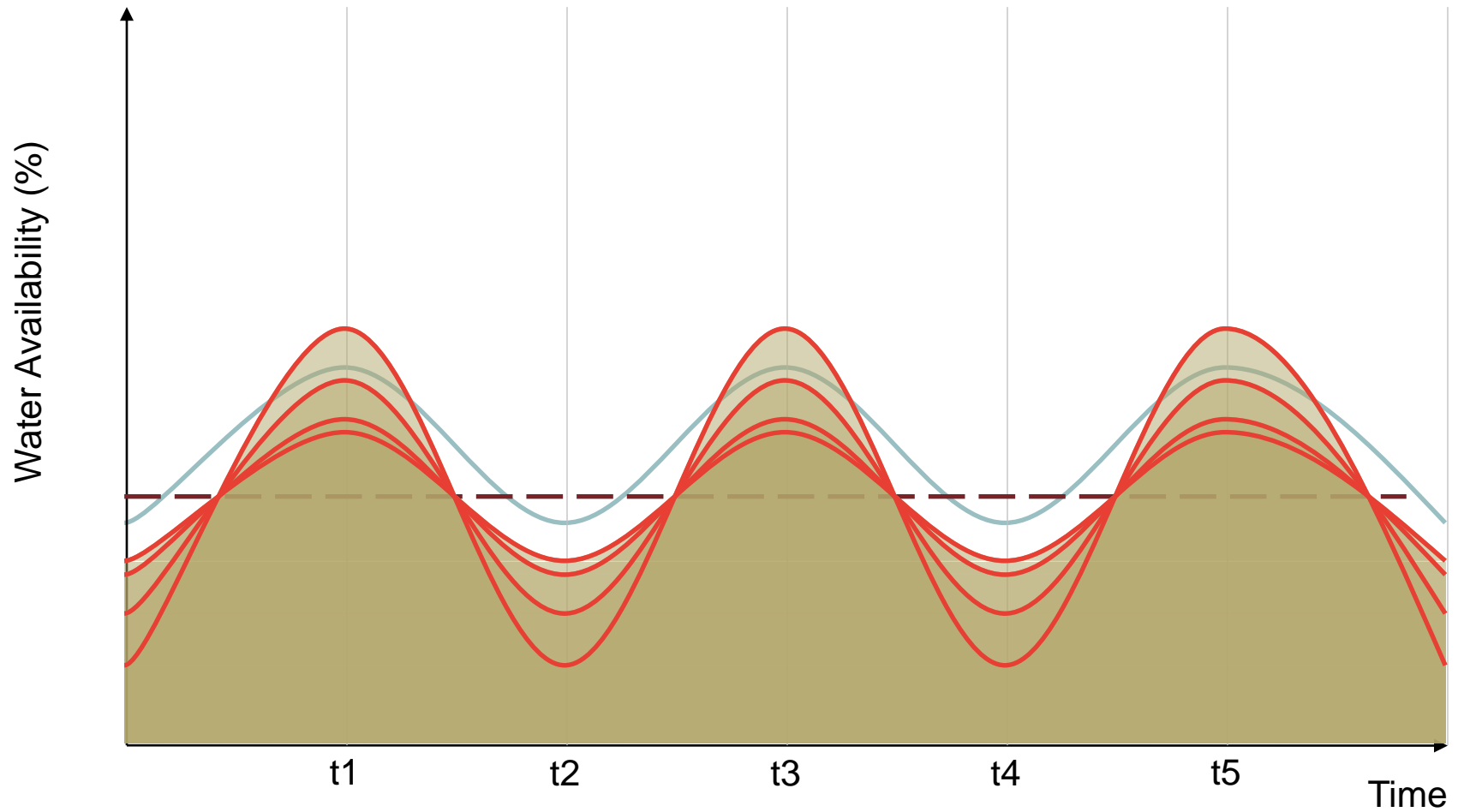
More water to environment in dry years



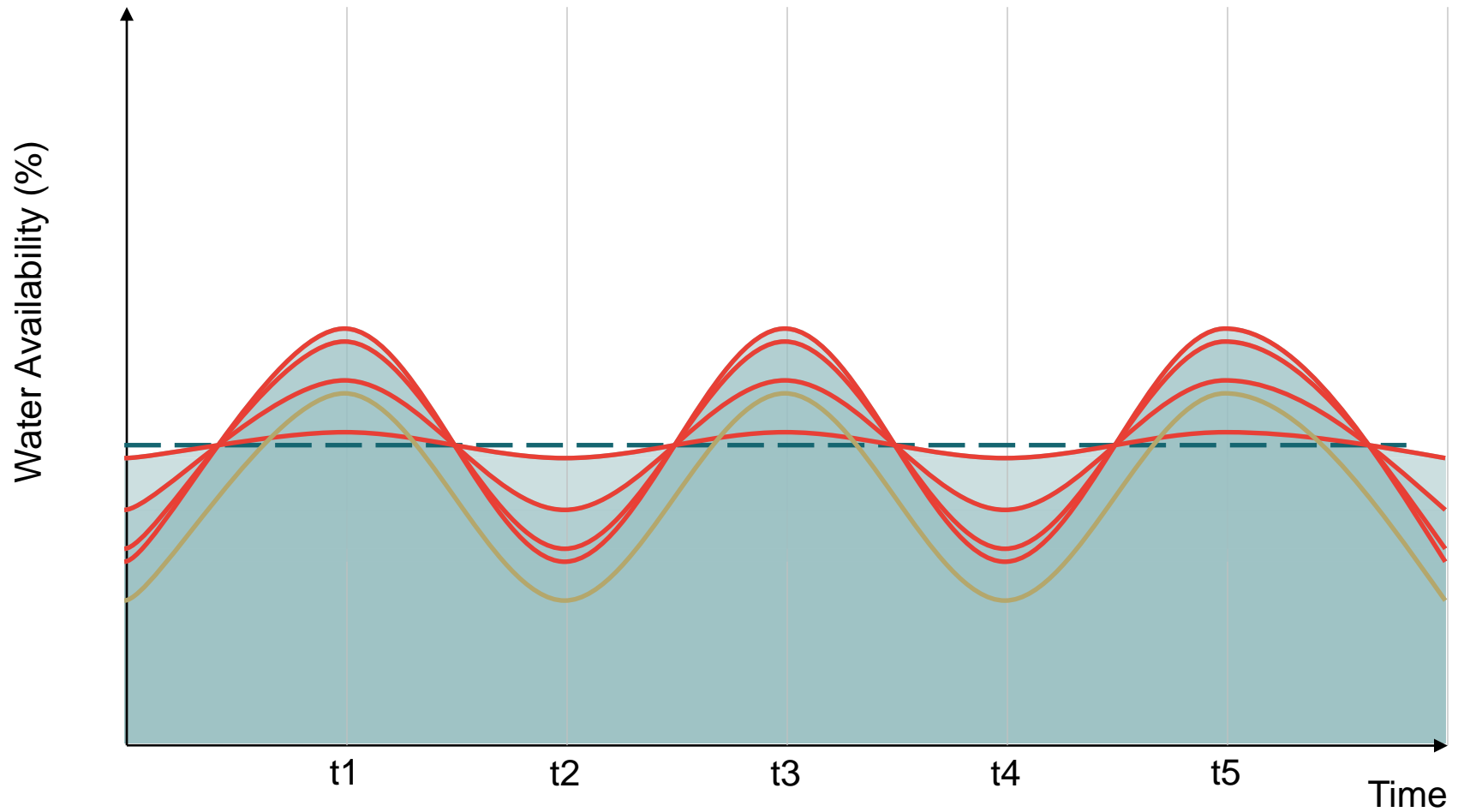
A lot more water to environment in dry years



Comparing the volumes available for consumption



Comparing the volumes available for environment



Environmental water demands can either complement or conflict with existing rights to water supply

- Irrigation demand
 - Depends on industry
 - Perennial horticulture
 - Dairy (semi interruptible)
 - Annual crops
- Environmental demand
 - Minimum flows
 - Maintain refugia
 - Some connectivity
 - Regular small floods
 - Occasional large floods
 - (not unseasonal floodings)
- Dry year demands conflict (environmental demand when economic value highest)
- Countercyclical demands in wetter periods provide opportunities for complements

Example of environmental water demands

Table B4.5 Environmental water requirements: Lower Goulburn River Floodplain

Target	Event			Proportion of years event required to achieve target (% of years)		Proportion of years event occurred under modelled without-development conditions (%)	Proportion of years event occurred under modelled current arrangements (%)
	Flow required (measured at McCoys Bridge)	Duration ^a	Timing	Low uncertainty	High uncertainty		
Maintain 100% of current extent of wetlands in good condition	25,000 ML/d	7 days total (with 1 day minimum)	June to November	60	50	72	36
	30,000 ML/d			50	40	65	32
	30,000 ML/d			40	33	50	23
Maintain 100% of current extent of red gum forest and red gum woodland in good condition	45,000 ML/d	7 days total (with 1 day minimum)	Preferably winter/spring, but timing not constrained to reflect that high flows are dependent on heavy rainfall and will be largely unregulated events	35	25	44	13
	60,000 ML/d			20	15	26	6
Provide conditions conducive to successful breeding of waterbirds ^b	30,000 ML/d	30 days total (with 1 day minimum)	June to November	30	30	35	11

Frequent small floods

Occasional large floods

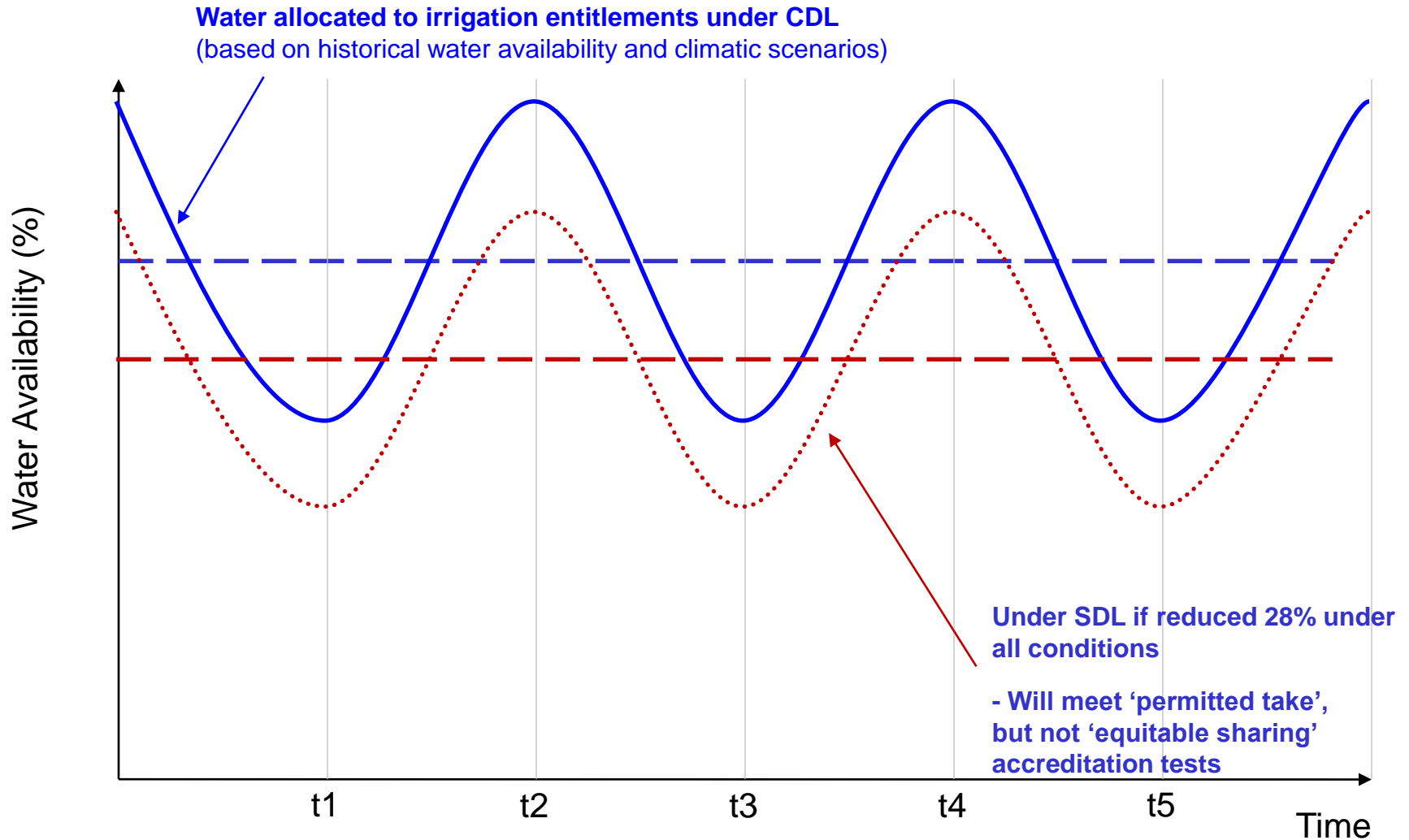
^a Duration is expressed both as a total and minimum duration. Minimum durations are therefore a subset of total duration. ^b MDBA analysis showed that if a minimum duration is not specified and individual events must meet the total duration criteria, this resulted in a significantly reduced proportion of years.

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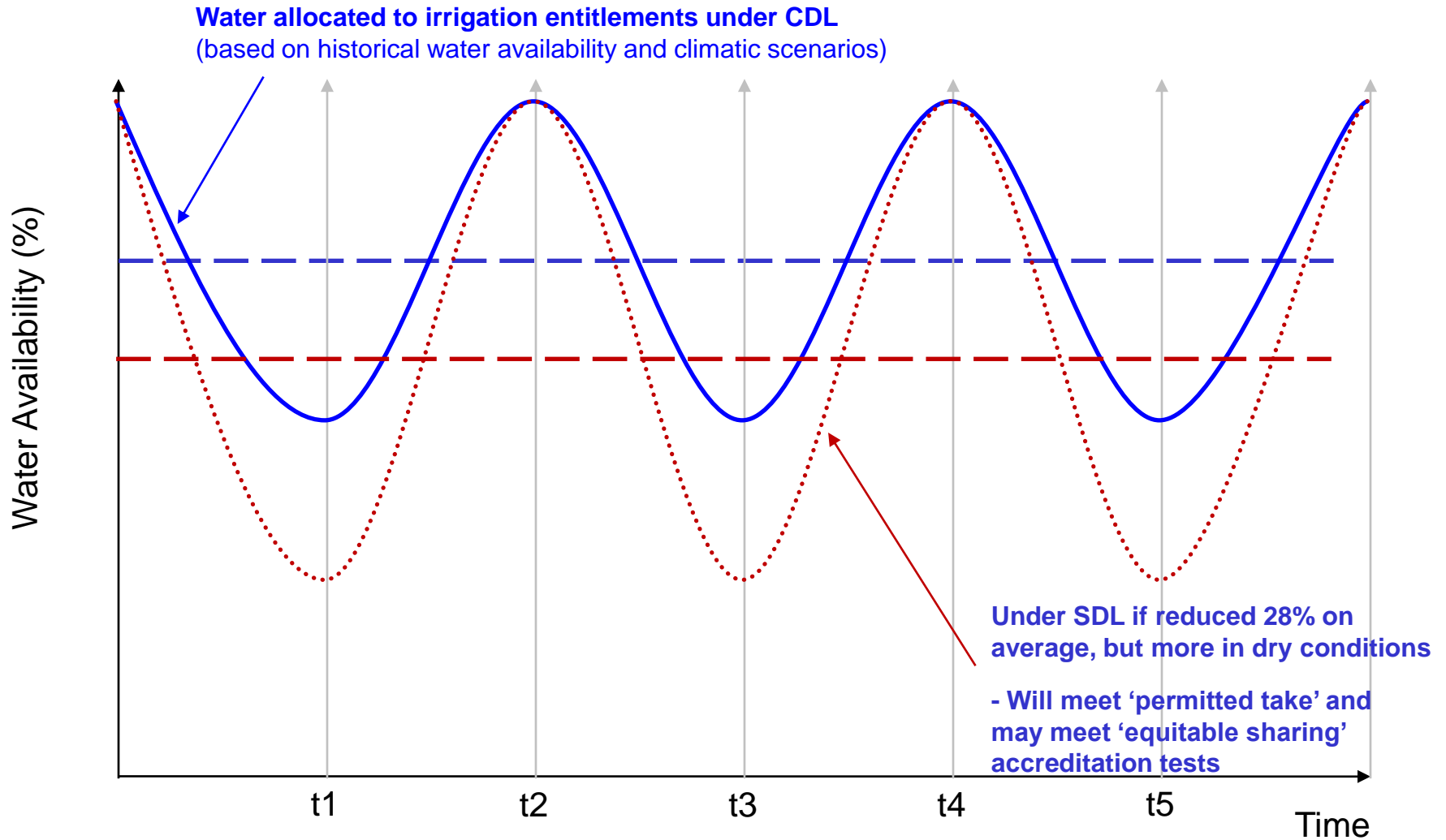
Proposals from the Basin Plan Guide

- Draft accreditation tests are presented in this appendix E of the technical background. There are about 170 draft tests, but not all may be relevant to a specific WRP
- There are six key test that relate to achieving SDL volumes. These rules have the general form:
 - Equitable sharing = equal sharing
 - Average permitted take_(t,c) ≤ SDL x AWA_(t,c)/AWA_(all years,historical)
for all t = all years, 10-yr low period, 10-yr high period
and c = historical , median 2030 climate change
AWA is average water availability
- These tests are referred to as ‘the tests for permitted take and equitable water sharing’

Meeting just the 'permitted take' test



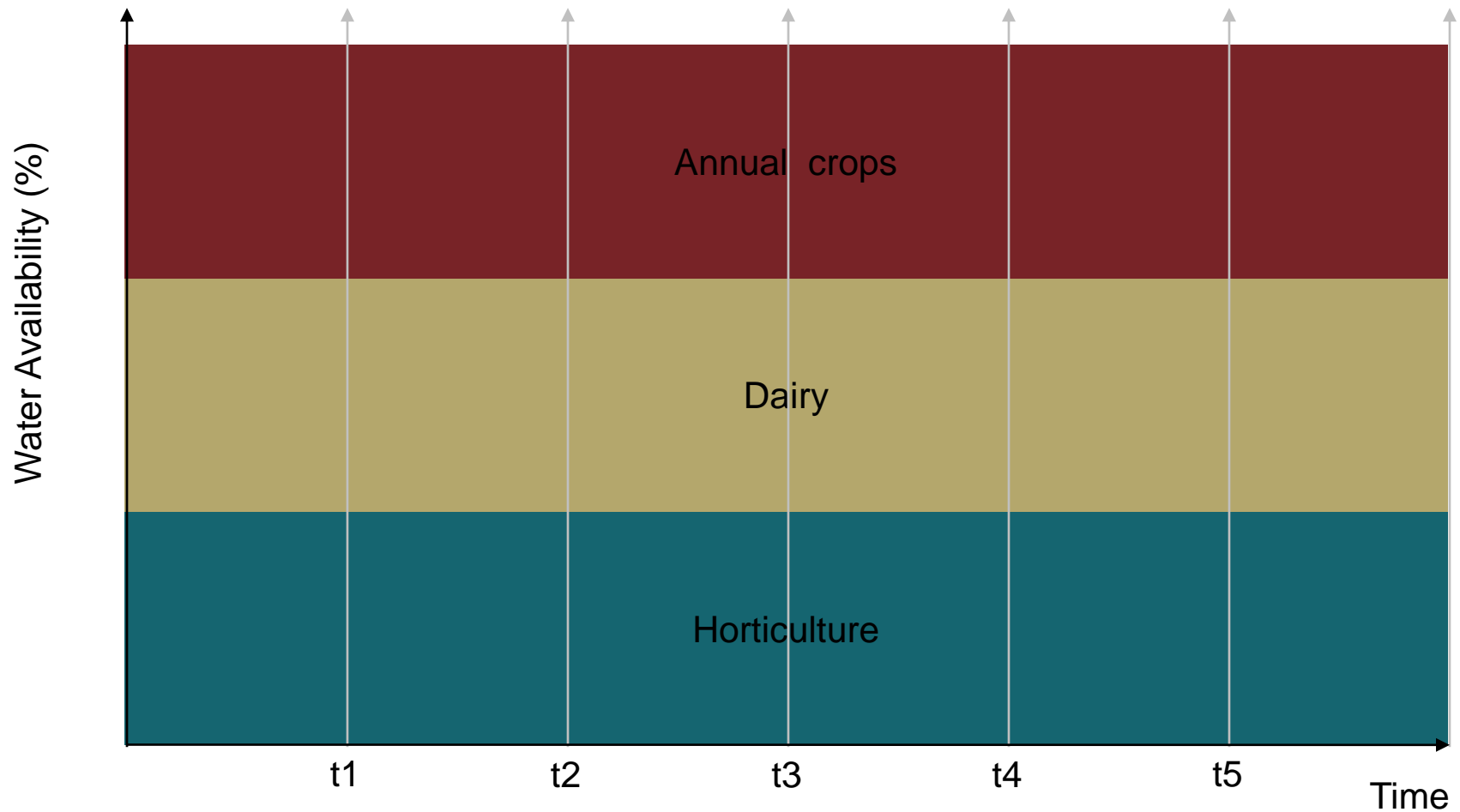
Example: meeting all 6 SDL-related tests



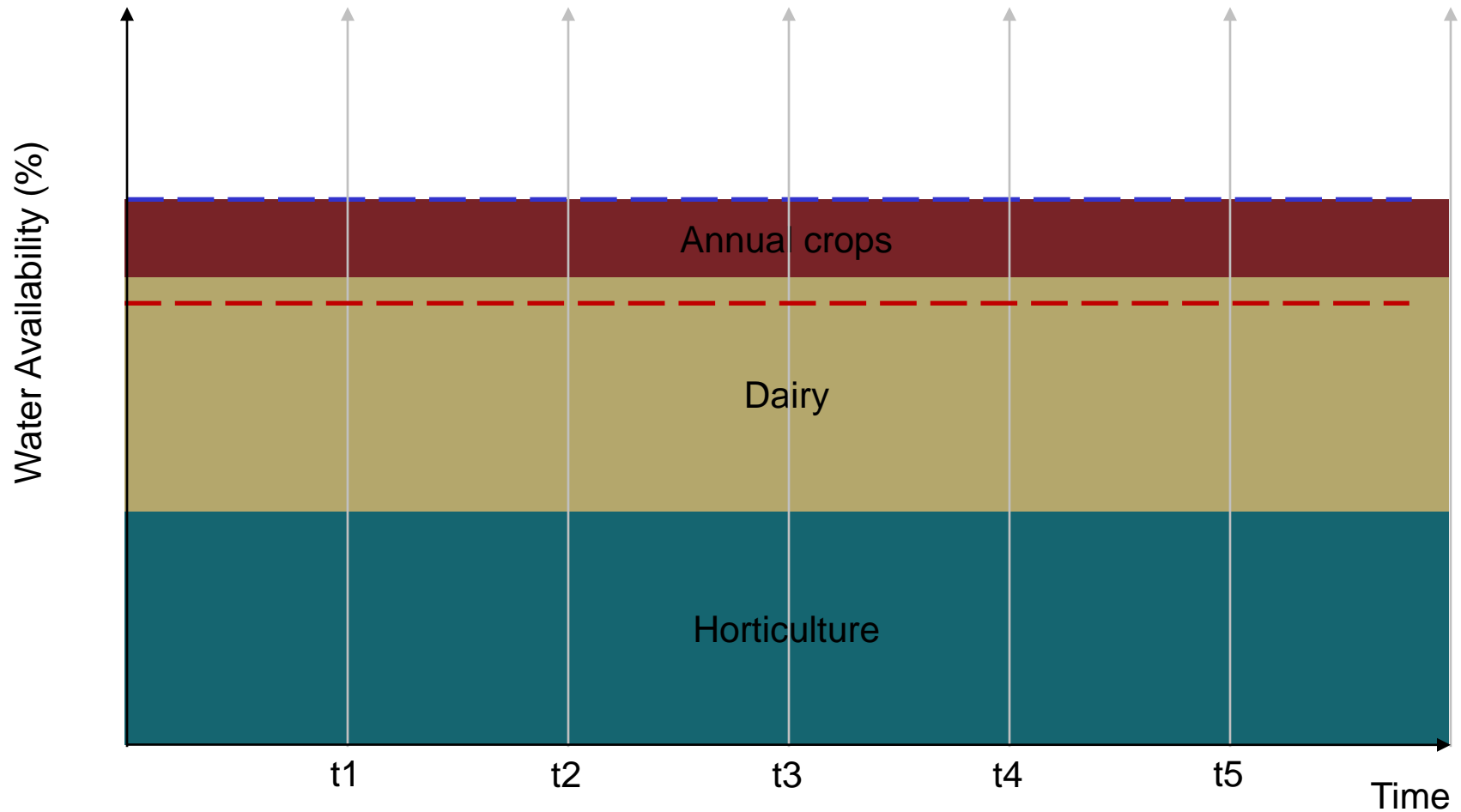
Findings

- If we implement some of the proposals from the Basin Plan, we risk significantly affecting the supply reliability of existing water users
- To meet the BP, irrigation water use will need to reduce significantly
In the Goulburn-Broken:
 - -25% change in average total diversions = average irrigation water use -33%
 - '10-year dry period' accreditation test = irrigation water use -54% (compared to 2000-2010)
- Understanding the impact on irrigation water is key to understanding the socio-economic impact of the proposed requirements of the Guide to the Basin Plan
- So, what does this mean for irrigating industries?

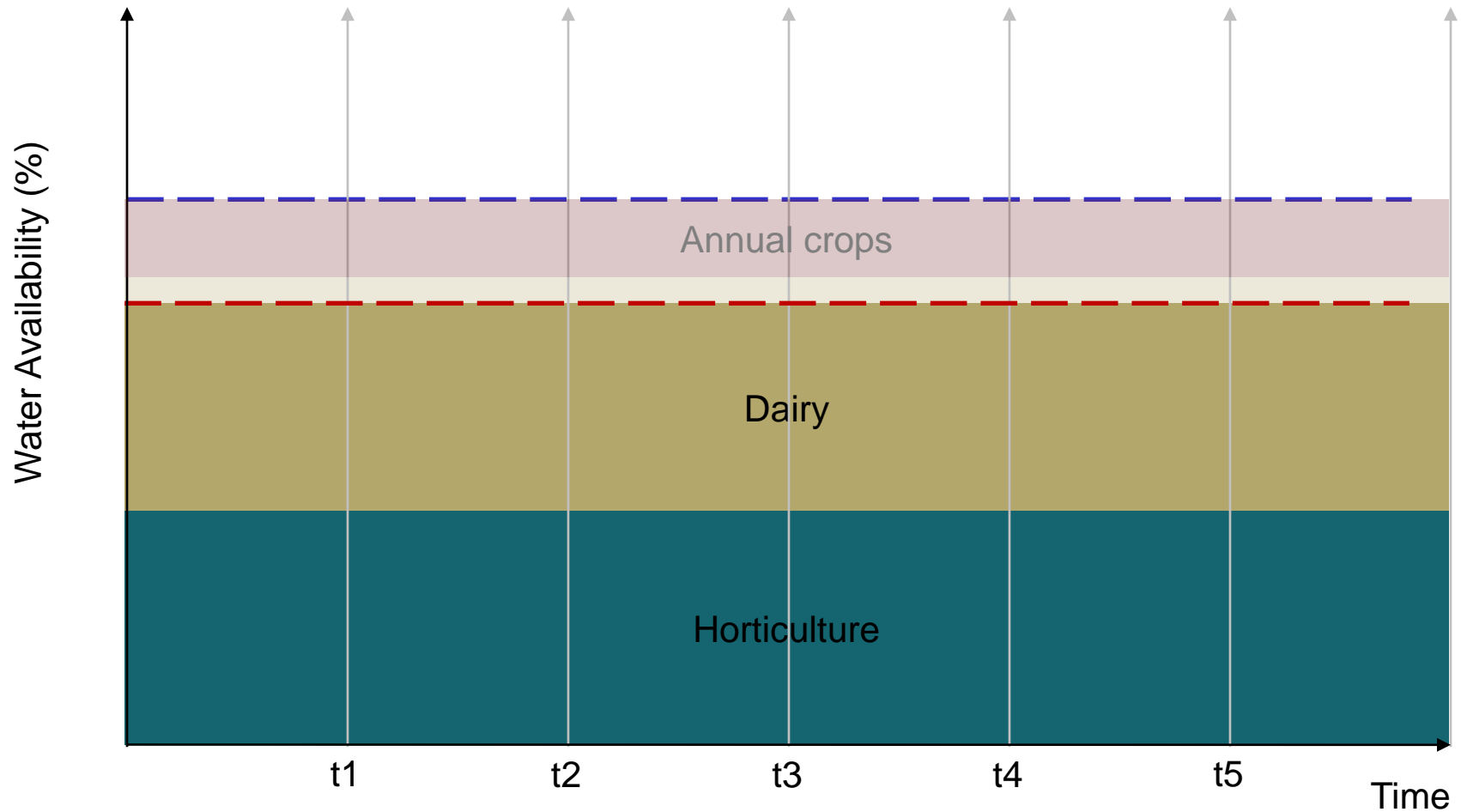
Hierarchy of water's marginal value in production



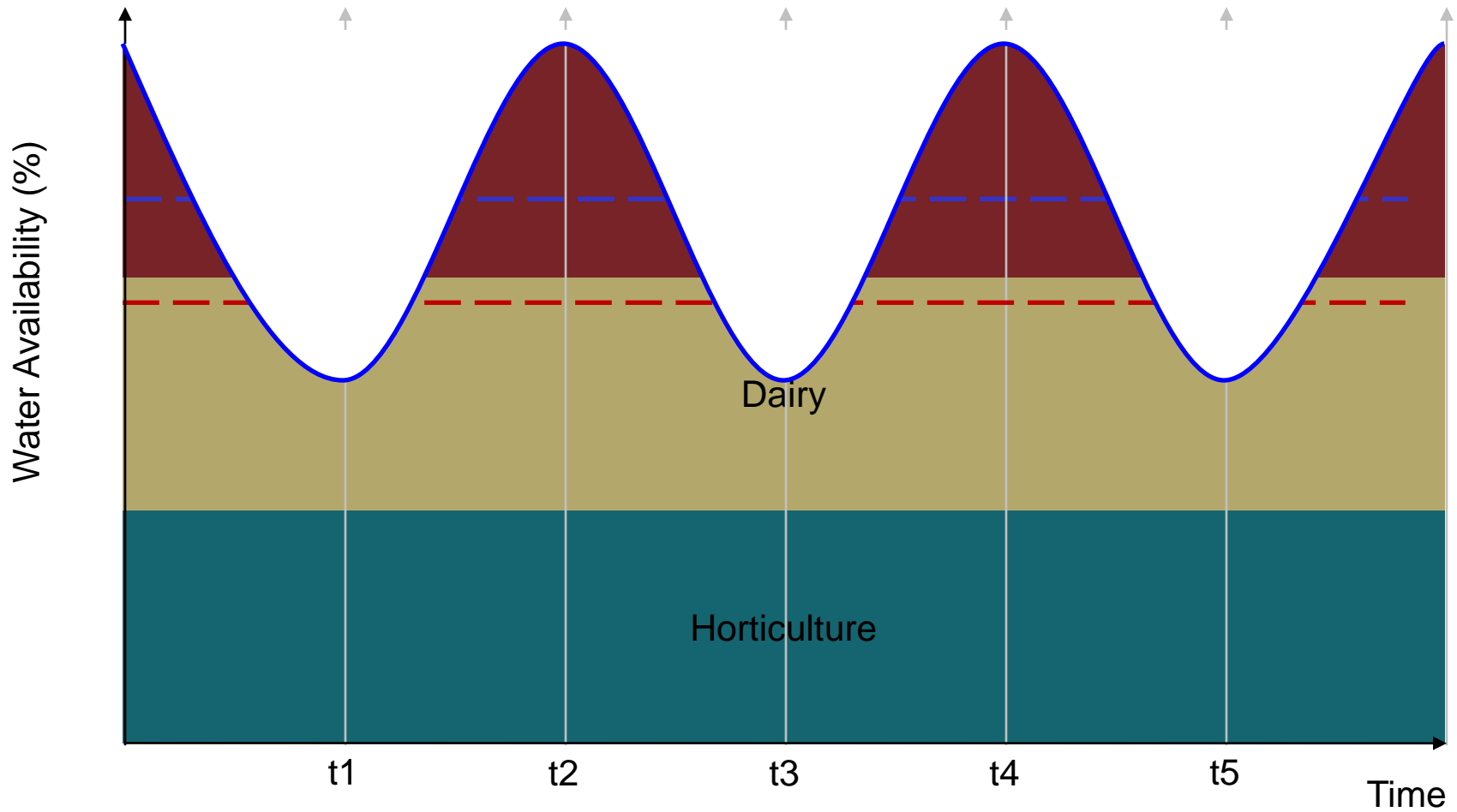
What does this mean for irrigating industries? ... on average



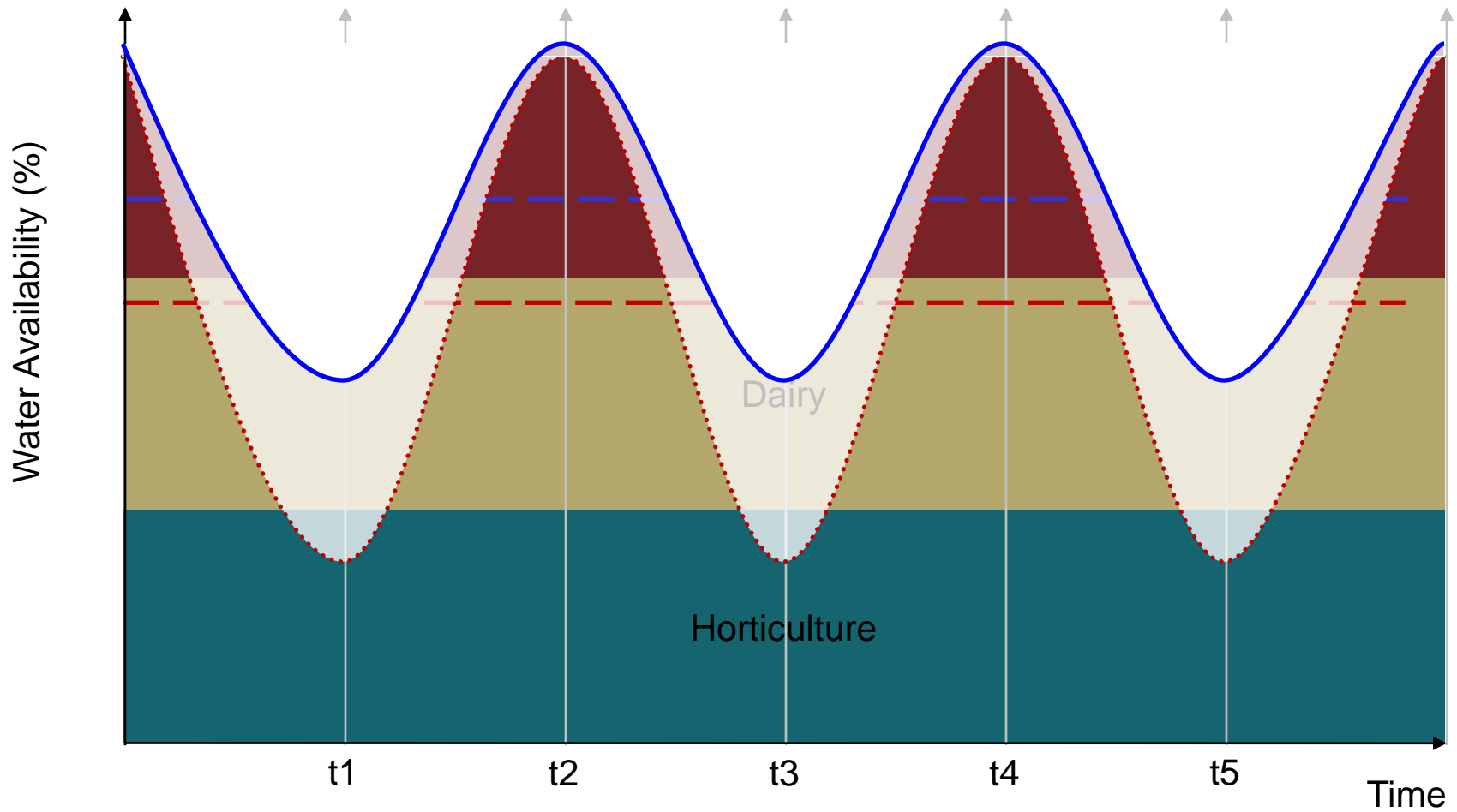
What does this mean for irrigating industries? ... on average



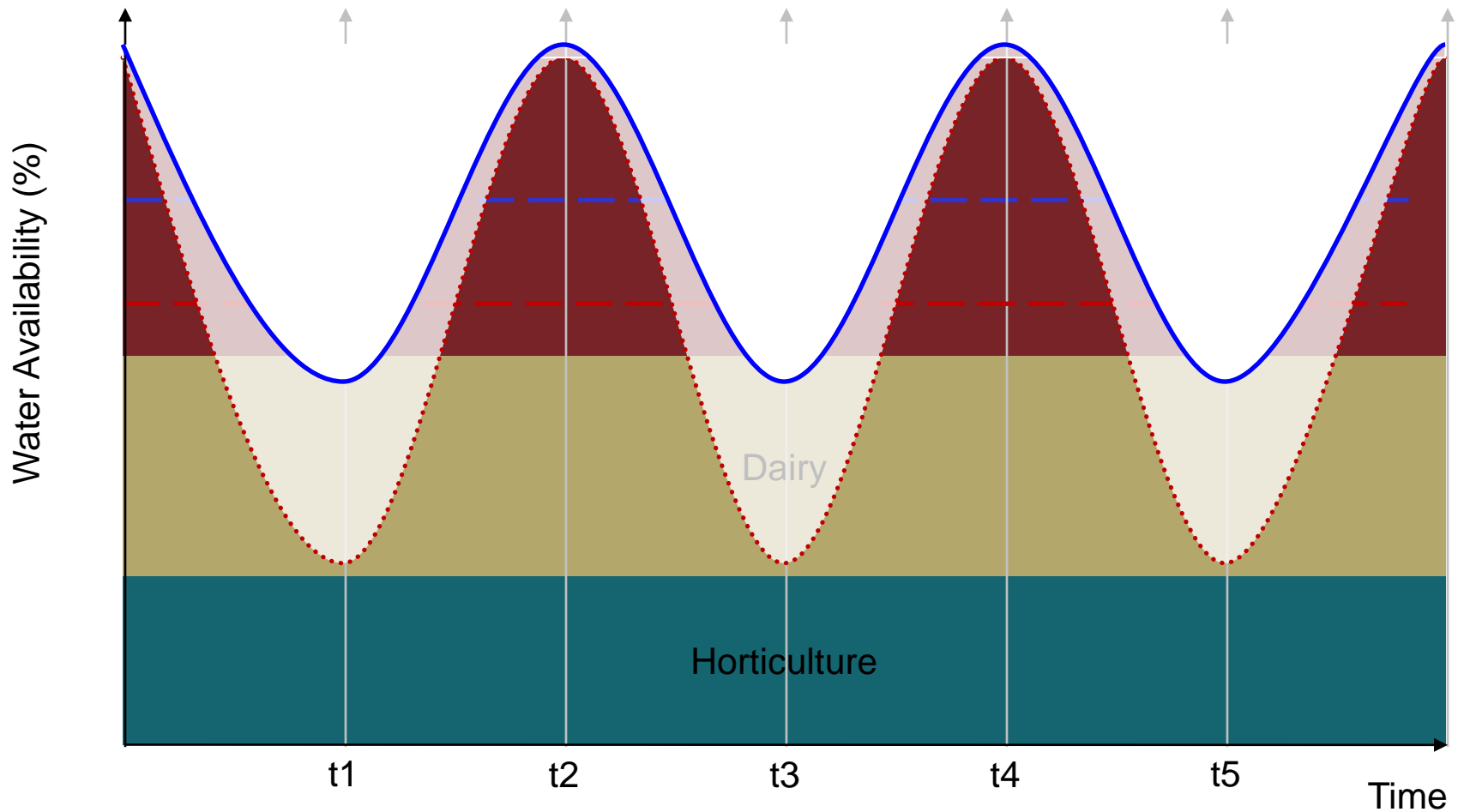
What does this mean for irrigating industries?



What does this mean for irrigating industries?



What does this mean for irrigating industries? ... a change in the industry mix



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What is 'equitable sharing'?

- Equitable \neq Equal
- Equitable Sharing of Waters:
What amounts to an "equitable" share of the waters of an international water basin often is not clear. Some have argued that "equitable" sharing must mean equal sharing. The merest perusal of the standards for equitable utilization demonstrates that while equal access is guaranteed, equal shares are not.
- Needs to take into account relative demands and marginal value
 - Volume is a crude measure of benefit

Conclusions

- Modelling impact of Basin Plan
 - First assessments based on long-term average volumes
 - Given details of BP proposals, more research needed to consider impacts under variability
 - Only understanding this detail, can efficiency improvements be made
- Striking a better balance between water uses
 - requires managing water in a dynamic sense
 - not just applying inflexible allocation rules, for example, those based on equal/‘equitable’ sharing and long term averages

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Abstract

Environmental demands & the implications for supply reliability

David Appels & David Briggs (Frontier Economics)

The Basin Plan and associated science informs our understanding of the water demands of the environment. In the general commentary concerning the Basin Plan the Federal government have made assurances that the transition to new levels of environmental water provision (i.e. more sustainable levels of extraction/diversion) will be fully supported through the voluntary buyback of water rights. Economists generally endorse the principle of voluntary exchange as leading to Pareto improvements. So there is nothing to worry about, right?

As it happens there are a numbers of ways environmental water demands can be met. This presentation examines how meeting environmental water demands can either complement or conflict with existing rights to water supply. Importantly, if we implement some of the proposals from the Basin Plan, we risk significantly affecting the supply reliability of existing water users.

Striking a better balance between water uses requires managing water in a dynamic sense, rather than just applying inflexible allocation rules, for example, those based on 'equitable' sharing (if interpreted to mean equal) and long term averages. However, more complex allocation rules places an onus on good science and good institutional design.

Example calculations, Goulburn-Broken example

- In dry 10-years
 - Average water availability -40%
 - Irrigation allocations -25%

- If there is a 30% buyback
 - Long-run average irrigation -30%

 - In dry period:

Historically, get $1 \times (1-0.25) = 75\%$

Under BP, get $(1-0.3) \times (1-0.4) = 42\%$