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How an evidence based approach changed a WASH risk project

Glen McIntosh | Senior Asset Manager

7 August 2019

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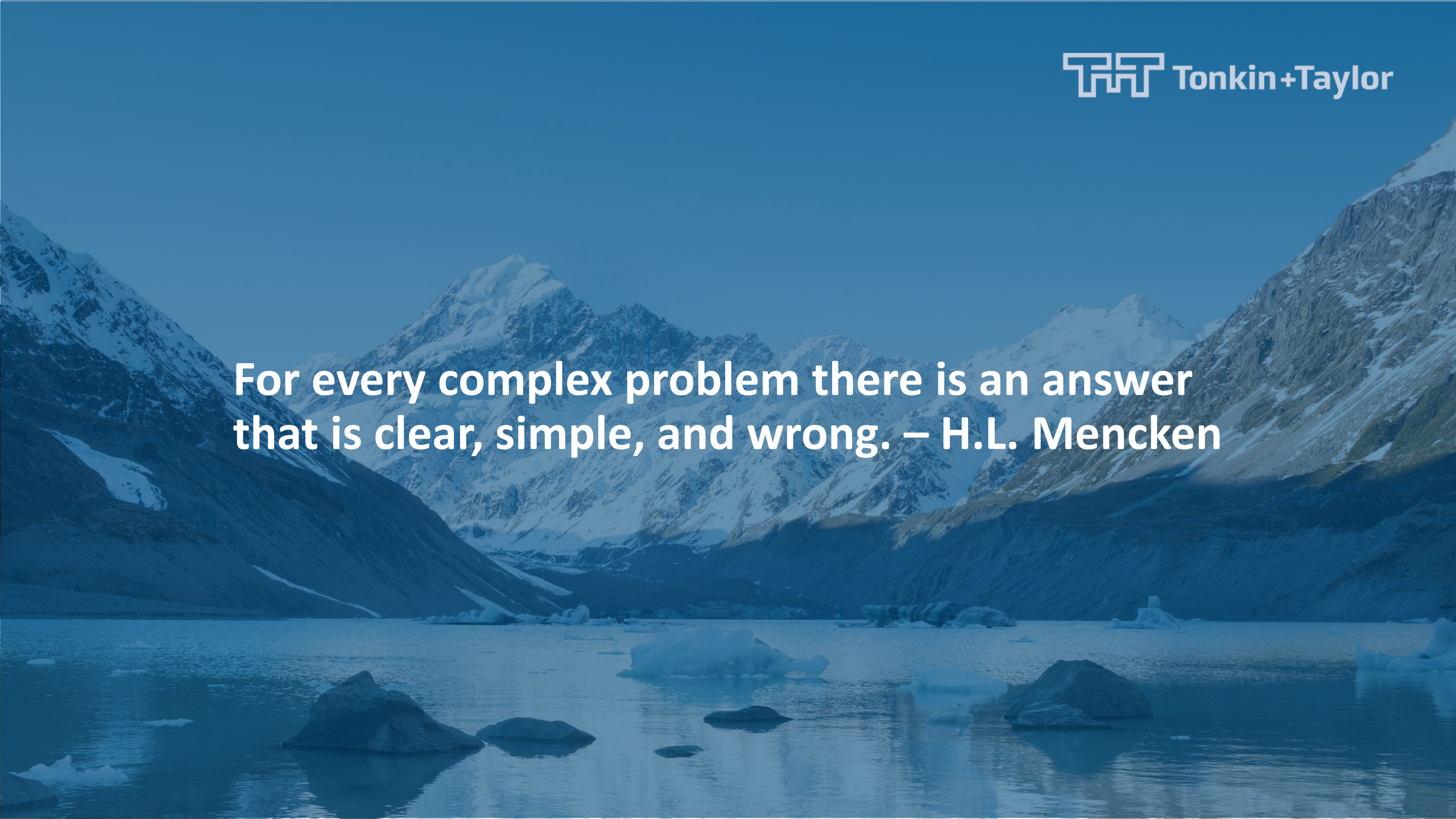
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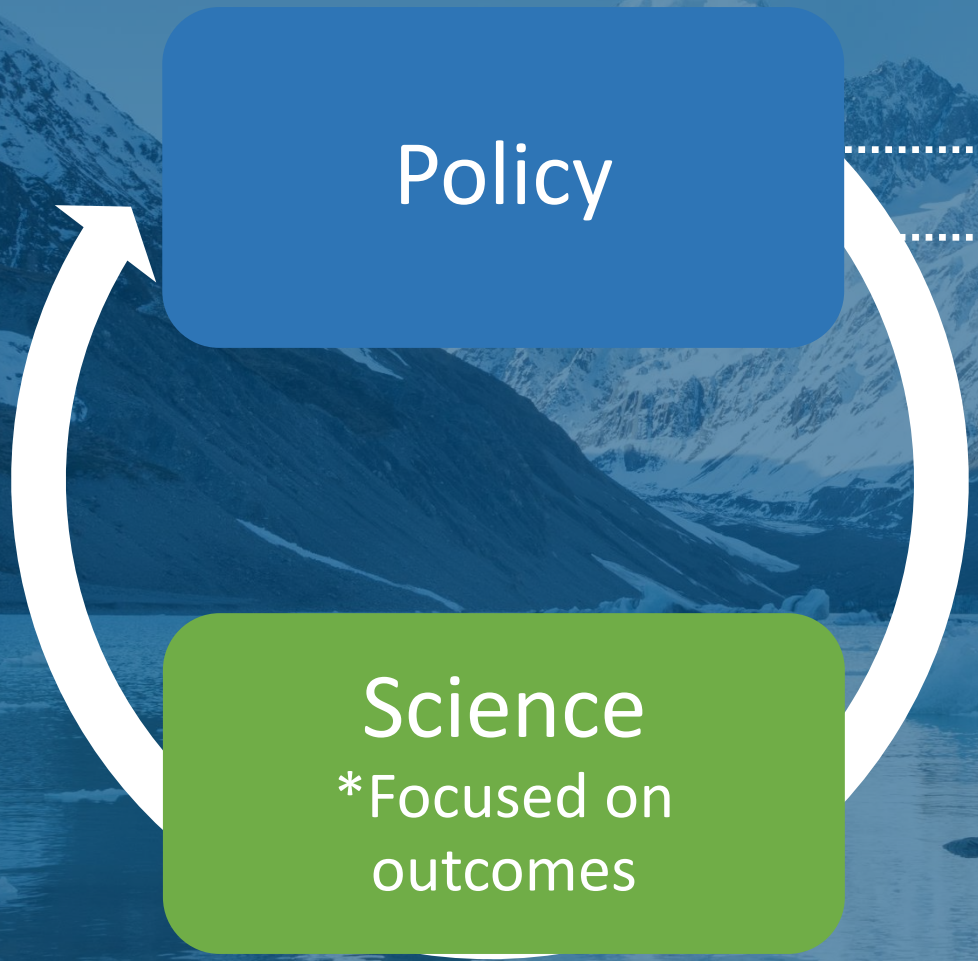
For every complex problem there is an answer that is clear, simple, and wrong. – H.L. Mencken

Overarching theme…



Community Outcomes?

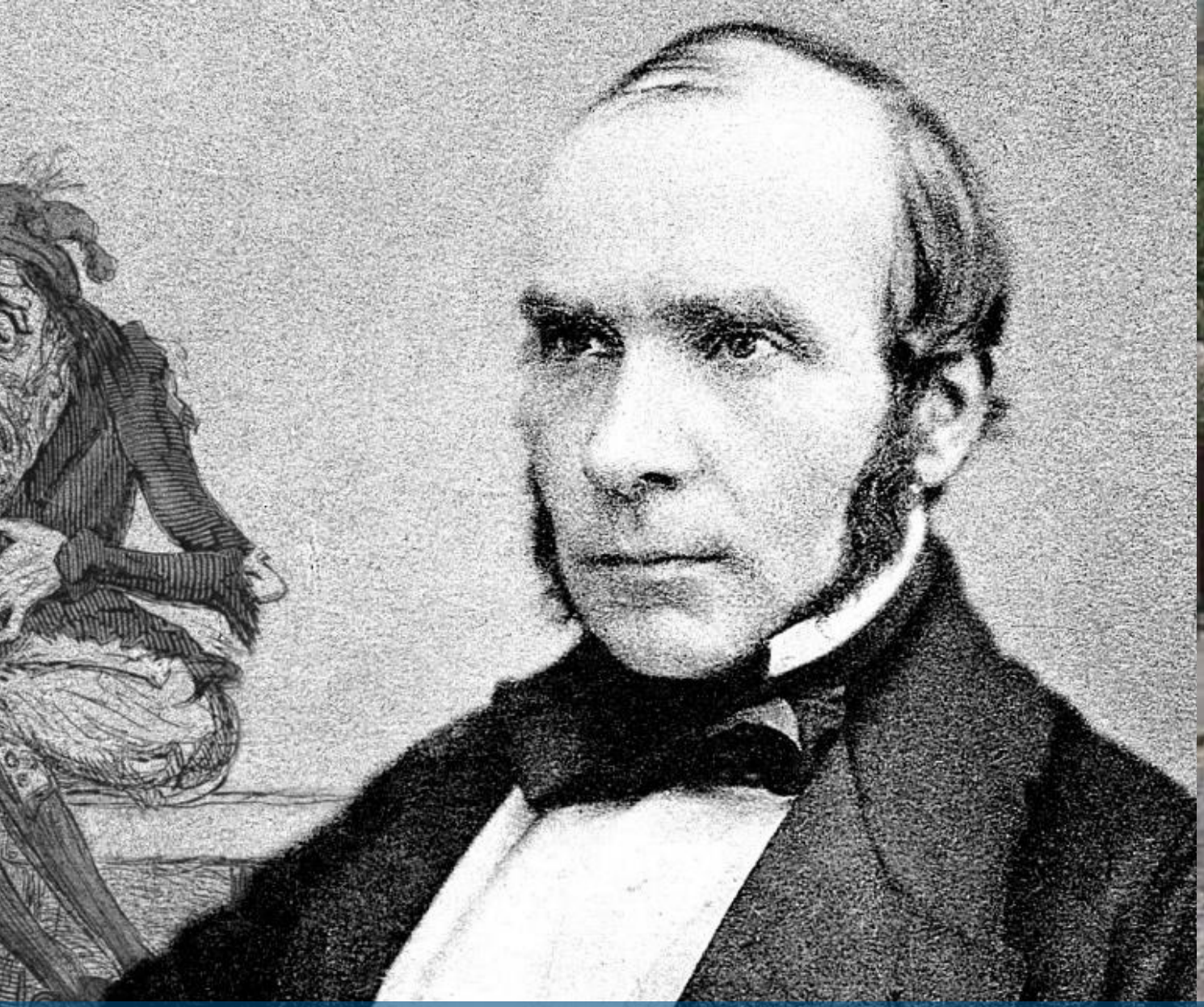
Risk mitigation?

Risk management underpinned by good science = better outcomes for all

Pacific Island drivers and considerations

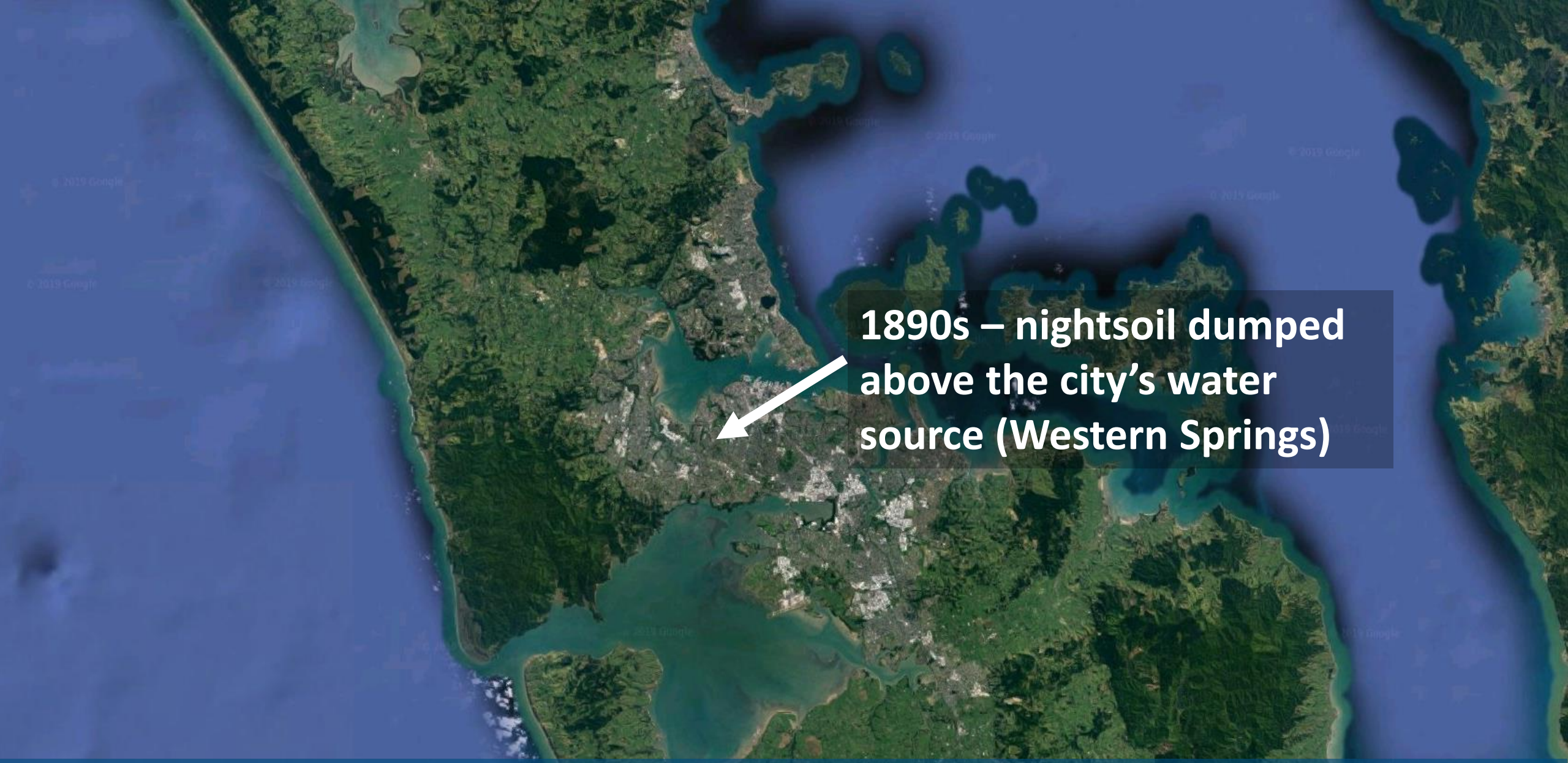
- Community health and wellness
- Climate change resilience
- Protection of fragile ecosystems
- Sustainable seafood sourcing
- Sustainable tourism
- Cultural values & local context
- Competing demands for investment funding
- Bringing the community along the journey to outcomes

Prioritisation & alignment of WASH investments to community outcomes is crucial…



A brief history of evidence based approaches

One city’s history of WASH infrastructure upgrades



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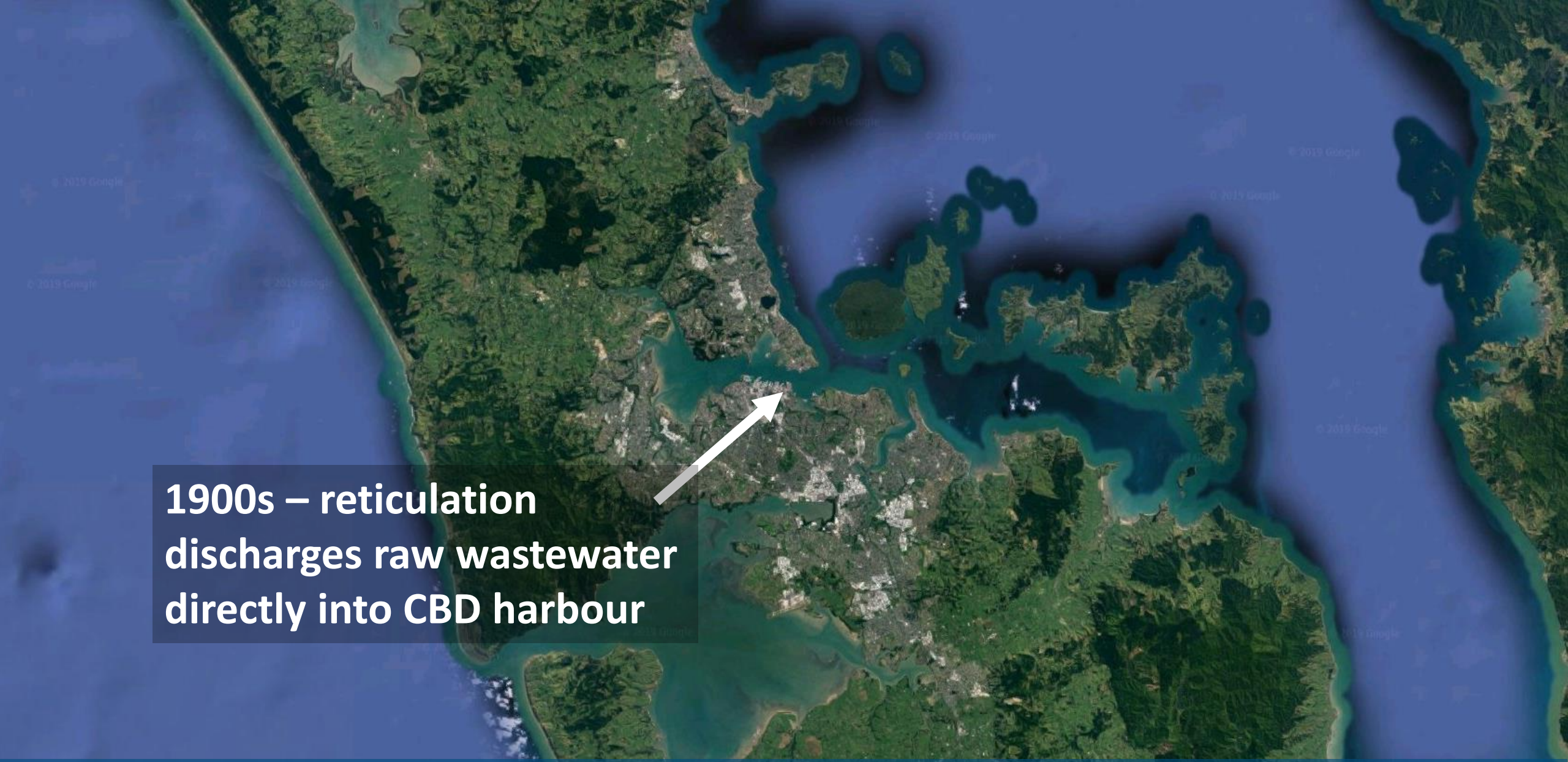

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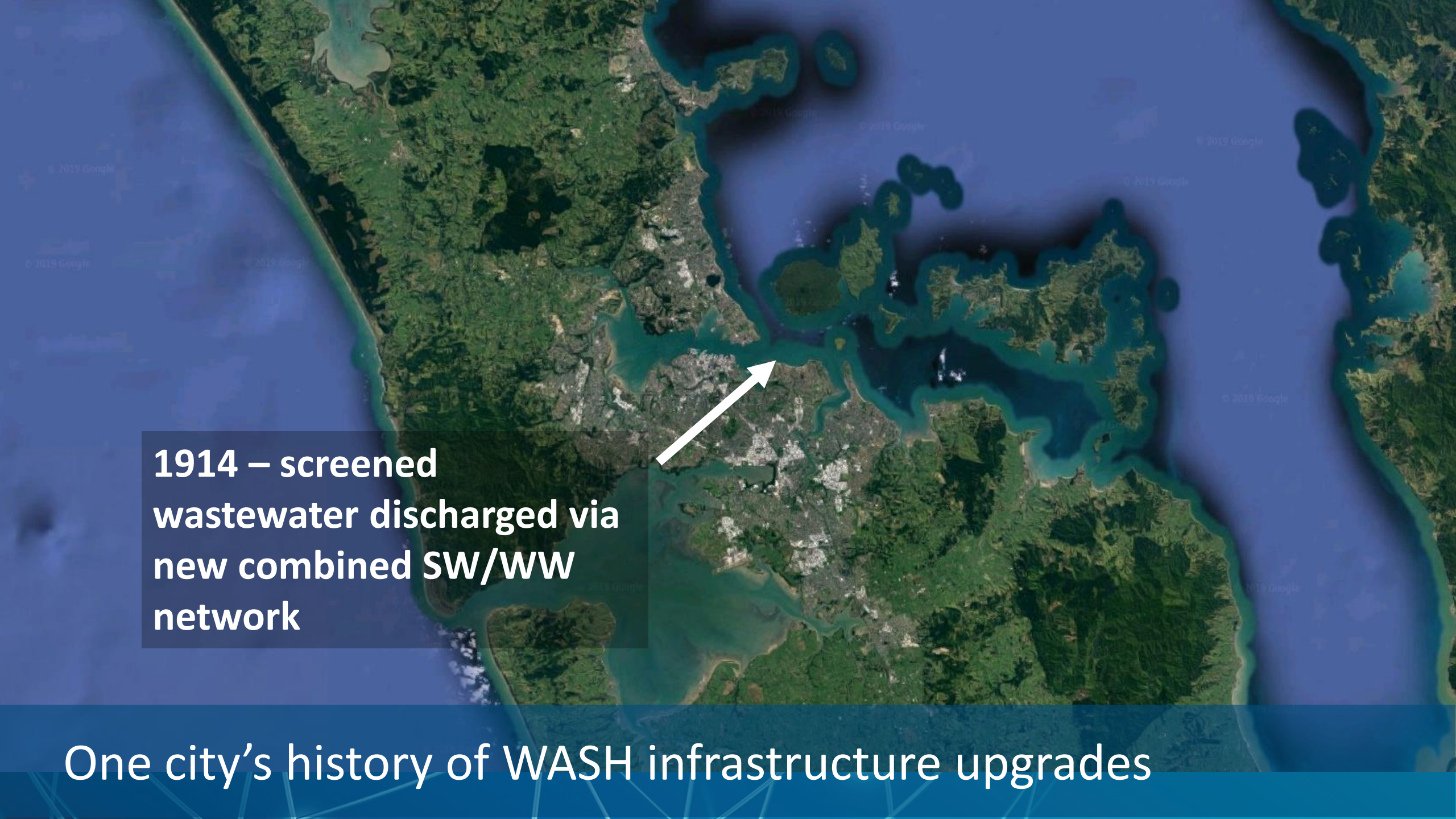

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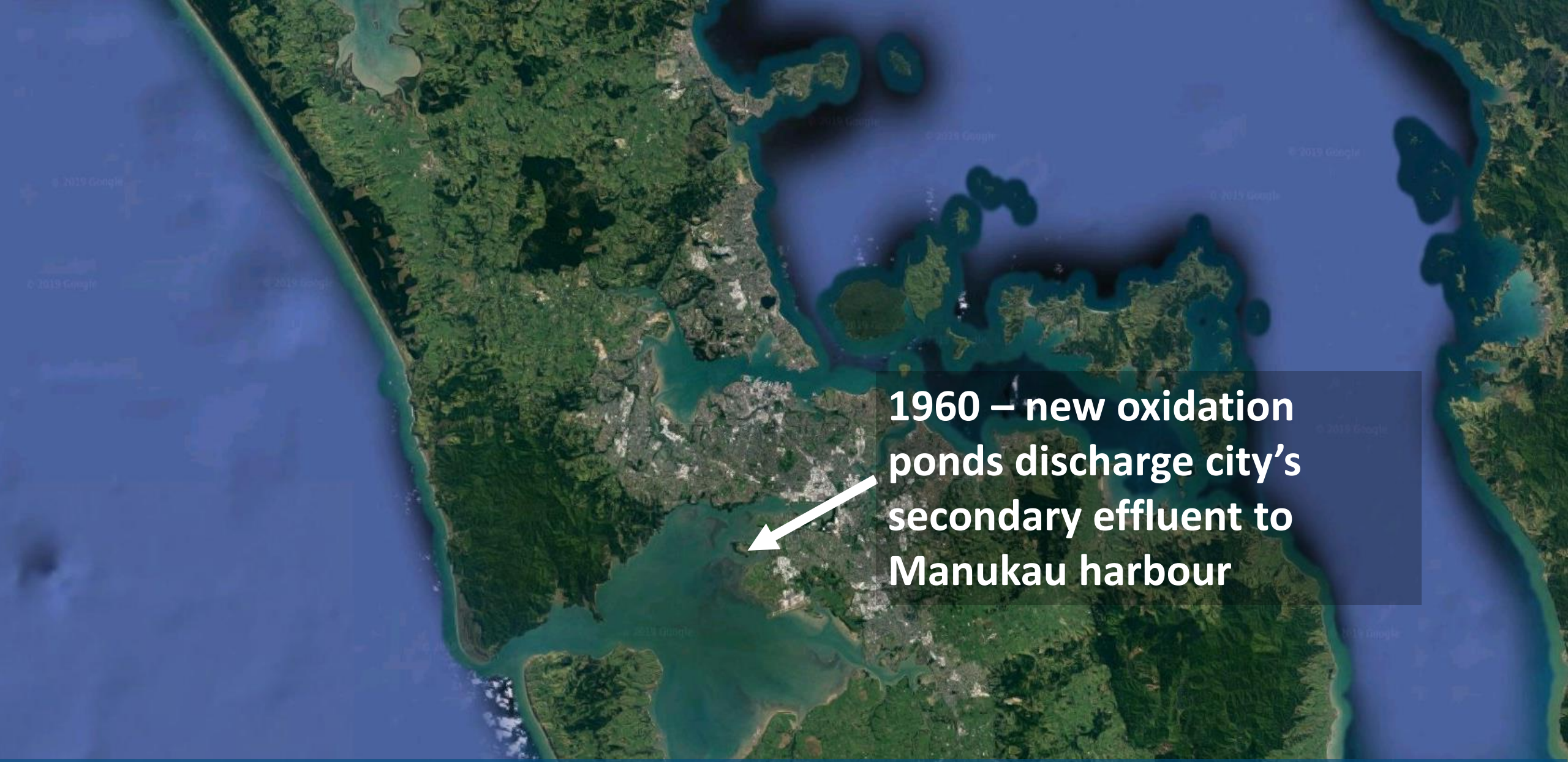

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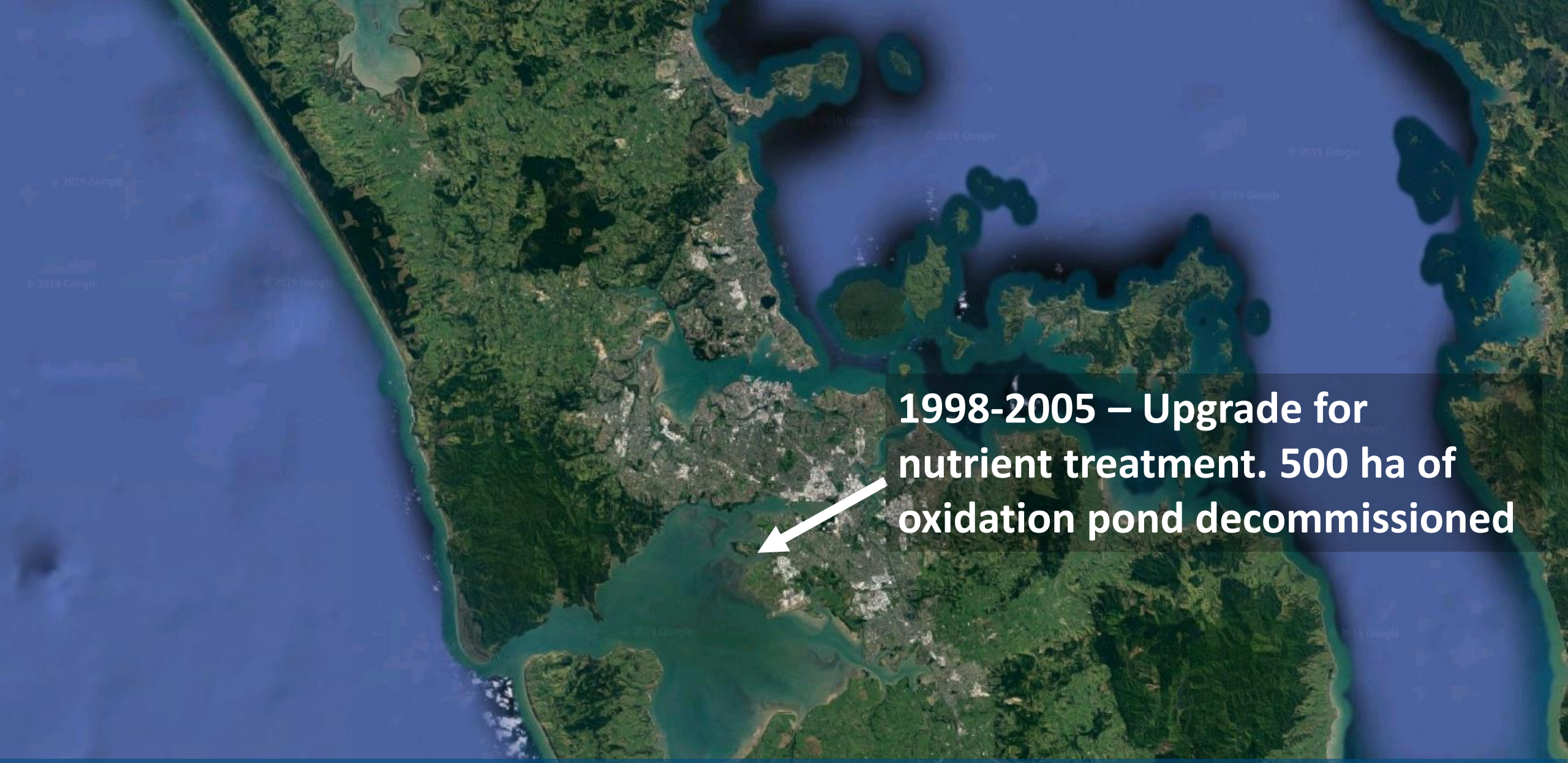

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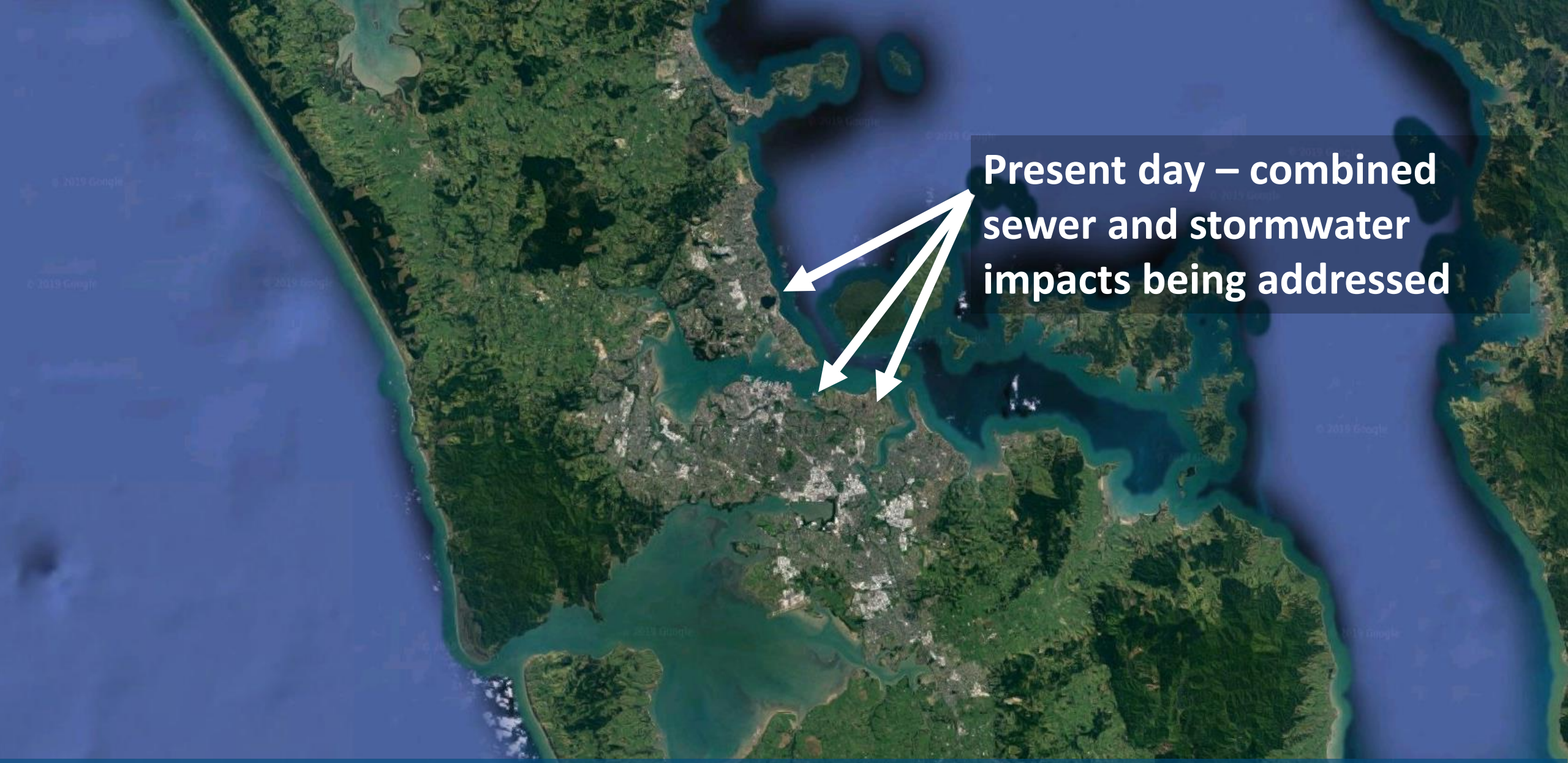

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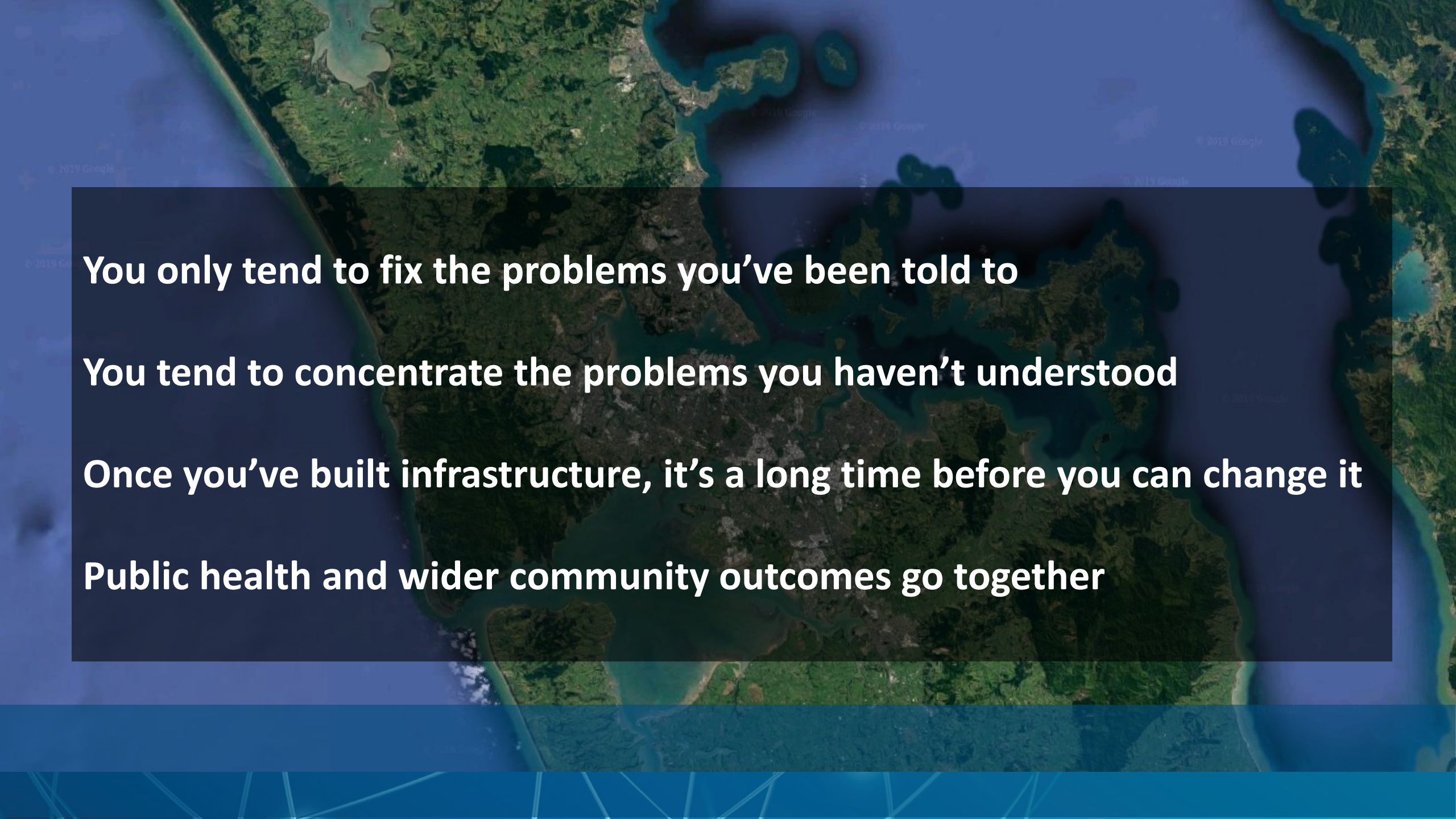

You only tend to fix the problems you've been told to

You tend to concentrate the problems you haven't understood

Once you've built infrastructure, it's a long time before you can change it

Public health and wider community outcomes go together

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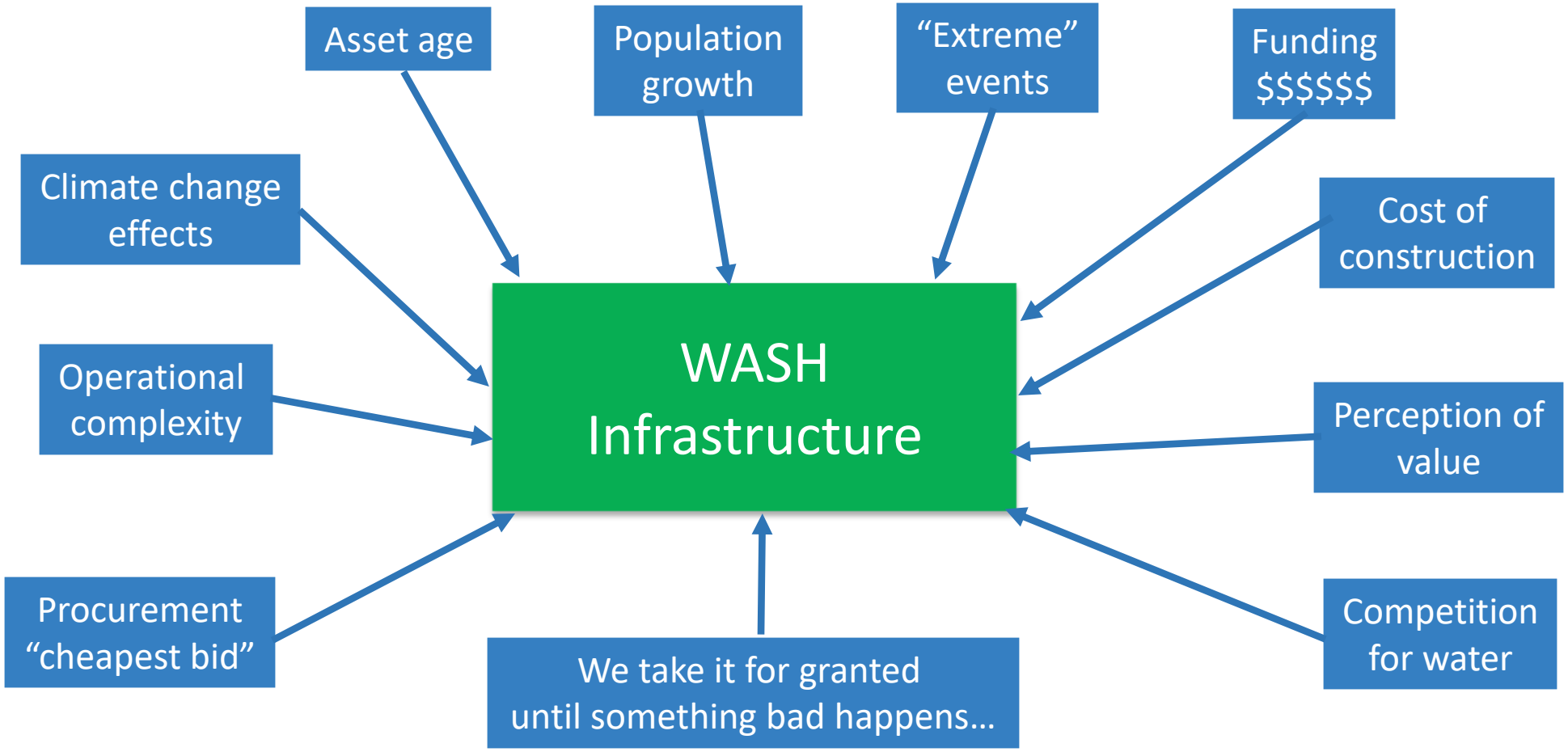
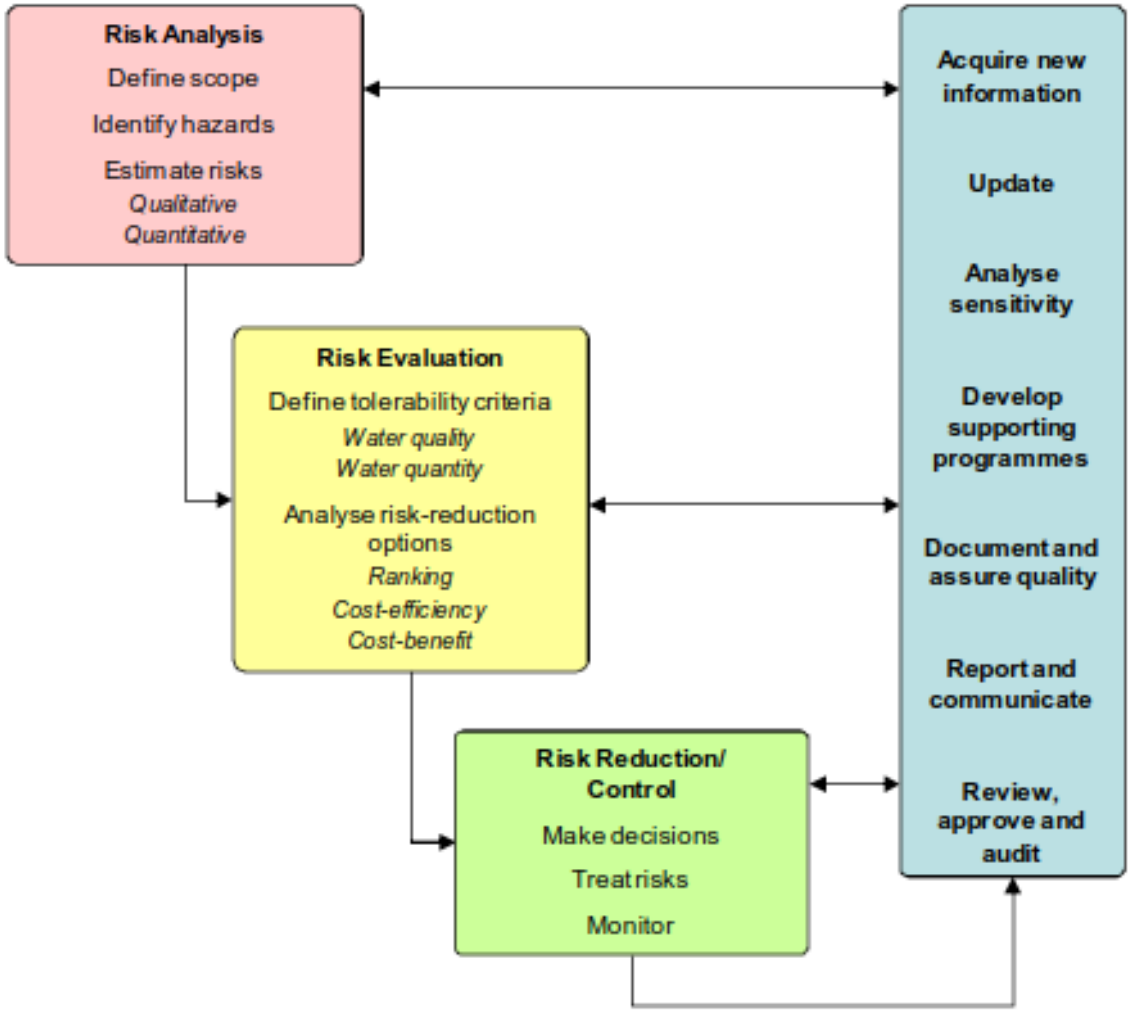
WASH Risk and Resilience in the Pacific Islands

The risk factors are serious and increasing…



and more complex to understand…

Global movement to using risk frameworks to drive better engineering outcomes…



- ✓ Enhanced asset understanding
- ✓ Robust prioritisation
- ✓ Informed decision making
- ✓ Better understanding of ROI
- ✓ Expecting the unexpected…

Clients shifting to a risk-based approach…

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Watercare
An Auckland Council Organisation

Yarra Valley Water

Christchurch City Council

QUEENSLAND Urban Utilities

Thames Water

Sydney WATER

Wellington Water

Melbourne Water

And as a result are delivering better outcomes much more cost effectively…

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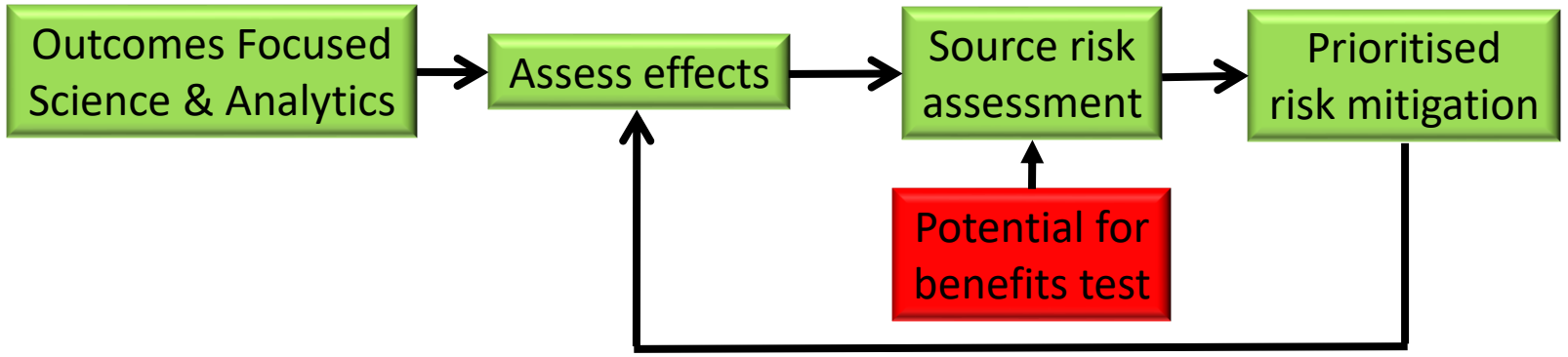
"In the tent"

- ✓ Community
- ✓ Stakeholder
- ✓ Regulatory
- ✓ Political

QUEENSLAND Urban Utilities



QUU SEWERAGE SYSTEM

EFFECTS BASED PLANNING – ACTION PLAN

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Merri Creek improvement project

Planned 5 year capital investments…

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Melbourne Water

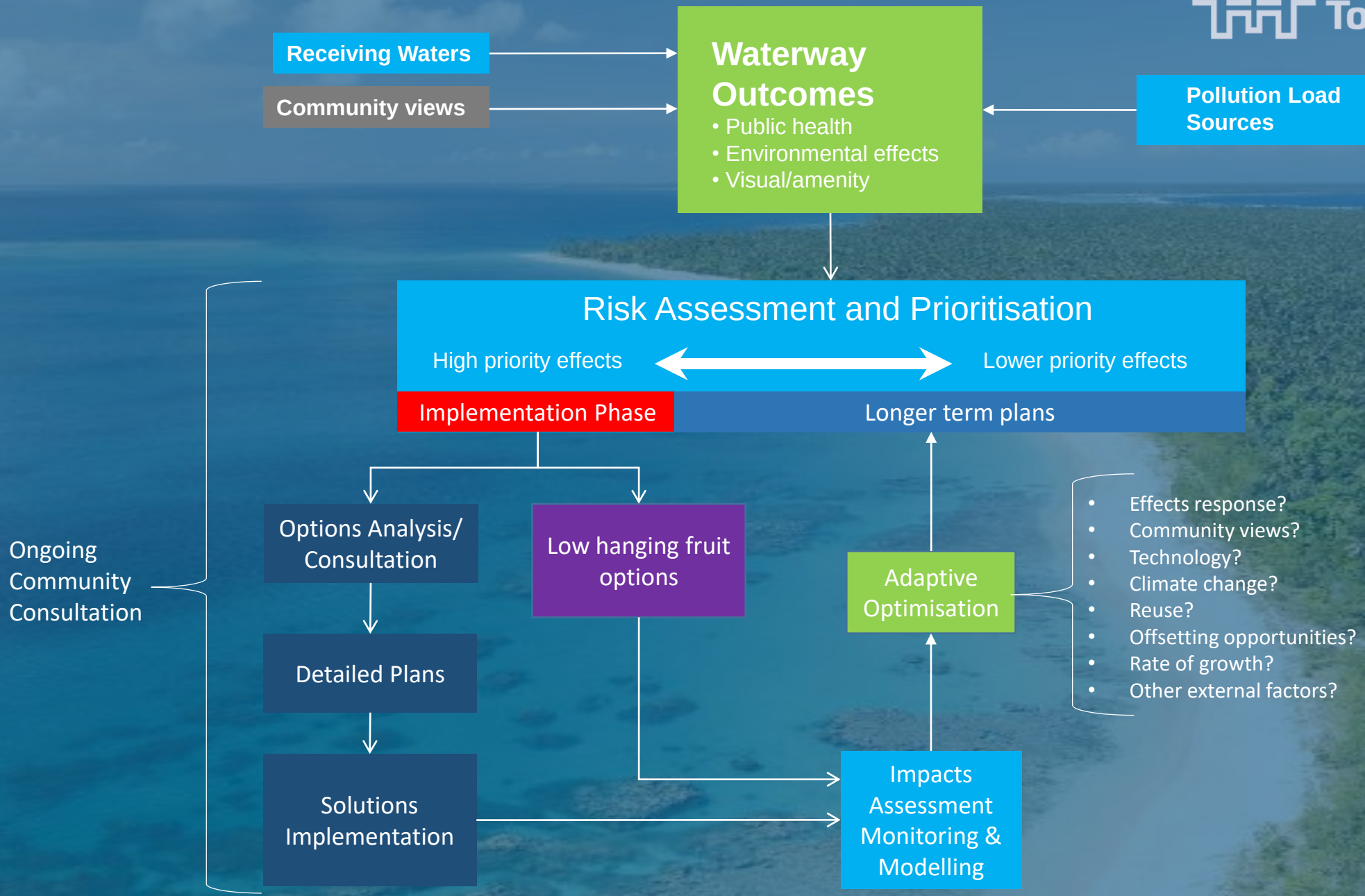
Project	Estimated Project Cost
Yarra Lower, Merri Creek Lower, Merri Creek, Queens Pde to Bakers Rd footbridge	$567K
YAR_Curly Sedge Creek, Craigieburn Grasslands	$228K
Merri Ck Faulkner Reservoir	$187K
Merri Creek Aitken confluence	$200K
Malcolm Creek	$52K
Merri Creek Broadhurst to Lynch	$149K
Community Grants	$71K
Corridors of Greens	$72K
Stream Frontage Management Program	$13K
Living Rivers Program	$1.4M
Minor works Revegetation Weed management Grass cutting Desilting Debris removal Stabilisation	$1.8M
TOTAL	**$4.7M**

Yarra Valley Water

SEPP Compliance Project	Estimated Project Cost
Bell St	$2.7M
St Georges Rd	$4.5M
Reservoir	$1.4M
Gilbert Rd	$2.5M
Northcote	$1.0M
Merlynston	$7.0M
Preston Diversion	Recently completed
TOTAL	**$19.1M**

Councils / MCMC

Overview of waterway effects risk framework



	Community Perception Study (2014)	Current Legislation SEPP	Melbourne Water – HWS MCMC	Agreed practical outcome
PUBLIC HEALTH				
Primary contact recreation	N	Y	N	N
Secondary contact recreation	N	Y	NOT CLEARLY DEFINED	N
Passive recreation - liveability	Y	Y	Y	Y
ENVIRONMENT				
Native Fish	Y	Y	Y	MAINTAIN AND/OR ENHANCE BIODIVERSITY
Frogs	Y	Y	Y	
Macroinvertebrates	Y	Y	Y	
Vegetation	Y	Y	Y	
AESTHETICS				
Vegetation	Y	Y	Y	Y
Odours	Y	Y	Y	Y
Water colour / appearance	Y	Y	Y	Y
Water turbidity / murky water	Y	Y	Y	N
Accessibility	Y	N	Y	Y
Absence of Litter	Y	Y	Y	LITTER LOAD REDUCED

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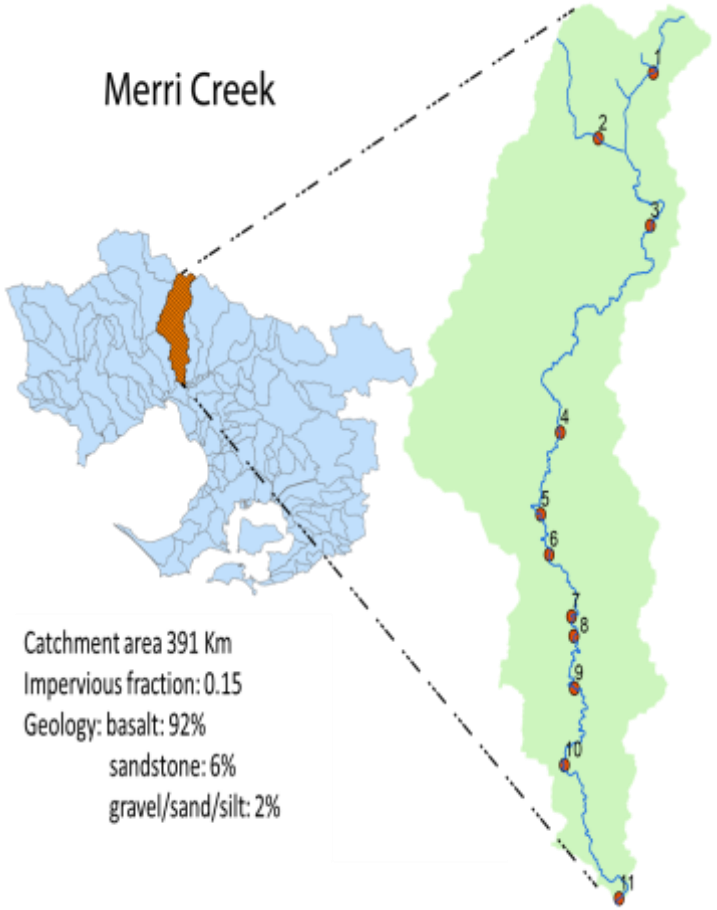
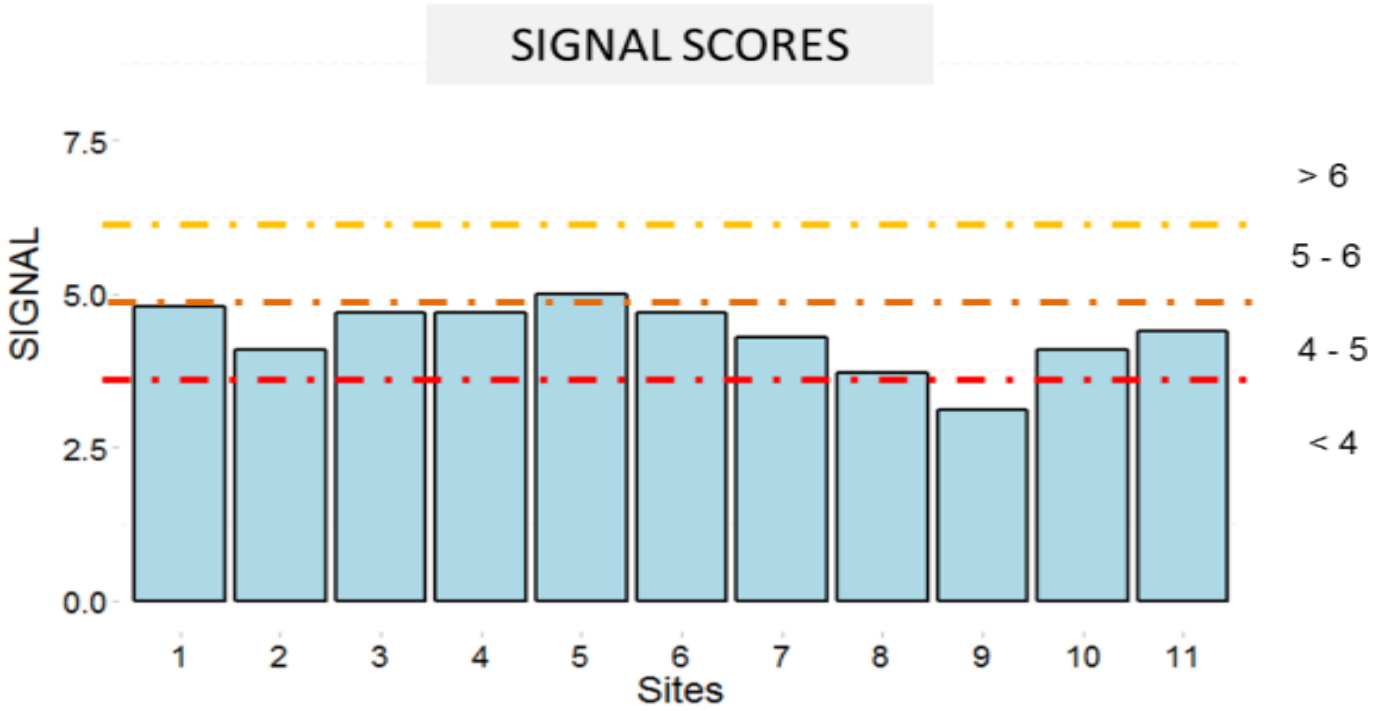
Evidence based approach for outcomes

Science/evidence to understand community outcome effects & risk…

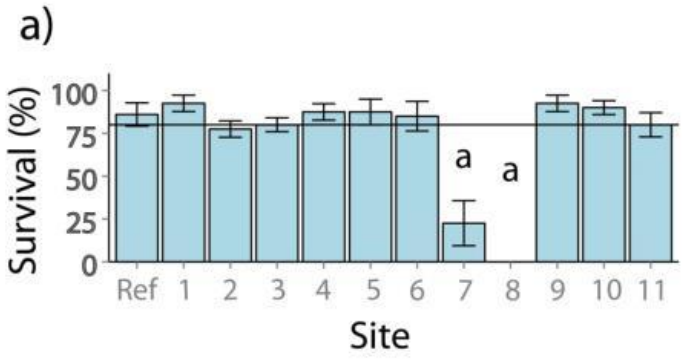


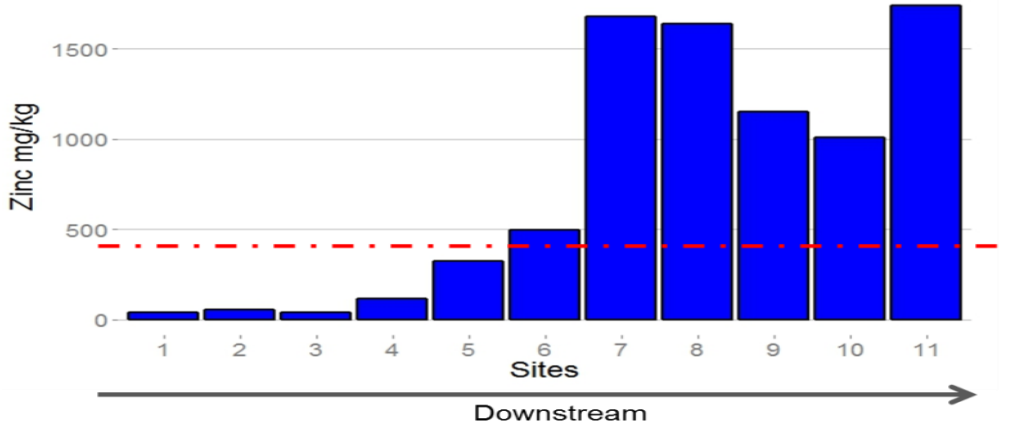
Ecological Condition

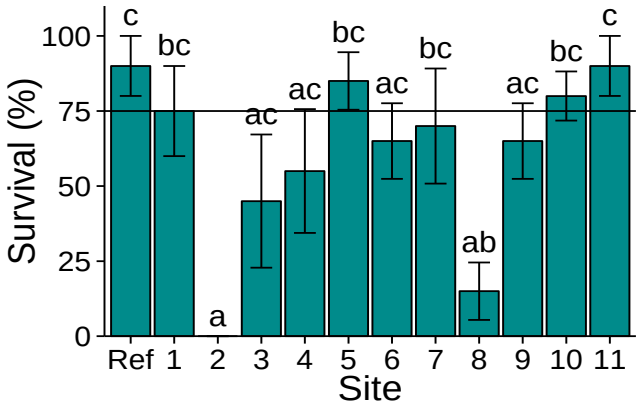


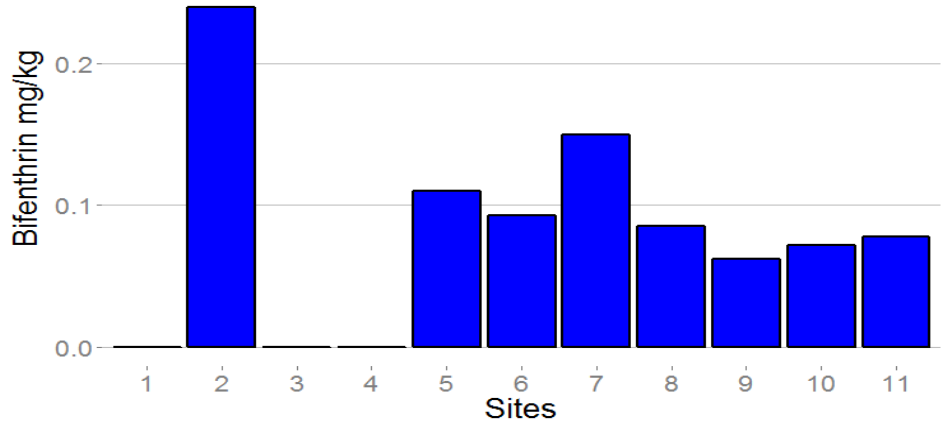
"To achieve healthy living streams flowing through attractive environments which provide habitat for native animals…"

Science/evidence to understand community outcome effects & risk…









Science/evidence to understand sources, risk & offsetting opportunities

Science/evidence to understand sources, risk & offsetting opportunities

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Drain ID	Drain Name	Human Detections							Dog Detections							Cow Detections						
		Week						Classification	Week						Classification	Week						Classification
		1	2	3	4	5	6		1	2	3	4	5	6		1	2	3	4	5	6	
1	Wallara Waters Drain							None/Low	+	+		+	+		Frequent							None/Low
2	O'Hearns Drain		+					None/Low	+			+	+		Intermittent							None/Low
3	Epping Drain		+					None/Low	+	+		+	+		Frequent							None/Low
4	Ainslie Rd Drain	+	+	+	+	+	+	Consistent	+	+	+	+	+	+	Consistent						+	None/Low
5	Jessica Rd Drain	+	+	+	+	+		Frequent	+	+	+	+	+		Frequent				+			None/Low
6	Barry Rd Drain		+		+			Intermittent	+	+		+			Intermittent							None/Low
7	Somerset Drain	+	+		+			Intermittent	+	+		+	+	+	Frequent						+	None/Low
8	Thomastown West Drain	+	+	+	+		+	Frequent	+	+	+	+	+		Frequent	+	+	+	+		+	Frequent
9	Thomastown Main Drain						+	None/Low	+			+		+	Intermittent						+	None/Low
10	Merrilands Drain		+				+	Intermittent	+	+		+	+	+	Frequent						+	None/Low

Drain ID	Drain Name	Human Faecal	*E.coli*	Ammonia	Pesticides	Heavy Metals	TPH	Conductivity	Visual/Litter	Further investigation
1	Wallara Waters Drain									No
2	O'Herns Drain									No
3	Epping Drain									No
4	Ainslie Rd Drain	✓		✓						Yes
5	Jessica Rd Drain	✓	✓	✓		✓	✓		✓	Yes
6	Barry Rd Drain					✓				Yes
7	Somerset Drain		✓			✓	✓	✓		Yes
8	Thomastown West Drain	✓			✓					Yes
9	Thomastown Main Drain									No
10	Merrylands Drain									No
11	Merlynston Creek									No
12	Elizabeth St Main Drain	✓	✓				✓			Yes
13	The Avenue Main Drain									No
14	Preston Main Drain				✓		✓		✓	Yes
15	Fairfield Main Drain	✓	✓		✓					Yes

Risk based approach to contaminants

Risk = Likelihood x Consequence

Potential for benefit test = what is the value of mitigating identified risks?

Risk rating and potential for benefit can be used to set priorities for mitigation option investments

Likelihood of impact

		Duration of exposure to contaminants			
		No first flush	Low first flush	Pron first flush	Dry weather
Proportion of contaminant load	Very high proportion	3	2	1	1
	High proportion	4	3	2	1
	Moderate proportion	5	4	3	2
	Low proportion	5	5	4	3

Consequence of impact

		Distance to sensitive aquatic receptors			
		>1km	500m-1km	250m-500m	<250m
Ecological Sensitivity	Very Sensitive	3	2	1	1
	Sensitive	4	3	2	1
	Tolerant	5	4	3	2
	Not sensitive	5	5	4	3

Evidence based projects for Merri Creek

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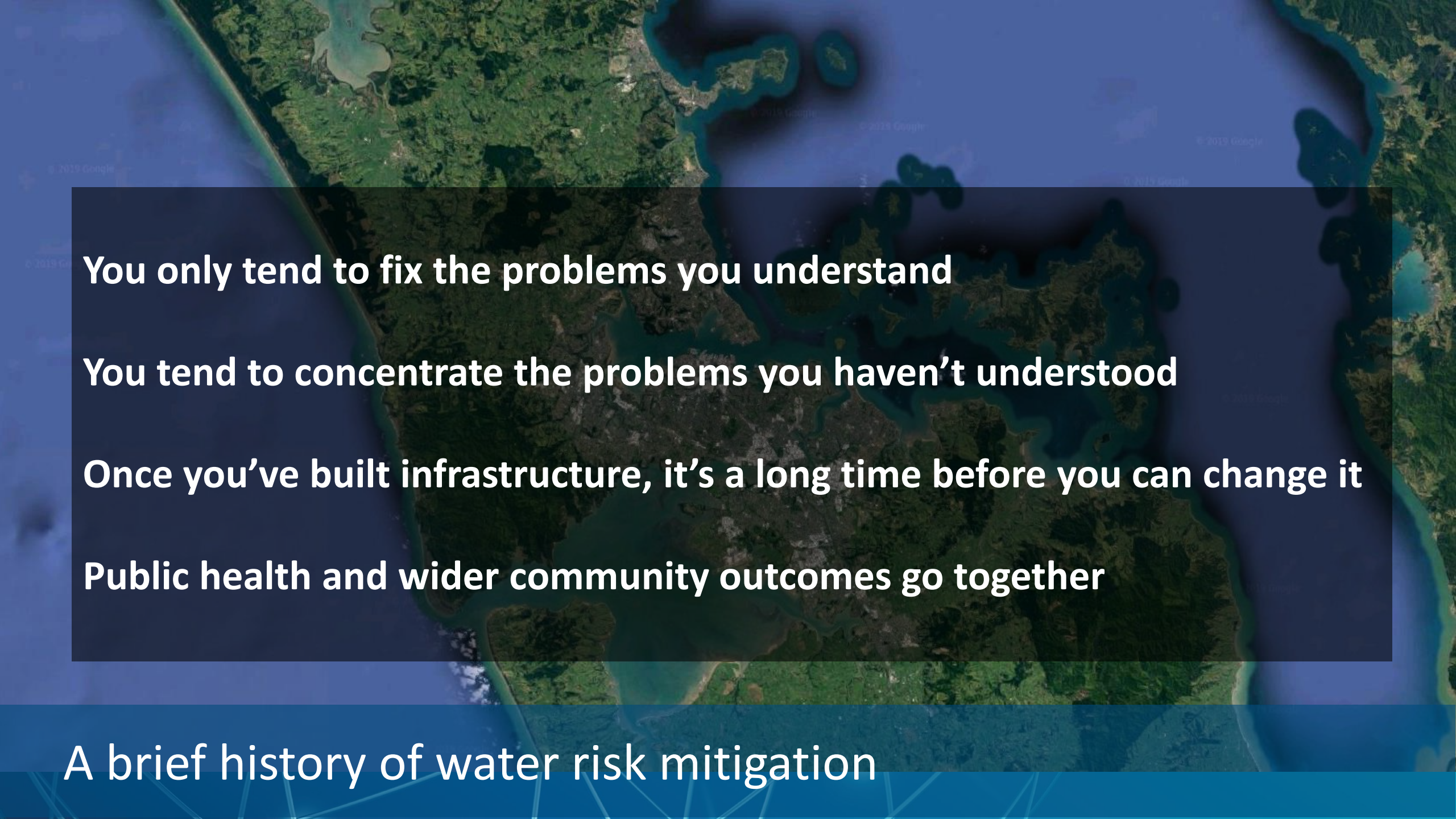
Description	Estimated Investment	Outcome Addressed	Benefit
Reduction of heavy metal pollution loads and associated toxicants from industrial areas	$1M	Aquatic Life	High
Identification and rectification of illegal sewer to stormwater connections	$1M	Public Health (YR &PPB only)	High
Stormwater monitoring and characterisation program to identify key sites for stormwater treatment / diversion to sewer (first flush)	$2M (mon) $3M (div)	Aquatic Life, Aesthetics	High
Continue targeted vegetation management / enhancement programs	$3.5M	Aquatic Life, Aesthetics	High
Mitigate of aesthetic impacts from stormwater	$2M	Aesthetics	High
Mitigate of aesthetic impacts from WWOs	$0.5M	Aesthetics	Low / Medium
TOTAL	**$13M**		



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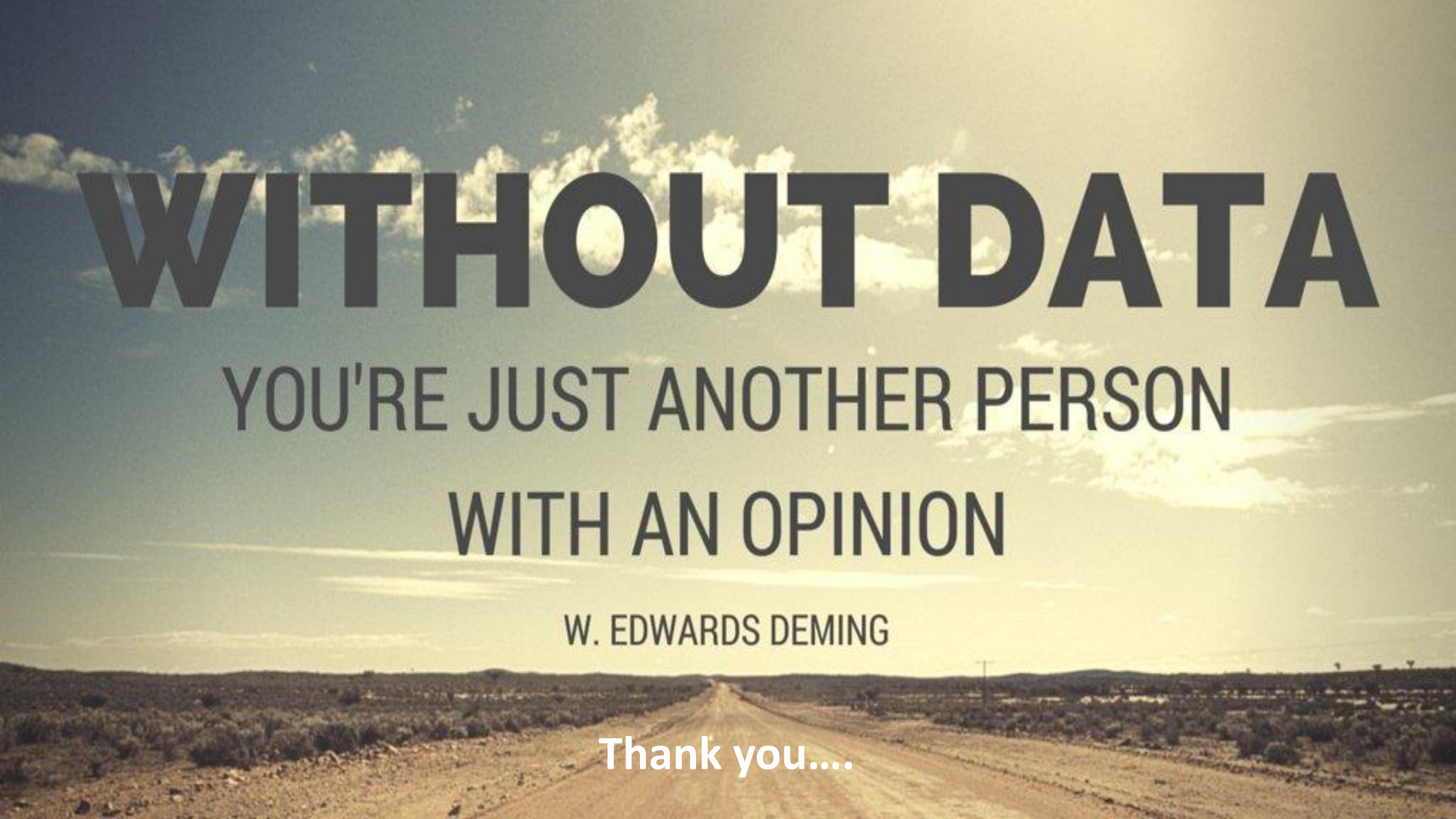
A brief history of water risk mitigation


WITHOUT DATA
YOU'RE JUST ANOTHER PERSON
WITH AN OPINION
W. EDWARDS DEMING

Thank you….