



Australian Government



River Murray Phytoplankton Monitoring Program (PMP)

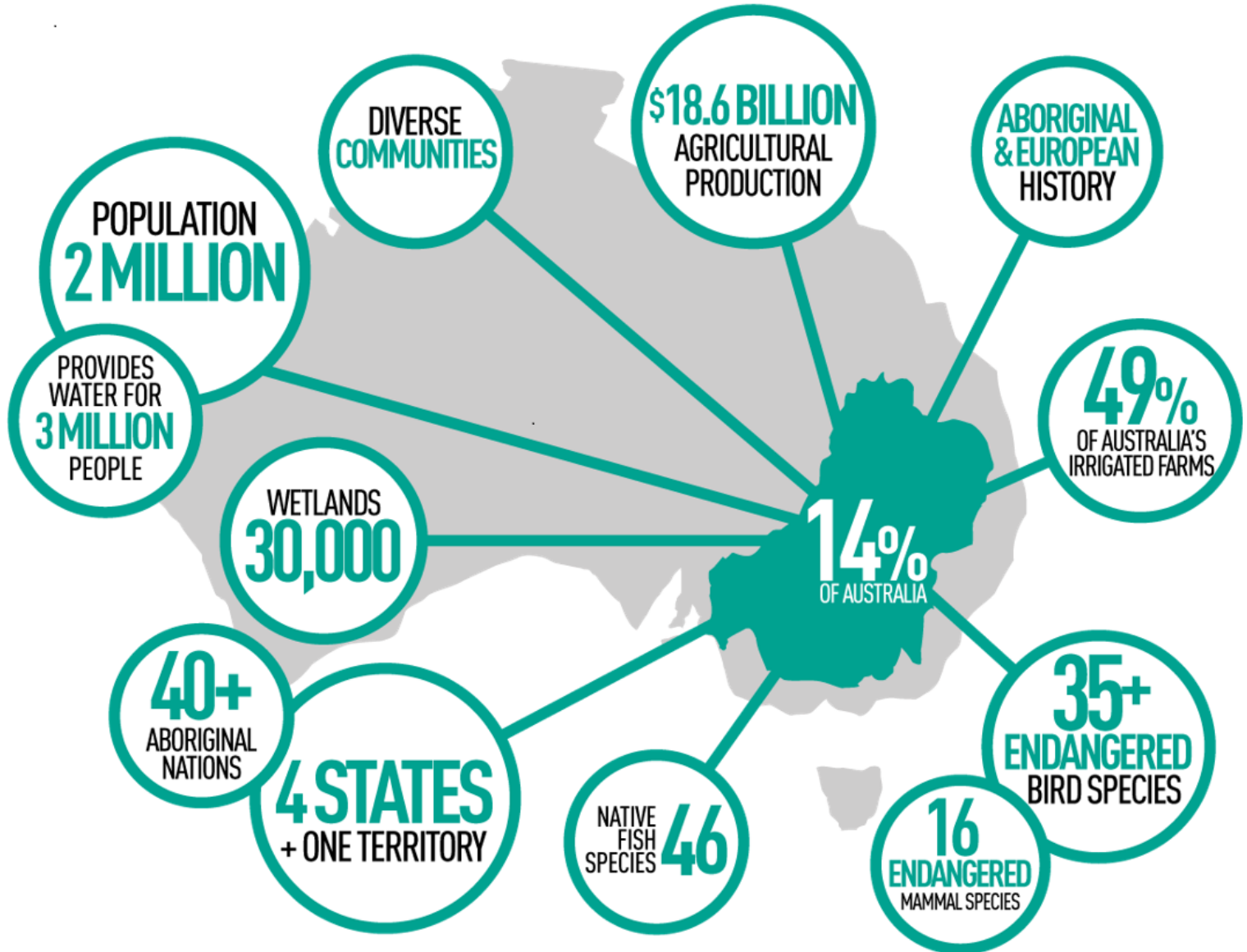
Tapas K Biswas
Murray Darling Basin Authority

Tatura Victoria 3rd Nov 2016

Content

- Murray-Darling Basin and the River Murray Phytoplankton Monitoring Program (PMP)
- Key observations and links identified for algal blooms
- Conceptual model showing factors responsible for phytoplankton growth
- Murray-Darling Basin Algal Management Strategy
- Conclusions
- Future research needs

Fast facts of the Murray-Darling Basin

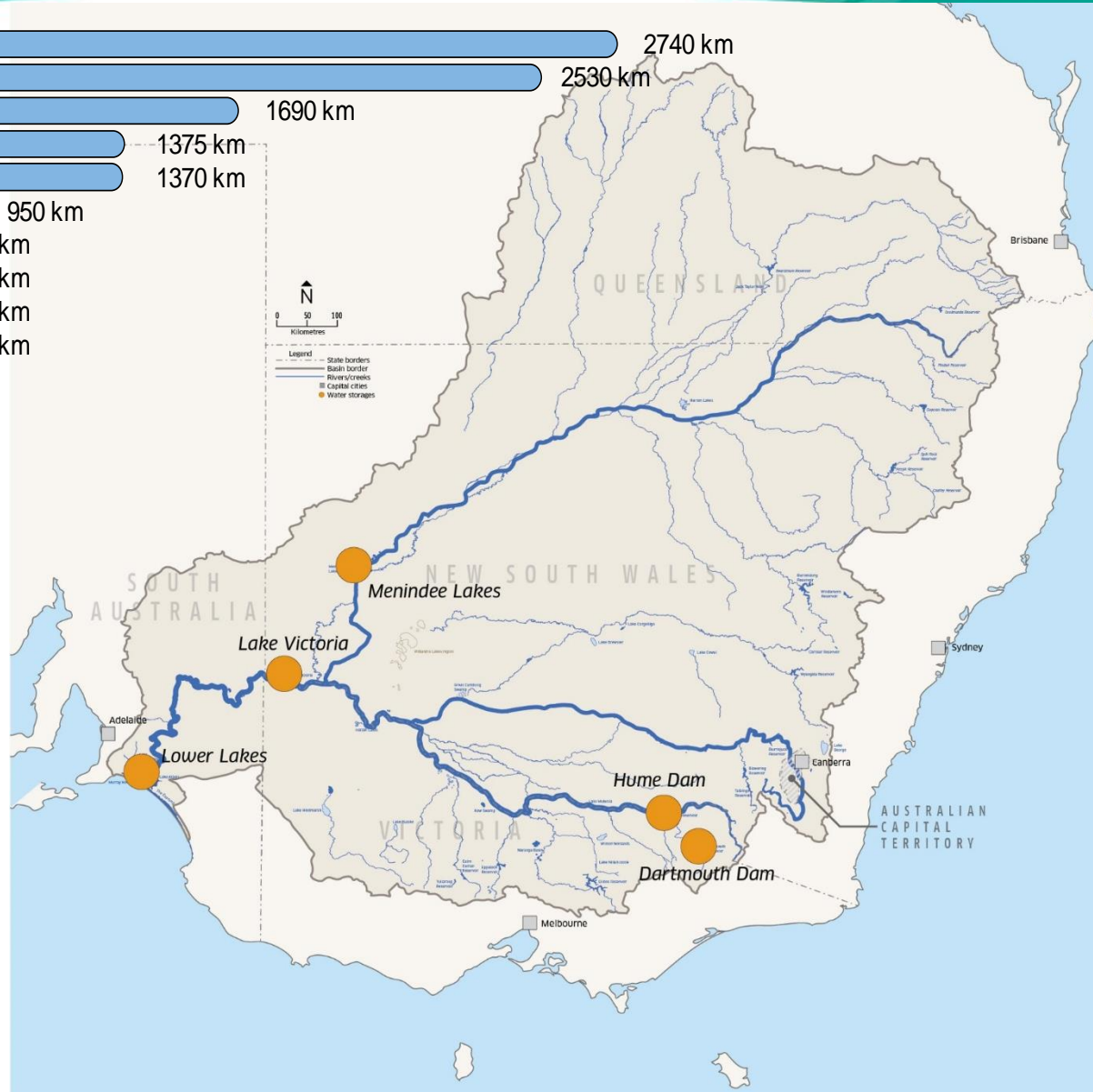
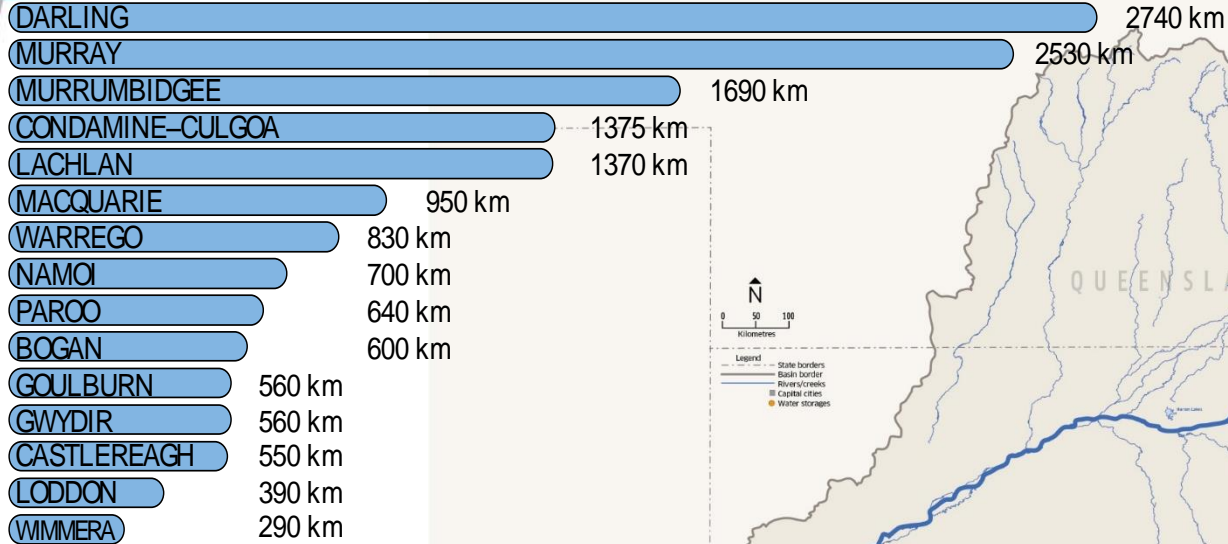




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Hydrology: River and major storages



Phytoplankton Monitoring Program - a requirement under Water Act 2007



COMMONWEALTH OF AUSTRALIA

Water Act 2007

Basin Plan

I, Tony Burke, Minister for Sustainability, Environment, Water, Population and Communities, acting under subparagraph 44(3)(b)(i) of the Water Act 2007, hereby adopt this Basin Plan, being the Basin Plan given to me by the Murray-Darling Basin Authority under subparagraph 44(2)(c)(i) of that Act.

[NOT FOR SIGNATURE]

Tony Burke

Minister for Sustainability, Environment, Water, Population and Communities

Dated November 2012

- The PMP plays a crucial role for the Murray-Darling Basin Authority – it fulfils statutory responsibilities of Clauses 44-46 of the Murray-Darling Basin Agreement, Schedule 1.
- No other program monitors the broader phytoplankton community, as the sampling undertaken by States overwhelmingly monitor cyanobacteria only.

Blue-green algae in Murray River, 2016



Picture: Victorian Government

Started in Lakes Hume and Mulwala in mid-February and by April it extended to 1700 km downstream of Hume dam.



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History of sampling sites for Phytoplankton Monitoring Program

Original Sites 1980/ Weekly sampling	Discont early	Extant currently	Altered Dec 2013
Murray – Jingellic	X		
Mitta - Tallandoon	X		
Murray – Heywoods		X	
Murray – Yarrawonga		X	
Murray – Torrumbarry		X	
Barr Ck – Capels Flume*		X	Removed
Murray – Swan Hill		X	
Murrumbidgee–Balranald		X	Made monthly
Murray – Euston		X	
Murray – Merbein		X	
Darling – Burtundy		X	Made monthly
Murray – Lock 9		X	
Murray – Lock 5	X		
Murray – Morgan		X	
Murray – Tailem Bend		X	
Goolwa - SA		X	Discontinue in Jun 2016
Milang–Lake Alexandrina			Wkly sampling start July

Map showing sites for River Murray Phytoplankton Monitoring Program





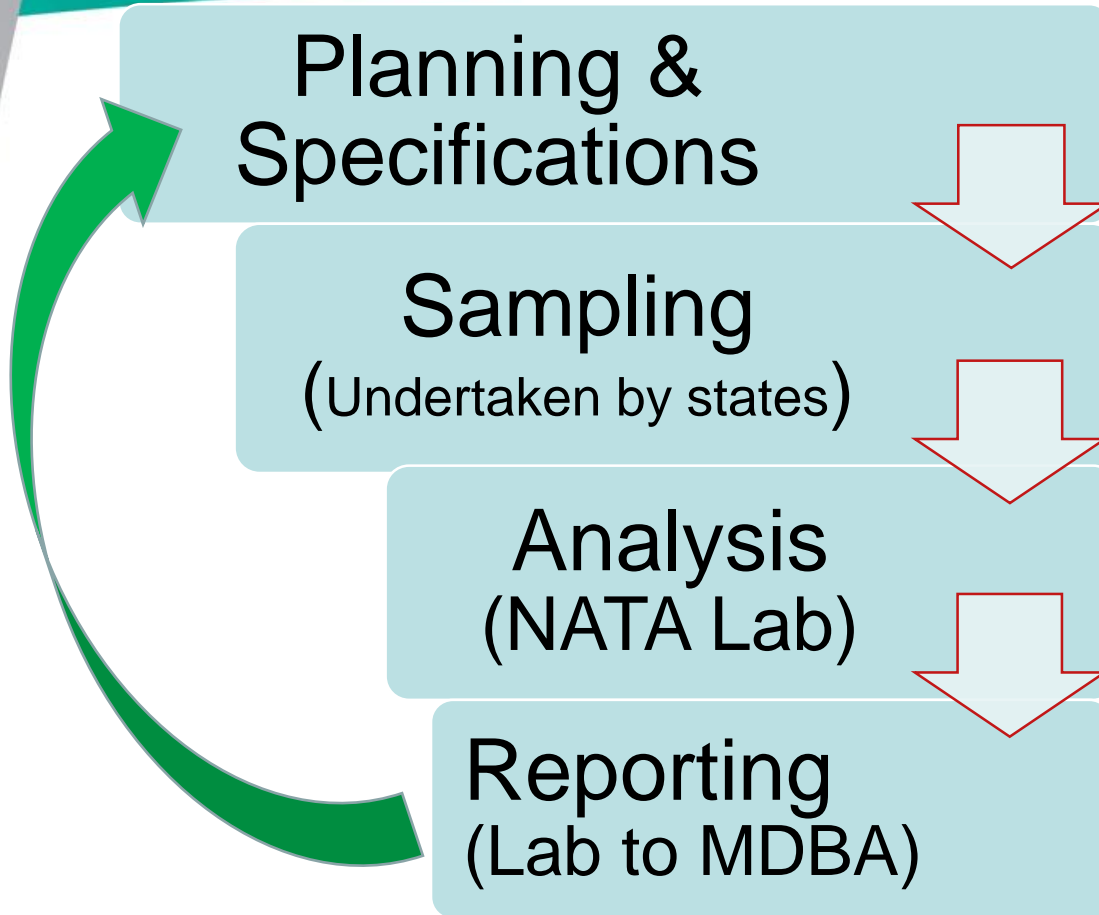
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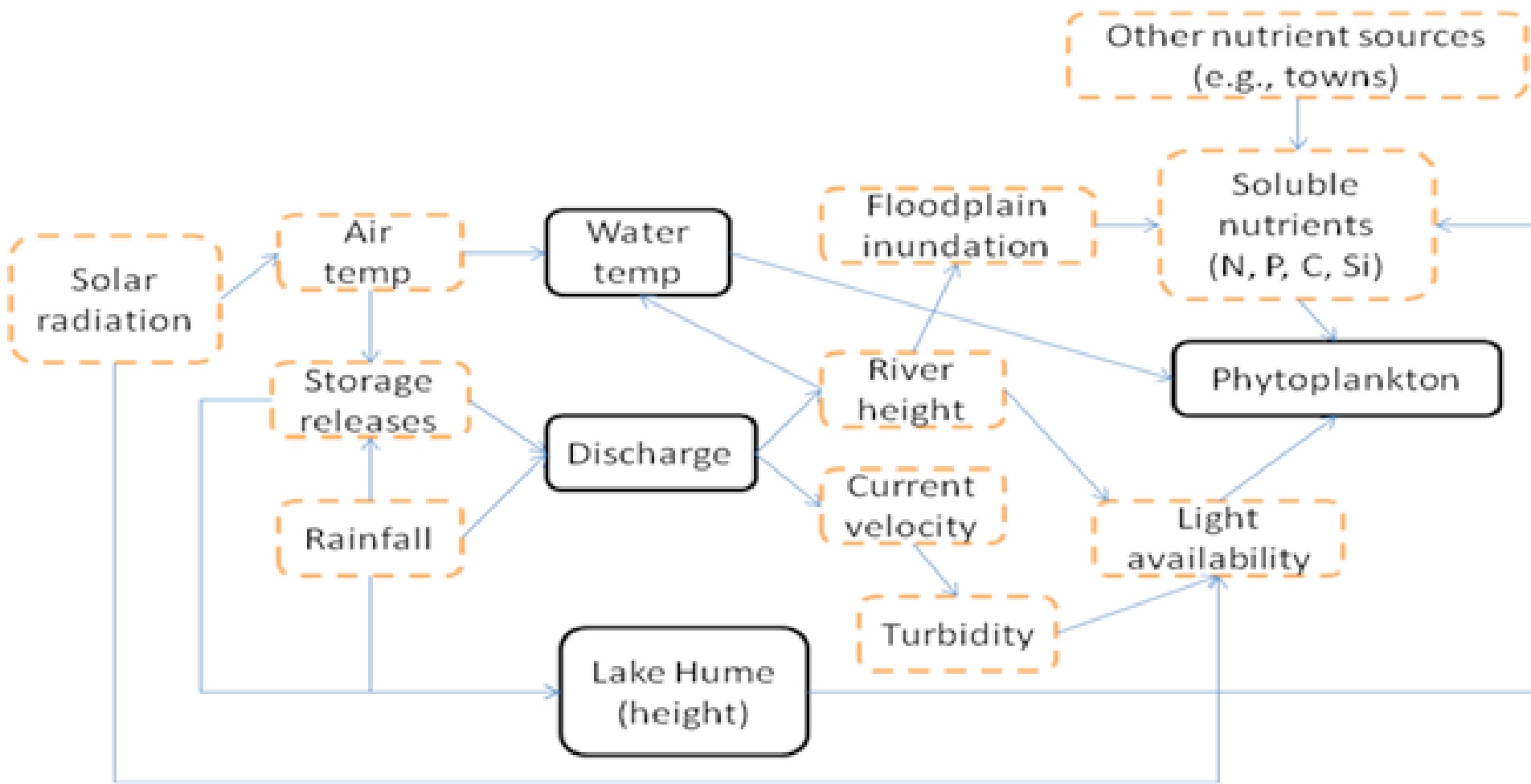
Taxa into which phytoplankton data had been aggregated

Cyanobacteria	Algae
<i>Anabaena</i> (<i>Dolichospermum</i>)	<i>Actinastrum</i>
<i>Anabaenopsis</i>	Cryptophyceae
<i>Aphanizomenon</i>	<i>Ankistrodesmus</i>
<i>Cylindrospermopsis</i>	Euglenophyceae
<i>Cylindrospermum</i>	<i>Aulacoseira distans</i>
<i>Microcystis</i>	<i>Melosira varians</i>
<i>Nodularia</i>	<i>Aulacoseira granulata</i>
<i>Nostoc</i>	Other Chlorophyceae
<u>Other Cyanophyceae</u>	Centric diatoms
<i>Cylindrospermopsis</i> sp.	Other Phytoplankton
<i>Planktothrix</i>	Chlamydomonads
	Pennate diatoms
	Chrysomonadales
	<i>Planctonema</i>
	Chrysophyceae
	<i>Scenedesmus</i>

Uniqueness of the PMP



Conceptual model - relationships among variables affecting phytoplankton growth



Current management strategies

The MDB Algal Management Strategy, (MDBC 1994)

- Point source nutrients
- Phosphates in Detergents
- Riparian Zone management
- Protecting ecosystems
- Flow and reservoir management
- Pest Species

Current management strategies

Multiparty coordination committee responsible for reporting Algal Blooms

RACC (Regional Algal Coordinating Committees)

- Media Releases
- Household Notices
- Notices to recreational users
- Notices to farmers and diverters
- Public notices in Public Places
 - Tourism Centres
 - Holiday destinations
 - Police stations
 - Road signs
 - Web

Murray River is open for Business



Discover Murray
MurrayRiver.com.au

● All Good - come and visit

● Safe to visit - do not ingest water / Avoid contact with water

Despite media reports on blue green algae
Murray River is Open for Business
Support the river community

www.murrayriver.com.au

Official Murray River Travel Website

About 117,000 visitors per month

What do we want from Murray river management perspective?



No Bloom; specially during Easter



No Fish Killsetc

Conclusions

- River Murray Phytoplankton Monitoring Program started in 1980; now a requirement under Water Act 2007.
- The program has a sufficient period of record and built reliable understanding of phytoplankton growth along the river and over time.
- Phytoplankton data has been a useful indicator of short- and long-term changes in environmental conditions.
- There are no other programs that monitor the broader phytoplankton community.
- In 2016, a new species *Chrysosporium ovalisporum* bloomed for the first time in the Murray even when flow was high.
- Continued monitoring is required in the face of continuing change, particularly under changing species and climates.

Future research needs

- Reliable, quick detection of blooms & toxins
- Reliable forecasting for future: both short & long-term (e.g., remote sensing)
- Opportunistic management to prevent or reduce extreme events
 - Reduction of frequency, extent and toxins by managing: flows, stratification (Lake Hume), nutrients, biological predators



Collaborators

Murray Regional Algal Coordinating Committee

NSW: Department of Primary Industry – Water and NSW-Water

Victoria: Goulburn Murray Water; Dept of Env, Land, Water & Planning

South Australia Water

Murray Darling Freshwater Research Centre

Commonwealth Scientific & Industrial Research Organisation

Australian National University