

Benthic Cyanobacteria and Toxin Production in New Zealand Rivers

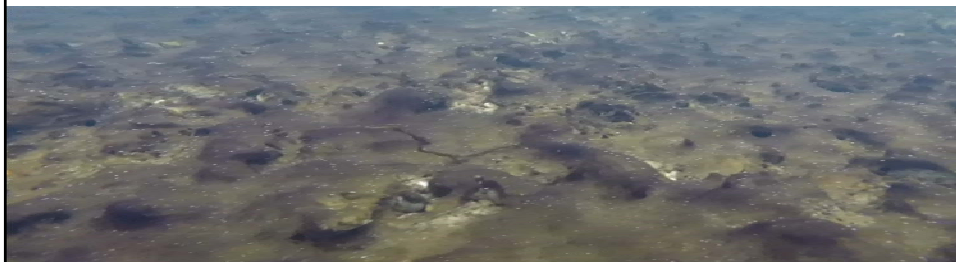


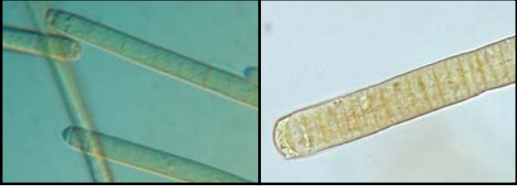
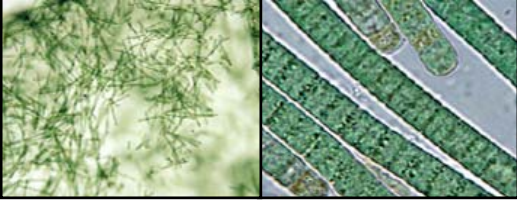



Susie Wood & Jonathan Puddick



Talk Outline

- Toxic species
- Our problems
- Knowledge to date - Ecology
- Toxins
- Monitoring and management
- On-going research

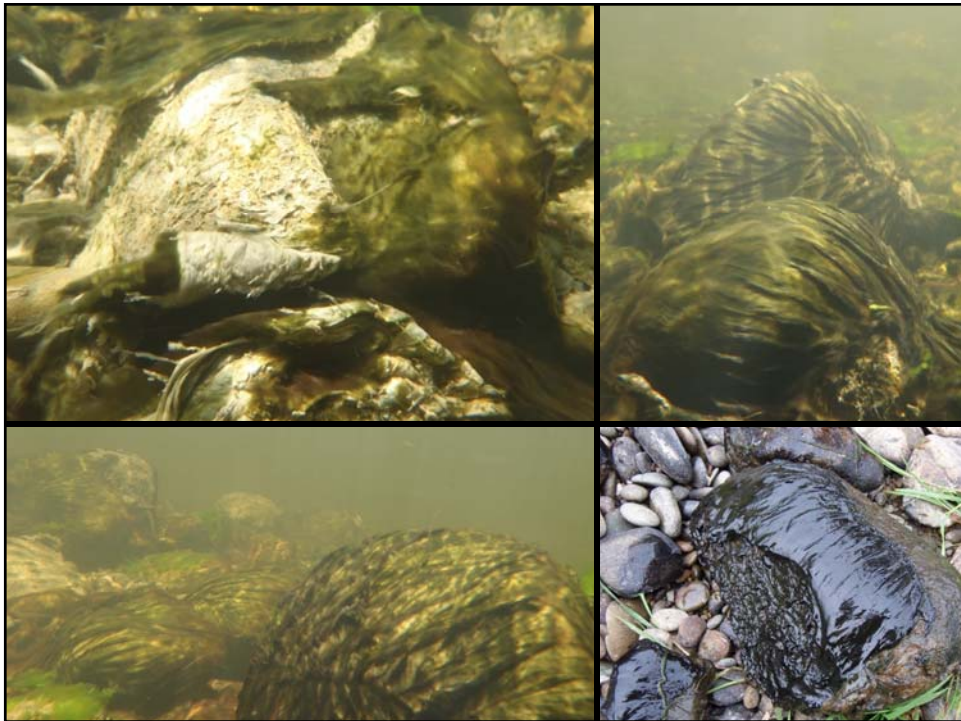


Species Responsible	
<ul style="list-style-type: none">• <i>Phormidium autumnale</i> ATX, HTX, dhATX, dh HTX	
<ul style="list-style-type: none">• <i>Planktothrix</i> sp. Microcystins	
<ul style="list-style-type: none">• <i>Scytonema</i> sp. Saxitoxins	
<ul style="list-style-type: none">• <i>Nostoc</i> sp. Microcystins	
<ul style="list-style-type: none">• Unknown sp. Nodularins	











THE HUTT NEWS, 21 NOVEMBER, 2008 NEWS 5

Toxic algae may have killed three Hutt dogs

THE THREE dogs taken in Hutt River last night were found dead in the river. The incident is being investigated by the Hutt City Council. The dogs were found in the river near the Hutt River bridge. The incident is being investigated by the Hutt City Council. The dogs were found in the river near the Hutt River bridge. The incident is being investigated by the Hutt City Council.

Algae can be deadly

TOXIC ALGAE can be deadly to dogs, as was demonstrated by the deaths of three dogs in the Hutt River last night. The incident is being investigated by the Hutt City Council. The dogs were found in the river near the Hutt River bridge. The incident is being investigated by the Hutt City Council.

Dog killed by toxic algae in Hutt River

COLIN PATTERSON

A DISTRAUGHT Wellington dog owner performed cardiac massage on his dog in a desperate attempt to revive the animal when it collapsed after a swim in the Hutt River.

Despite his efforts, Richard Nicholls' six-year-old Labrador cross, Maggie, died after a dip in the river on Sunday. Dog owners had been warned to keep their animals out of the water after tests revealed high levels of a bacterial algae.



"It's like losing one of your kids. My wife said she will refuse to go to the Hutt River ever again."

The Nicholls' other three dogs had their stomachs pumped. Mr Nicholls believed Maggie's death would have been prevented had they been better signage. He saw no signs when he arrived at the river, though later saw one "relatively inconspicuous" sign. There were other dogs in the water with their owners.

Hutt City Council spokesman John Pepper said the council had erected more than 70 signs along the river. The council had also used the media to inform owners. Animal control staff advised in the area had been alerted.

Upper Hutt City Council had also posted signs by the river and had told dog owners about the problem. Health officials said yesterday that the algae had now been found in Manawatu.

Council looks into dog 'poisonings' from river visits

HUTT CITY Council is looking into a claim that three dogs have been poisoned whilst swimming in the Hutt River. Louise Pierce from Taita says she took her dog Max for a swim near the dog exercise area north of Fraser Park on Sunday.

Her dog got sick shortly afterwards and had to be taken to the After Hours vet. The vet told her that she was the third person to bring in a dog that appeared to have been poisoned during a visit to the river.

Max was induced to a vet treated her as if she was poisoned with 1080. "If I had not got her to the vet, she would have died," Louise said. Whilst Max made a quick recovery, she was told that other dogs had died.

Council animal control Dalton told the Hutt News they went to press yesterday to look into the matter. If there is any problem, he says the council sign warning dog owners

Warning too late: Labrador cross Maggie died after swimming in the Hutt River last Sunday. Owner Richard Nicholls saw no warnings.

— while his wife drove to a vet. The vet put Maggie into an incubator and gave her adrenaline. However, efforts failed.

Both Mr Nicholls and his wife were upset at the loss of Maggie.

Fears killer algae may flare up in other areas

AUTHORITIES fear a toxic algal bloom in the Hutt River that has killed at least two dogs will flare up in other Hutt Valley waterways. It has brought a warning to keep children and pets away from shallow water. Hutt City Council is urging residents to be vigilant around streams, ponds and drainage ditches as warm weather and low rainfall increase the risk of the algae. Greater Wellington regional council issued a warning last week about high toxin levels in the Hutt River. Lower Hutt environmental health officer Dawn Bentley said the toxin was likely to be the same algae that killed dogs at Walkaway five years ago. The council advised rural land owners with private water supplies to check for the algae. It is described as a thick, black-green slimy mat. Anyone with concerns should use an alternative source of water. Hutt and Upper Hutt city councils have erected signs along rivers and stream banks advising of potential hazards from swimming or walking dogs. The algal bloom will remain a threat until it is washed away by a heavy downpour.



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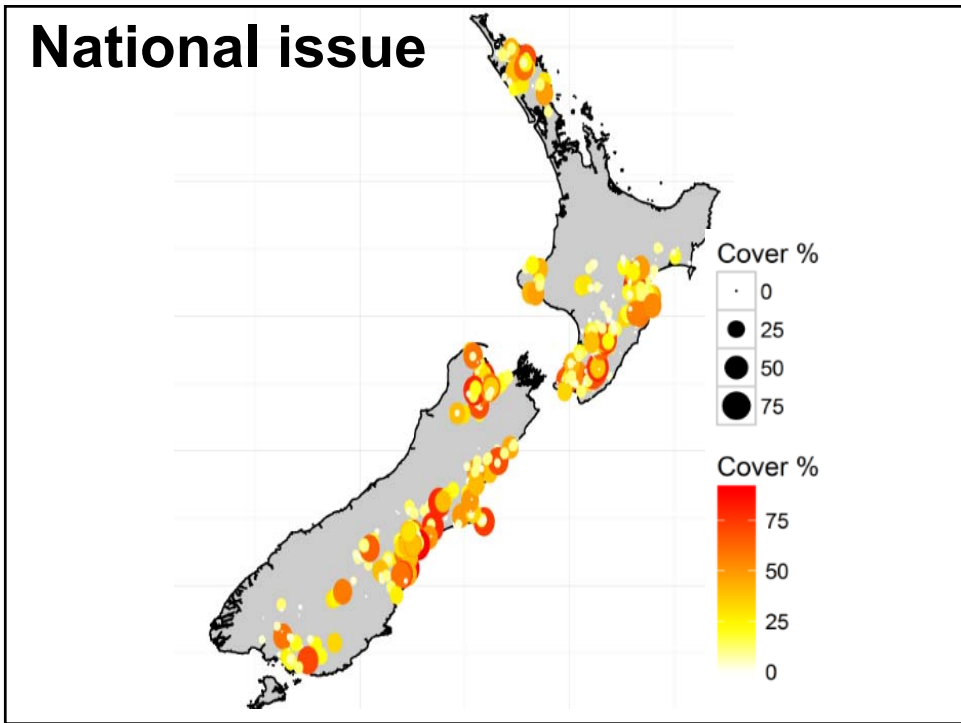
Toxic algae may have killed another dog

ALGAL BLOOM it would increase the risk of the Hutt and Wellington Regional Councils. Regional council officer Dawn Bentley said the toxin was likely to be the same algae that killed dogs at Walkaway five years ago. The council advised rural land owners with private water supplies to check for the algae. It is described as a thick, black-green slimy mat. Anyone with concerns should use an alternative source of water. Hutt and Upper Hutt city councils have erected signs along rivers and stream banks advising of potential hazards from swimming or walking dogs. The algal bloom will remain a threat until it is washed away by a heavy downpour.

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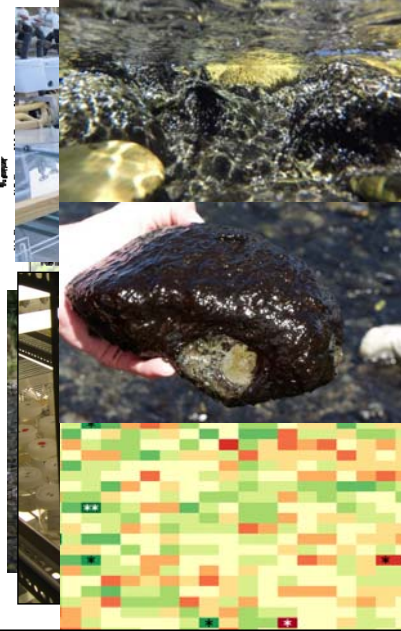
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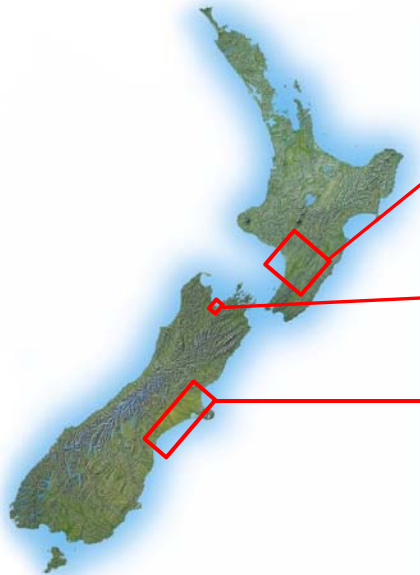


Ecology - Overview of approaches

- National scale
- Regional scale
- High-resolution river/site
- Experimental
 - in river
 - channels
 - cultures
- Within mat
- Cellular



River scale - weekly sampling



Manawatu

- 10 sites
- 2 years

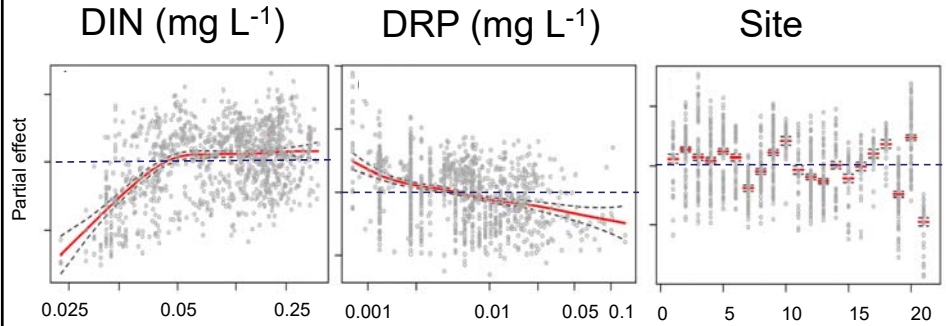
Nelson

- 3 sites
- 3 summers

Canterbury

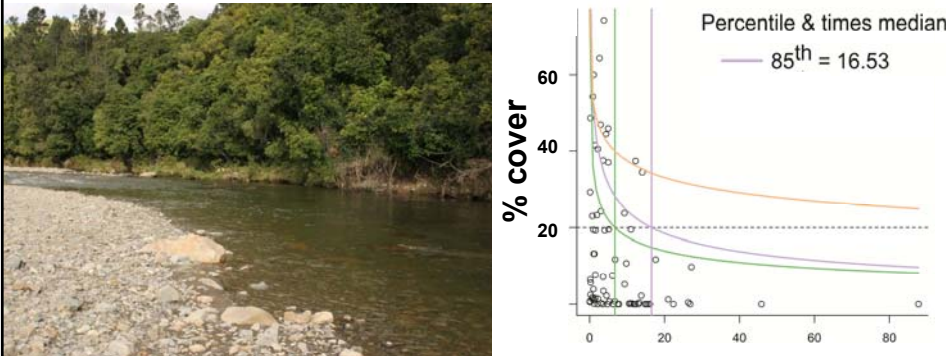
- 8 sites
- 8 months

River scale - weekly sampling

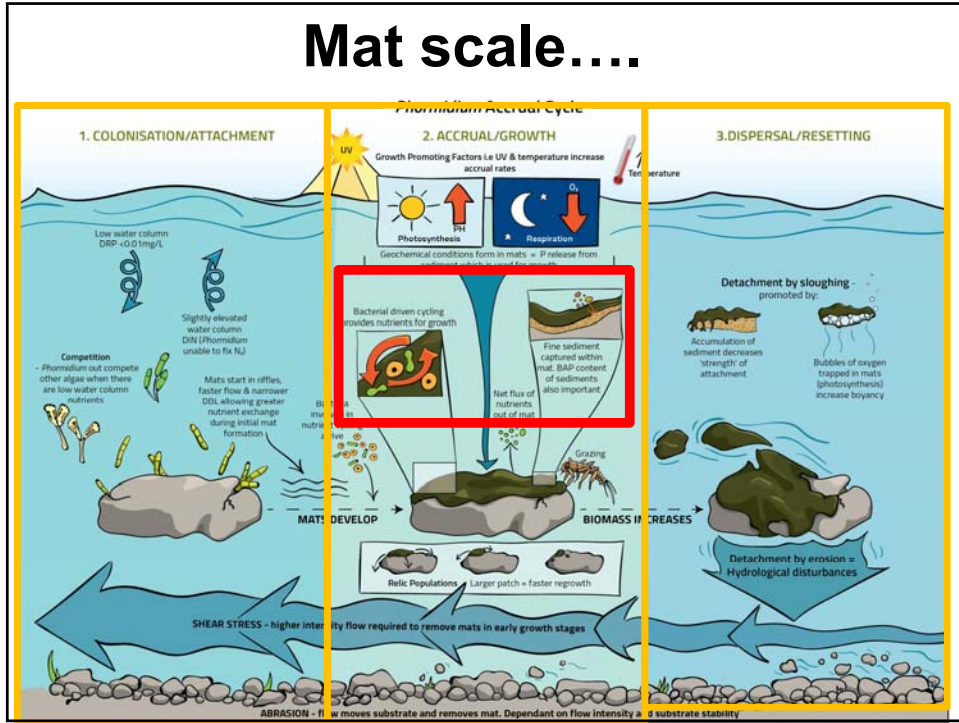


- Strong patterns - DRP (<0.01 mg L⁻¹)
- Generalities - DIN
- Site specificity - hierarchies of importance

Site Specificity

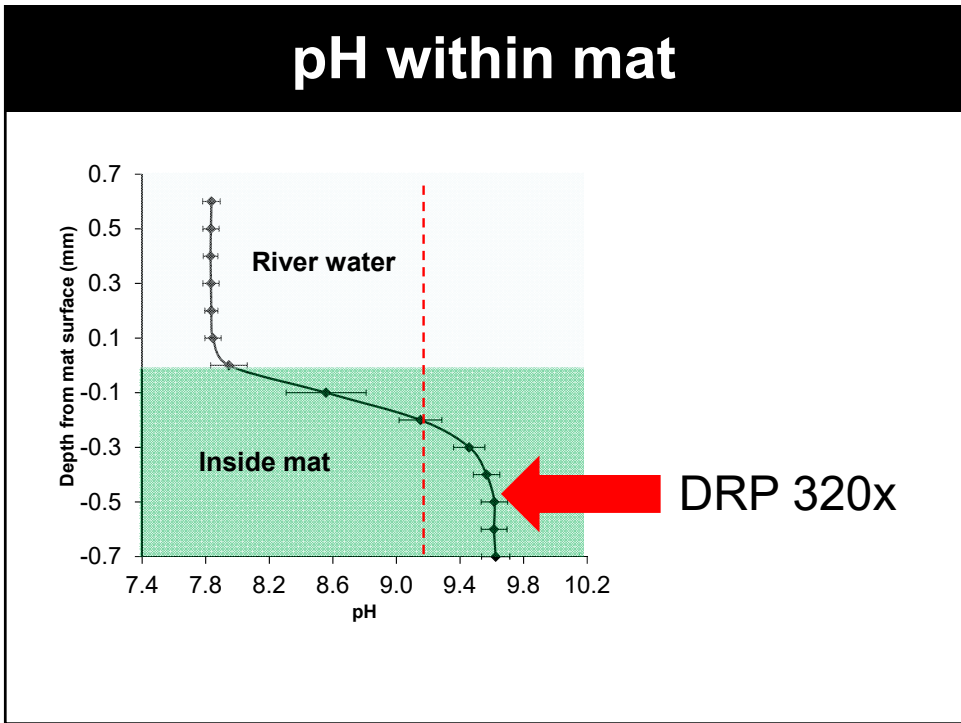


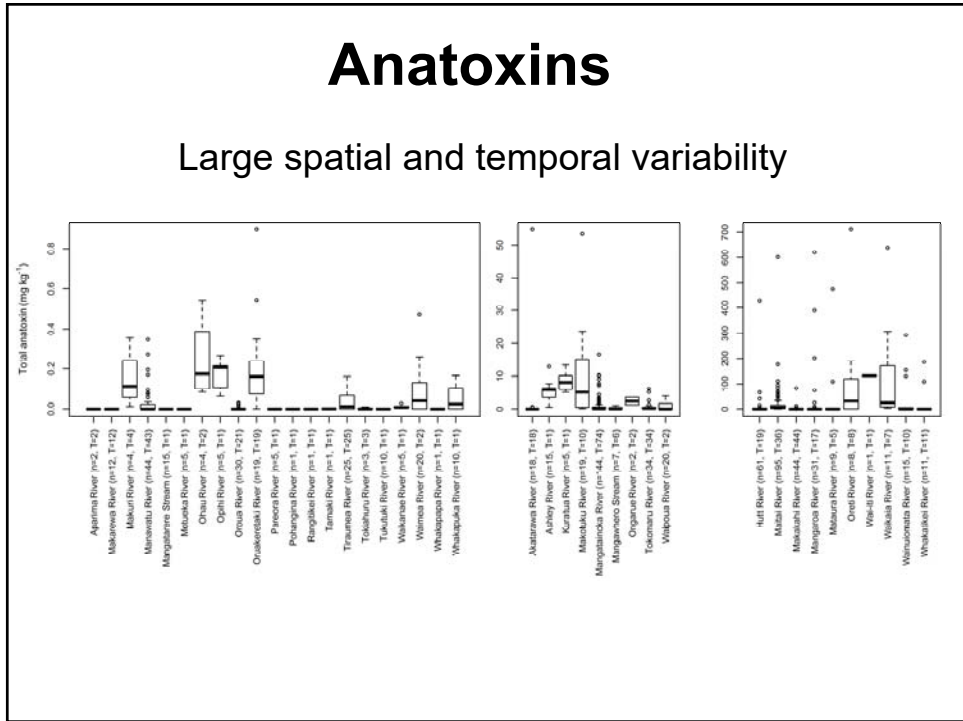
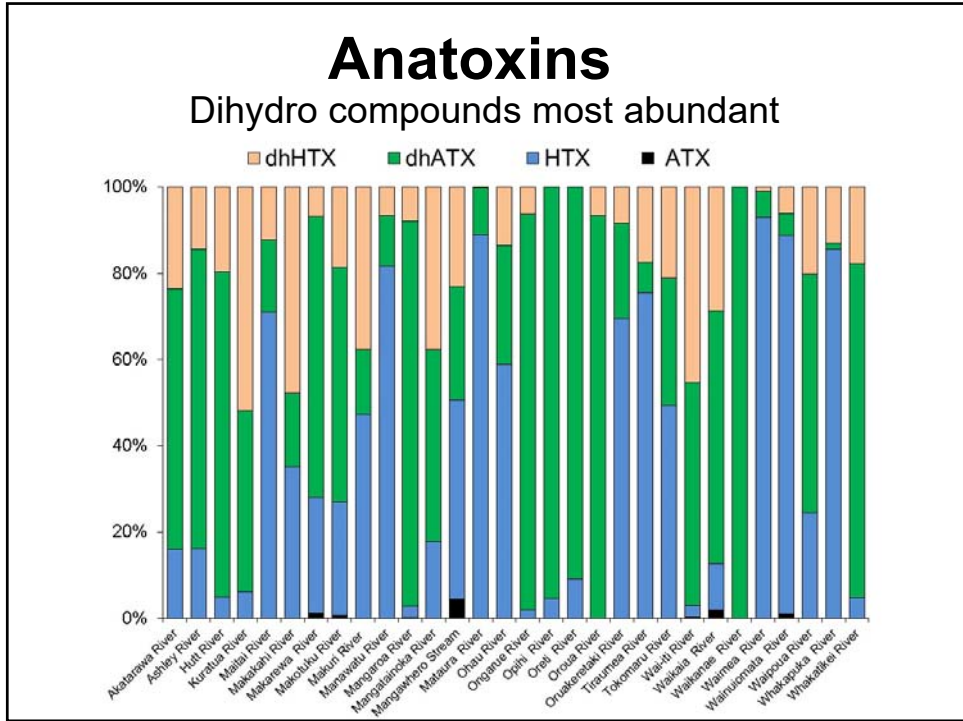
Mat scale....

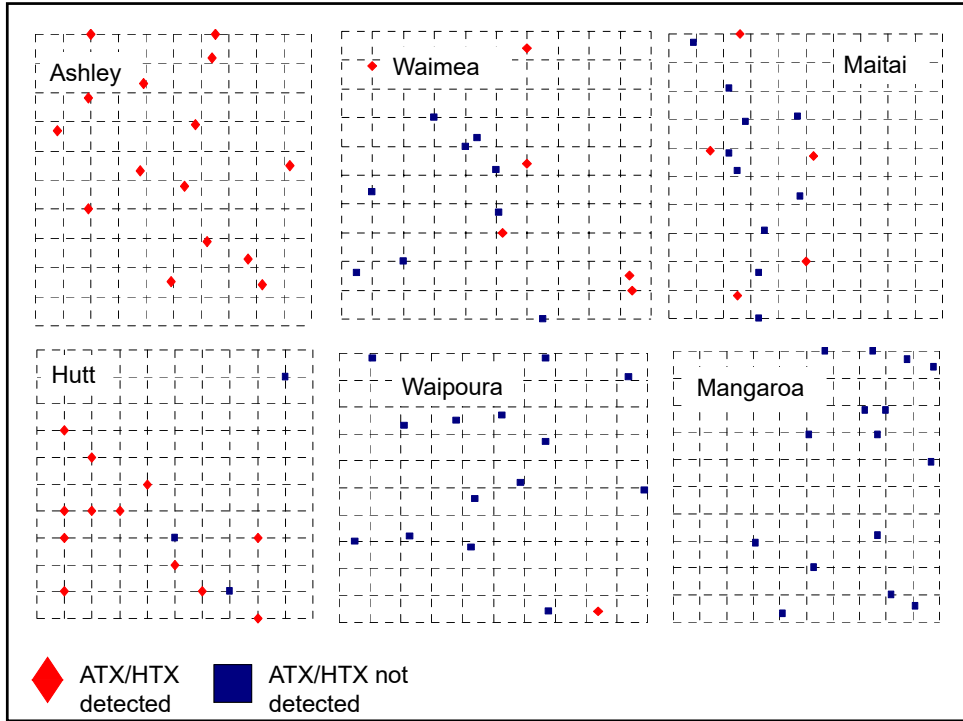


Fine sediment?

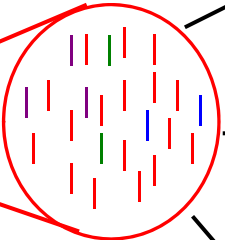






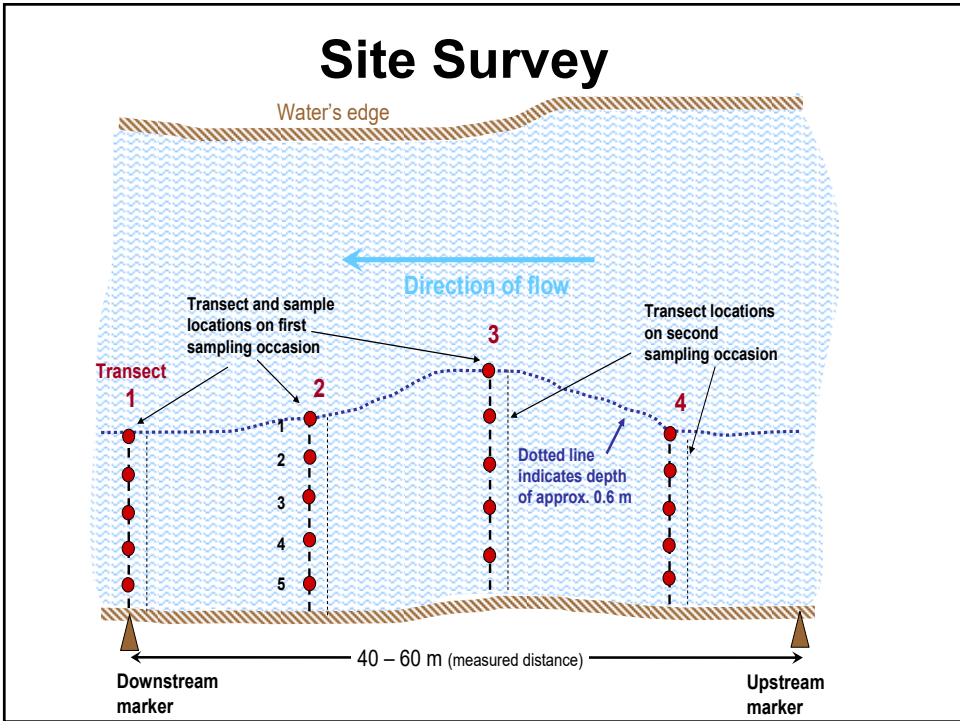


Single Mat Isolates



ATX mg/kg	ATX Gene
66.9	+
0.0	-
28.8	+
31.3	+
152.3	+
115.4	+
80.6	+
32.7	+
0.0	-
0.0	-
4.8	+
74.6	+
73.6	+

<h1>Recreational Guidelines</h1>	
<p>Surveillance (green mode) Up to 20% coverage.</p>	<ul style="list-style-type: none"> •fortnightly surveys
<p>Alert (amber mode) 20–50% coverage.</p>	<ul style="list-style-type: none"> •Notify the public health unit. •Increase sampling to weekly. •Recommend erecting information signs Consider cyanotoxins testing
<p>Action (red mode) <i>Situation 1:</i> Greater than 50% coverage or <i>Situation 2:</i> up to 50% cyanobacteria are visibly detaching from the substrate</p>	<ul style="list-style-type: none"> •Immediately notify the public health unit. • Consider testing samples for cyanotoxins.. •Notify the public of the potential risk to health.



Information & warning signs

WARNING
TOXIC ALGAE MAY BE IN THIS RIVER
 IT CAN MAKE PEOPLE SICK AND KILL DOGS

INFORMATION! Panui!
 Toxic algae may be in this river
 Toxic algae are a group of cyanobacteria, also known as blue-green algae, that can be harmful to humans and animals.

TOXIC ALGAE IN WELLINGTON'S RIVERS
 Keep you and your animals safe

Information videos e.g., <https://vimeo.com/160826825>

On-going research

- Effect on aquatic organisms
- Factors effecting accrual cycles (experimental)
- Factors effecting toxin production (molecular)
- Toxicity of anatoxins
- Improving guidelines
- Management (small scale-experiments)



