Project Description

		Provide Comments
Title	**Guidance for integration of gene testing in Cyanobacterial management**	
Project Type	☒State-of-knowledge ☐Problem Definition ☐Knowledge Generation ☐Knowledge Transfer ☒ Knowledge Adoption ☒Benefit Realisation	
Problem	Cyanobacteria gene testing is used by some water utilities as a timely and efficient approach for cyanobacterial management. The gene testing is intended to determine the genetic potential of known toxin producers to produce toxins. However, the current guidelines only use speciation, counts and biovolume to determine the risk to consumers, recreational users and stock. Key questions about how to best integrate gene testing into management include: • How should the assay taxonomic unit (OTU) results be interpreted in relation to cell speciation, cell numbers and biovolume? • How should the gene testing results be interpreted, as qPCR can give high gene numbers that do not correlate with toxin testing results? • Does gene testing reduce overall cyanobacteria management costs?	
Background/ Description:	Some Cyanobacteria species are well known for their potential to produce toxins. However, not all genotypes of known toxin producing species produce toxins. Testing is available that detects and quantifies the presence of strains of cyanobacteria that have the potential to produce toxins. If these strains are present, then additional sampling and testing can be undertaken to confirm the presence of toxins in the water and appropriate management actions taken.	
Objectives:	Develop guidelines for the inclusion of toxin gene testing in cyanobacteria management	
Scope/ Deliverables:	• Literature review of the use of gene testing from Australian and international (practical monitoring component for emerging guidelines e.g. Ohio, Oregon, Florida USA) water supplies and assess the suitability of gene testing for cyanobacteria toxin risk management. • Design a methodology that considers toxin risks for possible inclusion of gene testing in cyanobacteria management guidelines	

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	• Trial the methodology using a combination of case studies from past blooms and current blooms with conventional sampling, gene and toxicity testing. • Optimise the method based on the case studies • To identify the cost and operational benefits for the optimised methodology • Report the findings in a WaterRA guidance document	
Benefits	1. Improve management of cyanobacteria blooms in water supplies by reducing the toxin risk. 2. Provide more accurate information of the toxin risks associated with cyanobacteria blooms 3. Methodology to use gene testing effectively and undertake more targeted toxin testing	
Investigative or Research approach	The research is a desk top study including: • Literature review • Development of a methodology for the cost-effective use of gene testing in cyanobacteria toxin risk management. • Trial of the methodology using existing data in collaboration with WaterNSW and other to be determined partners. • Final report including recommendations on how the methodology could complement the existing guidelines	
Indicative Funding required:	☒Small (<$100k) ☐Medium ($100-$500k) ☐Large (>$500k)	
Duration/Start	☐Short (<6 months) ☒Medium (6-18 months) ☐Long (>18 months) Start: Mid-2021	

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