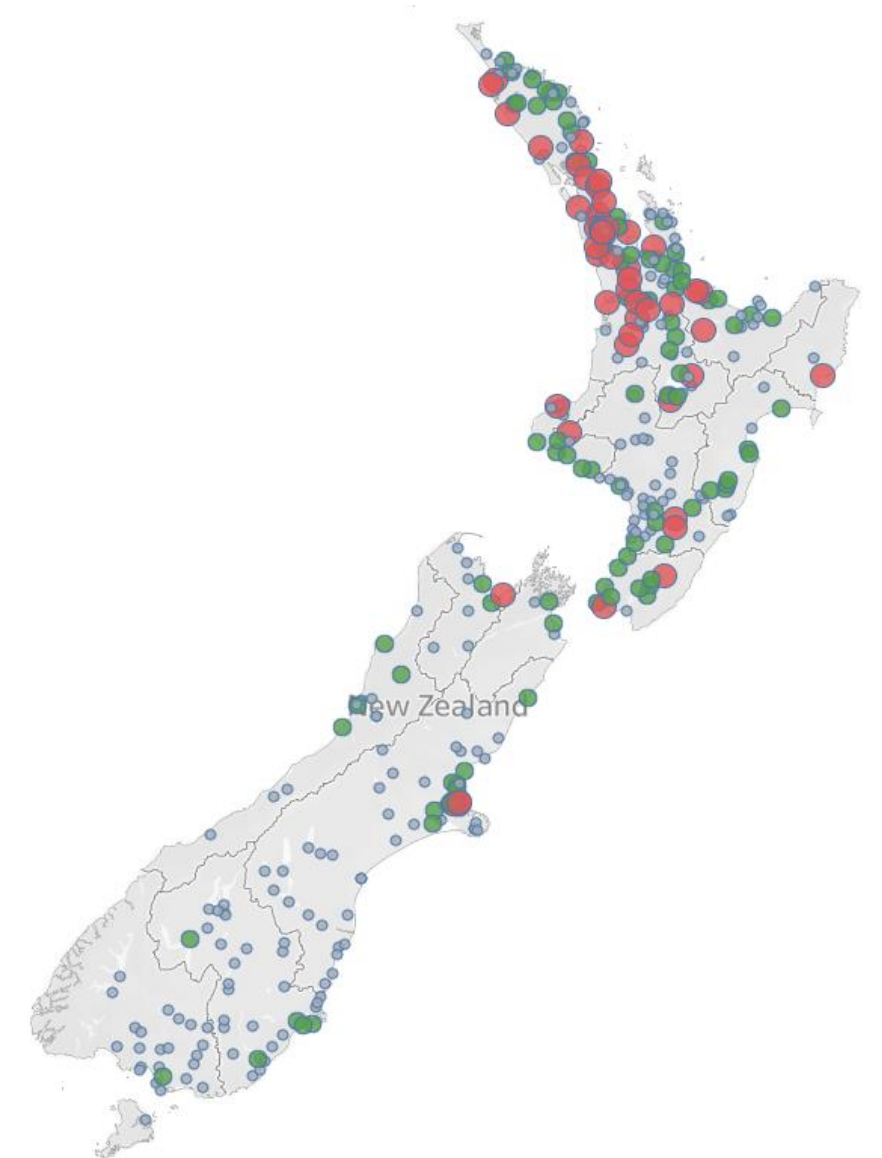


From Loos to Lockdown: Wastewater Surveillance of SARS-CoV-2 in Aotearoa

Kirsten Carter, Joanne Chapman, Dawn Croucher,
Brent Gilpin, & Joanne Hewitt

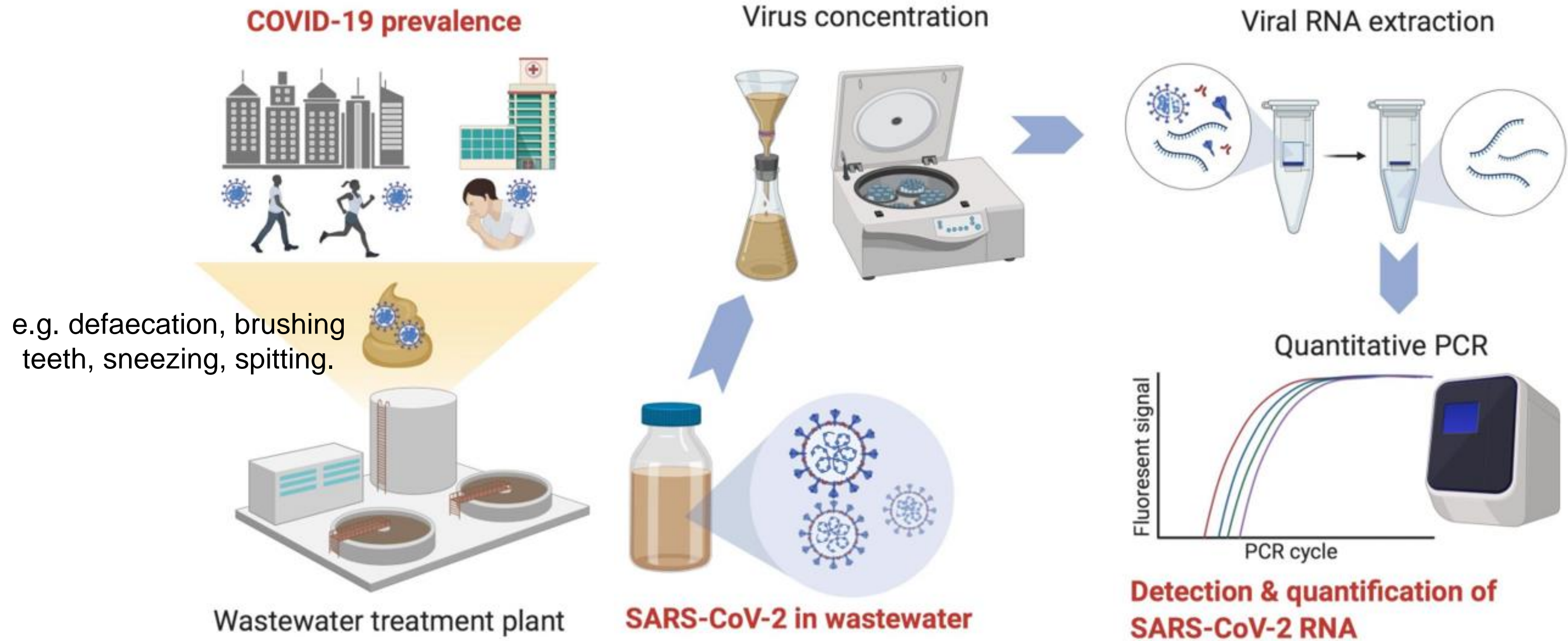


COVID-19 Surveillance

- Surveillance of COVID-19 has been carried out through case reporting, whole genome sequencing, and contact tracing.
- Detecting **SARS-CoV-2** RNA in wastewater is a novel and useful tool to support surveillance in communities and large populations.



Poop to PCR

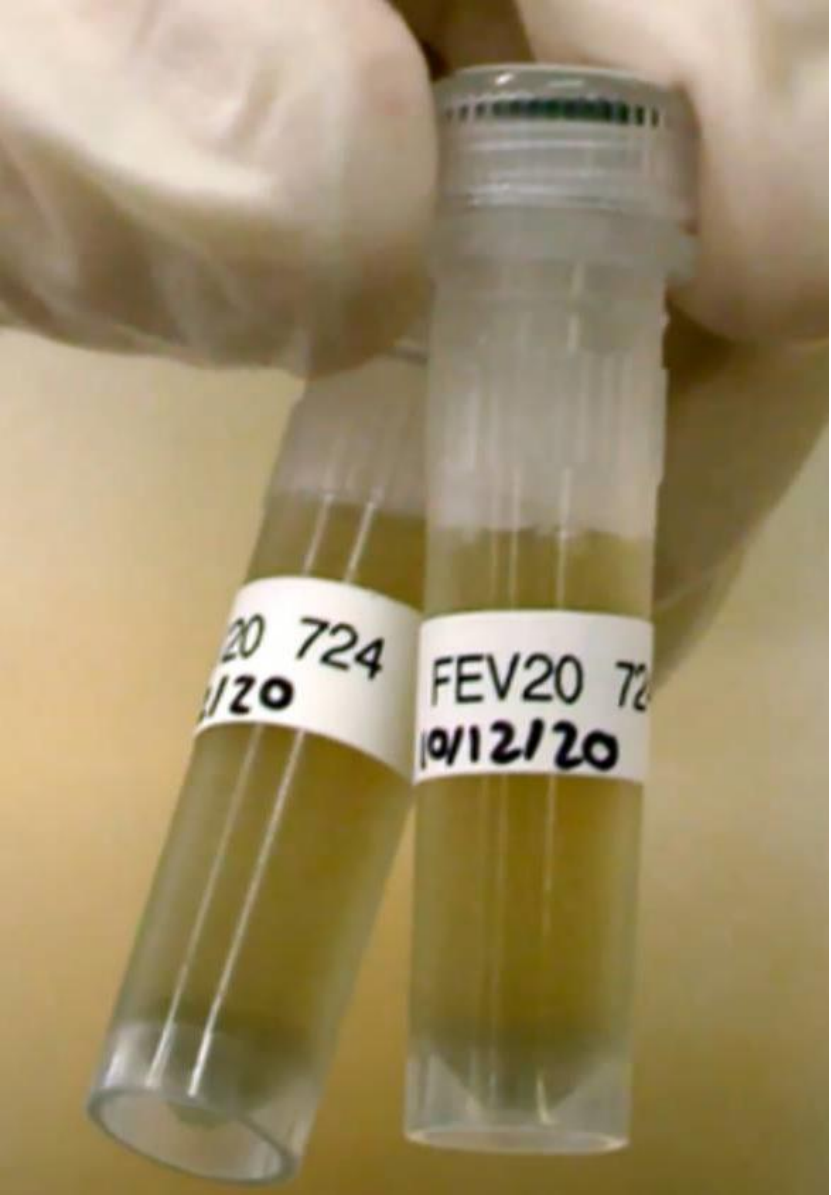


Poop to PCR at **E/S/R** Science for Communities

Arrival:



Processing:



250mL
into
1.25mL

Final concentrate

Extracted and undergo specific RT-qPCR testing

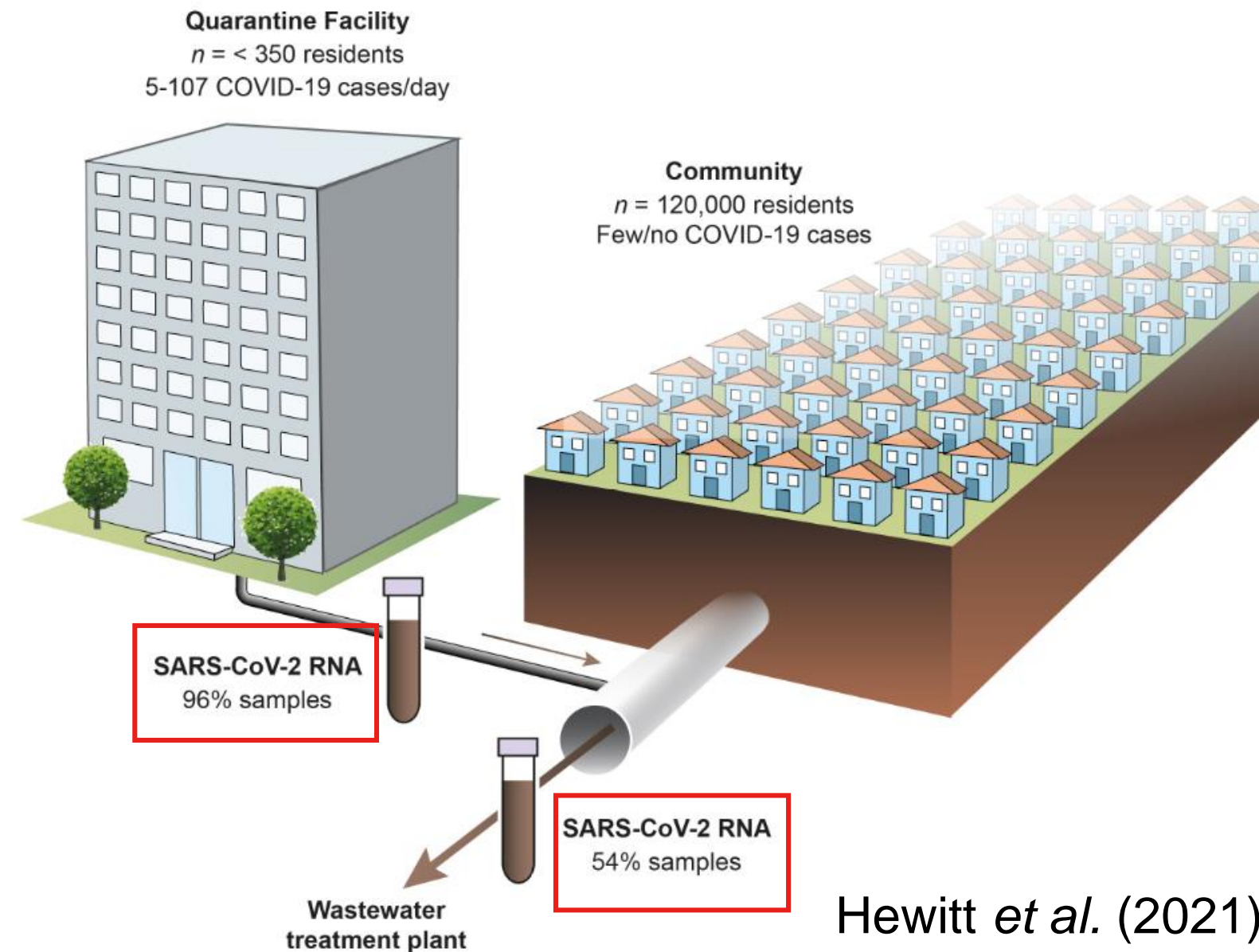
Humble beginnings

- July 2020 – first detections from Jet Park Hotel (JPH)
 - All international travellers placed in quarantine and moved to JPH if **positive** test returned.

- Estimation of sensitivity for our method

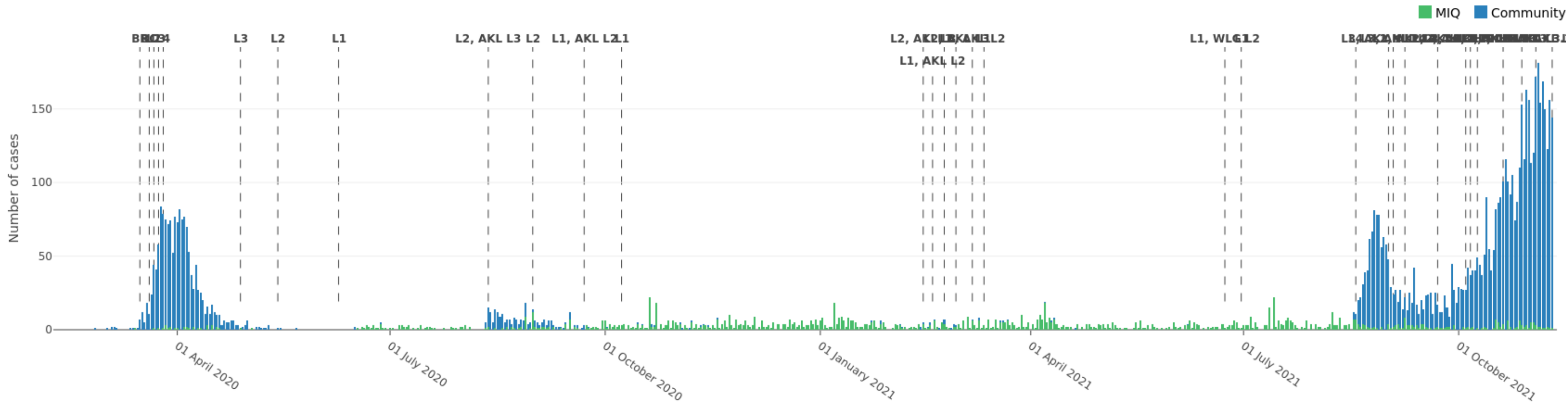
In 100,000 population:

- Up to 41% detection probability with 5 cases
- Up to 87% detection probability with 10 cases
- 90-100% detection probability with 40 cases



Delta's Impact

Case curve - cases by MIQ/community - daily



- Since the first case of Delta was confirmed on 17th August....

Wastewater surveillance of 3.9 million people

95% of all New Zealanders on reticulated water supply

430 wastewater samples have been collected and tested from **148 sites**

98 in the North Island and ...

50 in the South Island

3rd September 2021

Wastewater surveillance of 3.9 million people

95% of all New Zealanders on a reticulated wastewater network

1,294 wastewater samples have been collected and tested from **176 sites**

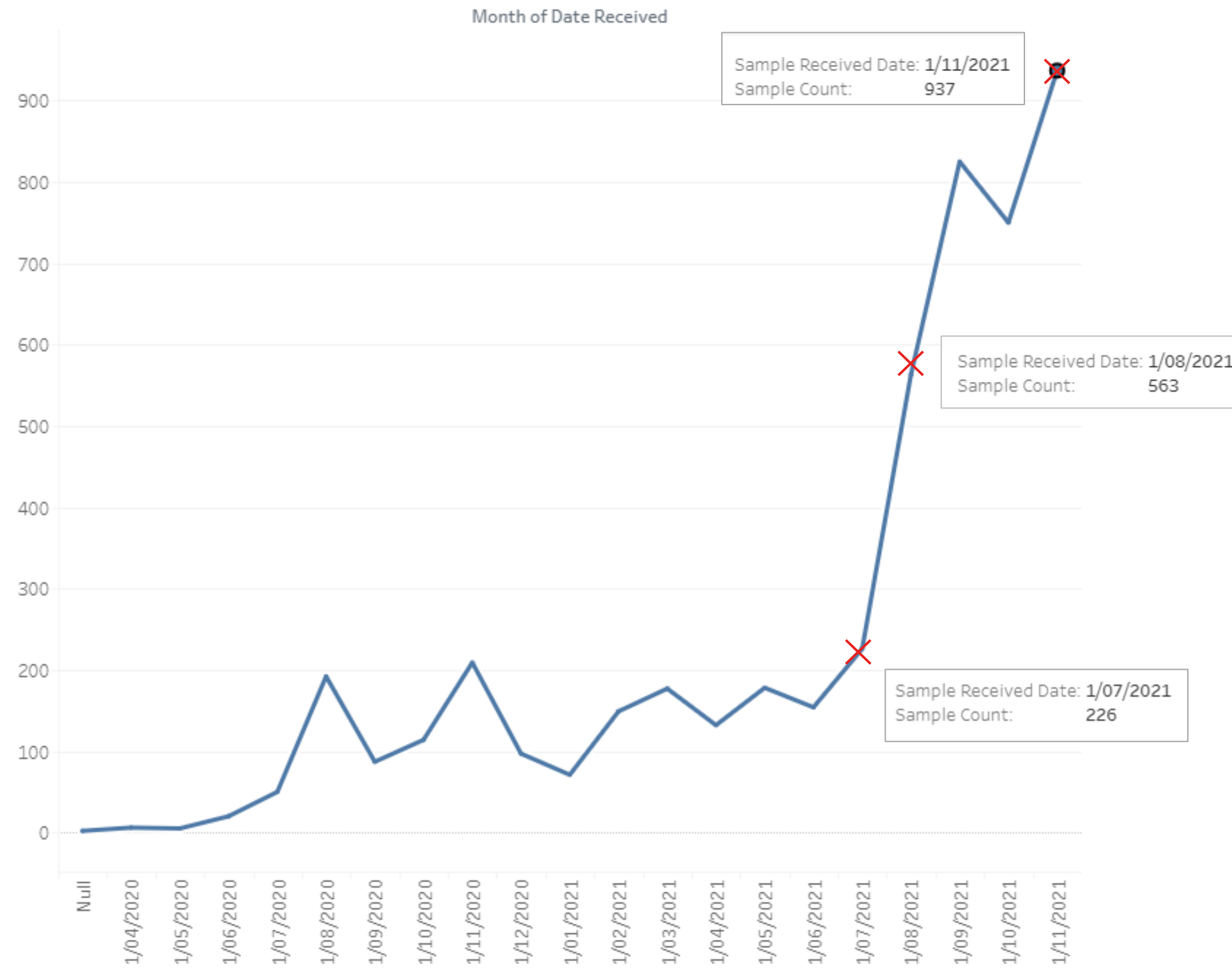
125 in the North Island and ...

51 in the South Island

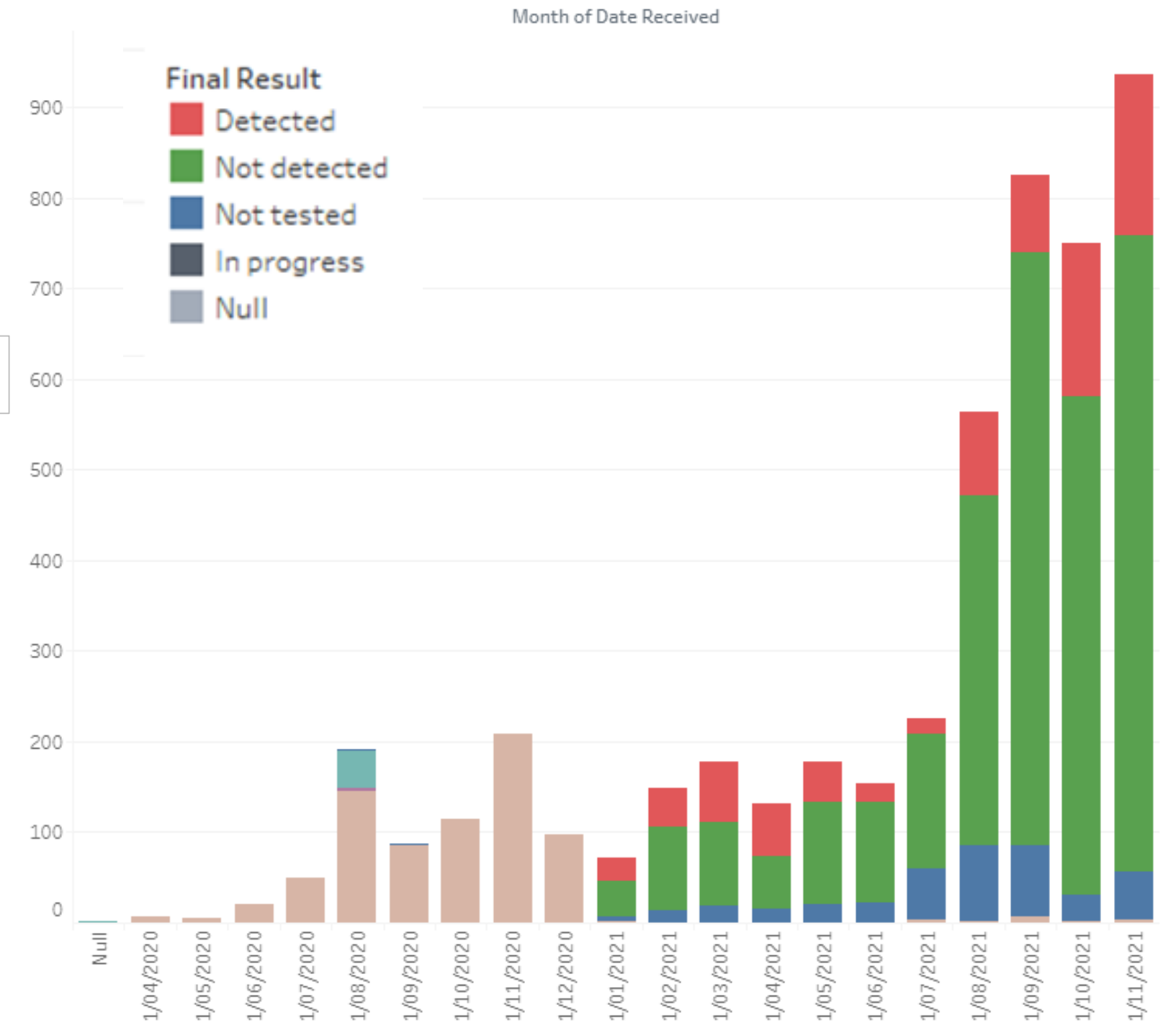
15th October 2021

Impact on Wastewater Lab

Number of samples received over time



Number of samples received by final results



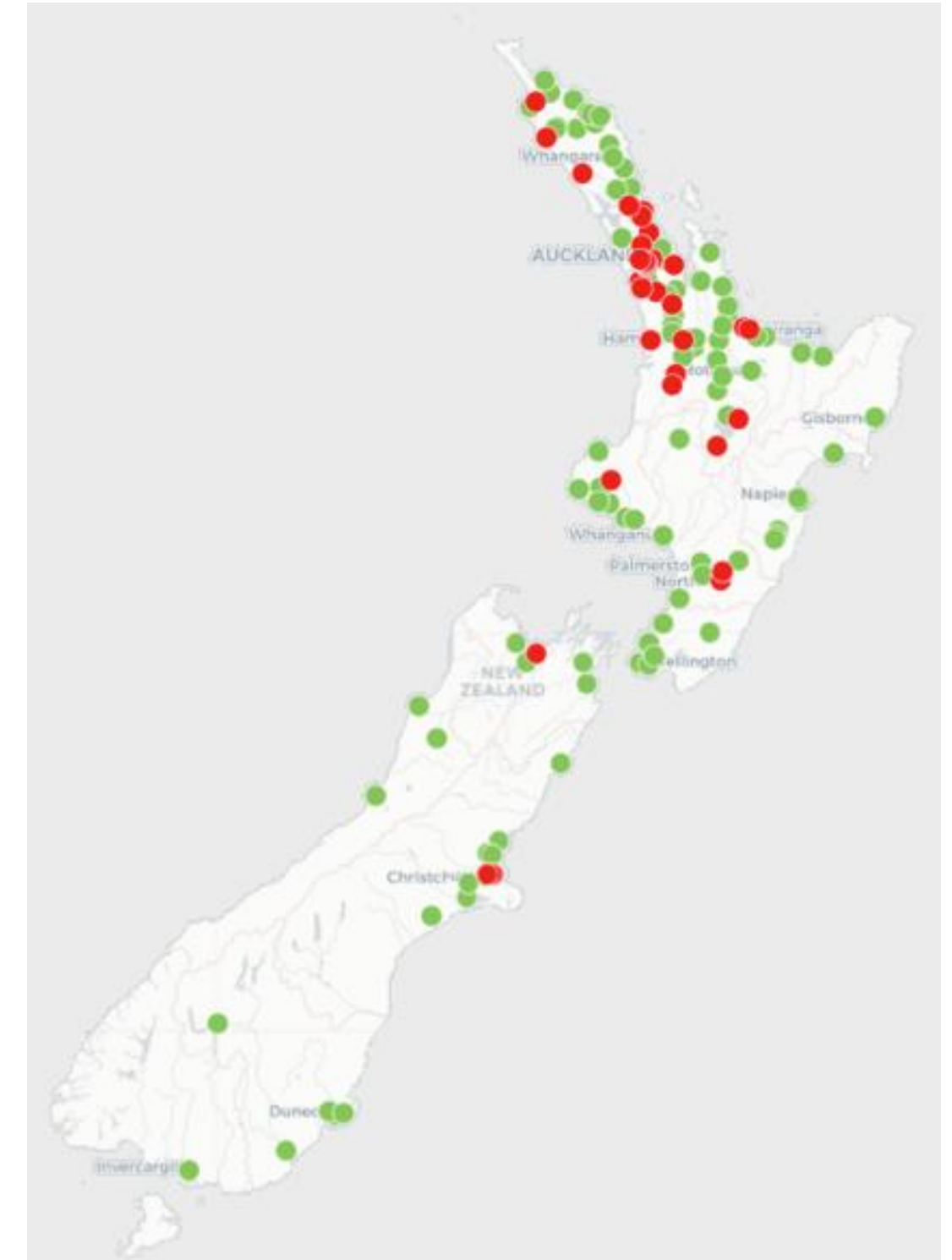
Map of our surveillance



1st – 14th August 2021 (27 sites)



15th – 31st August 2021 (148 sites)



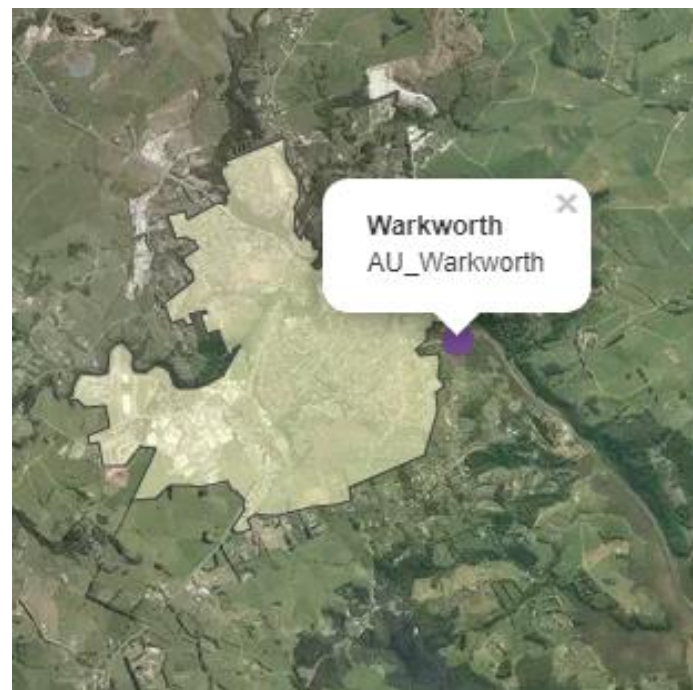
November 2021 (153 sites)



Effect of detection: case studies

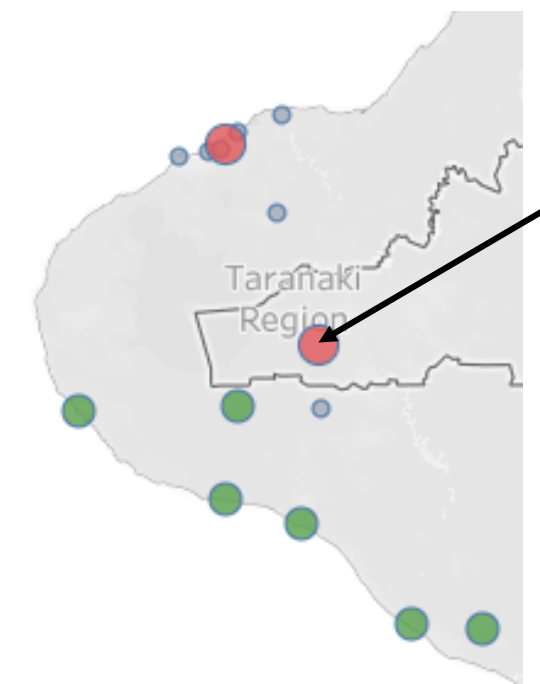
During Delta there have been instances when the presence of COVID-19 in communities was detected in wastewater **before** clinical positives were reported.

Warkworth – August 2021



Population: 3,500

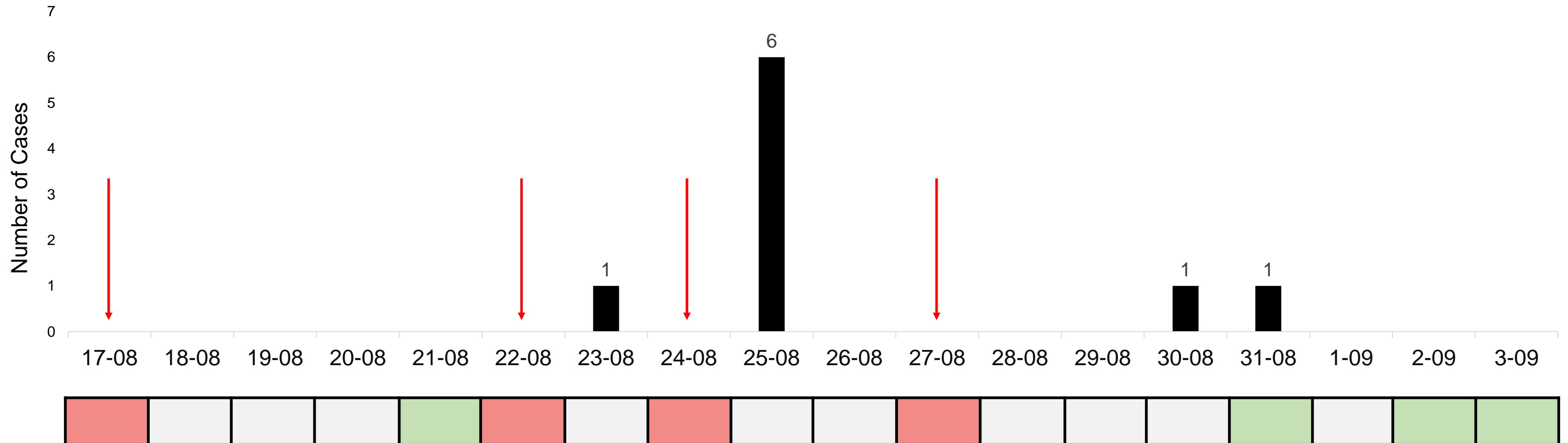
Stratford – November 2021



Population: 9,900

Timeline of events

Warkworth – August 2021

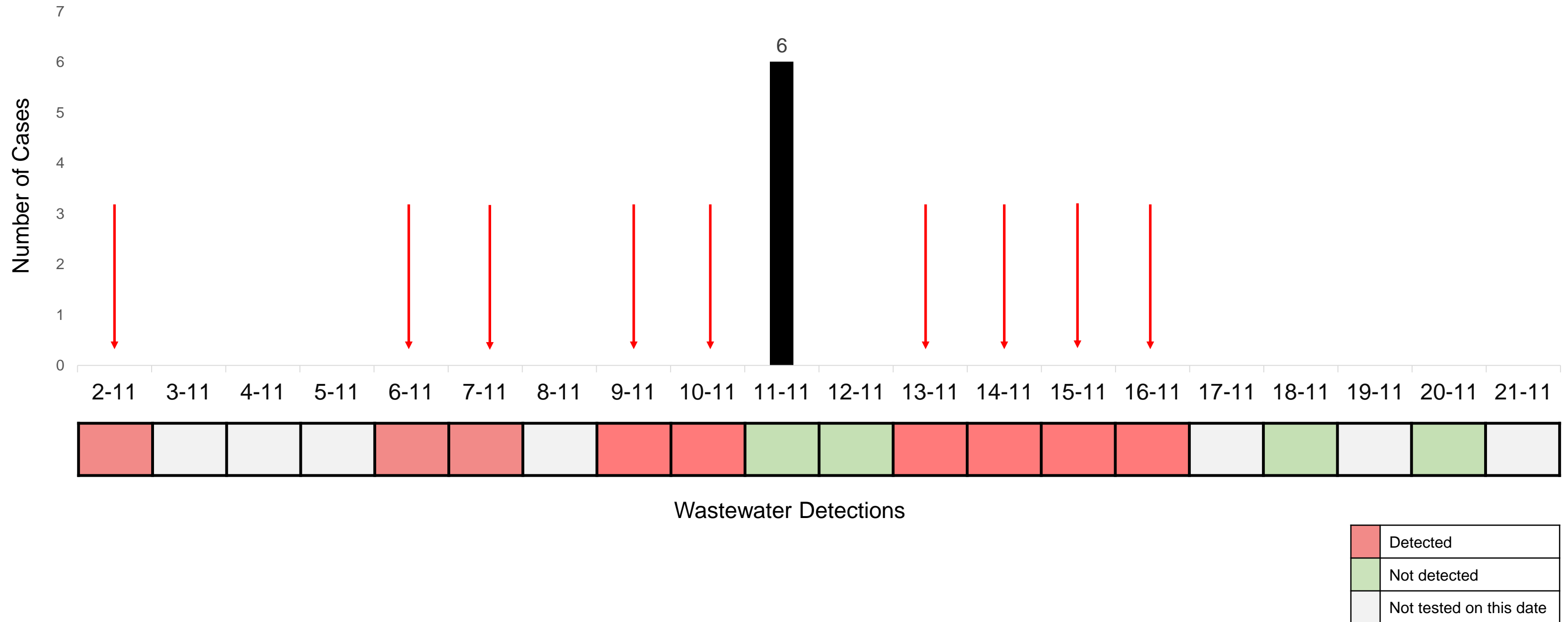


Wastewater Detections

Detected
Not detected
Not tested on this date

Timeline of events

Stratford – November 2021



Informing Public Health Action



Covid-19: Warkworth residents asked to get tested after virus found in wastewater ▶

Caroline Williams · 14:53, Aug 21 2021



Race on to find source after Covid-19 found in Taranaki wastewater ▶

Jane Matthews · 14:08, Nov 05 2021



Covid-19: Wastewater results see Stratford Speedway meet cancelled

Jane Matthews · 09:57, Nov 06 2021



Covid-19: Negative wastewater test results key to get out of lockdown ▶

Bridie Witton · 05:00, Sep 04 2021



Dr Jason Smith, Kaipara Ma...
@drjakesmith

Thanks and shout out to @ESRNewZealand for working round the clock to get Northland wastewater testing done. Amazing effort. These results put us in the clear ✓
Covid-19 coronavirus Delta outbreak: Northland wakes to level 3



Tweet your reply

Why continue Wastewater Testing?

- Wastewater testing, alongside other surveillance tools, will still be of significant value should COVID-19 become endemic in Aotearoa New Zealand.
 - Monitor community infection rates through quantification of virus levels in wastewater.
 - Currently working on the detection of variants.
 - Long term information: will we see seasonal fluctuations? Vaccine effectiveness across different regions?
- Public response after detection – increased community testing, mask-wearing, and location scanning.

Big Thanks

EEFV Lab

Joanne Hewitt

Dawn Croucher

Joanne Chapman

Tammy Waters

Ashley McDonald

Andrew Ng

Olivia Macrae

Watercare AKL

Rose Sim

Cassandra Billiau

ESR

Brent Gilpin

Richard Dean

Bridget Armstrong

Alex Eustace

Carmen Vettori

Mary Brunsdon



MANATŪ HAUORA



MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI



Every council, sampler, and courier driver involved so we had samples to test!