



RECENT EXPERIENCES PLANNING FOR STORMWATER VOLUME TARGETS

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Stormwater 2024

15–17 May | Takina Wellington Te Whanganui-a-Tara

Outline

1. Volume targets
2. Implementation
3. Discussion points

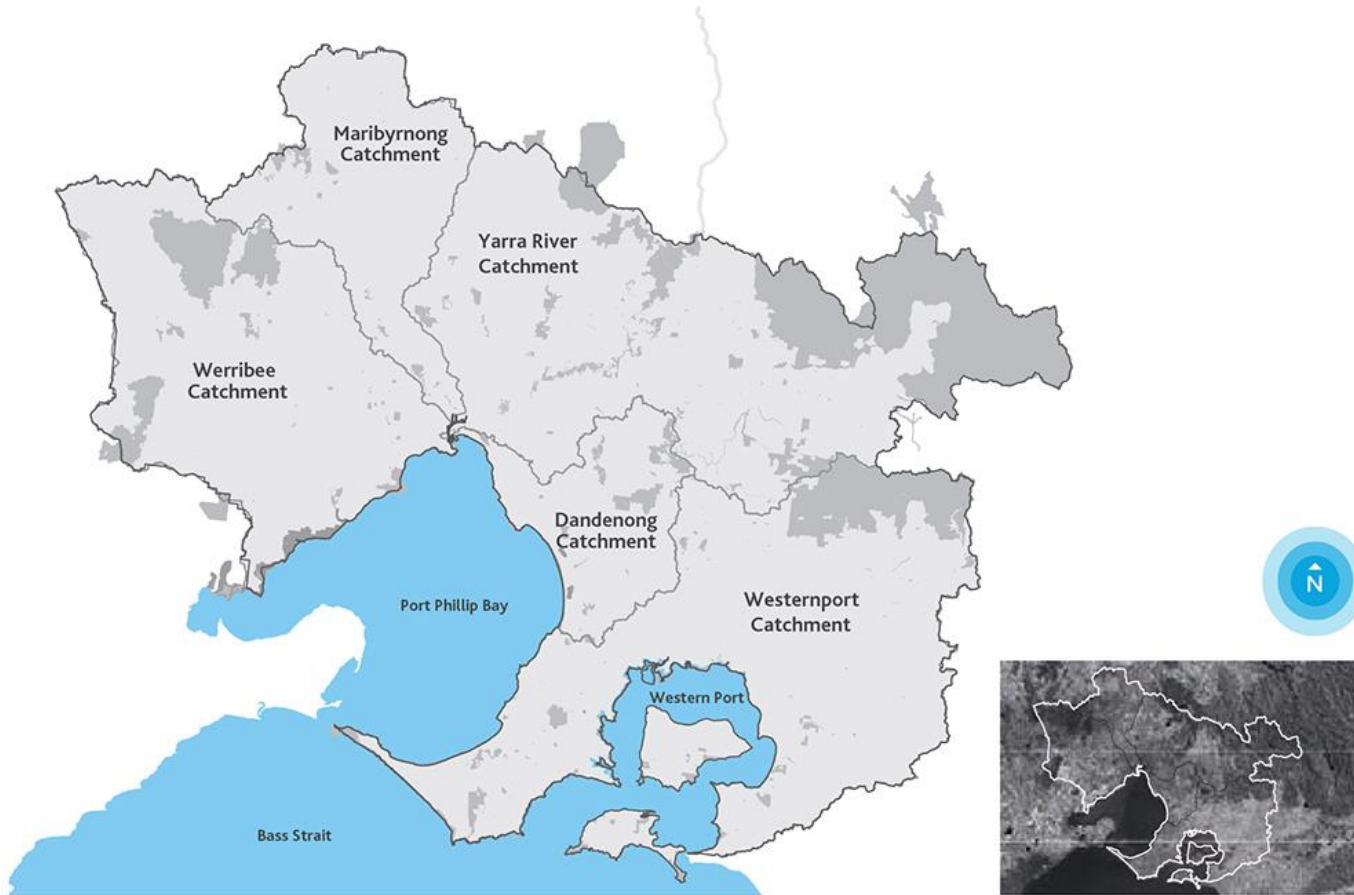
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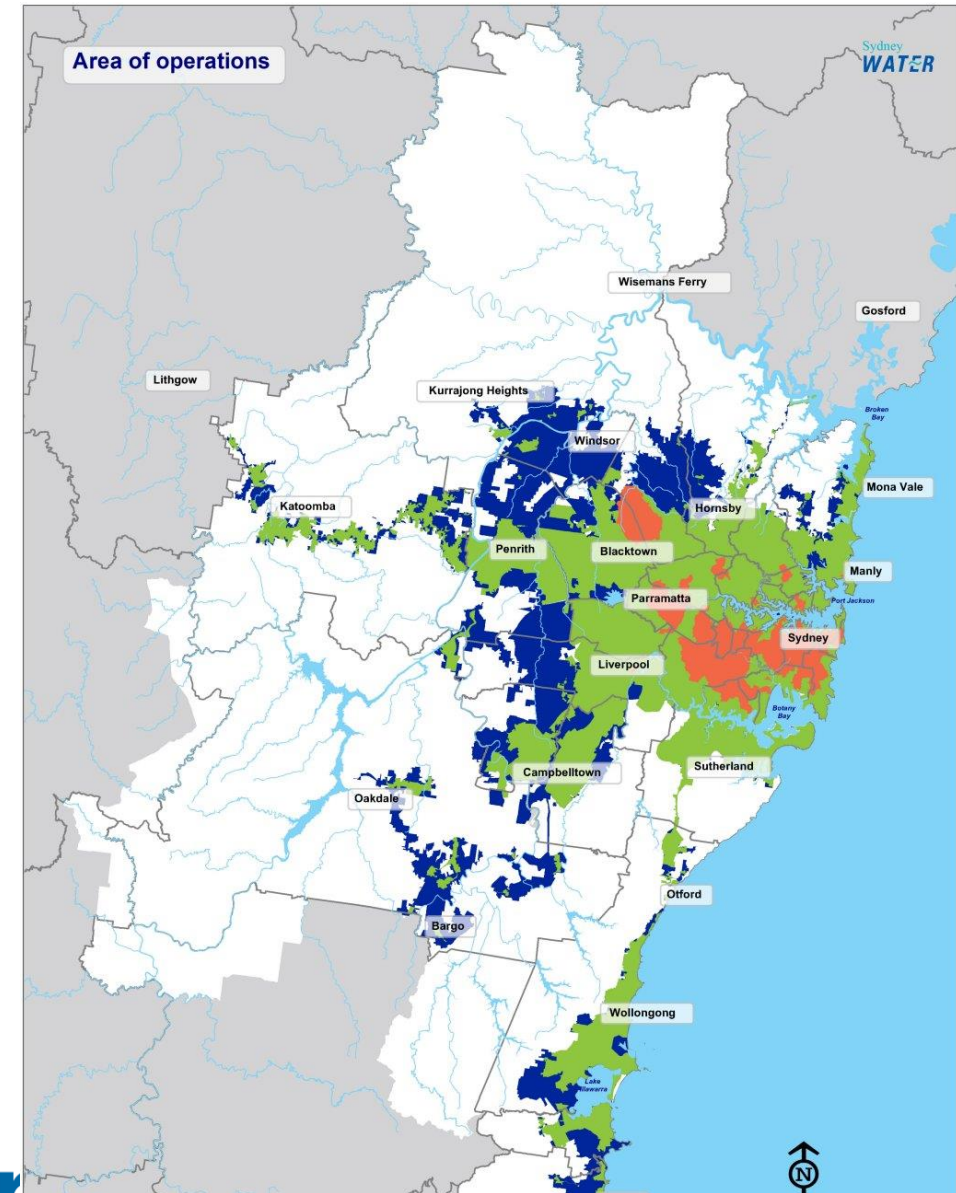
The logo graphic for Water New Zealand features a stylized mountain range in green and blue, with a white wave-like shape at the base.

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The two approaches



- Melbourne Water responsible for stormwater in catchments > 60 Ha



- Sydney Water responsible for stormwater in catchments > 15 Ha in western Sydney only

Melbourne volume reduction target development

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Melbourne Context: Healthy Waterways Strategy (2018)

- Framework for addressing community expectations and the obligations for waterway management in five catchments
 - Vision
 - Goals
 - Long-term targets (10-50 years)
 - Performance objectives (10 years)
- Ultimately a values-based question/approach:
 - What waterway values will be protected ?
 - What constitutes good?, improvement?
 - Who decides?



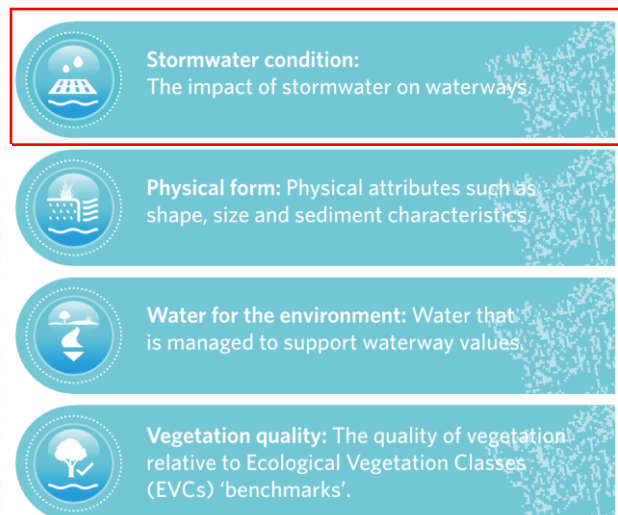
Context: Healthy Waterways Strategy (2018)

9 key values



- Macroinvertebrates are identified as a key value and “good overall indicator of waterway health”
 - **Implications for the scale or value of the targets.**
- Stormwater condition measured by directly connected imperviousness (DCI)

7 Waterway condition categories



How volume reduction targets are developed

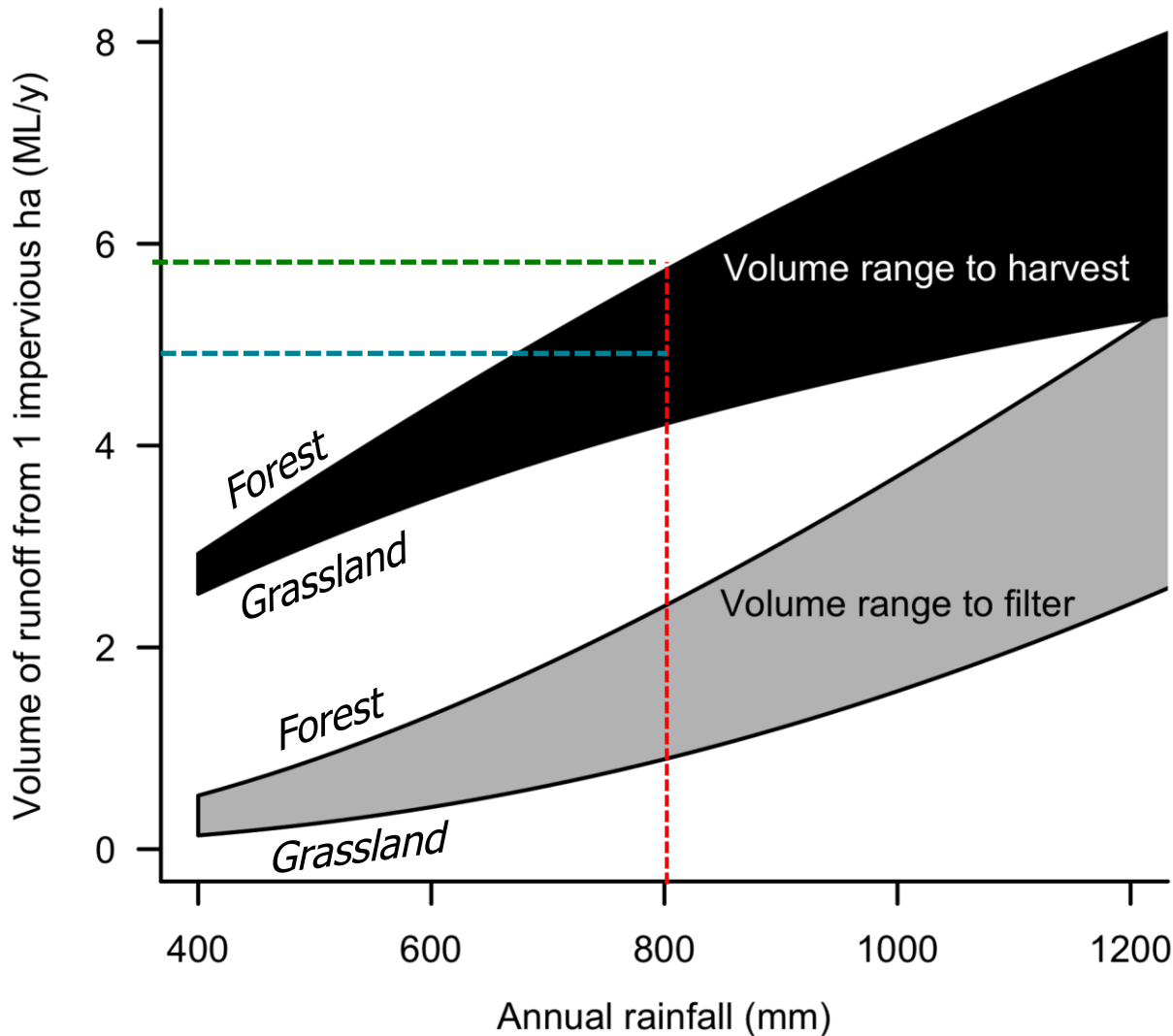
- Community co-design of targets for each catchment/waterway
 - Volunteer working groups
 - Community listening posts
 - Co-design labs
- Used to inform Vision, Goals, **targets, performance objectives**



What do you value about your local waterway and what do you want for its future?

**I love it and I want it to be
... 'protected, enhanced,
improved'**

How volume reduction targets are developed



- Catchment modelling used to quantify the *reduction* in volume of runoff required to return total runoff to **pre-urban** rates (Walsh *et al*, 2012)


Max potential volume to harvest:
5.9 ML/impervious ha/yr

Average potential volume to harvest:
~5.0 ML/impervious ha/yr

Can also be read as a DCI value of < 0.5 %

How volume reduction targets are applied

- Target stormwater condition identified for each sub-catchment

Current state	Current trajectory	Target trajectory	Waterway condition	Description	Rating	Explanation
mod.	mod.	high	 Stormwater condition	Directly connected imperviousness (DCI) is the proportion of the impervious surface that is directly connected to a stream through a conventional drainage connection	Very High	DCI <0.5% minimal or no threat from stormwater
					High	DCI 0.5-2% minor impacts to stream health from stormwater
					Moderate	DCI 2-5% stream health is impacted from stormwater
					Low	DCI 5-10% stream health is significantly impacted from stormwater
					Very Low	DCI >10% stream health is severely impacted from stormwater

Deep Creek performance objective

- Improve stormwater condition...so directly connected imperviousness (DCI) is below 1% prior to connection to Deep Creek. For every hectare of impervious area, this requires harvesting around **4.0 ML/y** and infiltrating **0.8 ML/y**.
- Once this catchment has reached its anticipated long-term urban footprint (2050), this will require around 15 GL/year of stormwater harvested and 3.9 GL/year infiltrated

Melbourne approach – summary

- A top-down landscape-centric approach
- Focus on volume that must be harvested or infiltrated prior to connection with waterway, to return runoff to pre-European levels
- The HWS adopts a DCI suitable for the protection of macroinvertebrates as a key value and indicator for waterway health.
- The HWS (2018) typically calls for a DCI of 0.4% or less for growth areas.
- Protection of macroinvertebrates and desire for a close to pre-European hydrology, are the basis of the targets

Sydney volume reduction target development

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Sydney Context

- Sydney Water do not have high-level volume reduction targets for all sub-catchments
- Explicit volume reduction targets developed in 2021 →
- These targets are proposed for application across catchments in the Western Growth areas of Sydney
- Targets designed to meet “ambient water quality and stream flow objectives” → translated into targets for application within each precinct.



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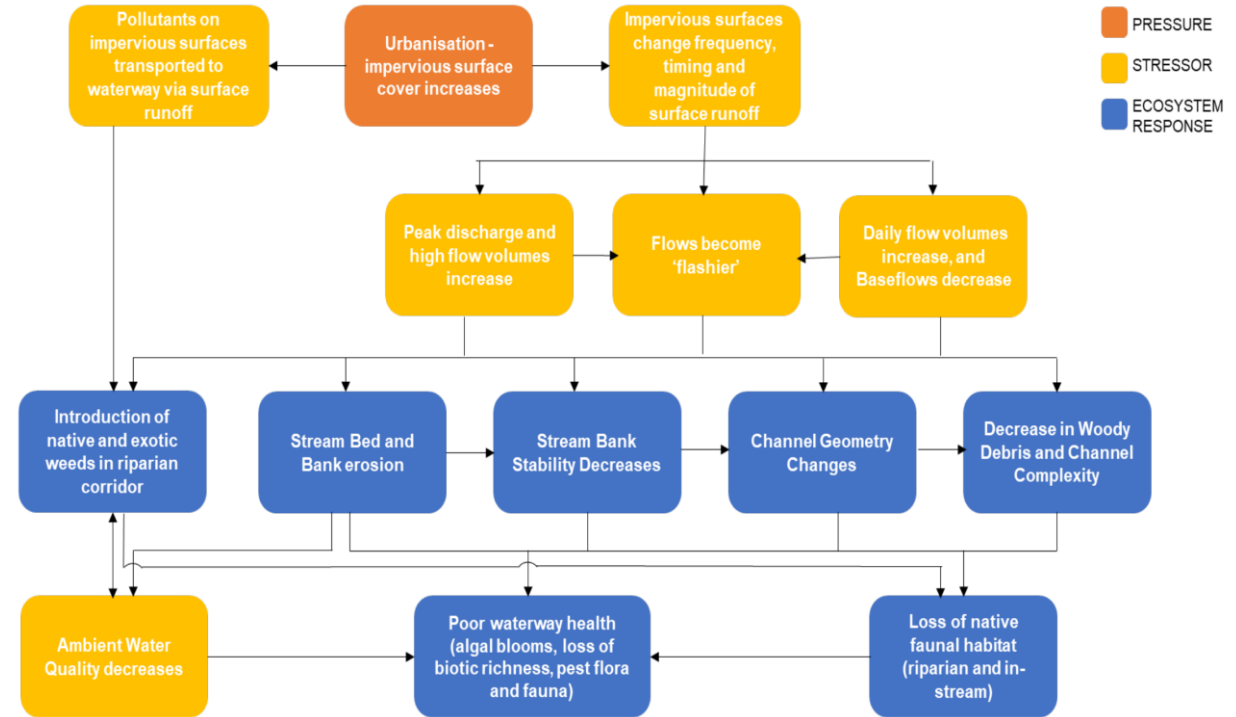
Performance criteria for protecting and improving the blue grid in the Wianamatta – South Creek catchment

Water quality and flow related objectives for use as environmental standards in land use planning

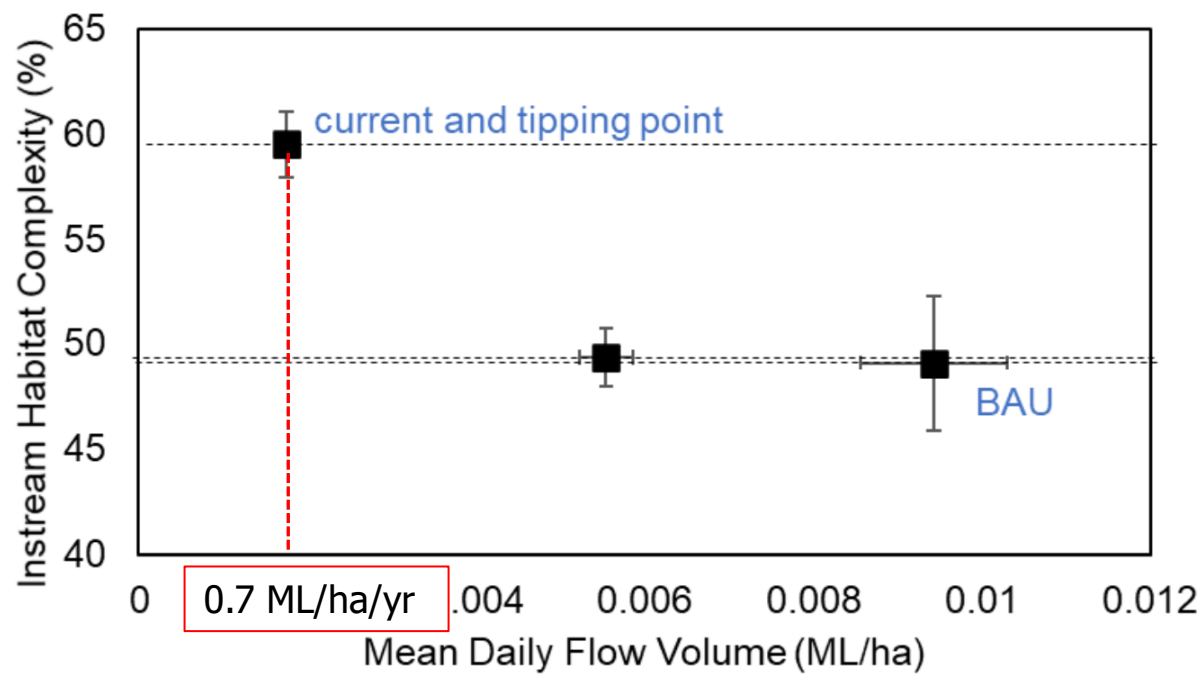
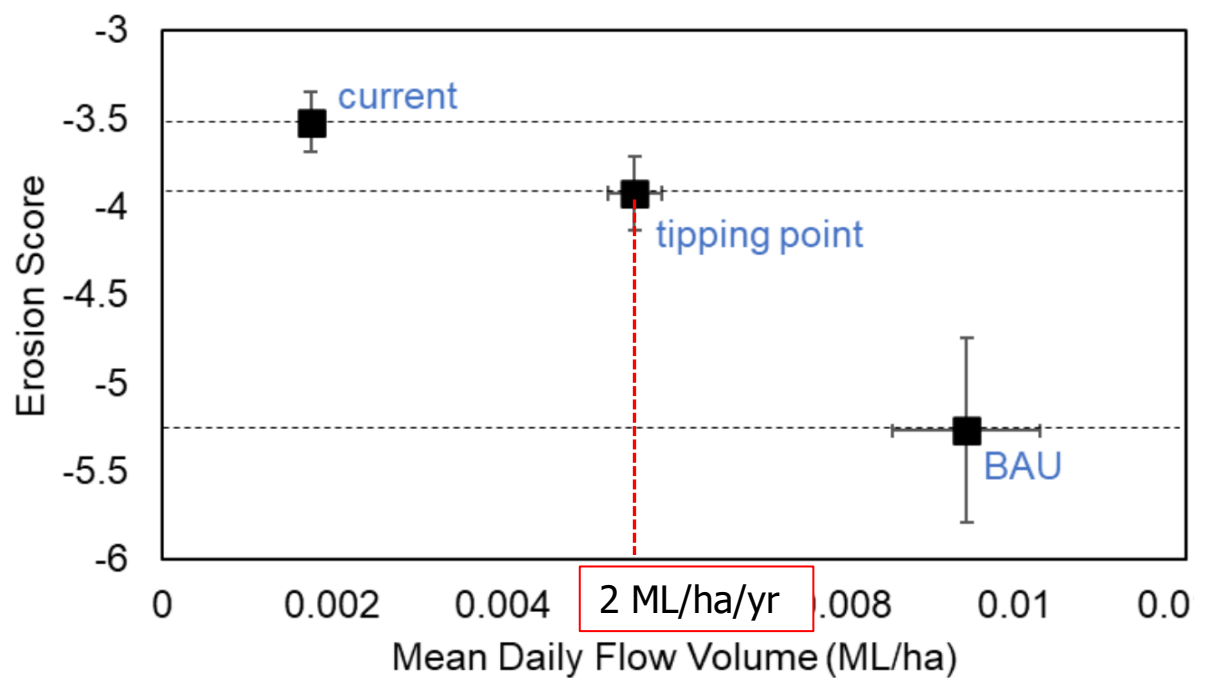


How Sydney's volume reduction targets were developed

- Model hydrological changes resulting from land use pressures and match with observed streamflow and waterway change
- Essentially tracking progressive degradation of Creek as catchment urbanises
- Quantify the relationship between the Pressure (urbanisation) – Stressor (flow, nutrients)– Ecosystem receptor (vegetation, physical form) relationships – quantify using metrics → % total imperviousness
- Identify 'imperviousness thresholds', beyond which changes in condition or tipping points, were identified.



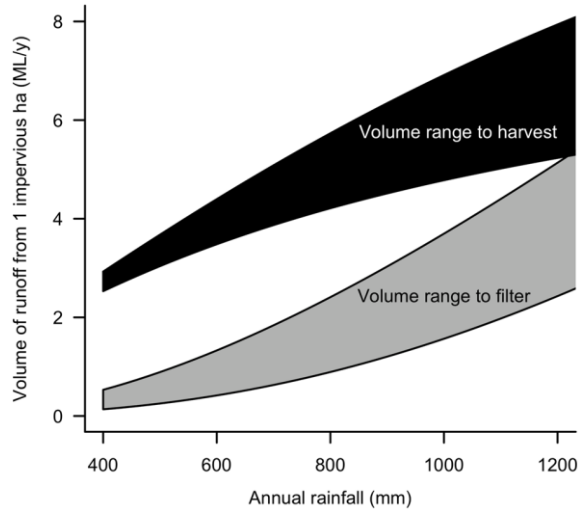
How volume reduction targets are developed



Sydney approach – summary

- A bottom-up, waterway-centric approach – focus on volume that can be delivered to/tolerated by waterway
- Did not adopt a Pre-Urban/Pre-European benchmark, just desire to avoid a waterway from becoming *significantly* worse than their pre-urban state (as measured by various metrics)
- Feasibility of targets considered at outset, negotiated via consultation with industry
- Threshold values regarded as feasible and adopted as upper limit on unit flow volume *delivered to waterways*

Melbourne Implementation

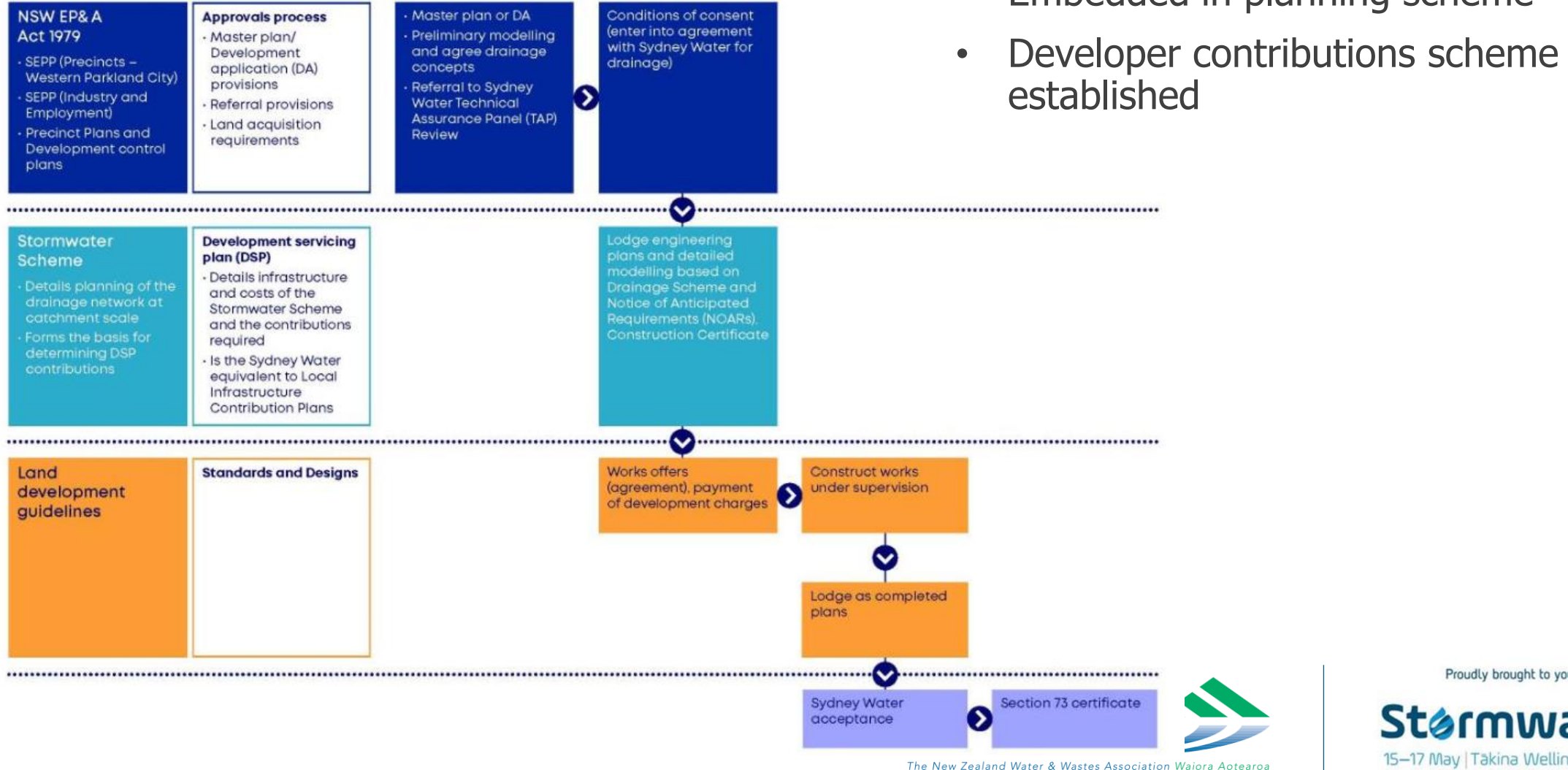


- Detailed, catchment specific analysis of infrastructure to implement harvesting targets completed for 1 catchment to date
- Will require regional scale stormwater harvesting schemes, utilising pump tations
- No direct link between targets/high-level plans and drainage schemes

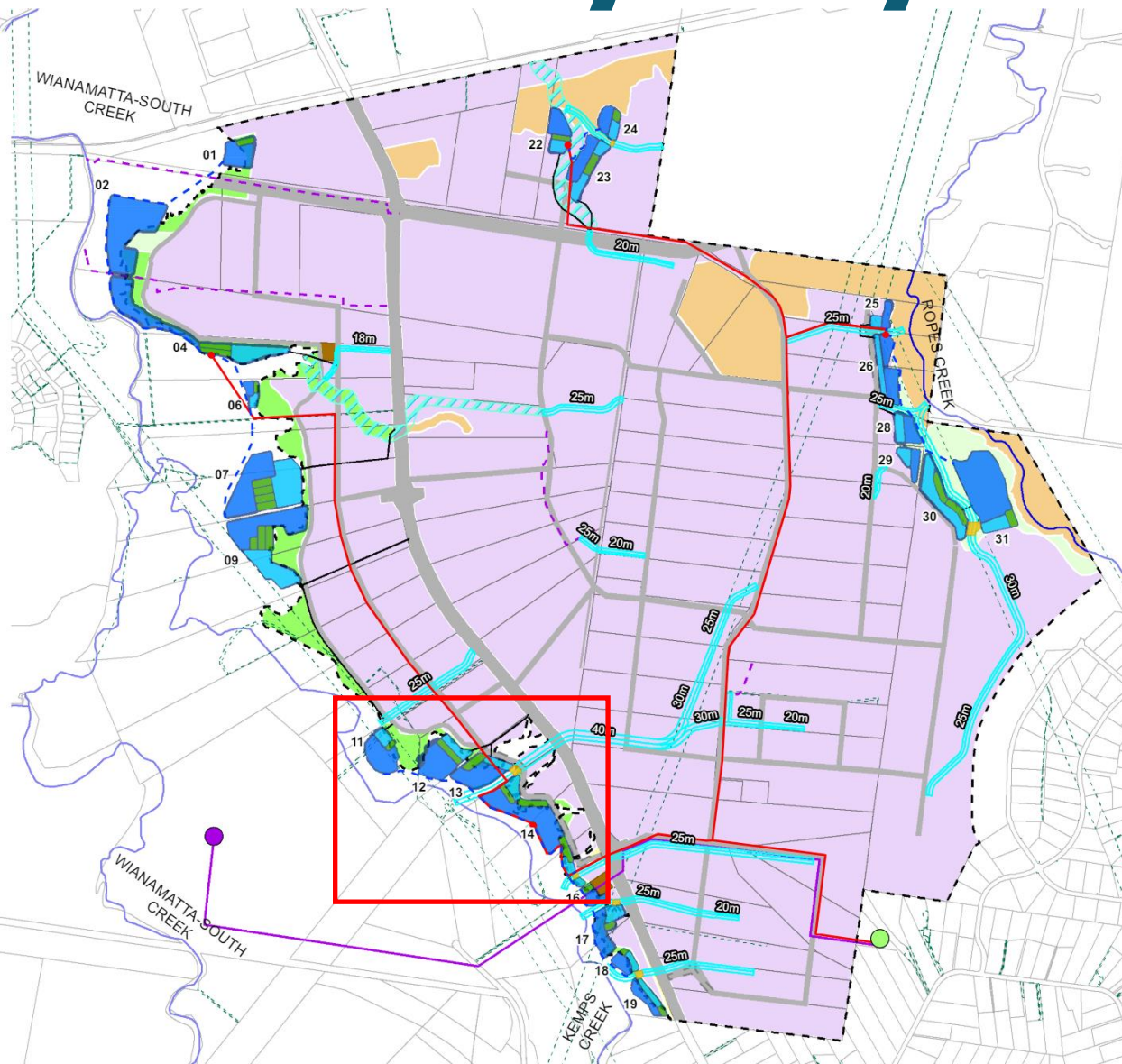


Sydney Implementation

Legislative Framework

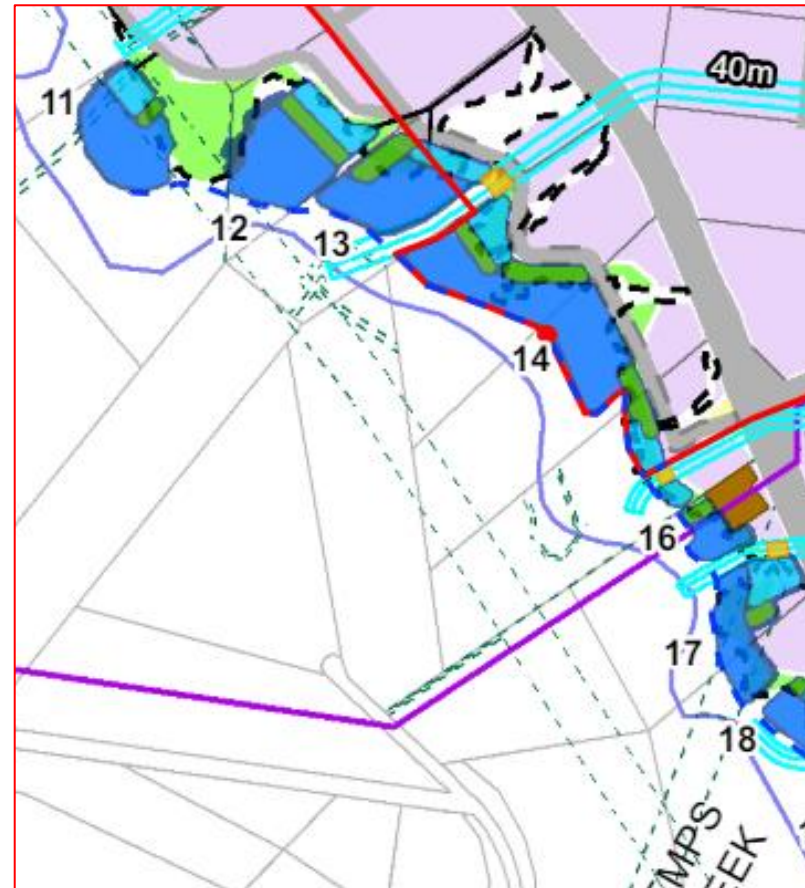


Sydney Implementation



Proposed Treatment Systems

- Wetland
- Storage Pond



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Discussion points

Key differences:

- High level vs catchment specific
- Sydney is wetland- large pond (two storages at the source, wetland and pond)
- Melbourne is wetland to pump (some in wetland, then have to pay to pump that volume)
- Targets vs scheme plans
- What are our targets designing for?
 - Macroinvertebrates, Fish, physical condition ?
- Top down to bottom up, landscape view vs waterways-centric view of target development.
- Question about urgency – can do all of these studies to support target development, but the development is charging on at pace.

Thank you!
Questions? Patai?