



National Urban Water  
Governance Program



MONASH University

# The Story of Melbourne: Key factors for advancing water sensitive urban design

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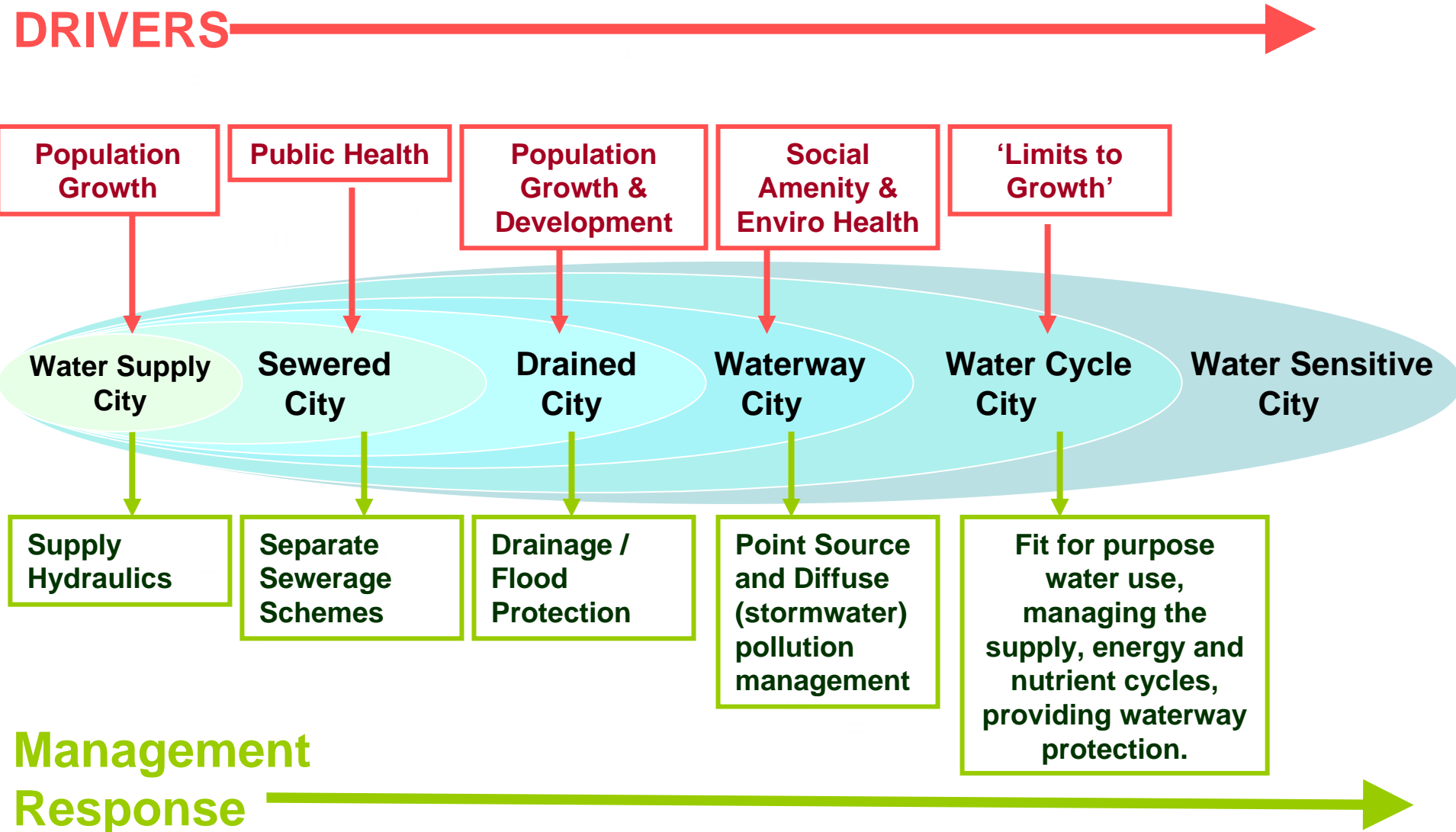
**Rebekah Brown**

**18<sup>th</sup> May 2007**

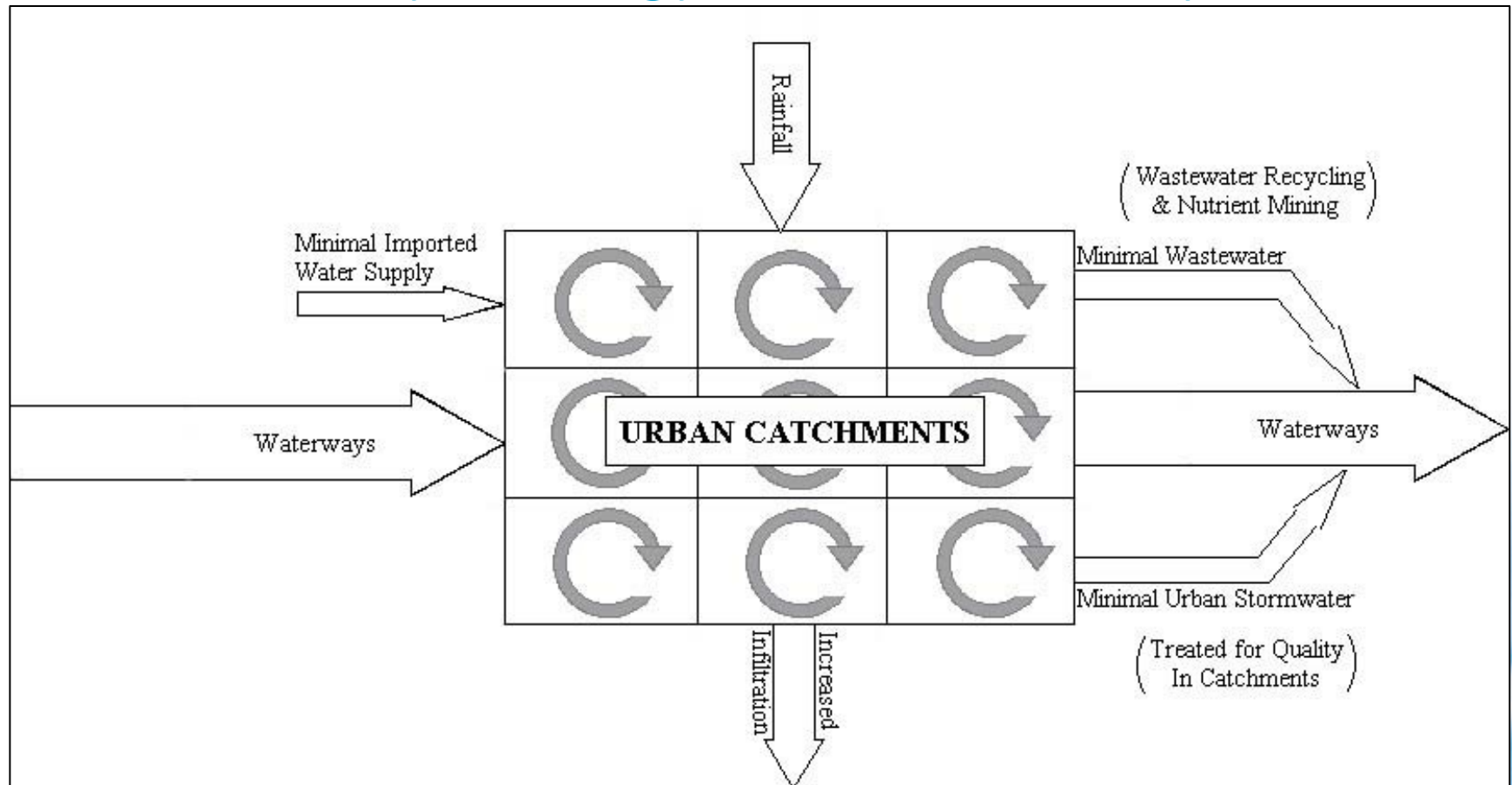
# Key Messages:

- 1. *Learning:*** Be proactive with understanding ‘what has worked’ and ‘why’
- 2. *Timing:*** Invest in developing sufficient institutional capacity before ‘regulating for change’
- 3. *System Jumps:*** Strategy must foster ‘Niches’ through: 1) supporting champions, 2) building social capital, and 3) bridging research with practice

# Urban Water Transition Phases



# Current Best Practice Thinking: Linking Quality and Quantity: managing the supply, energy and nutrient cycles



(adapted from Mouritz 1996)

# Transitioning to the Water Sensitive City?

**DRIVERS**



Population Growth

Public Health

Population Growth & Development

Social Amenity & Enviro Health

'Limits to Growth'

Intergenerational equity, resilience to climate change  
??????????

Water Supply City

Sewered City

Drained City

Waterway City

Water Cycle City

Water Sensitive City

Supply Hydraulics

Separate Sewerage Schemes

Drainage / Flood Protection

Point Source and Diffuse (stormwater) pollution management

Fit for purpose water use, managing the supply, energy and nutrient cycles, providing waterway protection.

??????

**Management Response**



# Key Knowledge Gaps

- What are the transition factors most important to enabling effective change towards the Water Cycle and Water Sensitive City?
- How can current reform processes be informed and adapted to advance change towards the Water Sensitive City?
- What are the implications for urban water managers and strategists?

# Institutional Barriers to Change?

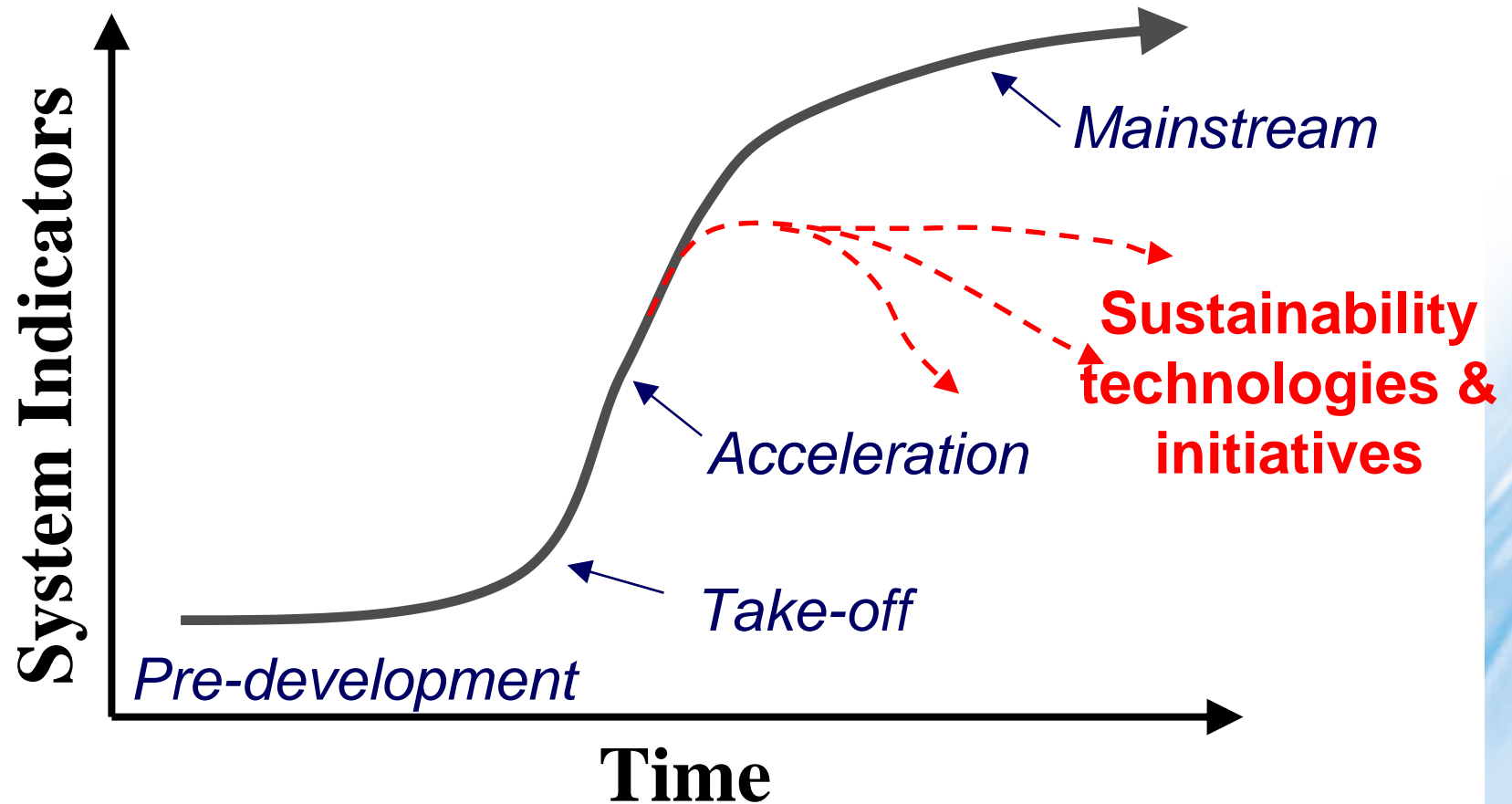
## Meta-Analysis Outcomes: Only 53 studies

- institutional fragmentation
- undefined organisational responsibilities
- limited political incentives and disincentives
- poor organisational commitment
- technological path dependency
- poor community capacity to meaningfully participate, and
- lack of experience with facilitating integrated management processes

**Brown and Farrelly (in press)**

(see for example Brown 2004, Marsalek and others 2001, Mouritz 1996 and 2000, Newman and Kenworthy 1999, Vlachos and Braga 2001).

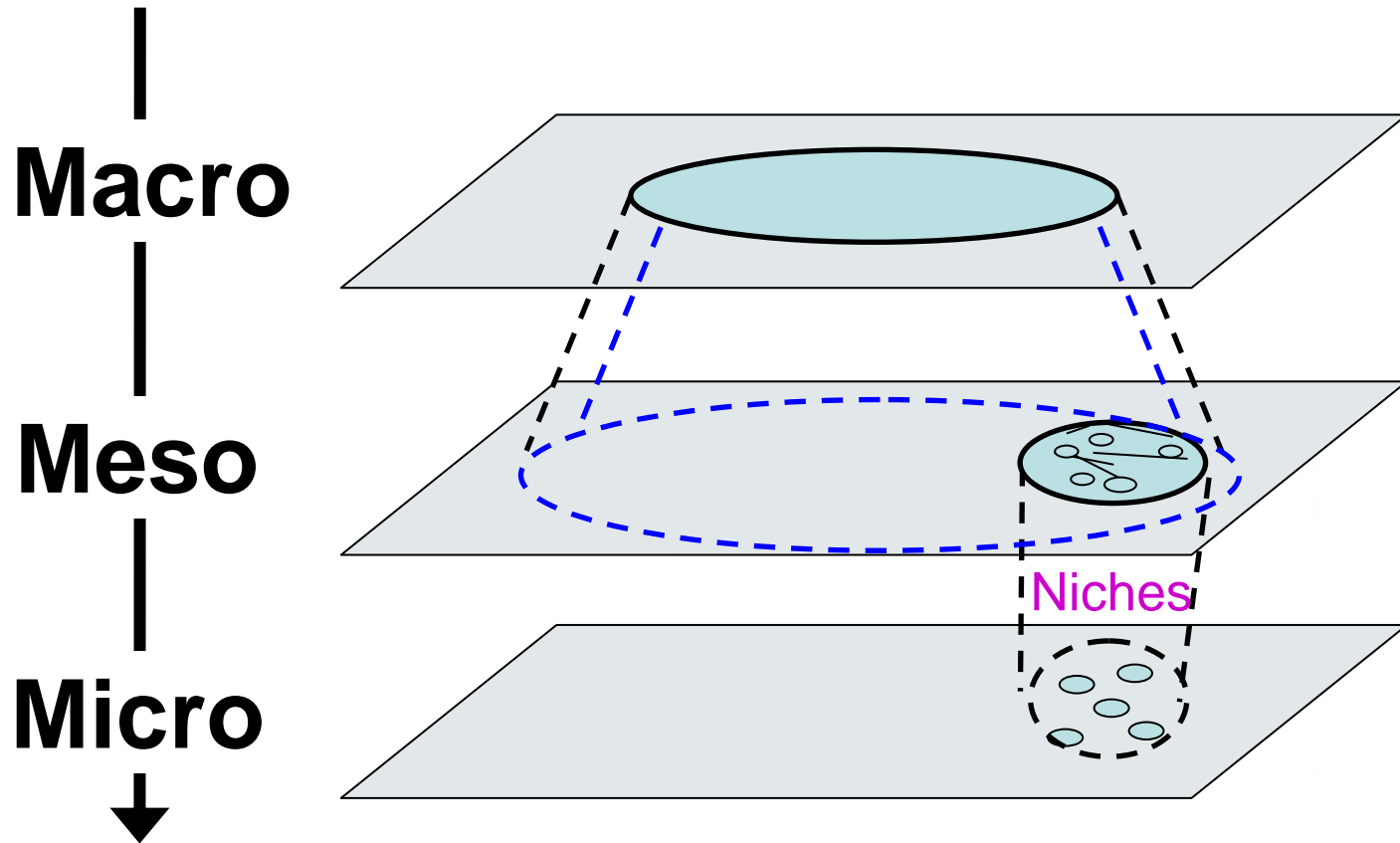
# Technology-diffusion: Innovation Studies



Hough (1975), Rotman (2000) & Stirling (2003)



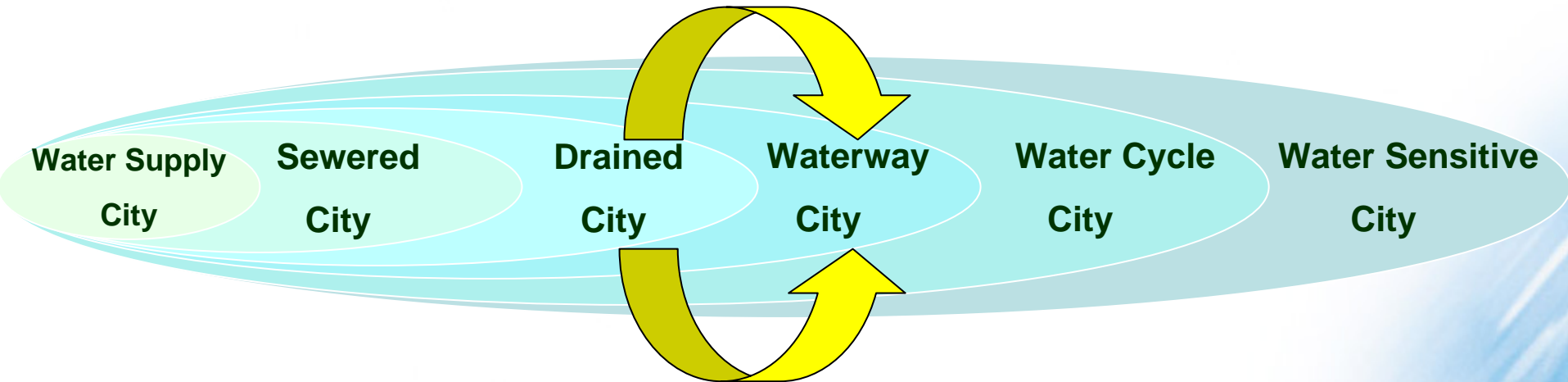
# Transition Theory: Changing Large Technical Systems



Rip and Kemp (1998), Geels (2002)

# Why the Melbourne Case Study?

## Transitioning from the 'Drained City' to the 'Waterway City'



**Urban Stormwater  
Quality Management**

# Case Study: Metropolitan Melbourne



# Social Research: Design and Methodology

- **Theoretical Framework**
  - Transition Theory
- **Qualitative Retrospective Case Study Analysis**
- **Historical Data Collection Techniques**
  - 28 Oral Histories
  - Policy and Organisational Literature (content analysis)
  - Review of historical research literature
  - Identification of champions
  - 80 Interviews
  - Stakeholder Validation processes

# Melbourne's USQM Transition Phases

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## PERIOD

## TRANSITION PHASE

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1965-1989

*'Seeds for Change'*

1990-1995

*'Building Knowledge & Relationships'*

1996-1999

*'Niche Formation'*

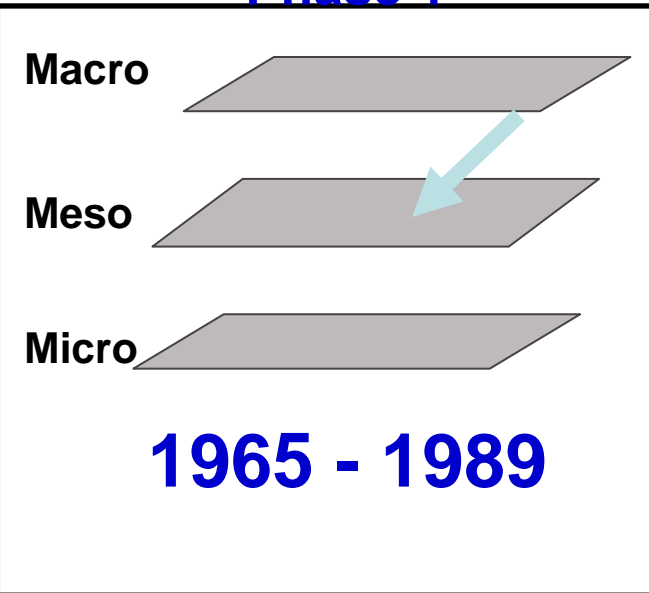
2000-2006

*'Niche Stabilisation'*

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# Phase 1: Seeds for Change

## Phase 1



## Environmentalism

- Sewage outfall resisted
- The Age “Give the Yarra a Go!” Campaign
- Algal blooms & Eutrophication
- Public beach closures & business impacts
- Waterway amenity and recreation (bike trails, public access)

# Phase 1: Seeds for Change

1965 - 1989

**Macro**

Environmental  
Values

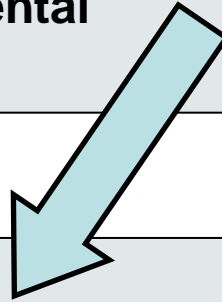
Socio-political  
landscape

**Meso**

Institutional  
regimes

**Micro**

Technological  
novelties





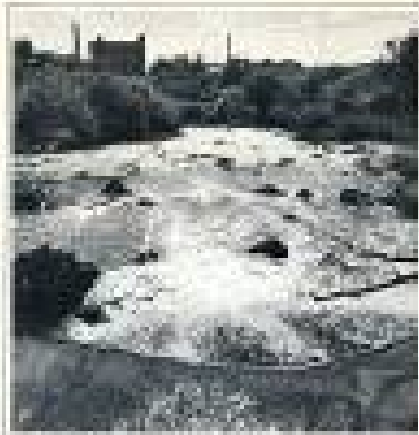
# WARNING RAW SEWAGE

M.M.B.W. DRAIN MAY  
POLLUTE BAY HERE  
AFTER HEAVY RAIN  
**SWIMMERS BEWARE**





# Growing social activism around waterways



## GIVE THE YARRA A GO!

**DEPARTMENT OF THE ARMY**

**STUDY 100** was done in 1992-1993 to assess the status of the world.

There is just the first time that a newspaper has tried to go something like this. The first time a newspaper ever did anything like this. The second time the way that new collection will be, making it different. And the first time of making money together in the business of collecting and selling.

These days, with unemployment and other problems, it's hard to get something done. When the first day of the month comes, some people remember a lot of things from last year and guess things are different. Since the Chinese calendar is the same as the last year, the year of the Snake was.

But we also believe that, whether the results from studies support the findings of Marmorek and his partners, support the idea, however small, that the government has the authority to regulate some parts of the Internet, it is a good idea to make sure that the government remains as uninvolved as possible in Marmorek's case. It is to help the government of Marmorek's people enjoy the true spirit of democracy in the Internet.

There is just one more thing to say. They are a little different in the matter of food. The Jews eat the forbidden and they want to know how to eat it. The Christians don't eat that stuff. The Jew's motto was a march toward eternal wisdom and good food. Well, this one doctrine we will observe in common: none of the forbidden and no love in the home (1968).

For more information, see [www.irs.gov](http://www.irs.gov). The IRS has a toll-free number, 1-800-829-1040, for general information. For more information on the 2001 tax law, see [www.irs.gov](http://www.irs.gov). For more information on the 2001 tax law, see [www.irs.gov](http://www.irs.gov).

The river is the only one that flows continuously from a single source, forming the link to the west where much of the city and its suburbs are built. In the absence of a river, the city is surrounded by a dry, hilly landscape, and the city is built on a hillside, with the river flowing through the center of the city.

For the 1990s, the book is a welcome, timely addition. While it is not the most comprehensive or the most scholarly, it is a good read for anyone interested in the future of the book industry. It is a book that should be read by all who are involved in the book business, whether as authors, publishers, or readers.

On Tuesday, the telephone, on New Hampshire Avenue, which is located at 17th Street, had a sign that the phone would be closed until 10:00 a.m. The sign said the phone was closed for about 100 to 150 days. The sign also said the phone was closed for about 100 to 150 days.

“We have previously shown that the degree of protein denaturation by urea is a function of the concentration of urea, which is described by the Arrhenius equation. Now, if we plot  $\ln k$  versus  $1/T$ , we are actually plotting  $\ln k$  versus  $1/T - 1/T_m$ . They should be straight lines, and in fact, with a community that is designed to carry about ten more, and a number that is somewhat low.

© 2000 Blackwell Science Ltd, *Journal of Internal Medicine* 247: 105–112

- **Stress** (the negative feel good factor is positive)
- **Stress** (good and bad)
- **Stress** (good and bad)

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 105–112

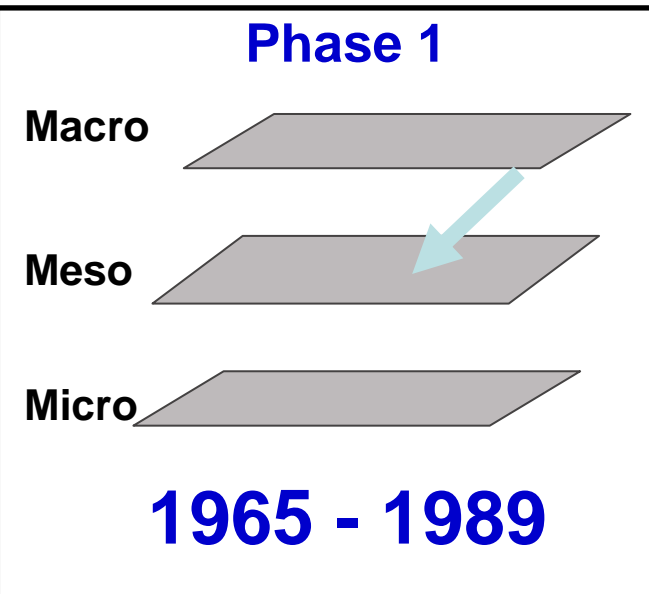
[illegible]

10. The first two paragraphs of the passage discuss the importance of the "first" and "last" paragraphs of a passage. Which of the following best describes the purpose of these paragraphs?



## The Age Newspaper “Give the Yarra a Go!” campaign (1980)

# Phase 1: Seeds for Change



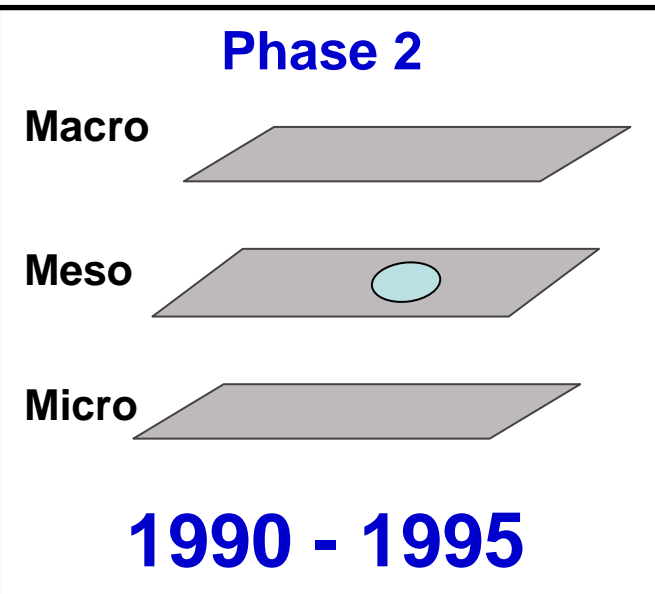
## Environmentalism

- Sewage outfall resisted
- The Age "Give the Yarra a Go!" Campaign
- Algal blooms & Eutrophication
- Public beach closures & business impacts
- Waterway amenity and recreation (bike trails, public access)

## Institutionalisation

- Port Phillip Bay Study (1968 – 1975)
- Establishment of the EPA in 1972
- National Water Quality guides
- Monash Aquatic Ecology certificate
- State Environment Protection Policies
- USA, Canberra, CSIRO – sewage wetlands, Gross Pollutant Traps, ponds

# Phase 2: Building Knowledge & Relationships



## New Learning Space

- CRC for Catchment Hydrology
- CRC for Freshwater Ecology
- GPT and Wetland Research
- Tagged Litter Study
- Port Phillip Bay Environmental Study (1992-1996)

# Visual impacts of trapping Gross Pollutants

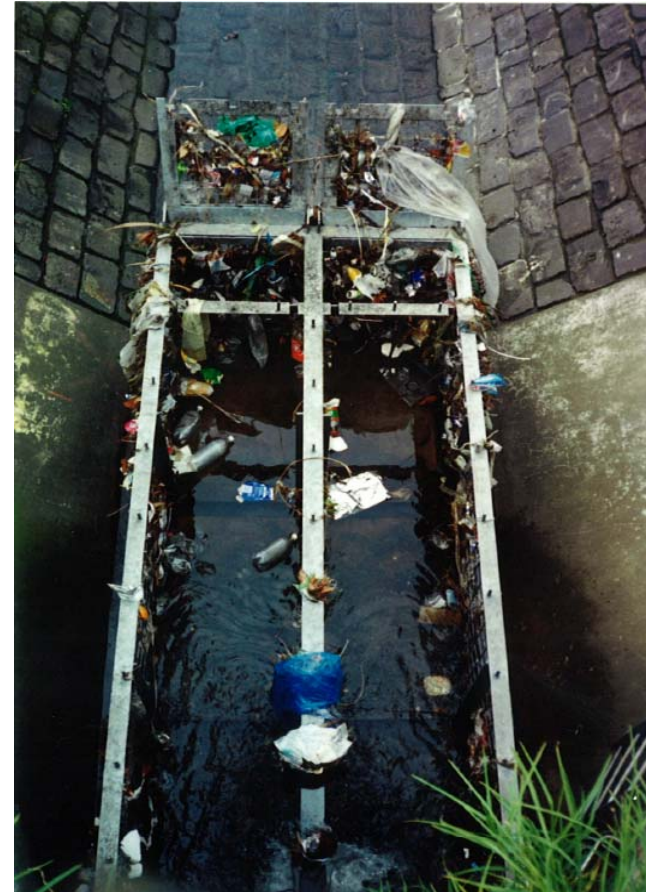




# Gross Pollutant Traps



**Testing the science**



# Technological Novelties



**Gross Pollutant Traps**

## **Maintenance & Cleaning Activities**





# "Softer technologies"

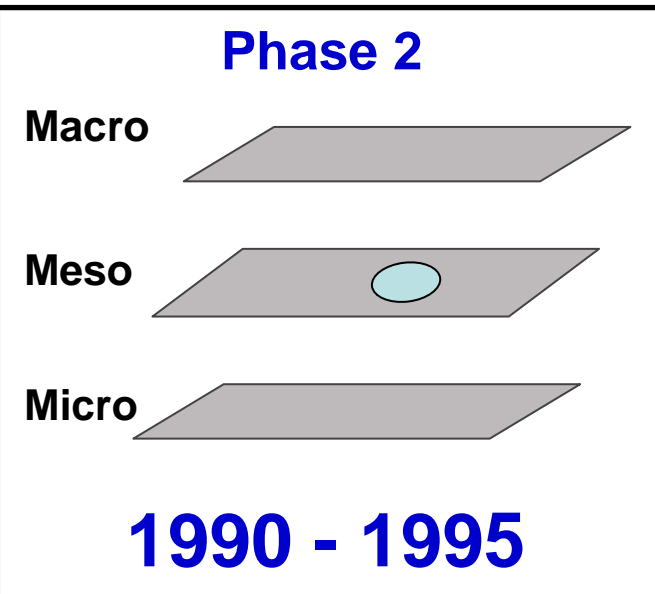


**Soft engineering solutions**

**Treating water quality**



# Phase 2: Building Knowledge & Relationships



## New Learning Space

- CRC for Catchment Hydrology
- CRC for Freshwater Ecology
- GPT and Wetland Research
- Tagged Litter Study
- Port Phillip Bay Environmental Study (1992-1996)

## Corporatism

- Water Industry restructure
- Melbourne Parks & Waterways
- Stormwater Quality Management



# Phase 2: Building Knowledge & Relationships

1990 - 1995

**Macro**

Environmental  
Values

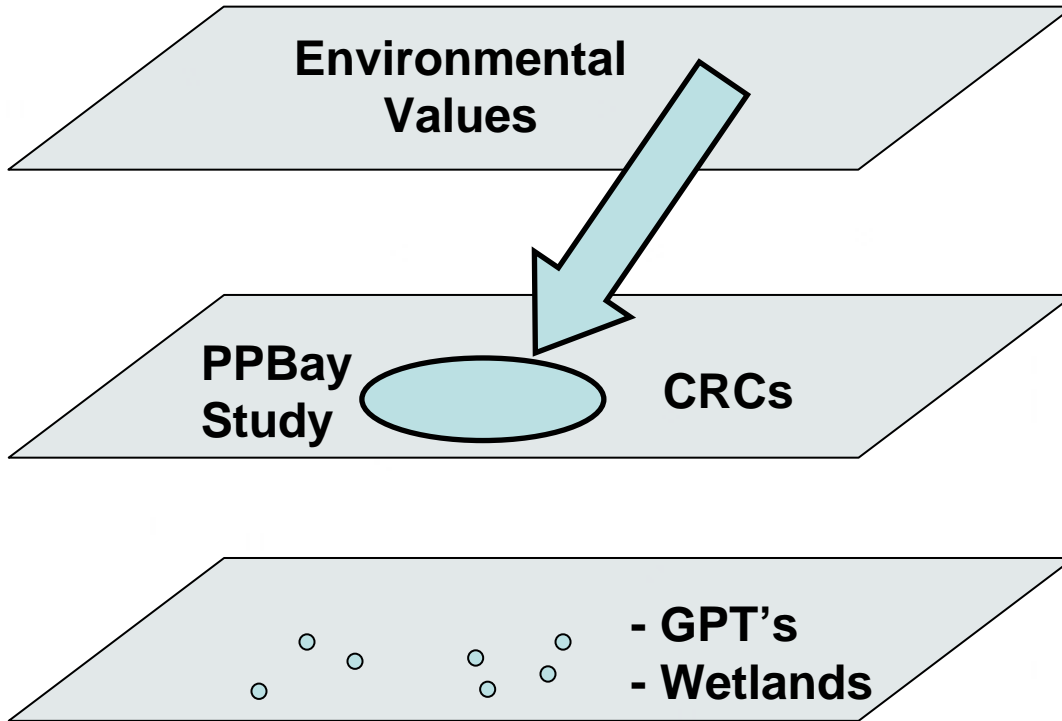
**Meso**

PPBay  
Study

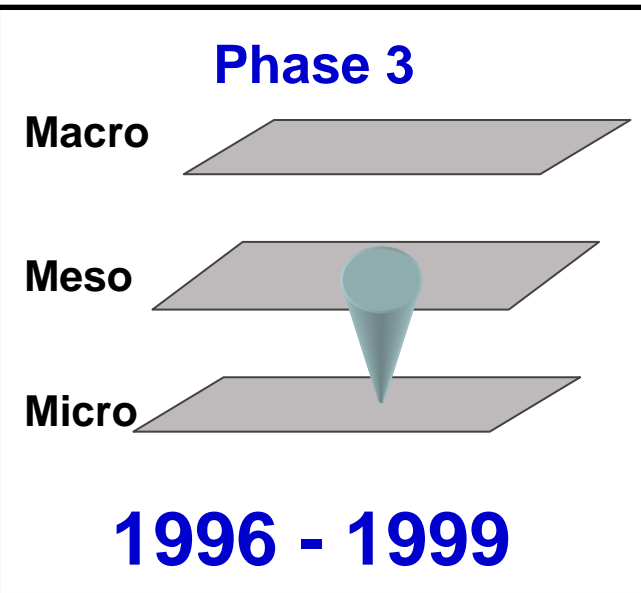
CRCs

**Micro**

- GPT's  
- Wetlands



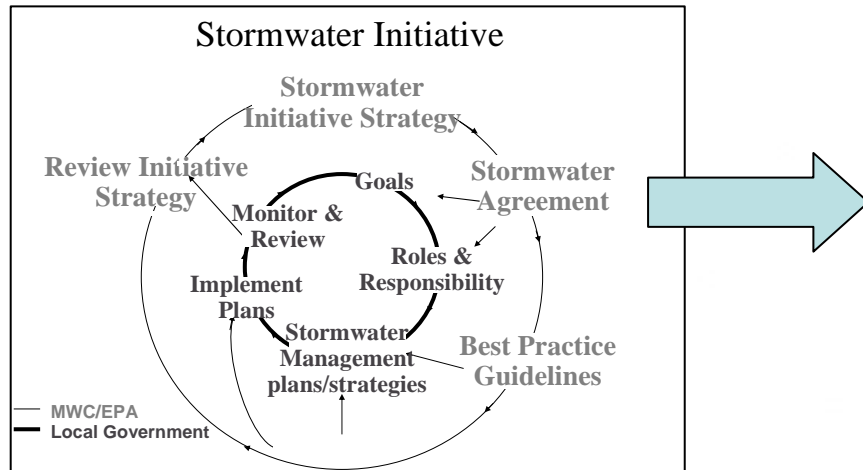
# Phase 3: Niche Formation



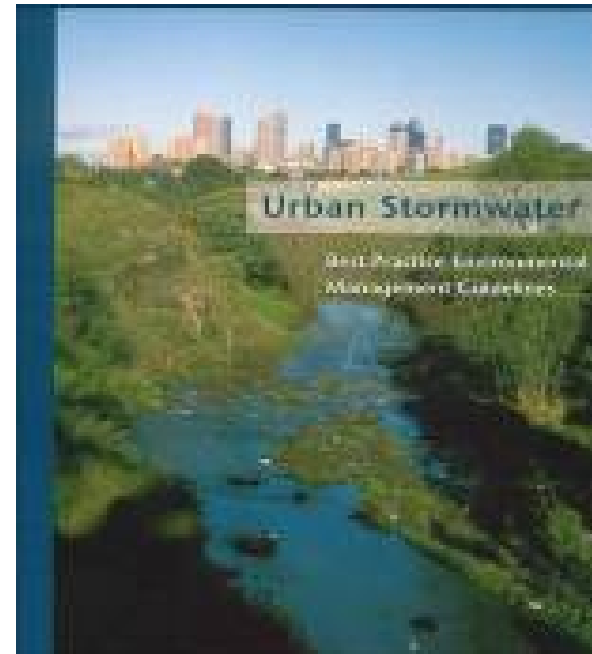
## Protective Sub-Institution

- Inter-agency Stormwater Committee
- Draft Inter-Agency Stormwater Agreement
- CRCCH – stormwater program
- Melbourne Water ‘ownership’

# USQM Innovations

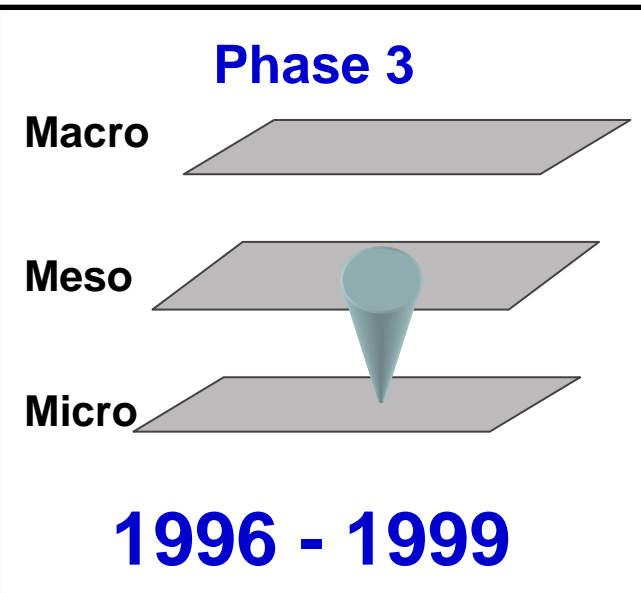


**Stormwater Initiative – goals & relationships**



***Urban Stormwater Best Practice Environmental Management Guidelines (1999)***

# Phase 3: Niche Formation



## Protective Sub-Institution

- Inter-agency Stormwater Committee
- Draft Inter-Agency Stormwater Agreement
- CRCCH – stormwater program
- Melbourne Water ‘ownership’

## PP Bay Env Study – nitrogen targets

- Stormwater Guidelines
- Stormwater Management Plans
- NHT ‘T1’ funding - Wetlands

# USQM Innovations



**The catchment of the future**

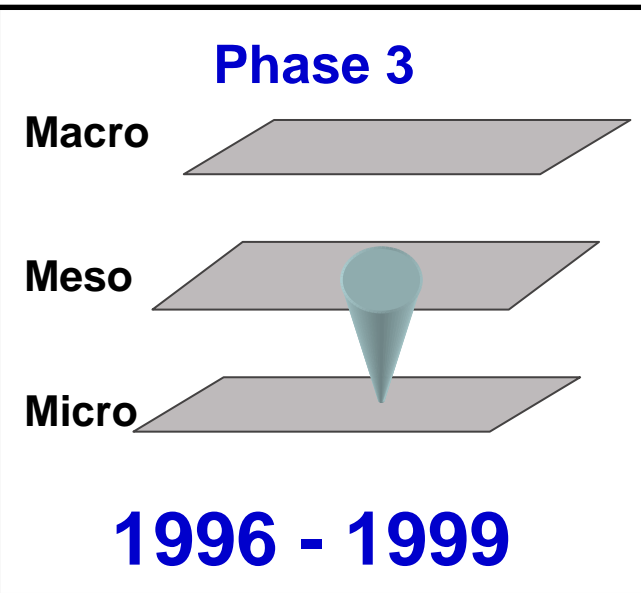


**Hampton Park Wetland**



**Signs erected by  
Melbourne Water near the  
wetlands**

# Phase 3: Niche Formation



## Protective Sub-Institution

- Inter-agency Stormwater Committee
- Draft Inter-Agency Stormwater Agreement
- CRCCH – stormwater program
- Melbourne Water ‘ownership’

## PP Bay Env Study – nitrogen targets

- Stormwater Guidelines
- Stormwater Management Plans
- NHT ‘T1’ funding - Wetlands

## SEPP Revised

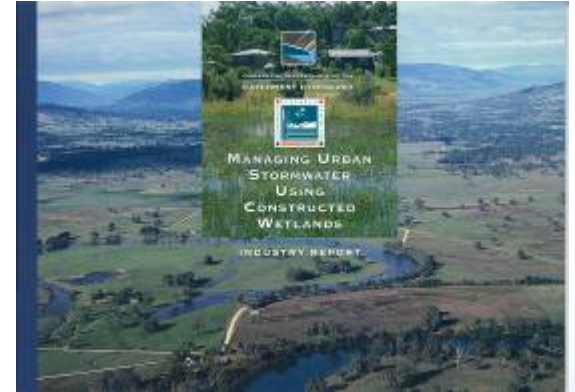
## Lynbrook Estate – demonstration



# Demonstration Projects and Guidelines



**Bioretention system and wetland at  
Lynbrook Estate**



**CRCCH Industry Report –  
*Managing Urban Stormwater  
using Constructed Wetlands*  
(1999)**

# Phase 3: Niche Formation

1996 - 1999

**Macro**

Environmental  
Values

Socio-political  
landscape

**Meso**

Nutrient  
Target

Stormwater  
Committee

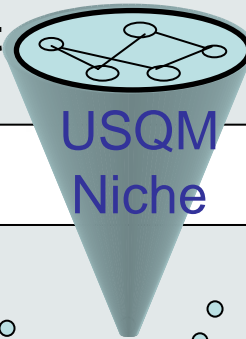
Institutional  
regimes

**Micro**

Lynbrook

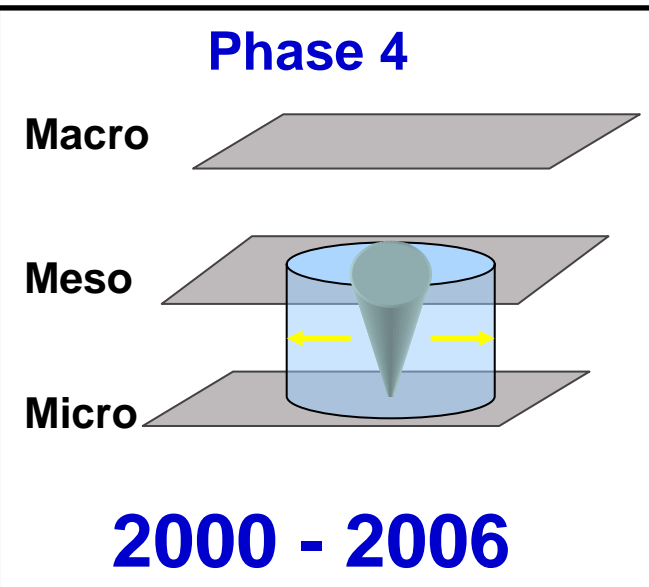
Training

Technological  
novelties





# Phase 4: Niche Stabilisation



**State Election - \$20M VSAP**

- Stormwater committee - agencies

**2000 WSUD Conference**

**MUSIC – industry design tool**

**Clearwater Program**

# Industry Capacity Building



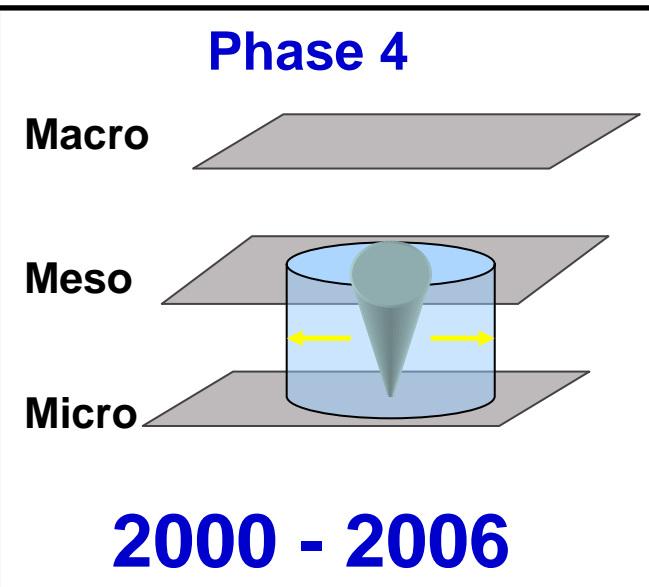
The *Clearwater* program



Urban stormwater  
quality Program group  
developing 'MUSIC'



# Phase 4: Niche Stabilisation



## **State Election - \$20M VSAP**

- Stormwater committee - agencies

## **2000 WSUD Conference**

## **MUSIC – industry design tool**

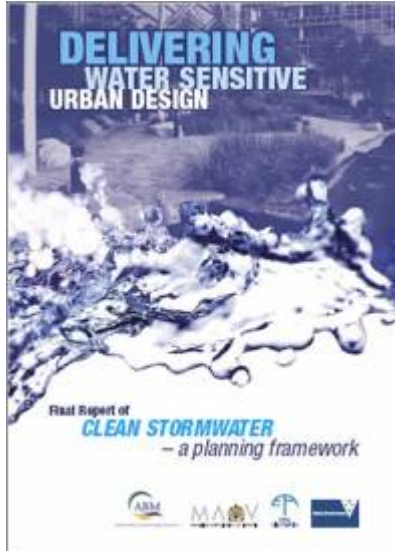
## **Clearwater Program**

## **ABM Project**

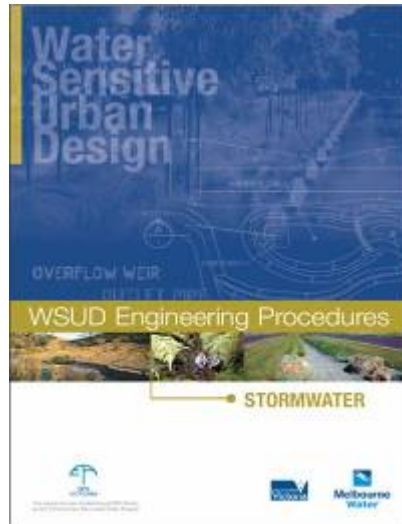
- Stormwater pollution trading
- MUSIC/STORM assessment
- Stormwater guidelines



# Development of Guidelines



***Clean Stormwater – a Planning Framework (2004)***



***WSUD Engineering Procedures: Stormwater (2005)***



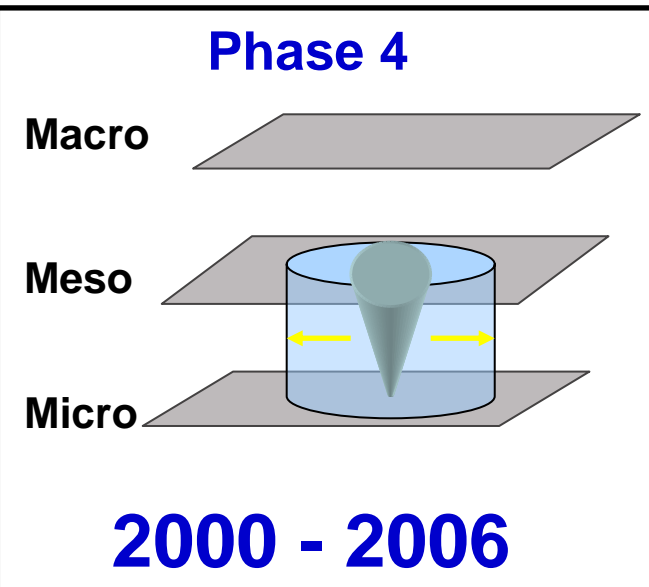
***WSUD Guidelines (2005)***



***Australian Runoff Quality (2006)***



# Phase 4: Niche Stabilisation



## State Election - \$20M VSAP

- Stormwater committee - agencies

## 2000 WSUD Conference

## MUSIC – industry design tool

## Clearwater Program

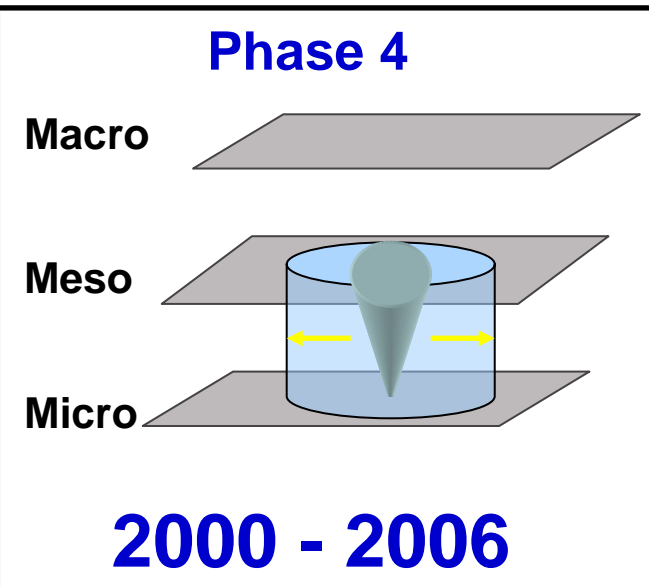
## ABM Project

- Stormwater pollution trading
- MUSIC/STORM assessment
- Stormwater guidelines

## Drought accepted



# Phase 4: Niche Stabilisation



**State Election - \$20M VSAP**

- Stormwater committee - agencies

**2000 WSUD Conference**

**MUSIC – industry design tool**

**Clearwater Program**

**ABM Project**

- Stormwater pollution trading
- MUSIC/STORM assessment
- Stormwater guidelines

**Drought accepted**

**Docklands – icon WSUD project**



# USQM Technology Implementation



Blacken Ridge  
Bioretention Basin



Baltusrol Estate  
Australand



Victoria Harbour,  
Melbourne Docklands  
(Lend Lease)



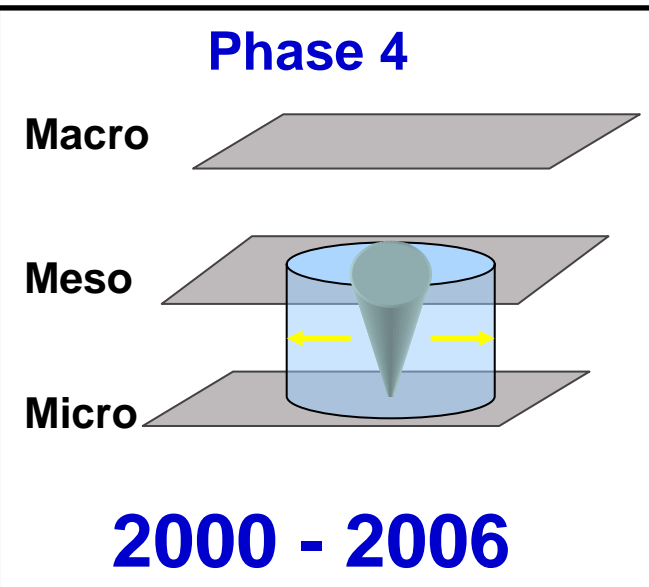
Baltusrol Estate  
(Australand)



NAB Building Forecourt Wetland



# Phase 4: Niche Stabilisation



**State Election - \$20M VSAP**

- Stormwater committee - agencies

**2000 WSUD Conference**

**MUSIC – industry design tool**

**Clearwater Program**

**ABM Project**

- Stormwater pollution trading
- MUSIC/STORM assessment
- Stormwater guidelines

**Drought accepted**

**Docklands – icon WSUD project**

**The Age – Yarra River Water Quality**

# Phase 4: Niche Stabilisation

2000 - 2006

**Macro**

- Drought
- Water Security
- State Election
- \$20M VSAP

**Meso**

MUSIC

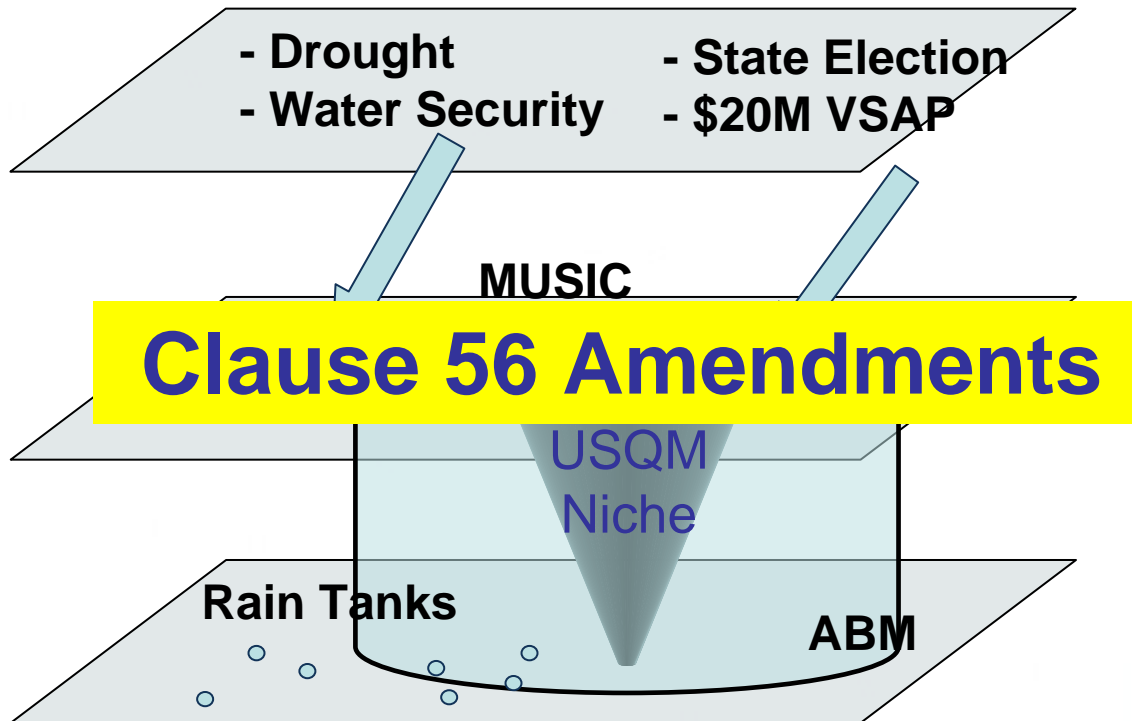
**Clause 56 Amendments**

**Micro**

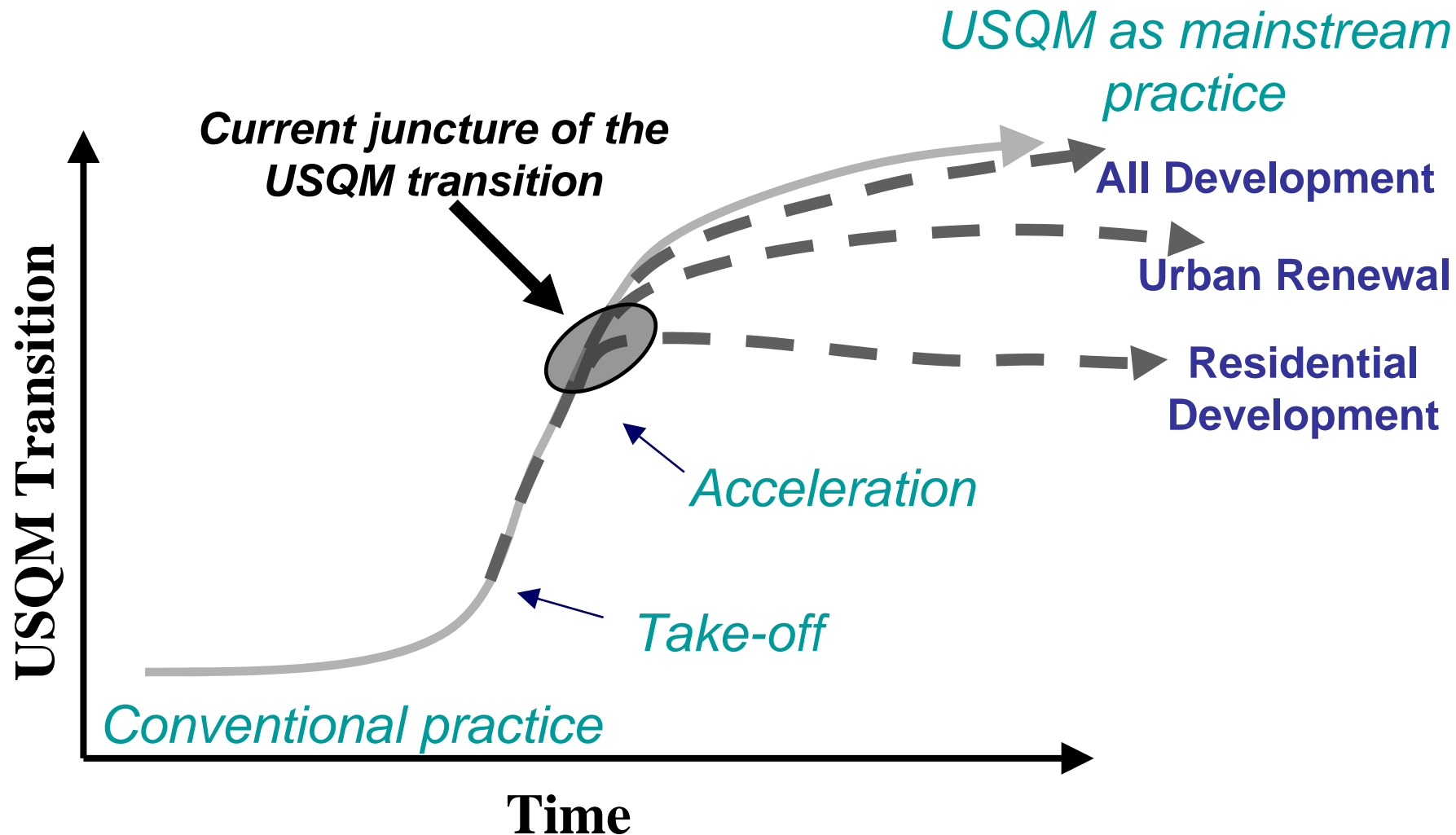
Rain Tanks

USQM  
Niche

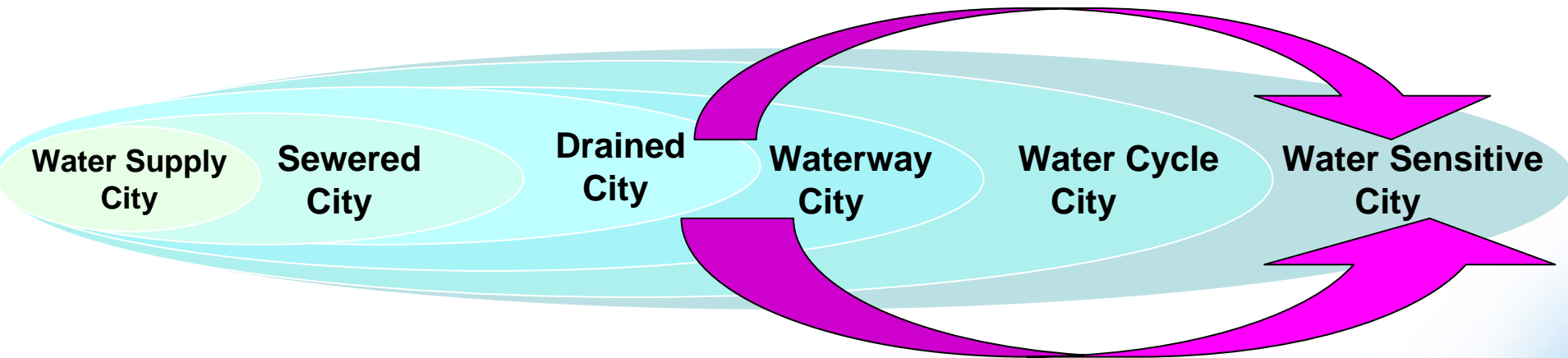
ABM



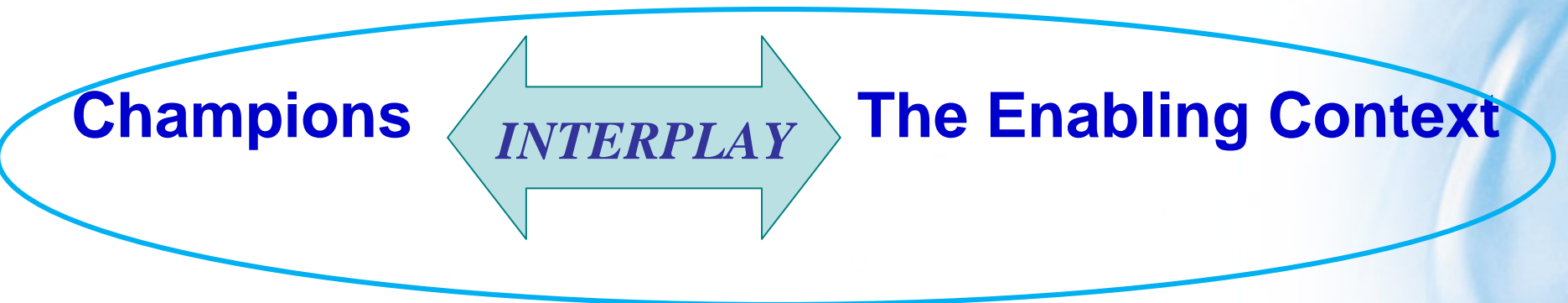
# Where is Melbourne located in the USQM transition process?



# How can we transition to the Water Sensitive City?



## The Transitioning Process



# Qualities of Champions

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- |                                       |   |
|---------------------------------------|---|
| <b>1 Vision for waterway health</b>   | A ‘common vision’ for protecting waterway health through pursuing a largely cooperative, rather than directive, approach for enabling change. |
| <b>2 Multi-sectoral network</b>       | A network of champions interacting across government, academia and the market.  |
| <b>3 Environmental values</b>         | Strong environmental protection values with a ‘genuine’ agenda for improving ’s waterways   |
| <b>4 Public good disposition</b>      | An orientation to advocating and protecting ‘public good’   |
| <b>5 Best practice ideology</b>       | Being more pragmatic and finding ways to help industry implement best practice thinking   |
| <b>6 Learning-by-doing philosophy</b> | Wanting to foster and trial new ideas, and valuing the rapid adoption of ongoing scientific insights  |
| <b>7 Opportunistic</b>                | Continually thinking ahead and creating opportunities through strategic advocacy and practice   |
| <b>8 Innovative and adaptive</b>      | Prepared to challenge the status quo, and concentrating efforts using an adaptive management philosophy                                       |



# The Enabling Context: Key Transition Variables

1	<b>Socio-Political Capital</b>	Aligned community, media and political concern for improved waterway health, amenity and recreation.
2	<b>Bridging Organisation</b>	Dedicated organising entity that facilitates collaboration across science and policy, agencies and professions, and knowledge brokers and industry.
3	<b>Trusted &amp; Reliable Science</b>	Accessible scientific expertise, innovating reliable and effective solutions to local problems.
4	<b>Binding Targets</b>	A measurable and effective target that binds the change activity of scientists, policy makers and developers.
5	<b>Accountability</b>	A formal organisational responsibility to the improvement of waterway health, and a cultural commitment to proactively influence practices that lead to such an outcome.
6	<b>Strategic Funding</b>	Additional resources, including external funding injection points, directed to the change effort.
7	<b>Demonstration Projects &amp; Training</b>	Accessible and reliable demonstration of new thinking and technologies in practice, accompanied by knowledge diffusion initiatives.
8	<b>Market Receptivity</b>	A well articulated business case for the change activity.

# Key Transition Factors

## Champions



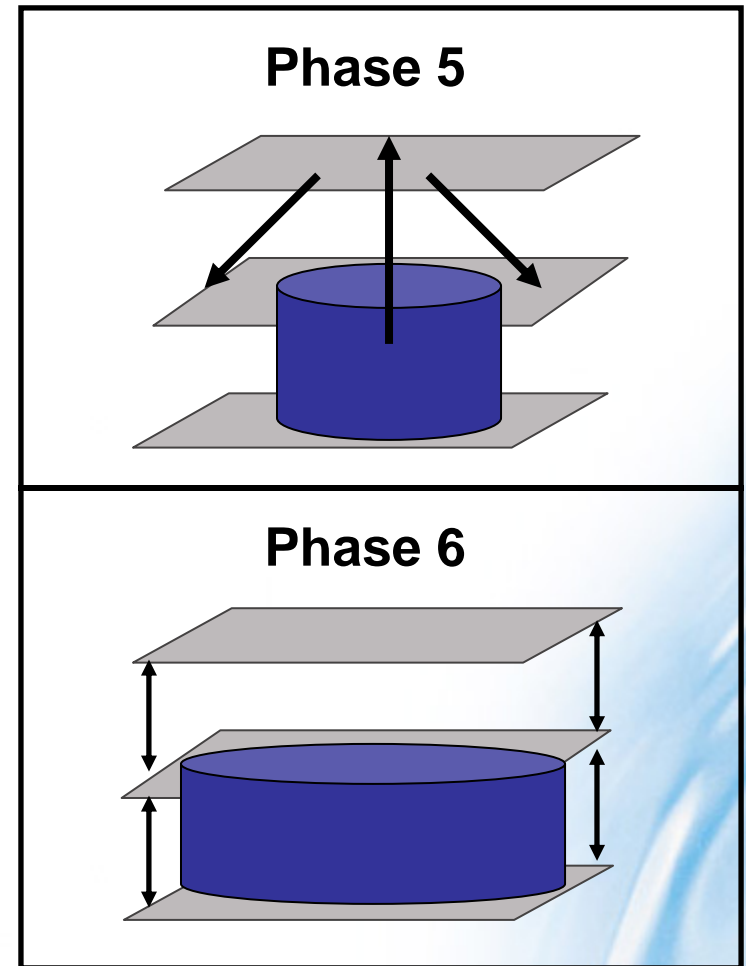
## The Enabling Context

1. Vision for Waterway Health
2. Multi-sectoral Network
3. Environmental Values
4. Public Good Disposition
5. Best Practice ideology
6. Learning by doing
7. Opportunistic
8. Innovative & Adaptive

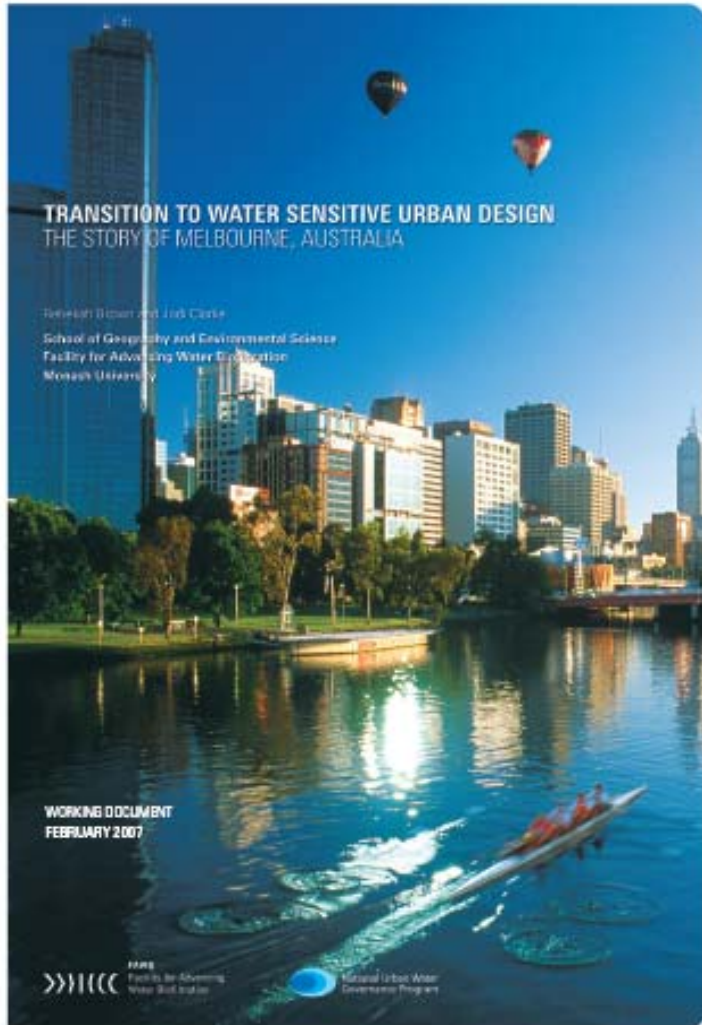
1. Socio-political Capital
2. Bridging Organisations
3. Trusted & Reliable Science
4. Binding Targets
5. Accountability
6. Strategic Funding Points
7. Demonstration Projects & Training
8. Market Receptivity

# Next Steps:

1. **Training Development: Strategy and Policy Workshops?**
2. **Comparative analysis with other cities and issues – National Urban Water Governance Program**
3. **Identifying Opportunities for niche integration, for example:**
  - **Alternative Water Sources**
  - **Sustainable Housing**
  - **Community Well Being**
4. **Envisaging a Water Sensitive City**



**Report Available in June 2007,**  
**[www.urbanwatergovernance.com](http://www.urbanwatergovernance.com)**



# **Transition to Water Sensitive Urban Design:**

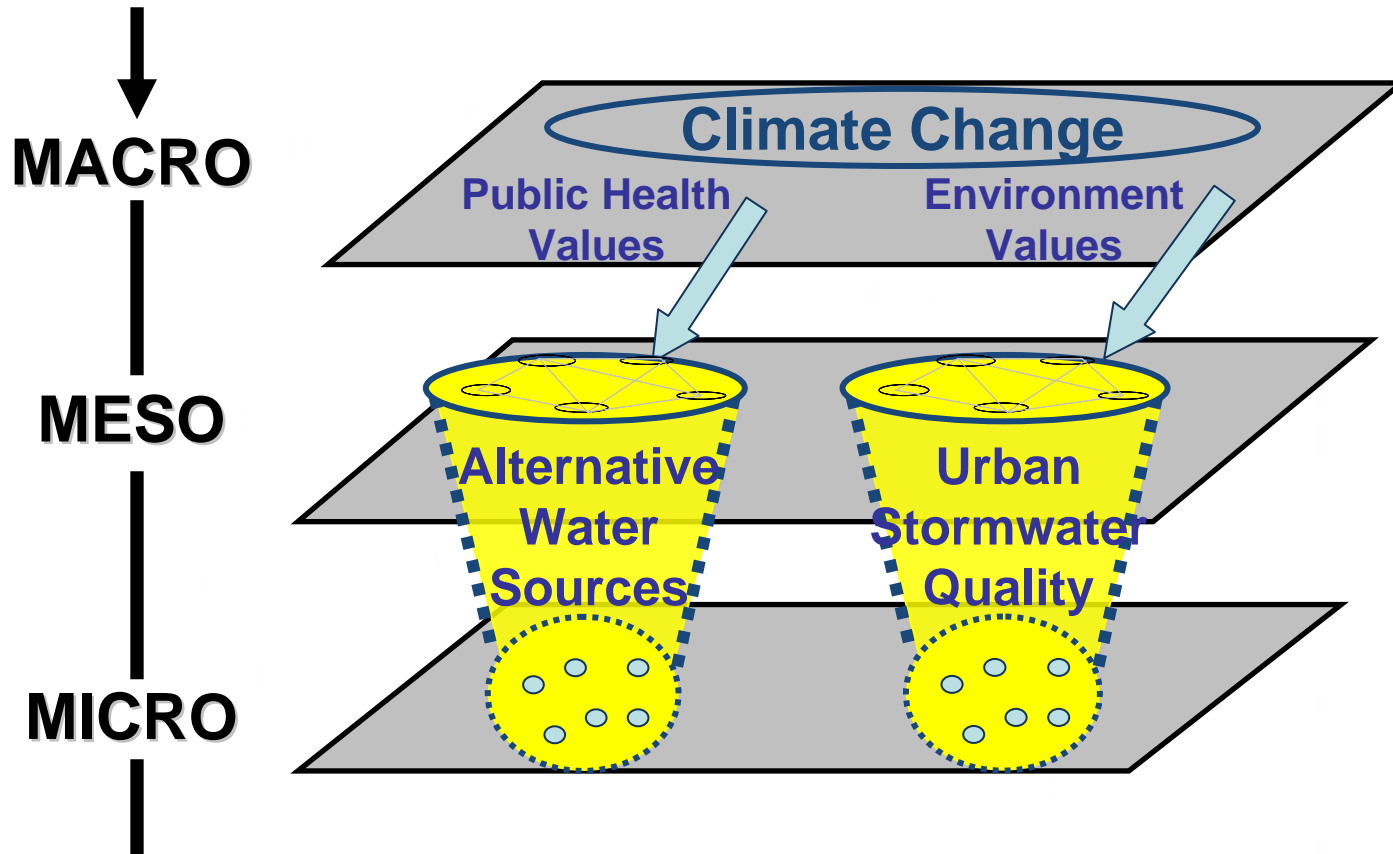
## **The Story of Melbourne, Australia**

**Rebekah Brown & Jodi Clarke**  
**June 2007**

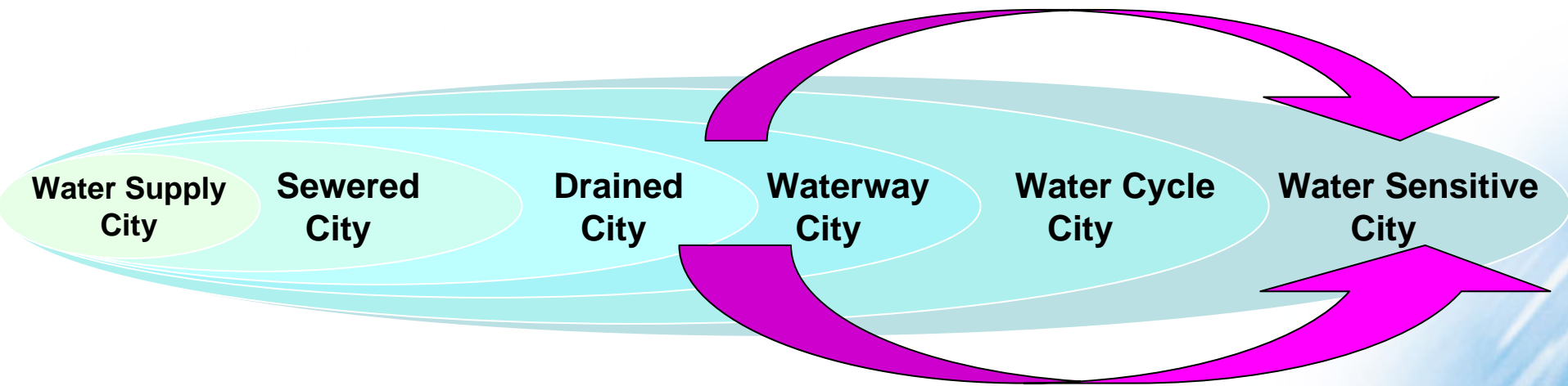




# How can the transition to the broader agenda of WSUD be completed?



# Transitioning to the Water Sensitive City:



# The NUWGP Team

## The Research Team



Rebekah Brown



Chris Cocklin



Barry hart



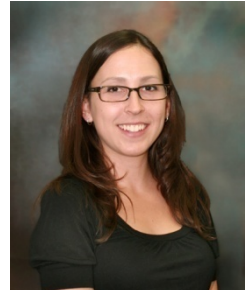
Nina Keath



Jodi Clarke



Megan Farrelly



Stacey Sawchuck

## Research Students



Andre Taylor



Jeroen Rijke



Susan VanDeMeen



Peter Morrison

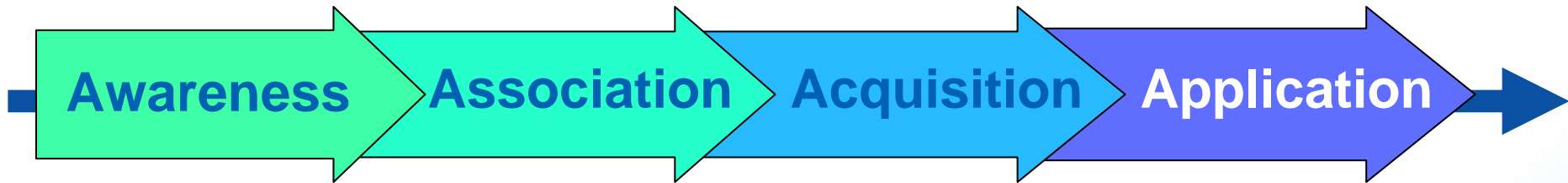


Richard Roberts

TU-Delft Student Exchange

# Receptivity Framework:

## Policy Implementation



Knowledge of  
problem and  
needs

Association with  
needs and potential  
benefits

Capacity to acquire new skills,  
systems, technologies, learn  
behaviours etc.

Incentives to practically  
apply and implement  
the new approach

