

Lake cyanobacterial monitoring

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Science Evening

Holiday Inn – Thursday 7th April



Bay of Plenty Regional Council, Rotorua Lakes Council and Te Arawa Lakes Trust.
Working as one to protect our lakes with funding assistance from the Ministry for the Environment.

#love our lakes
rotorualakes.co.nz



Outline

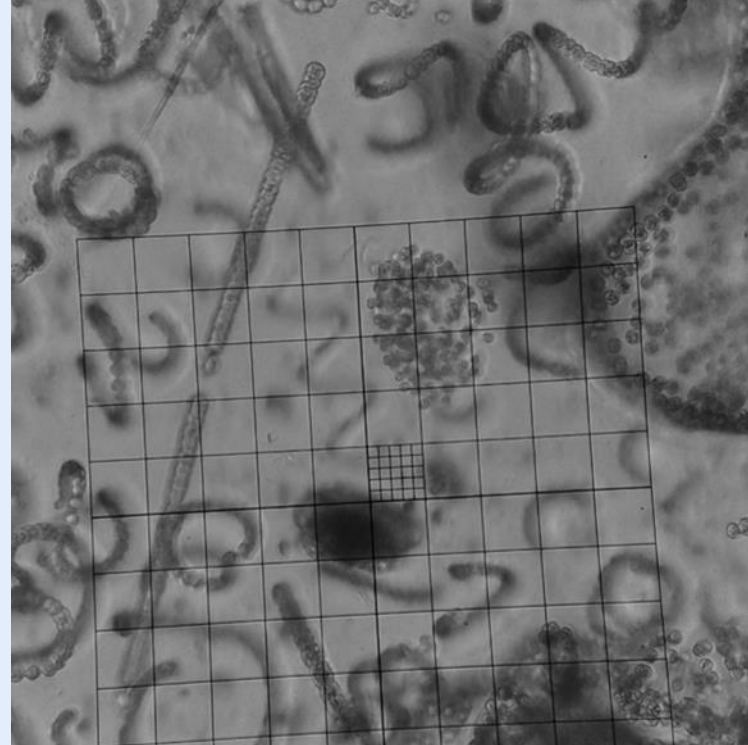
Bay of Plenty Regional Council Algal Monitoring Program

- Cyanobacteria –blue green algae
- BOPRC – Cyanobacteria monitoring
- Recreation Bathing Standards- Alert Level Framework
- Summer cyanobacteria trends 2014/2015 & 2015/2016
- Conclusions
- Questions

Cyanobacteria

Blue green algae

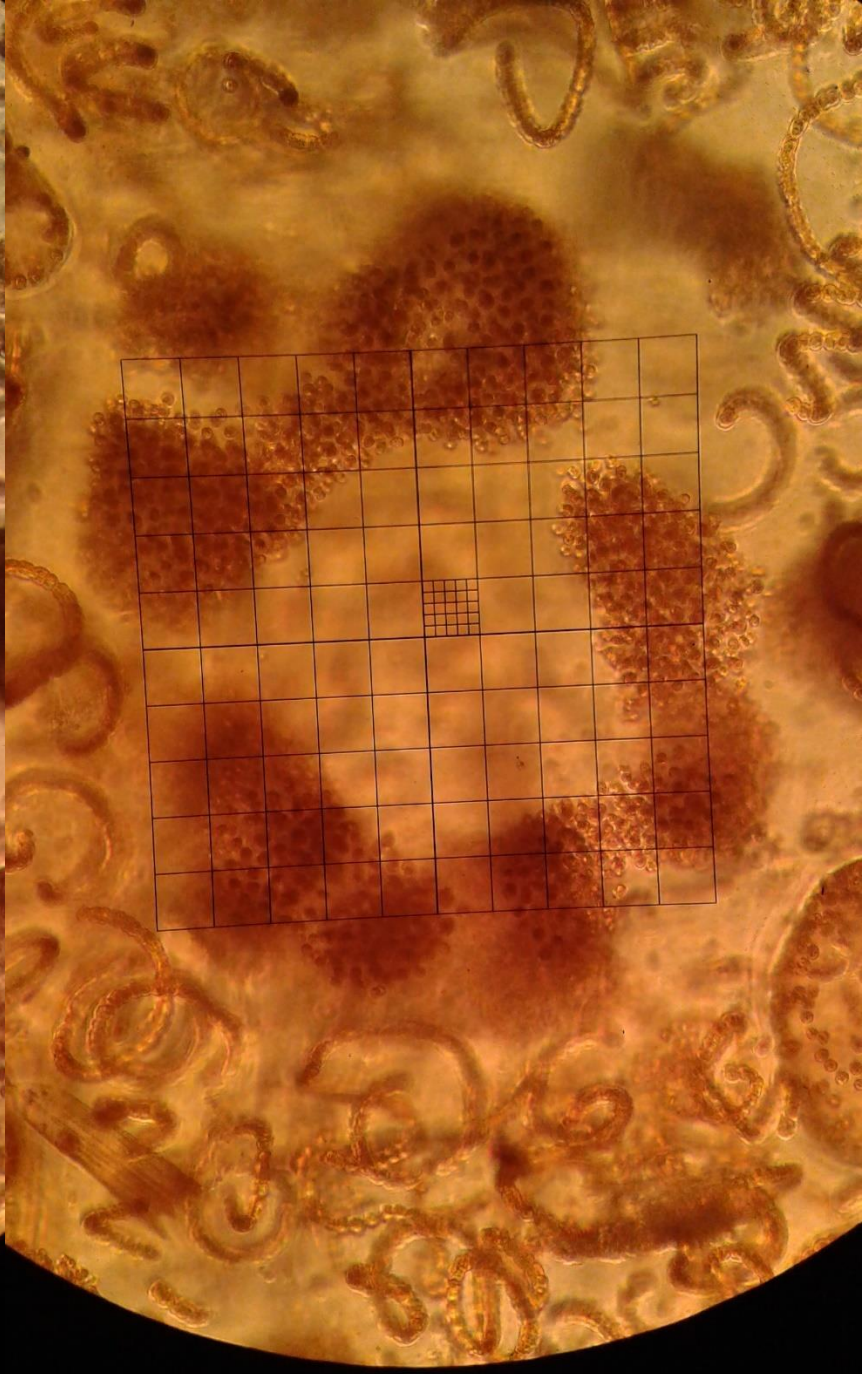
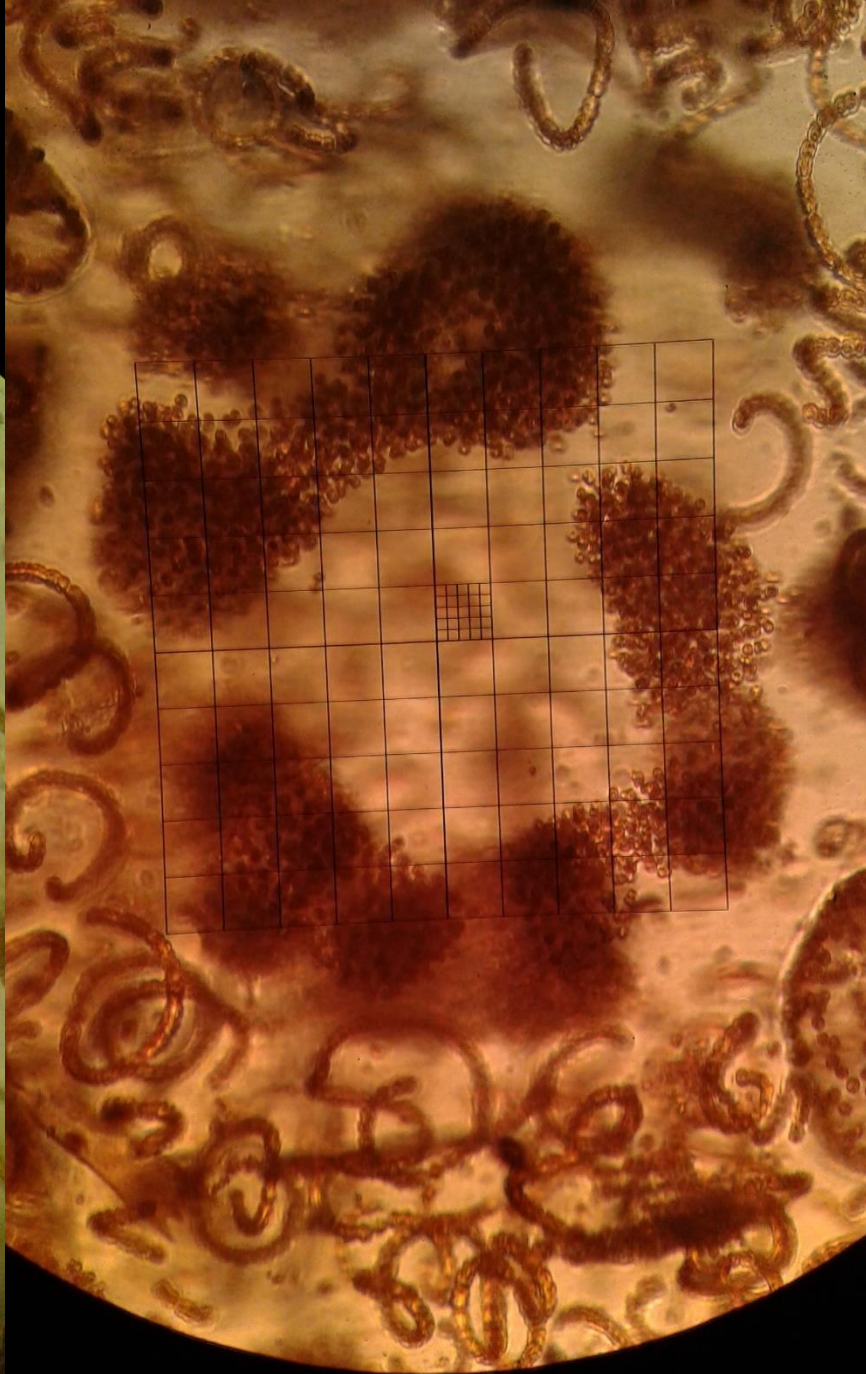
- **Planktonic single celled organisms**
- **Abundant and diverse in freshwater**
- **Lake temperatures increase in the summer and this increases blue green algae growth rates**
- **Some species of blue green algae are potentially toxic and these toxins can be harmful to humans**



BOPRC Cyanobacteria monitoring

What we do

- During summer we monitor a minimum of 12 sites on four lakes, sampling is conducted weekly to ensure bloom activity is identified
- We quantify the Cyanobacteria *blue green algae* species using counted cell biovolumes
- Total cell biovolumes for cyanobacteria are then classified using the alert level framework
- From our results the issue of a public health warning is given by Toi Te Ora Public Health Services



HEALTH WARNING

LAKE ROTOEHU

THERE IS A CONFIRMED PRESENCE OF
BLUE-GREEN ALGAE

UNTIL FURTHER NOTICE
THE WATER SHOULD **NOT** BE USED
FOR:

**DRINKING
SWIMMING
WATER CONTACT SPORTS**

FOR FURTHER INFORMATION CONTACT:

COMPLIANCE SOLUTIONS
ROTORUA DISTRICT COUNCIL
1061 HAUPAPA STREET
ROTORUA

Telephone:
(07) 348 4199

DATED: 16 FEBRUARY 2015

Sample Review

Recreational Bathing Standards

Alert Level Framework

- **To protect the public from risks associated with exposure to cyanobacteria i.e. harmful algae bloom**
- **Exposure being primary recreational contact i.e. drinking, swimming and water sports which increase with recreational lake use in the summer time**
- **We use the traffic light coloured alert level framework for protecting public from potentially toxic blue green algae these colours are displayed on a map on the BOPRC website**

SA Wood, et al., (2009). New Zealand Guidelines for Cyanobacteria in Recreational Fresh Waters – Interim Guidelines. Prepared for the Ministry for the Environment and the Ministry of Health. Wellington: New Zealand.

Recreational Bathing Standards

Green Surveillance Mode (up to 0.5 mm³/L)

- Undertake weekly or fortnightly visual inspection and sampling of water bodies where cyanobacteria are known to proliferate between spring and autumn

Amber Alert Mode (0.5 to <10 mm³/L)

- Continue weekly sampling and reporting to the public health unit. Multiple sites should be inspected and sampled


Red Action Mode (>10 mm³/L)

- Continue monitoring as for amber mode
- If potentially toxic taxa are present then consider testing samples for cyanotoxins
- Notify the public of a potential risk to health erect health warning signs at water body

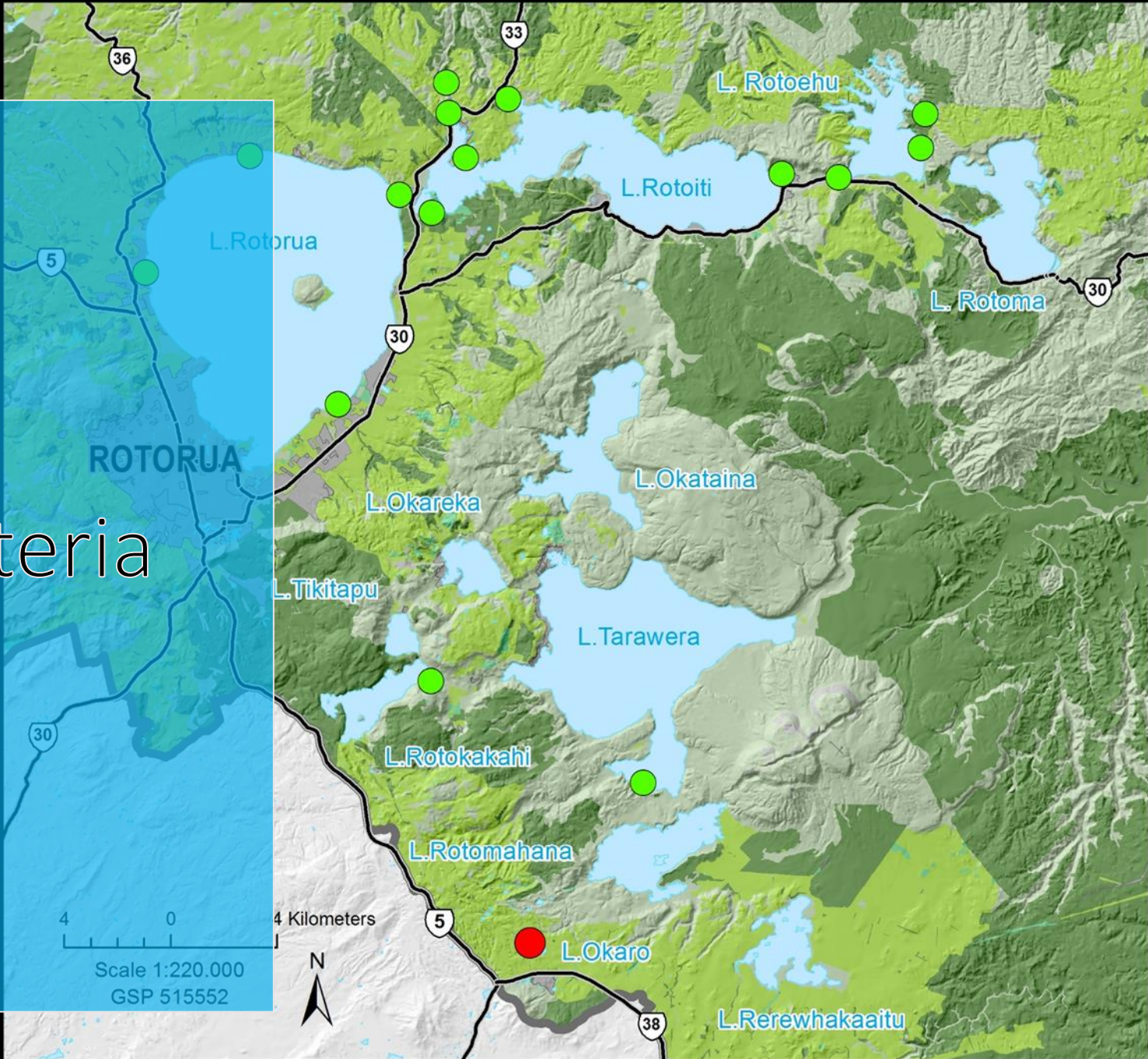


Lake Rotokakahi

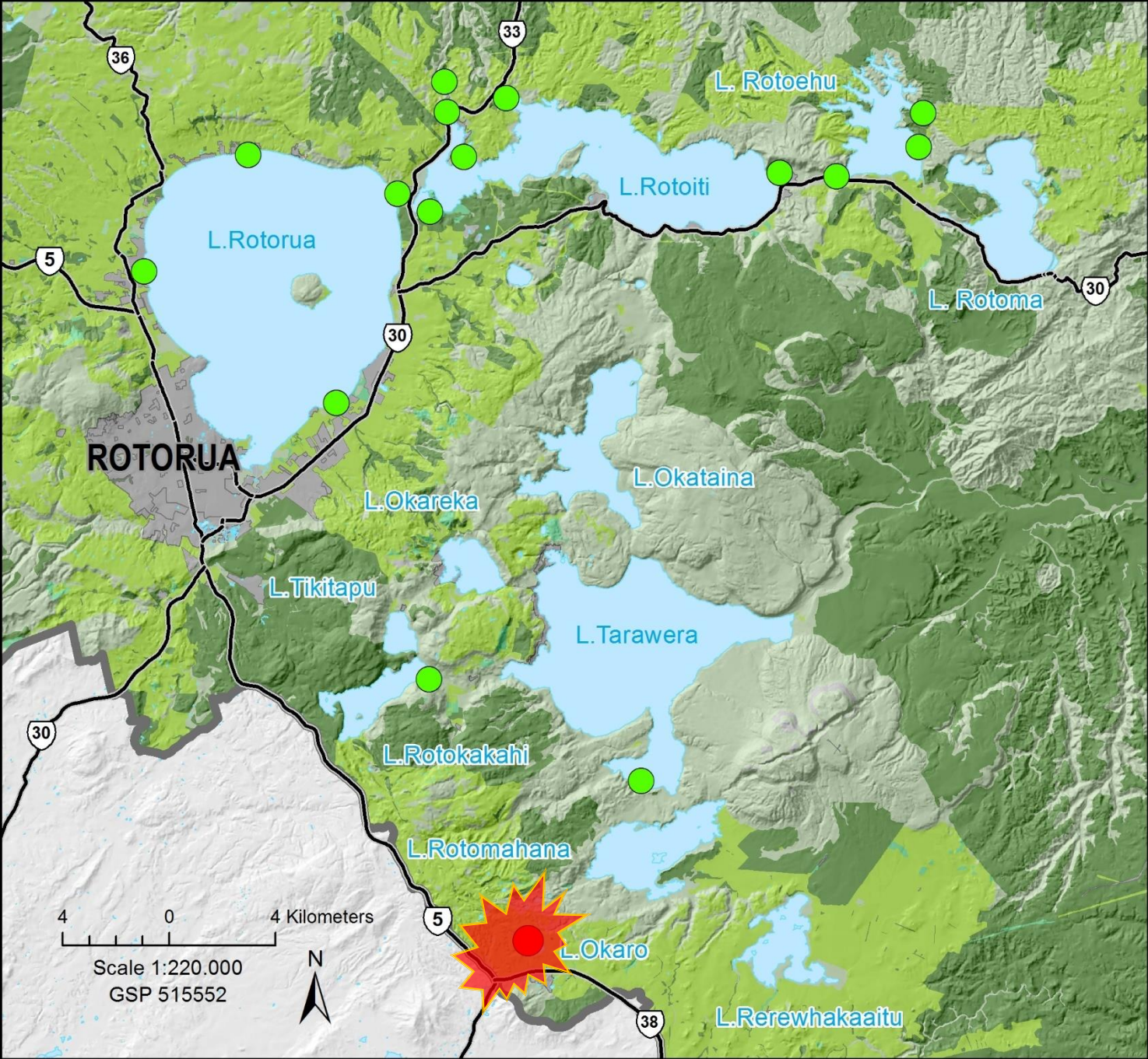
2015 Cyanobacteria Alerts



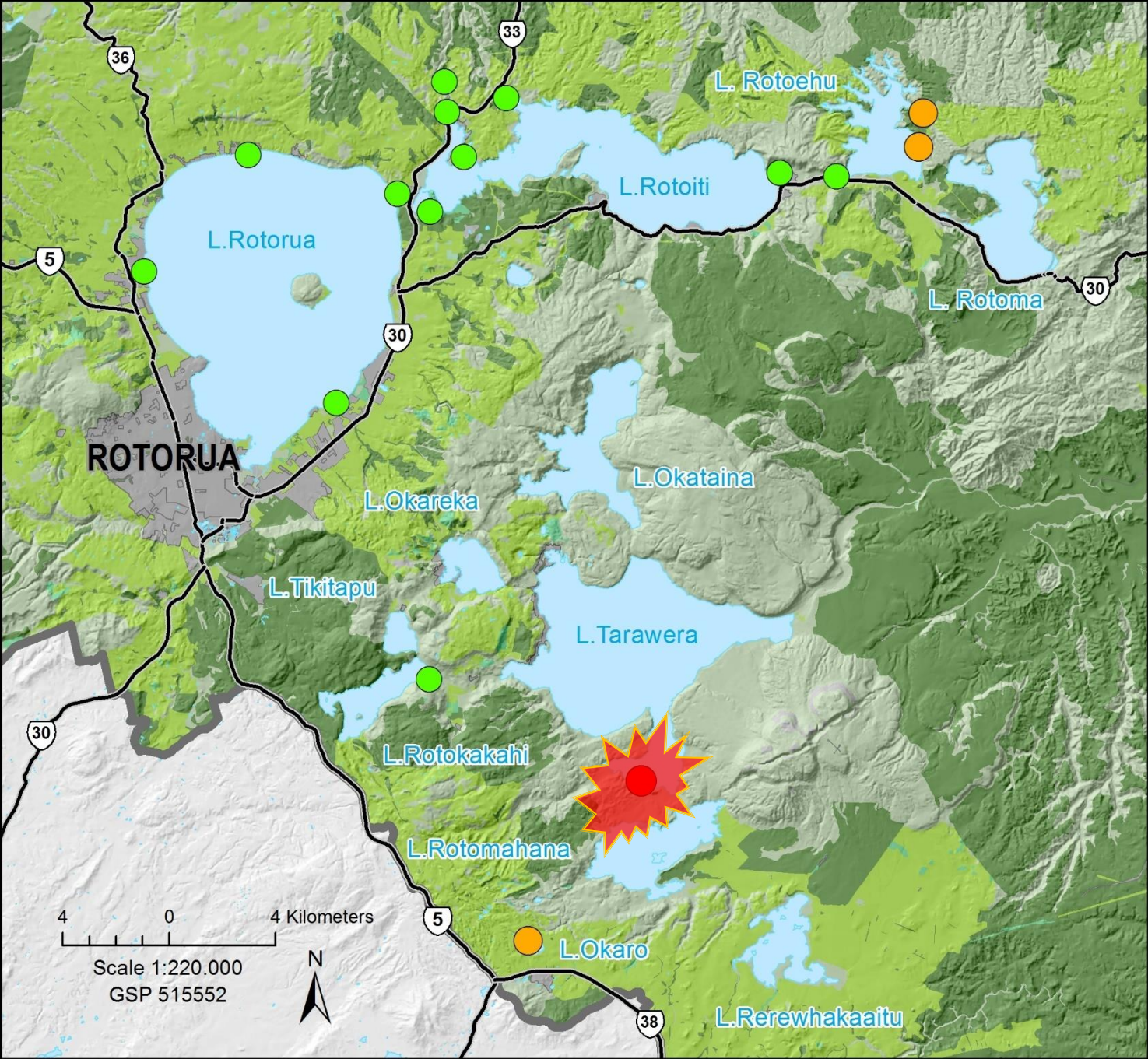
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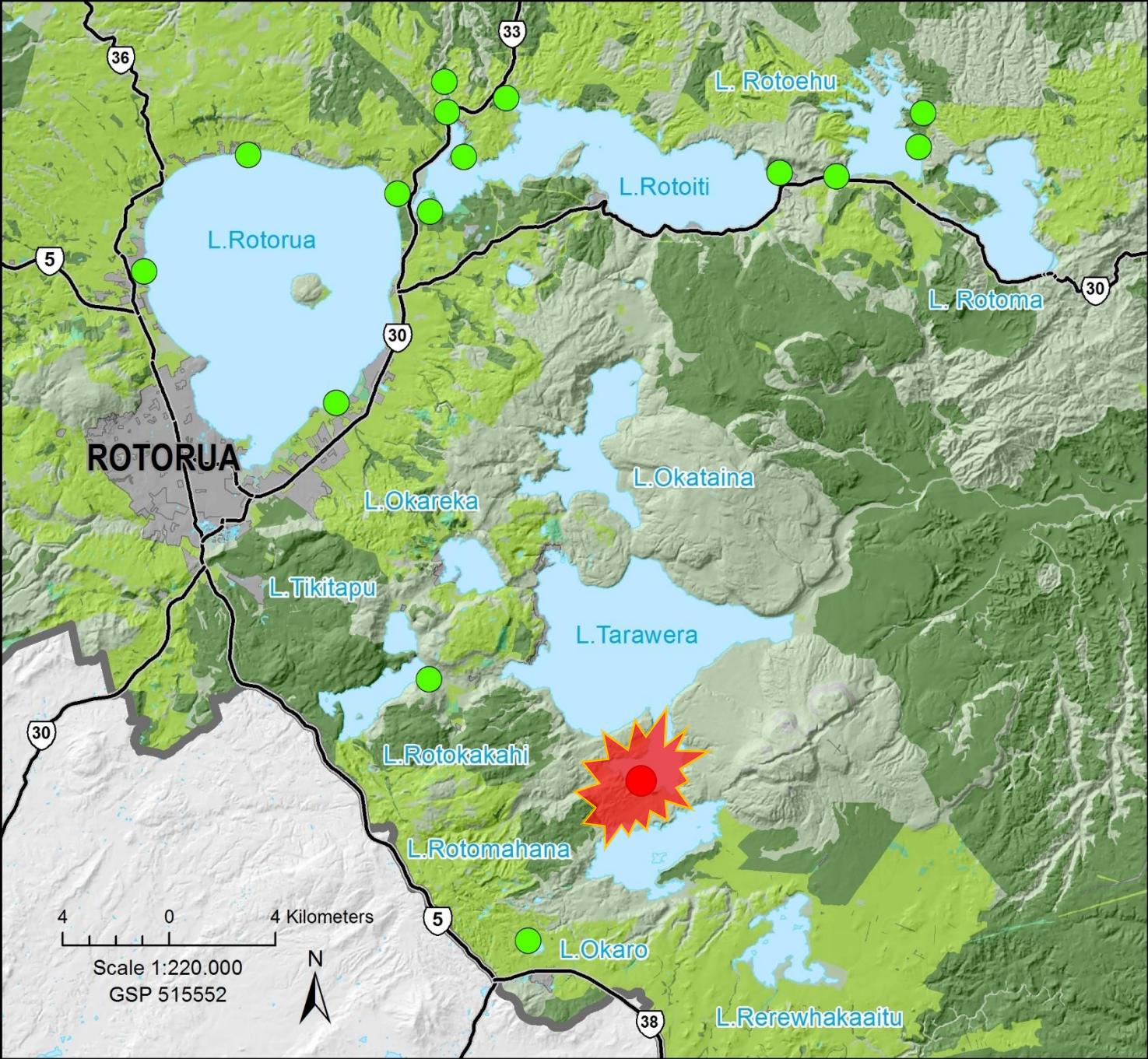
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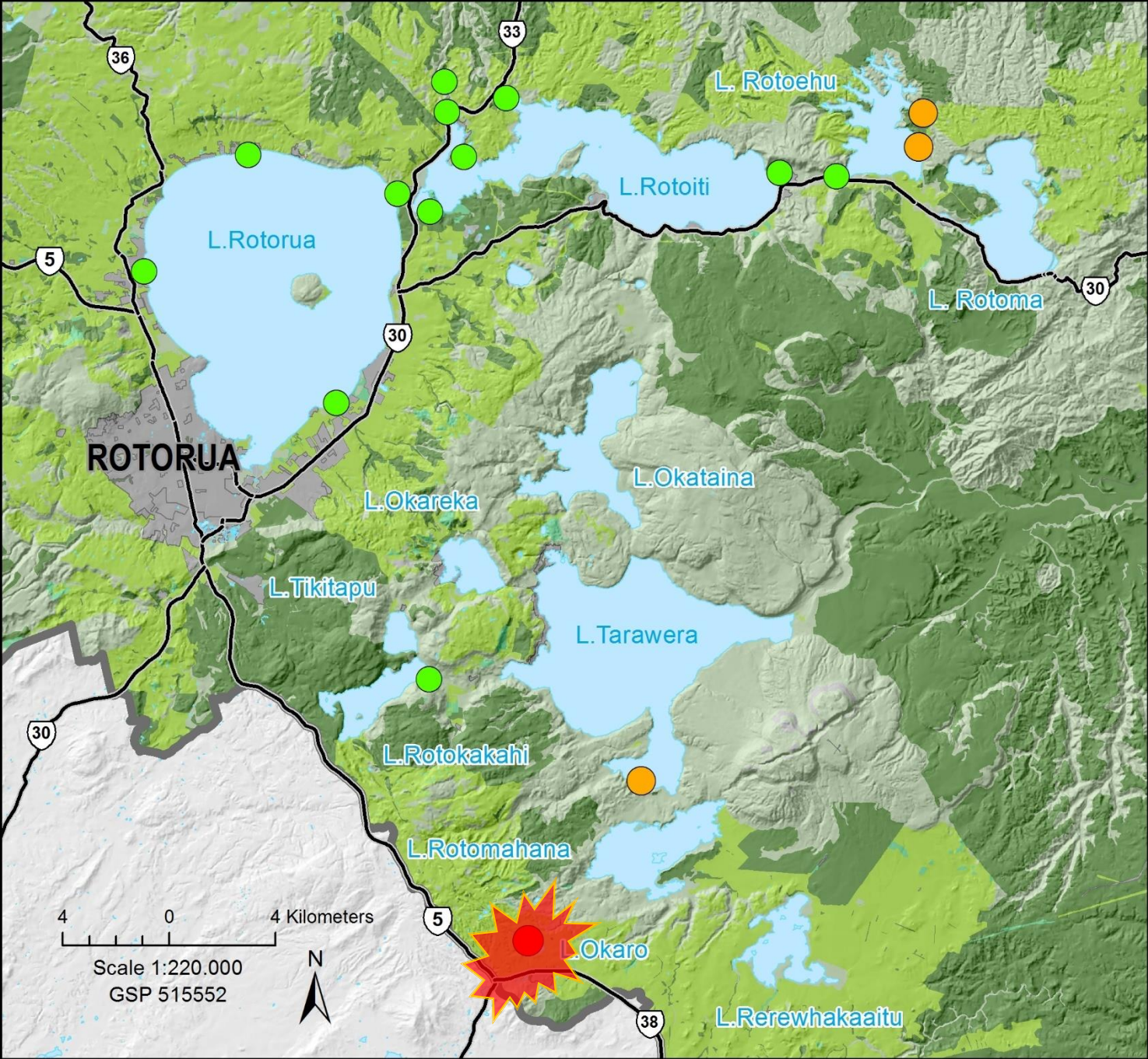
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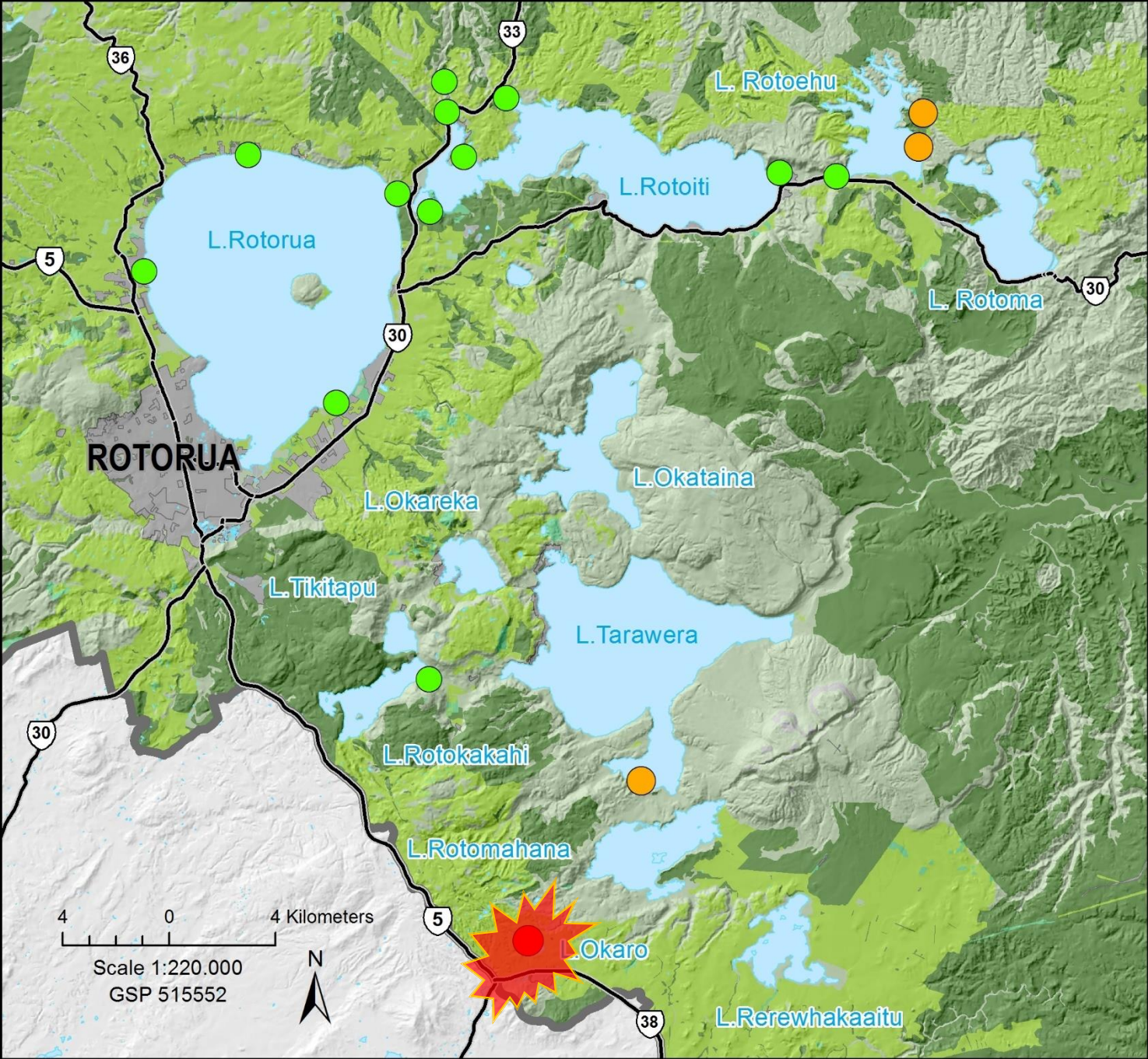
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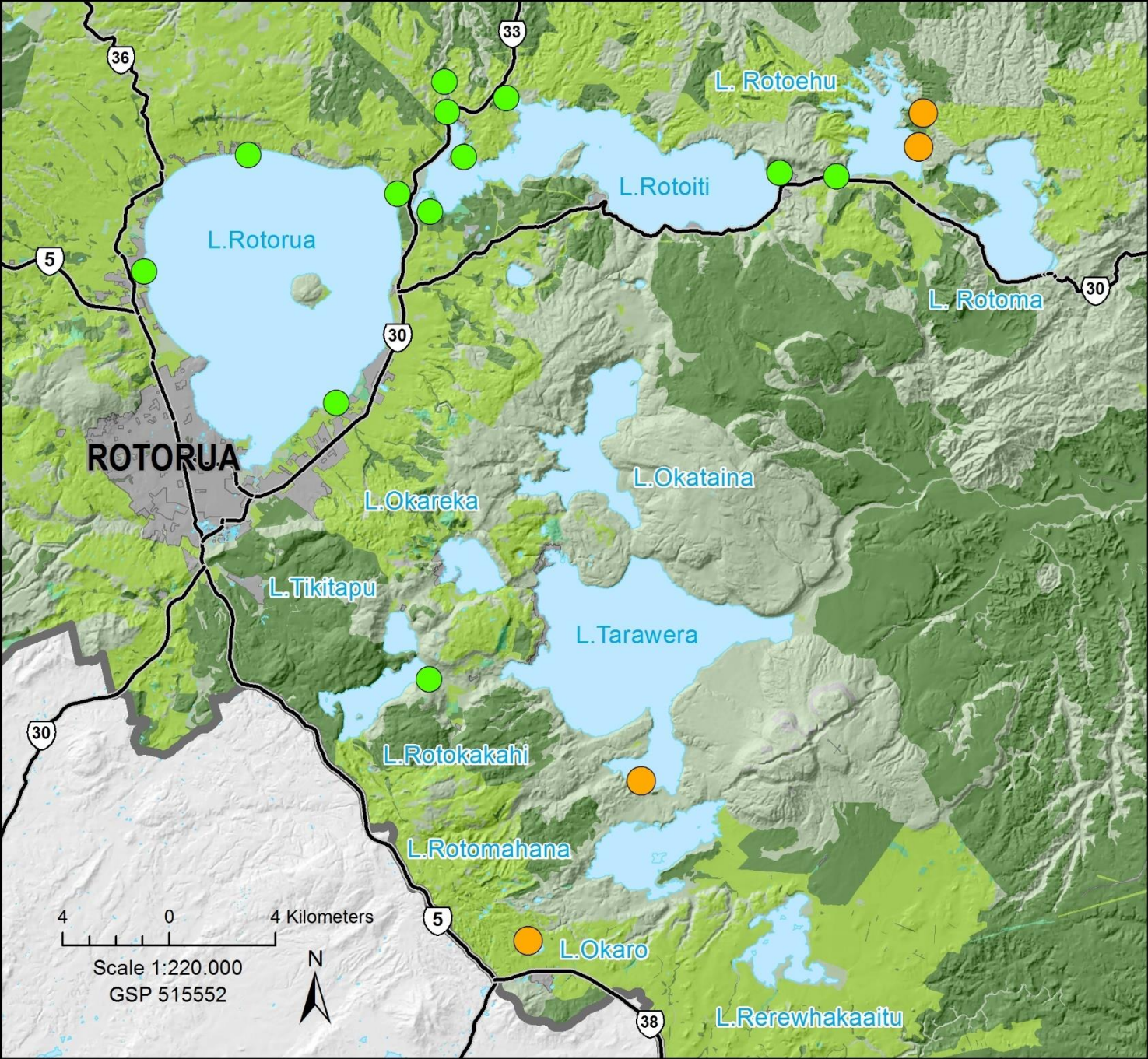
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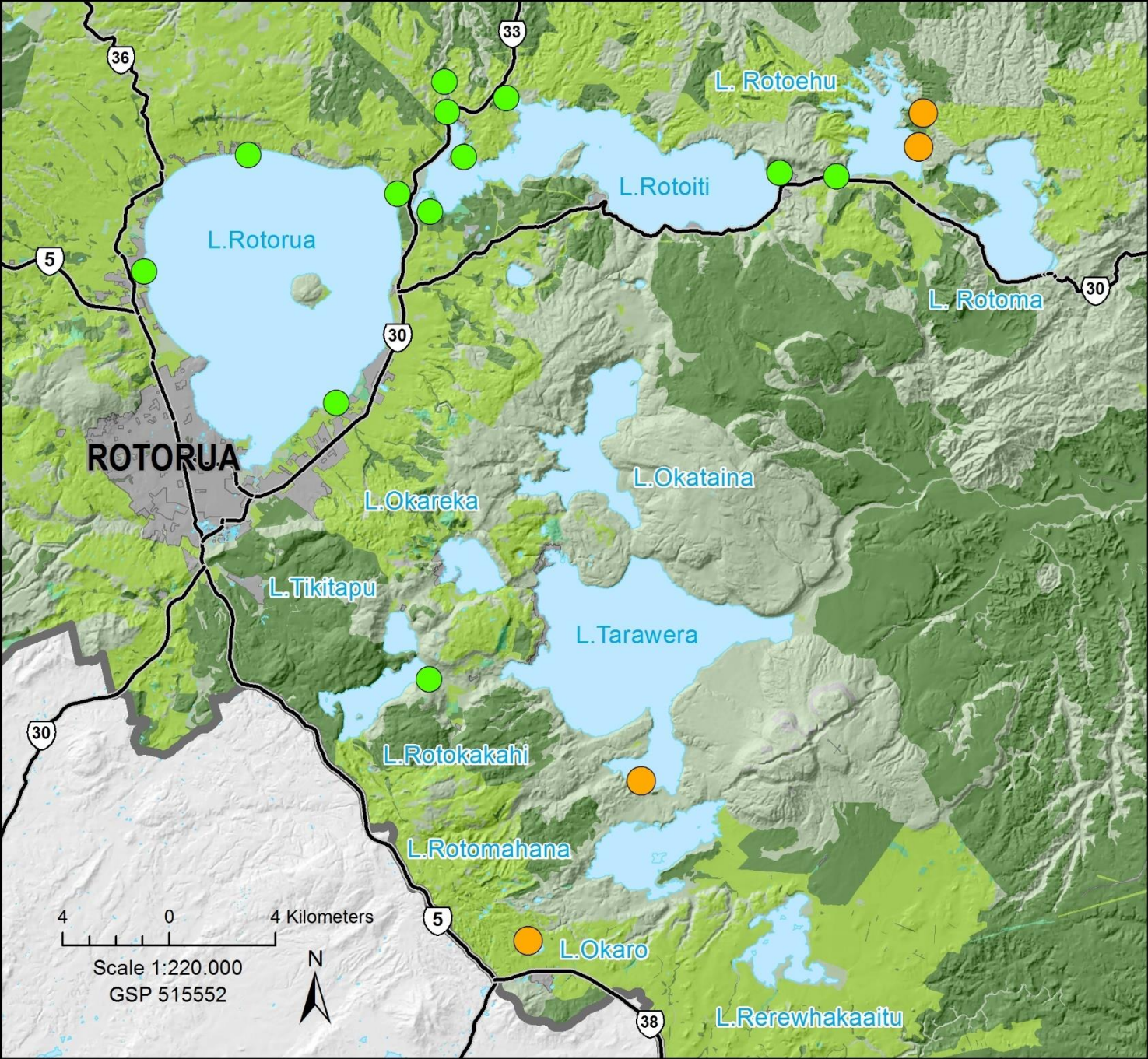
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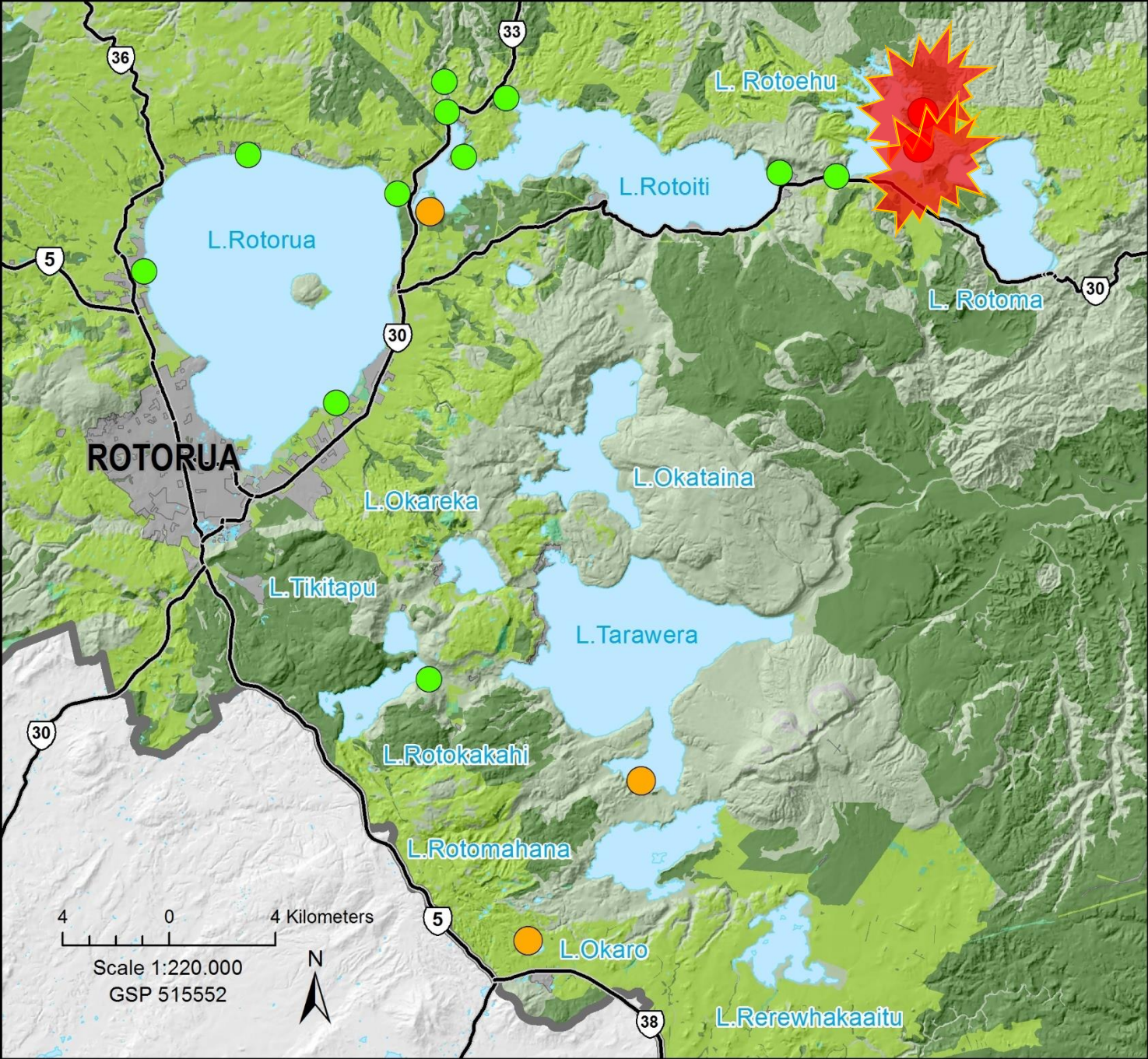
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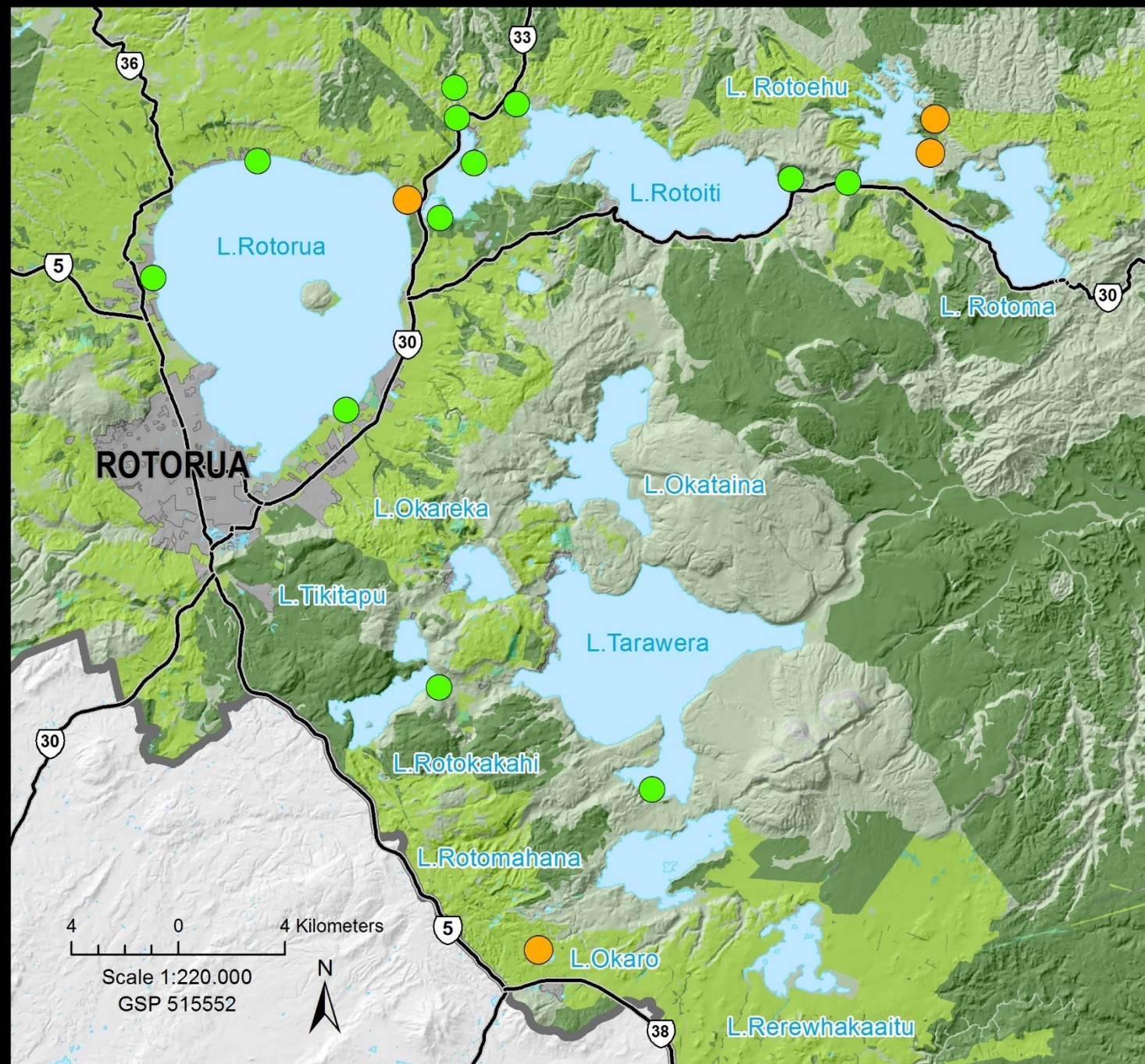
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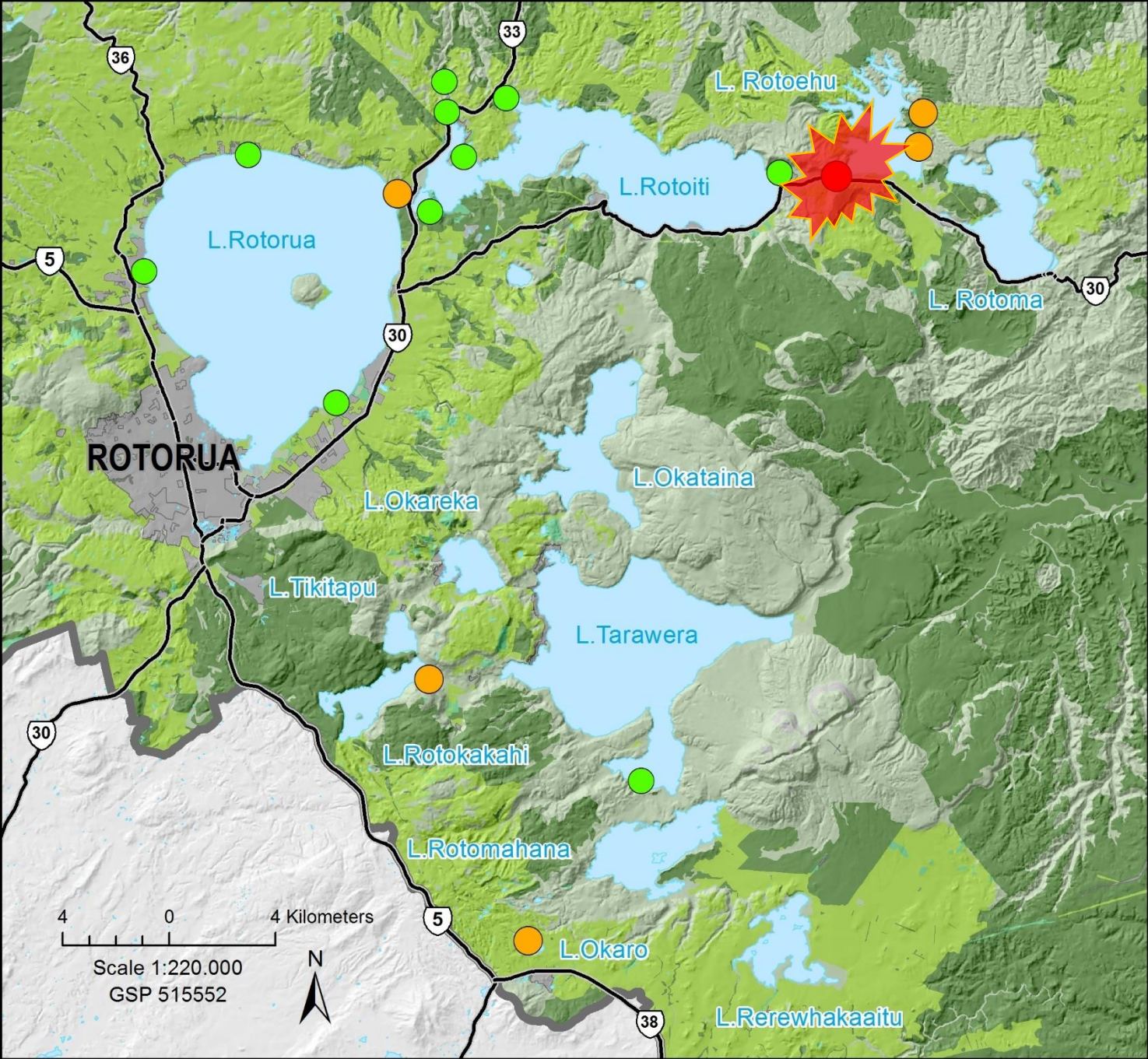
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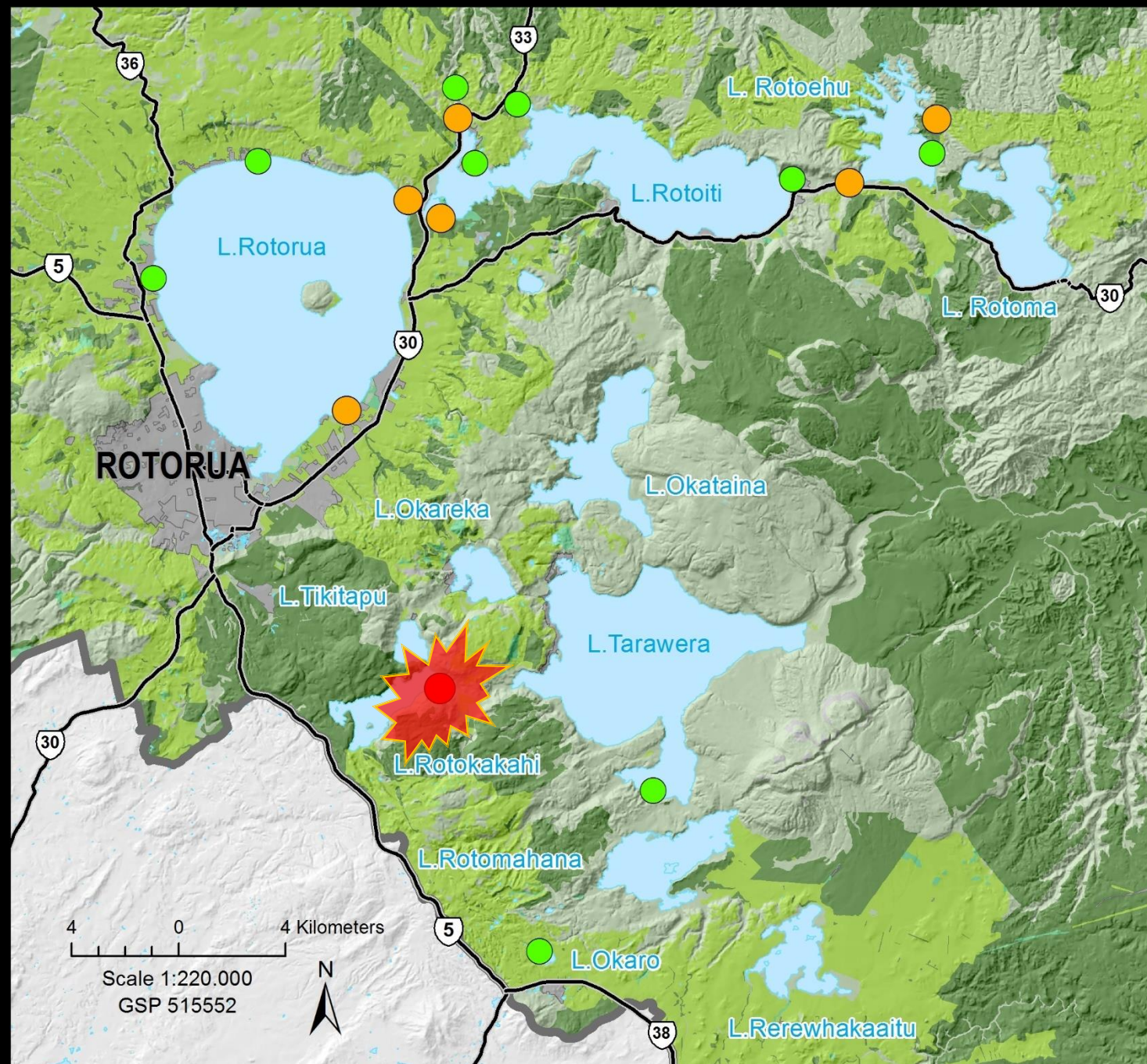
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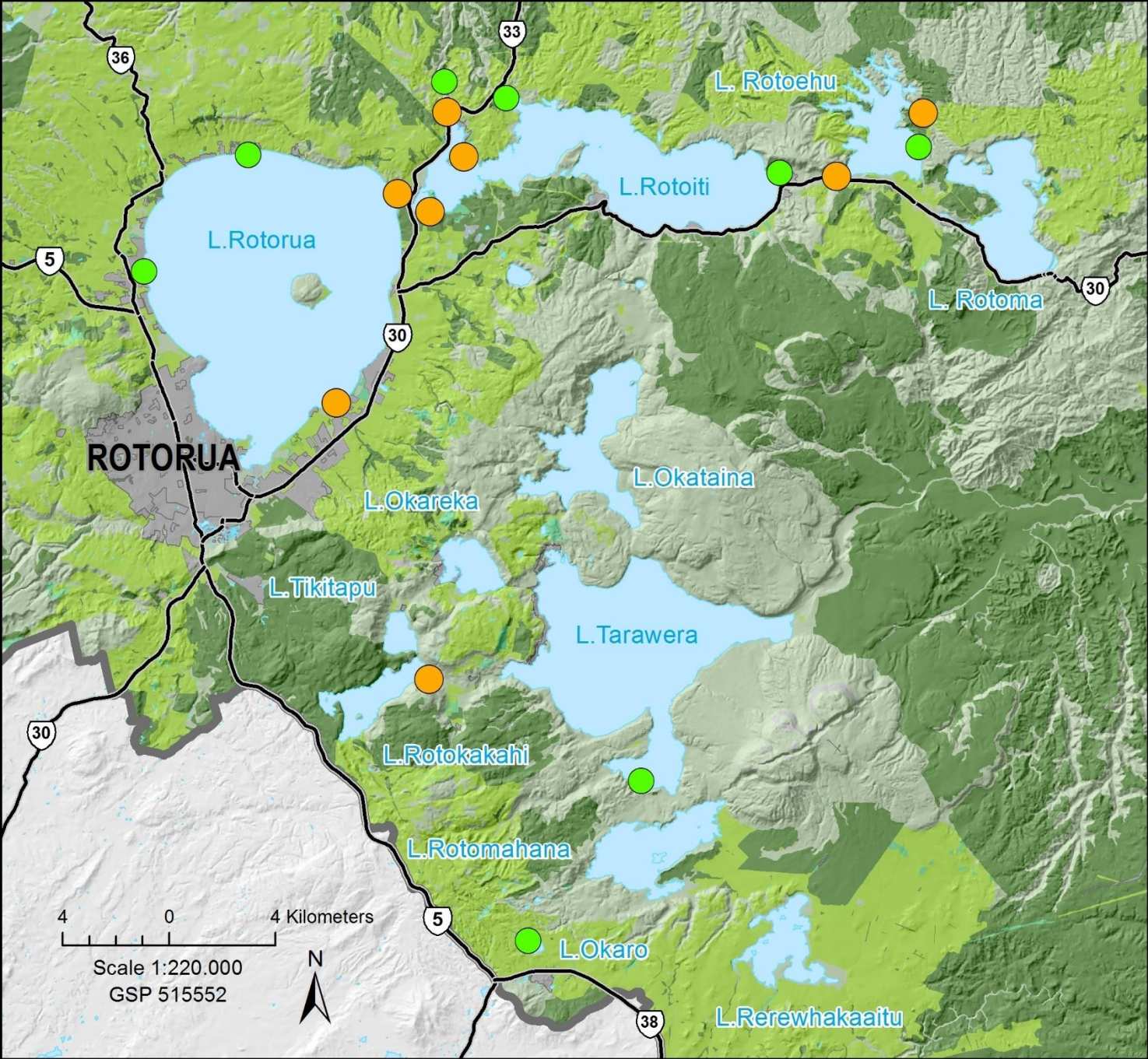
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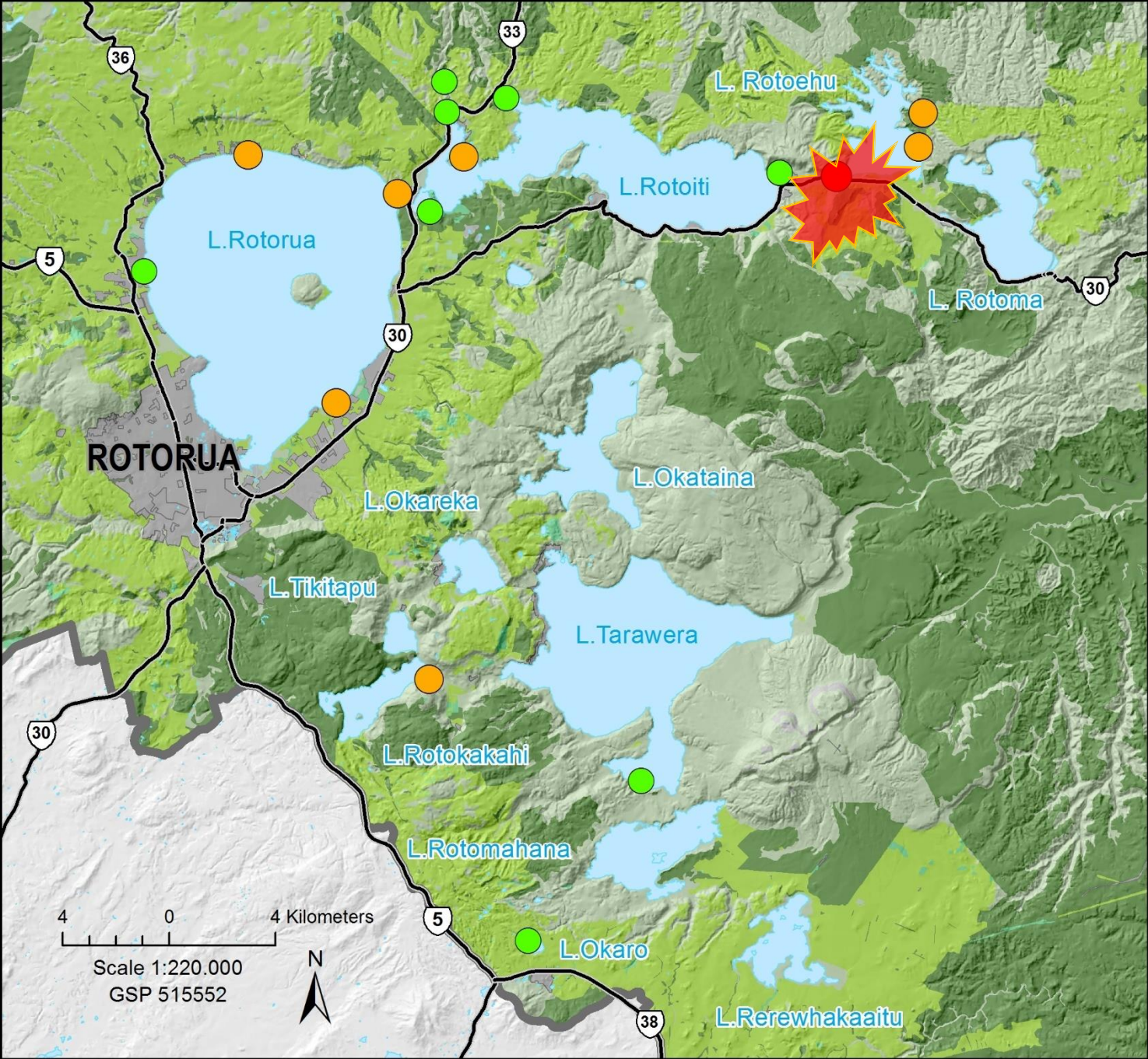
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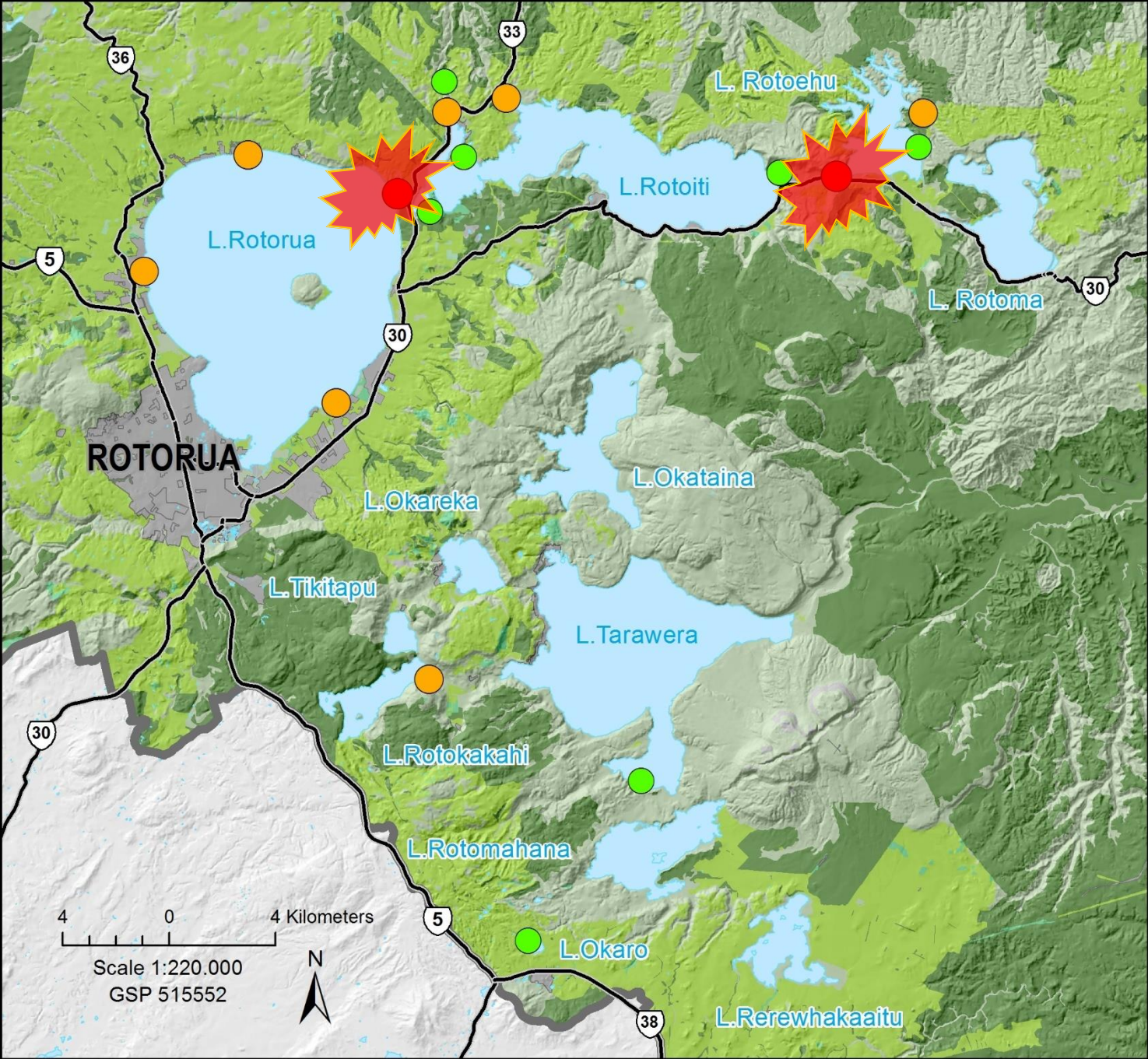
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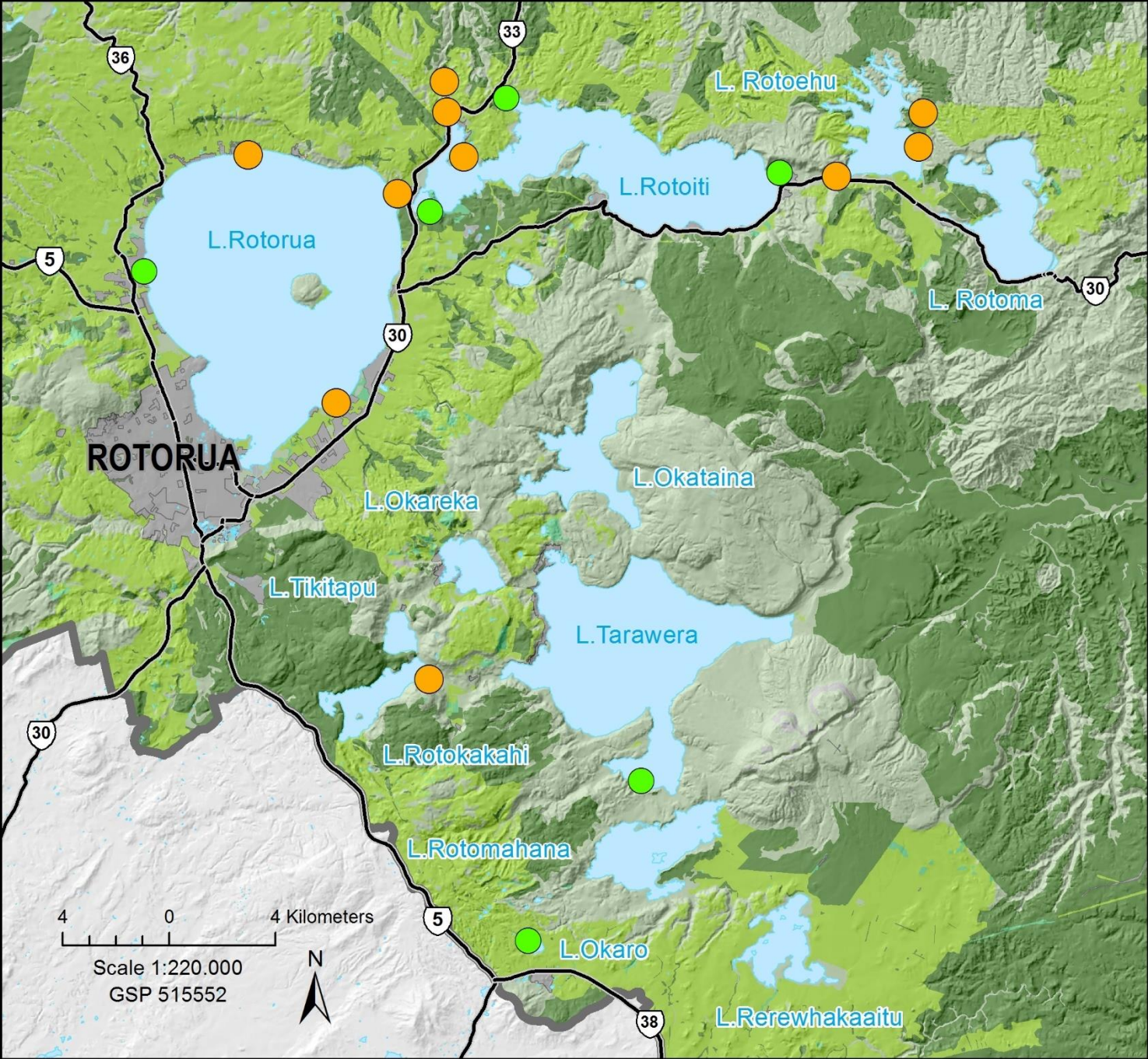
10 April 2015




18 April 2015



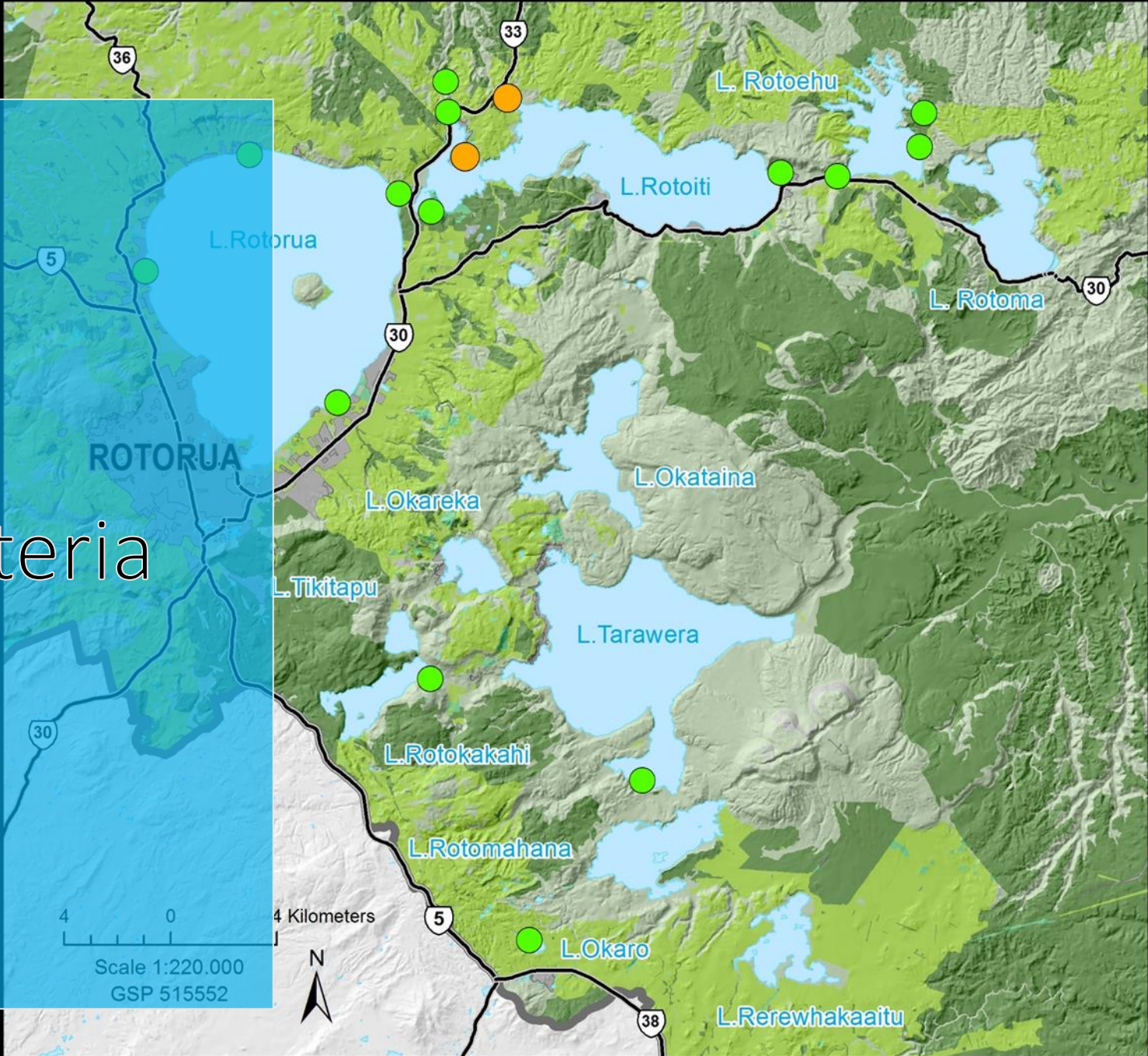
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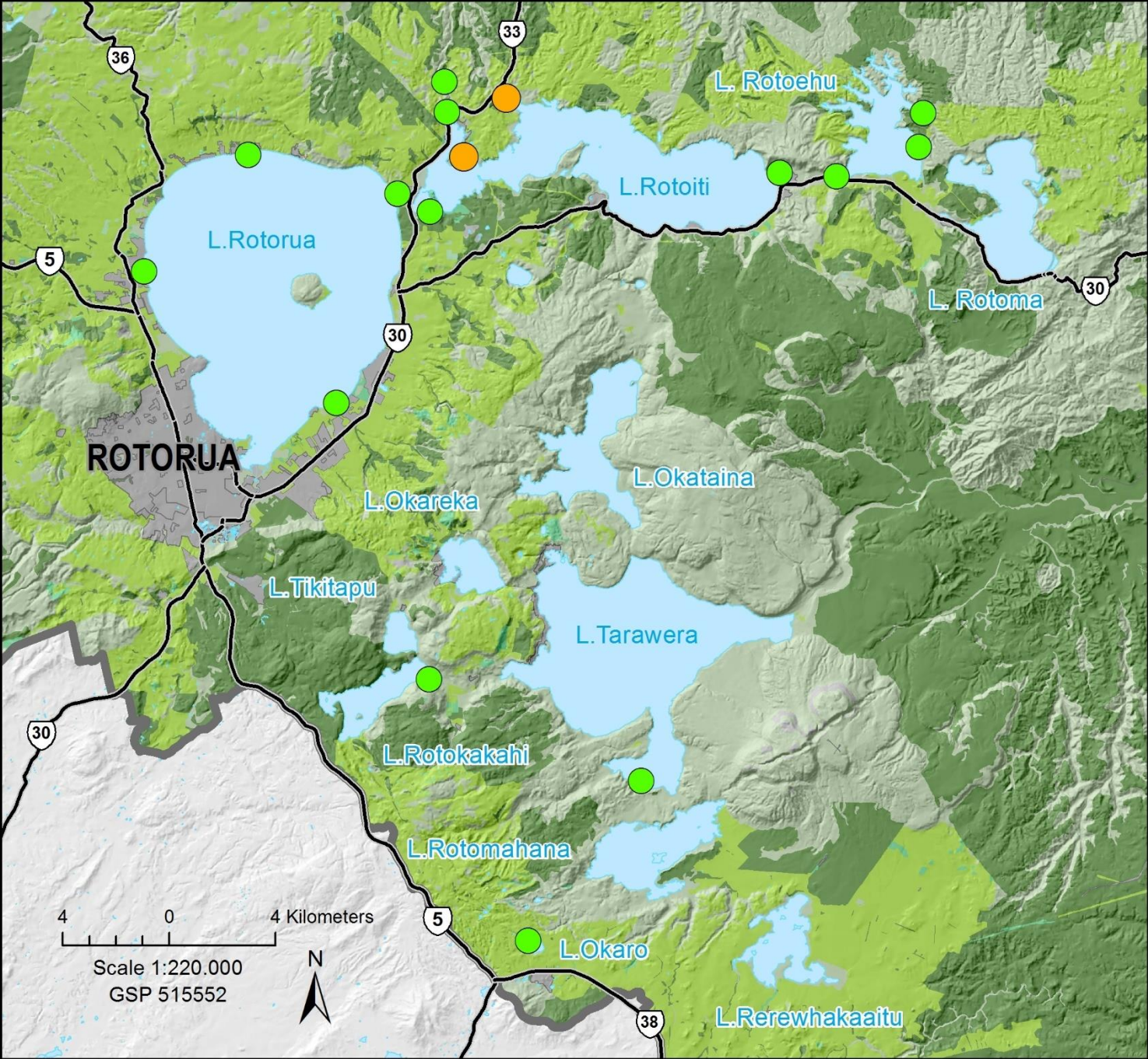
2016 Cyanobacteria Alerts



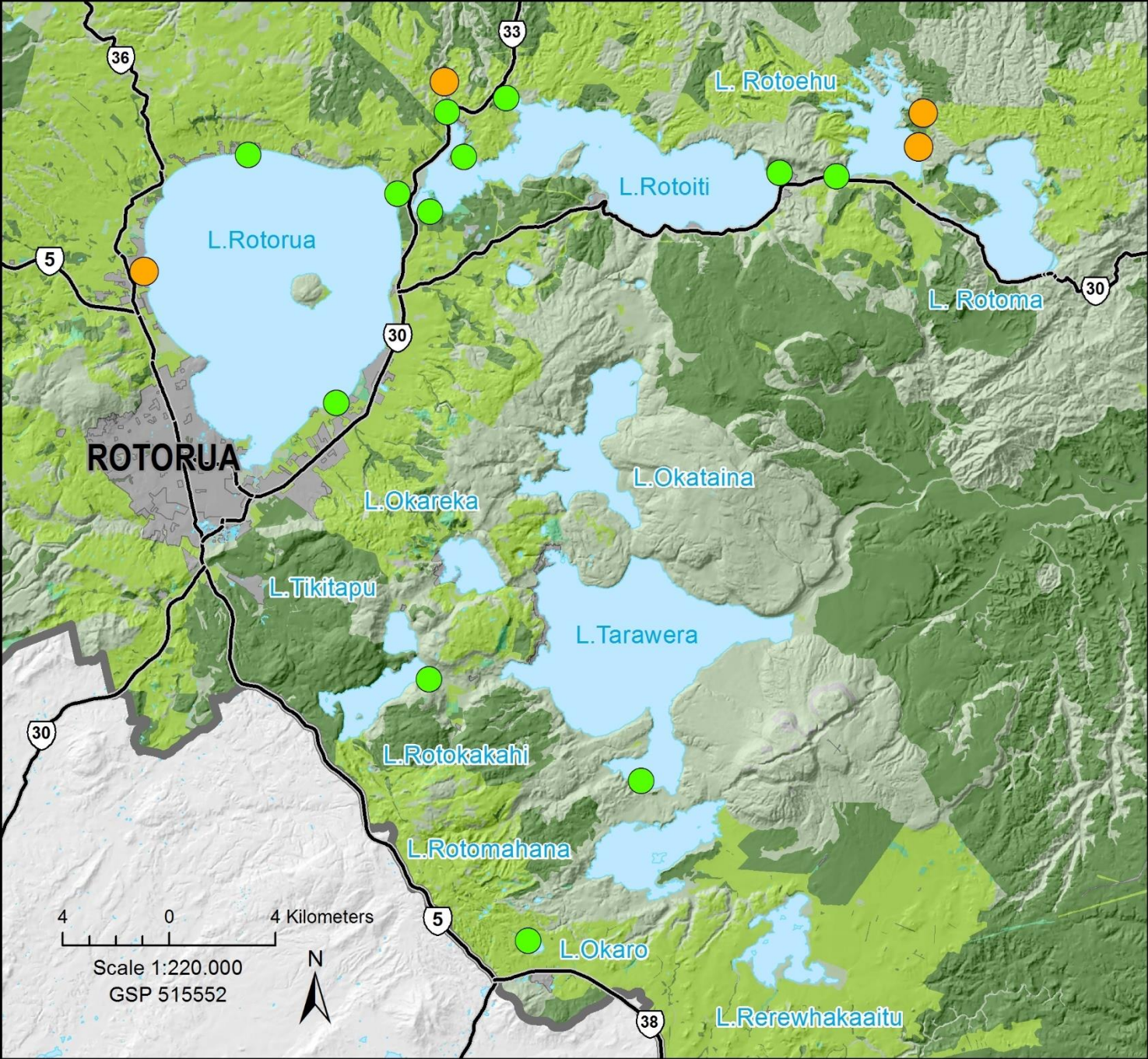
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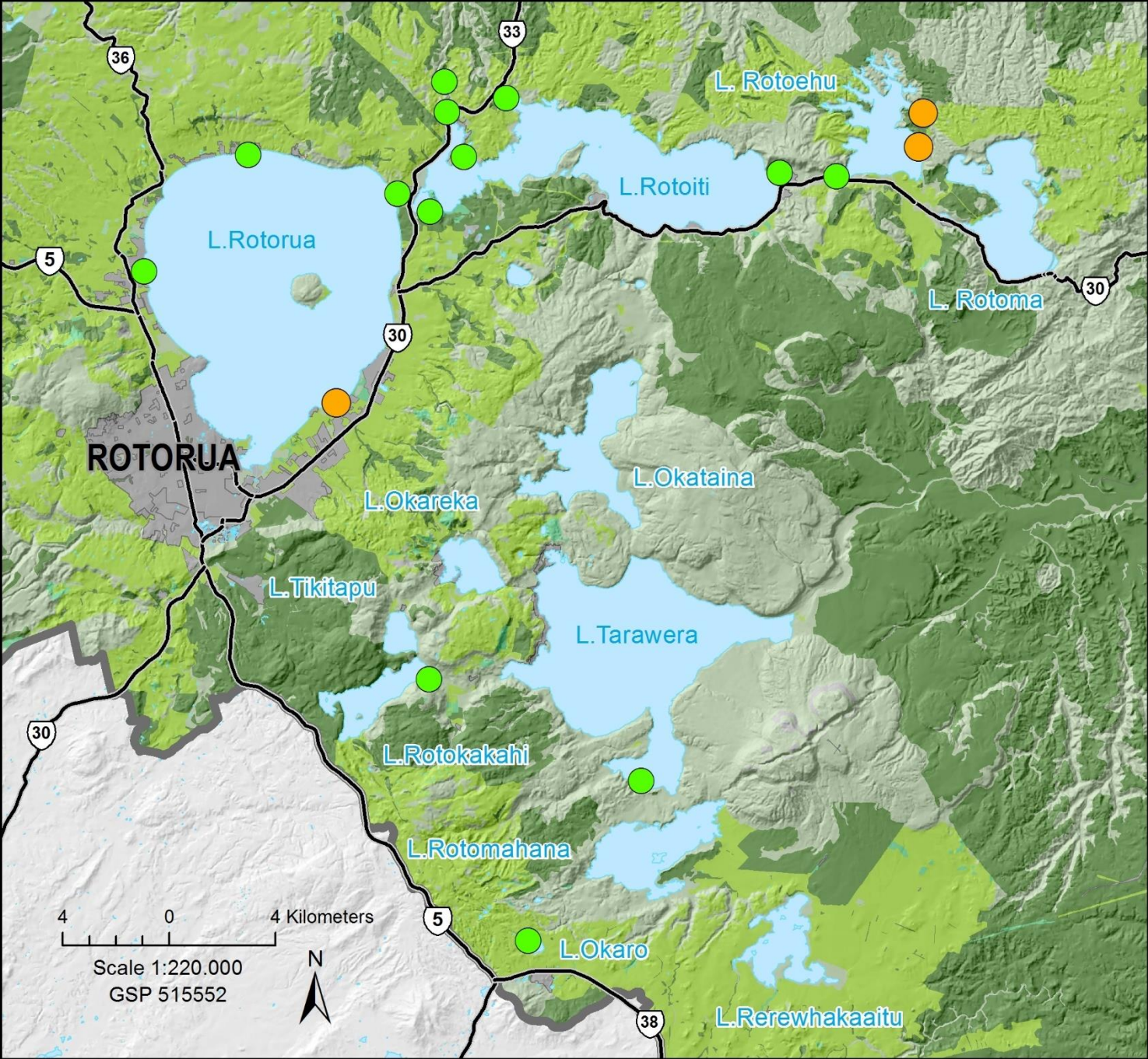
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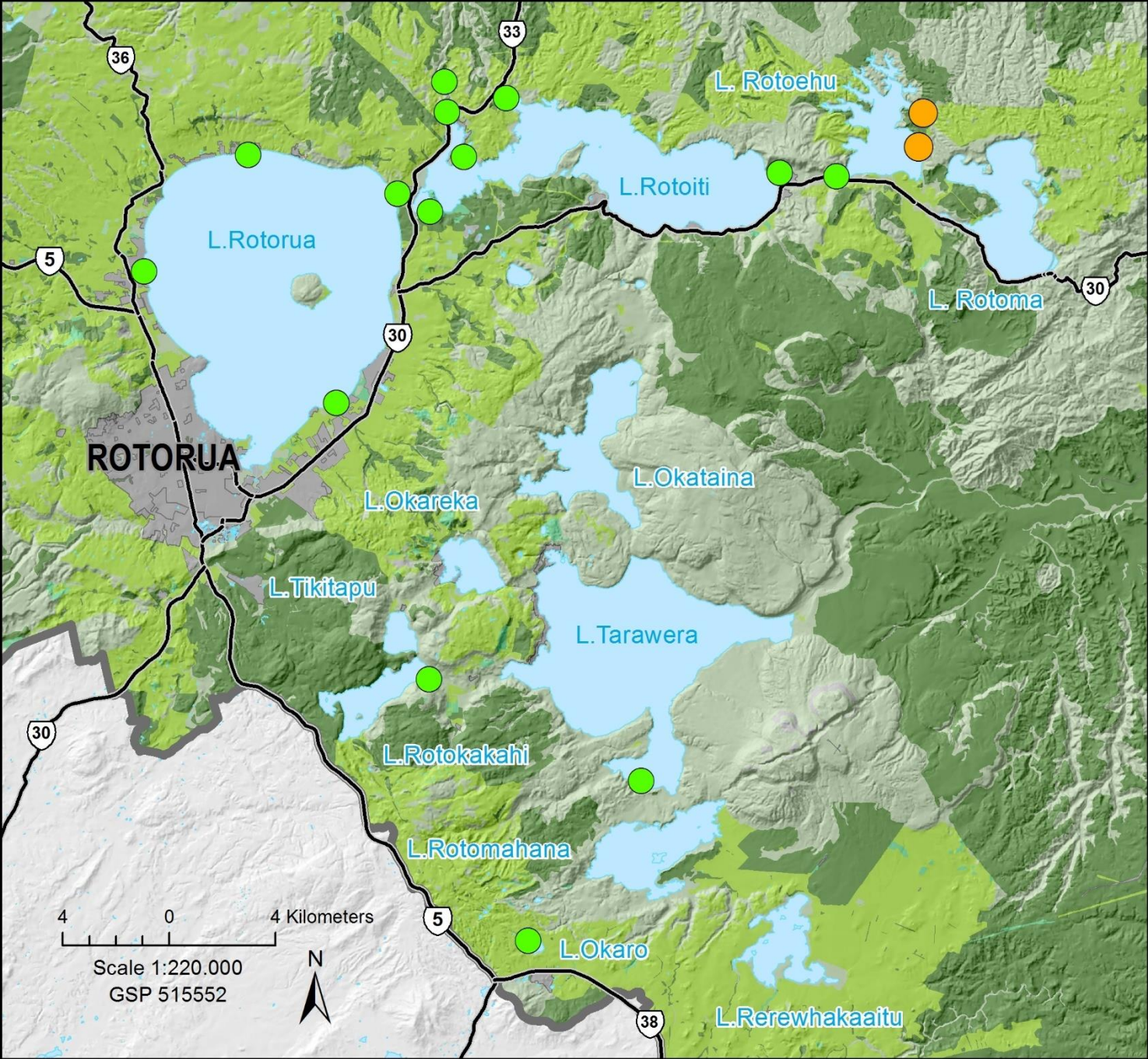
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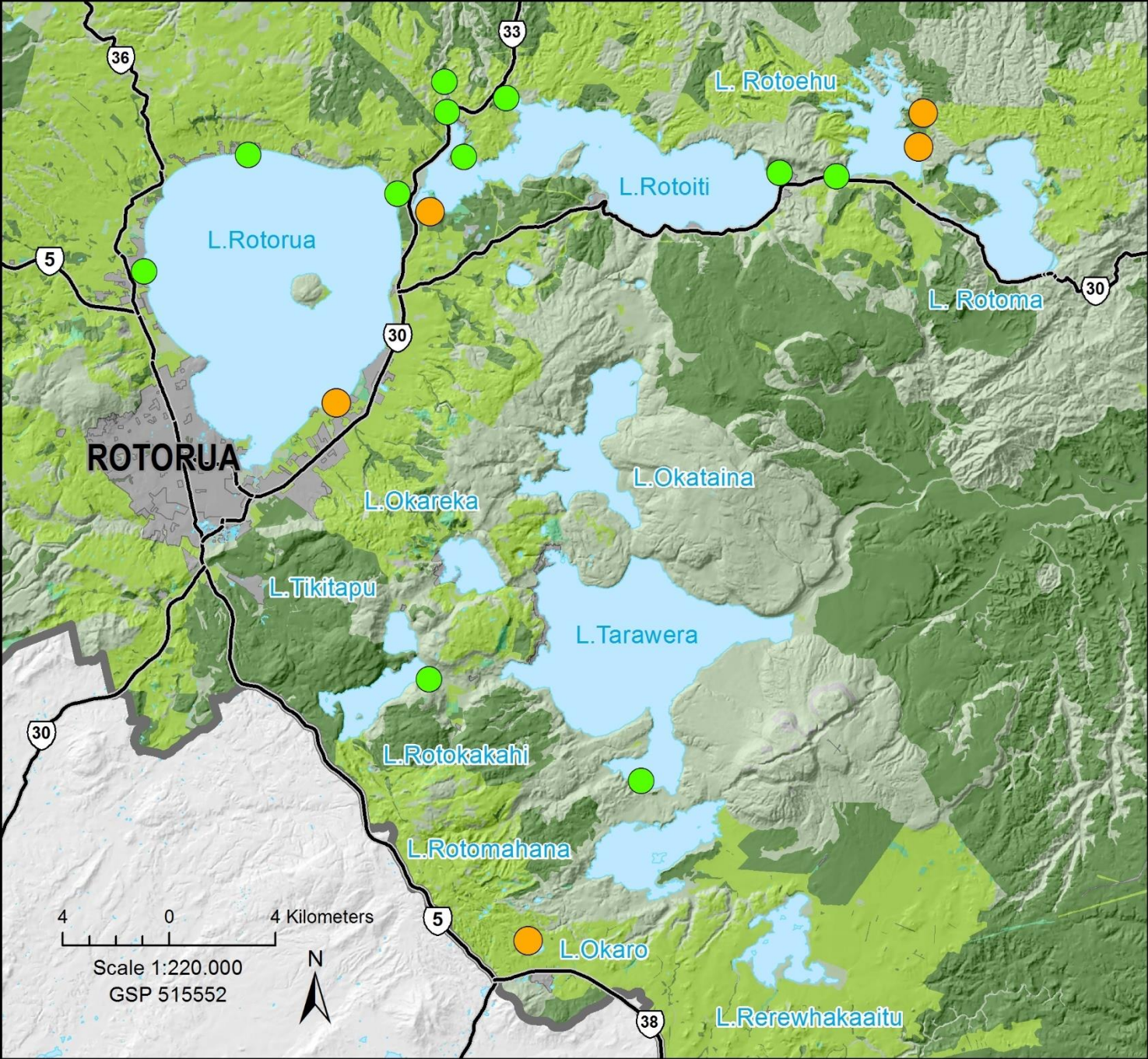
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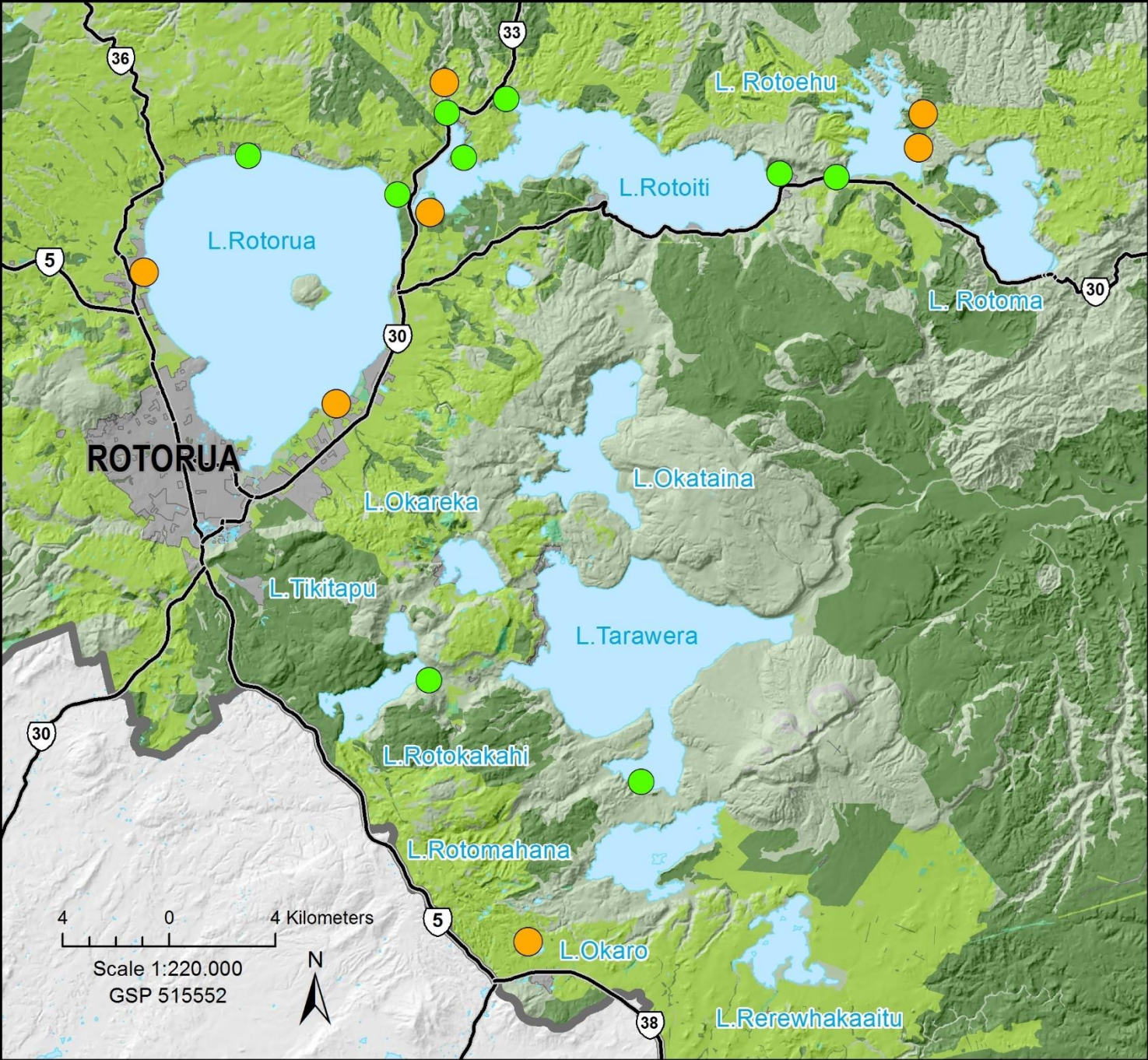
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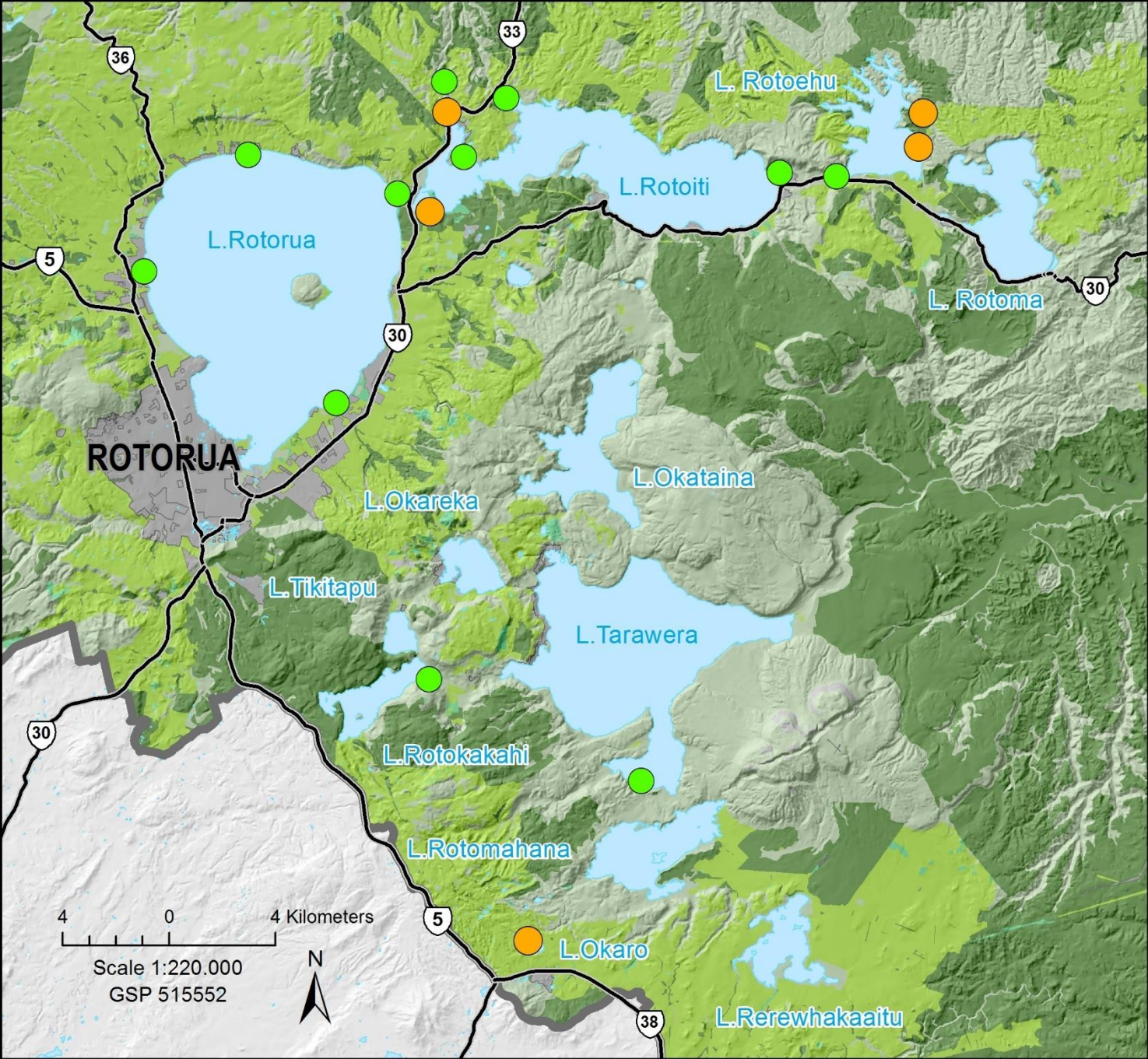
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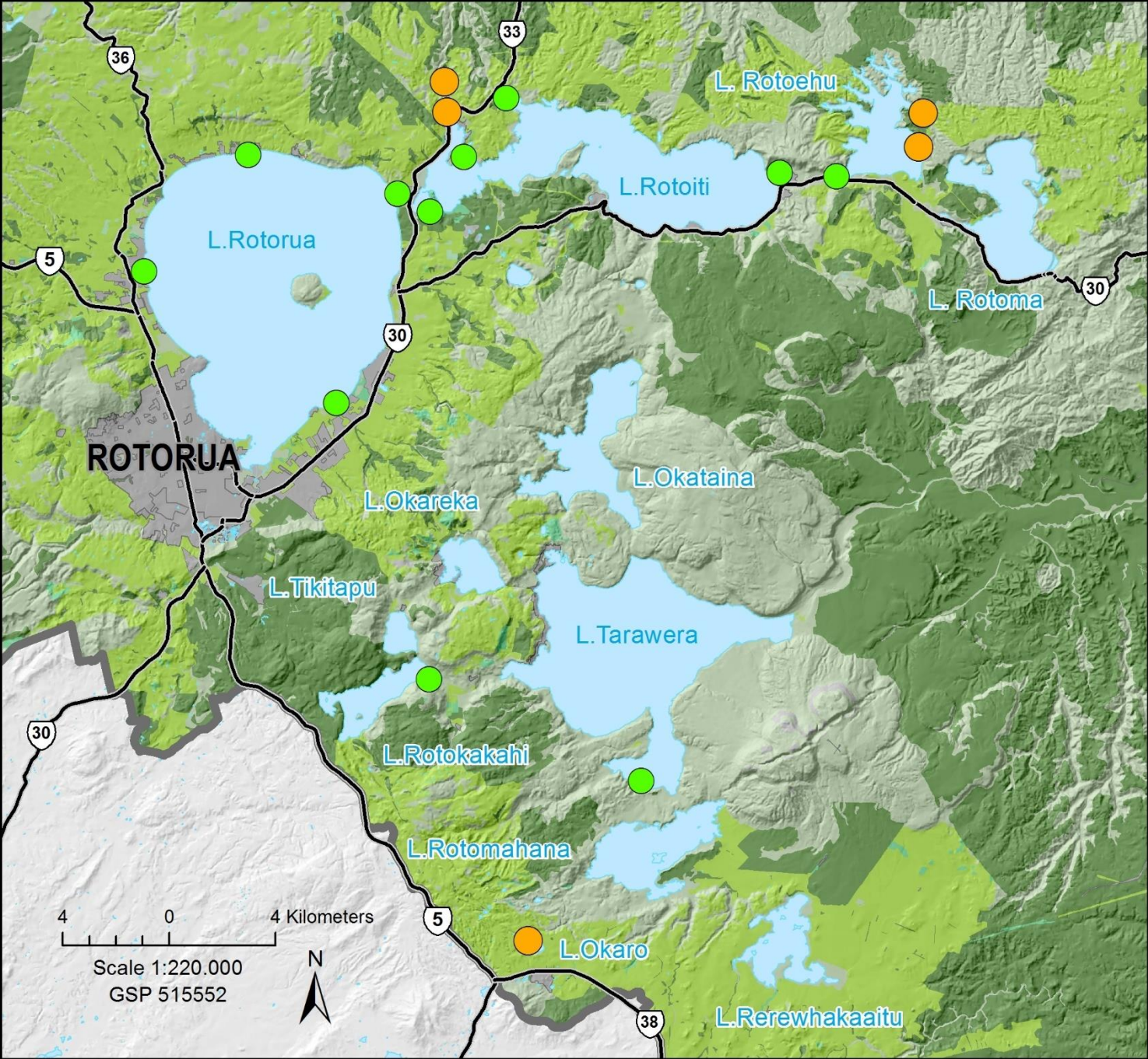
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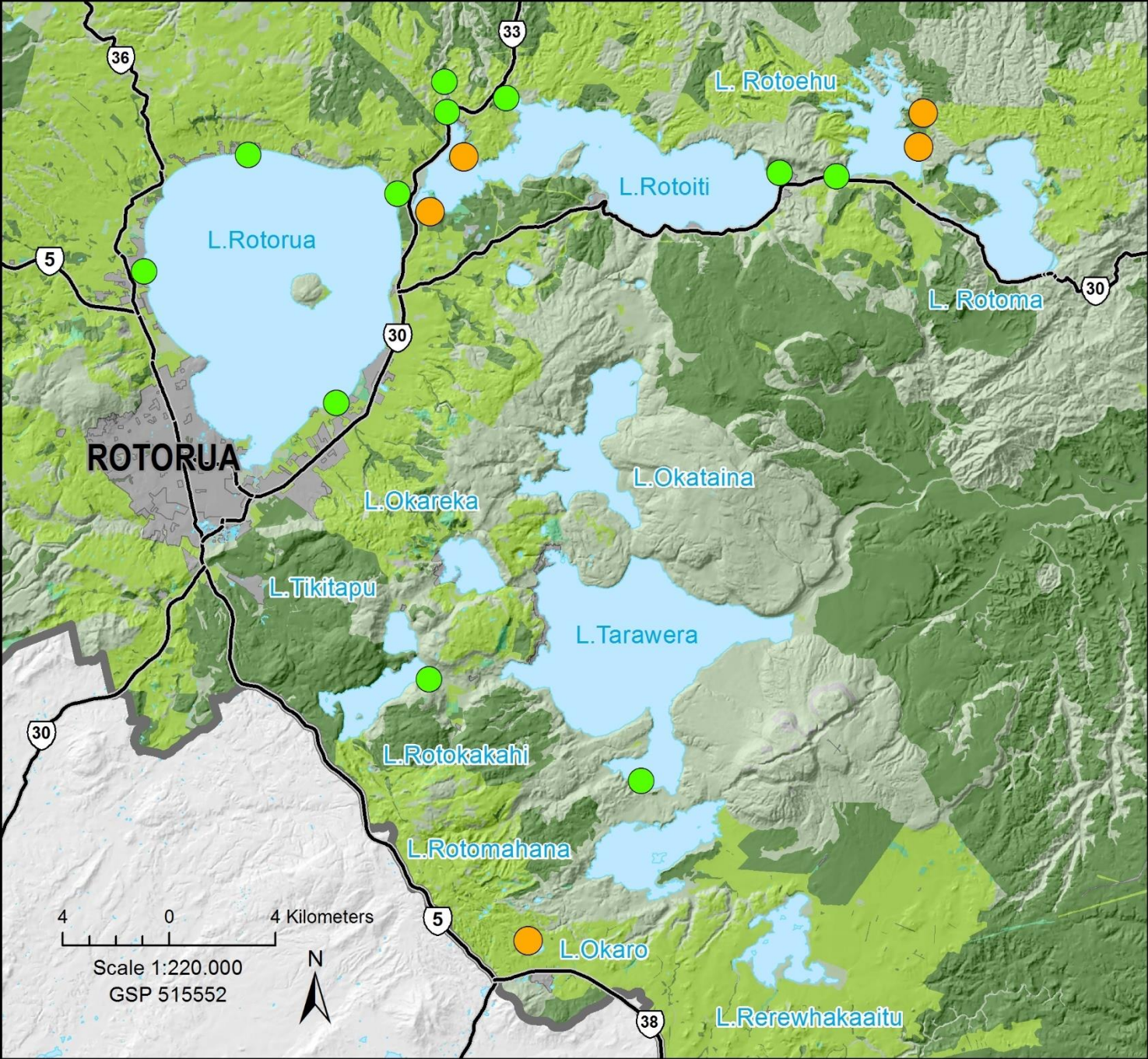
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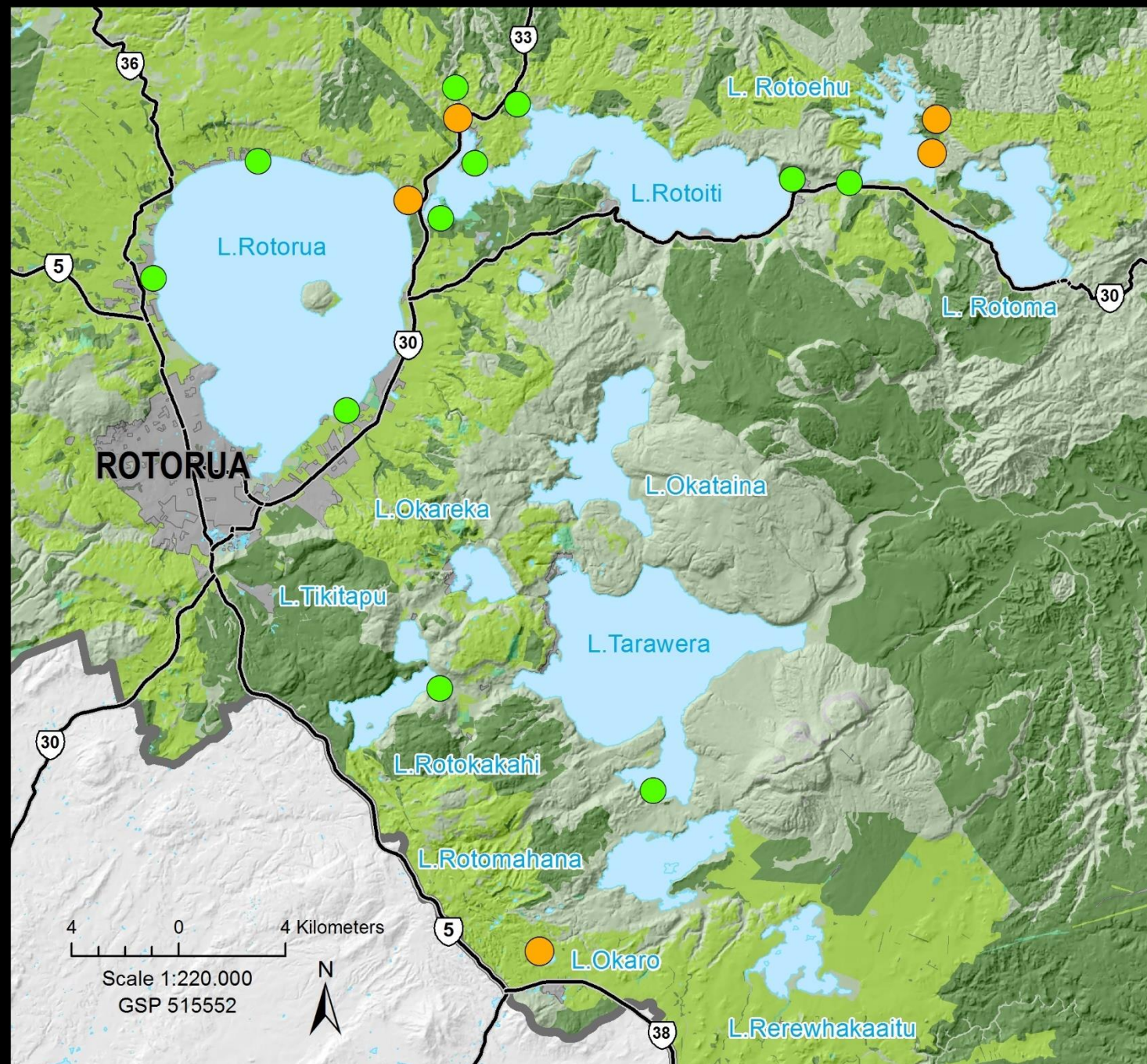
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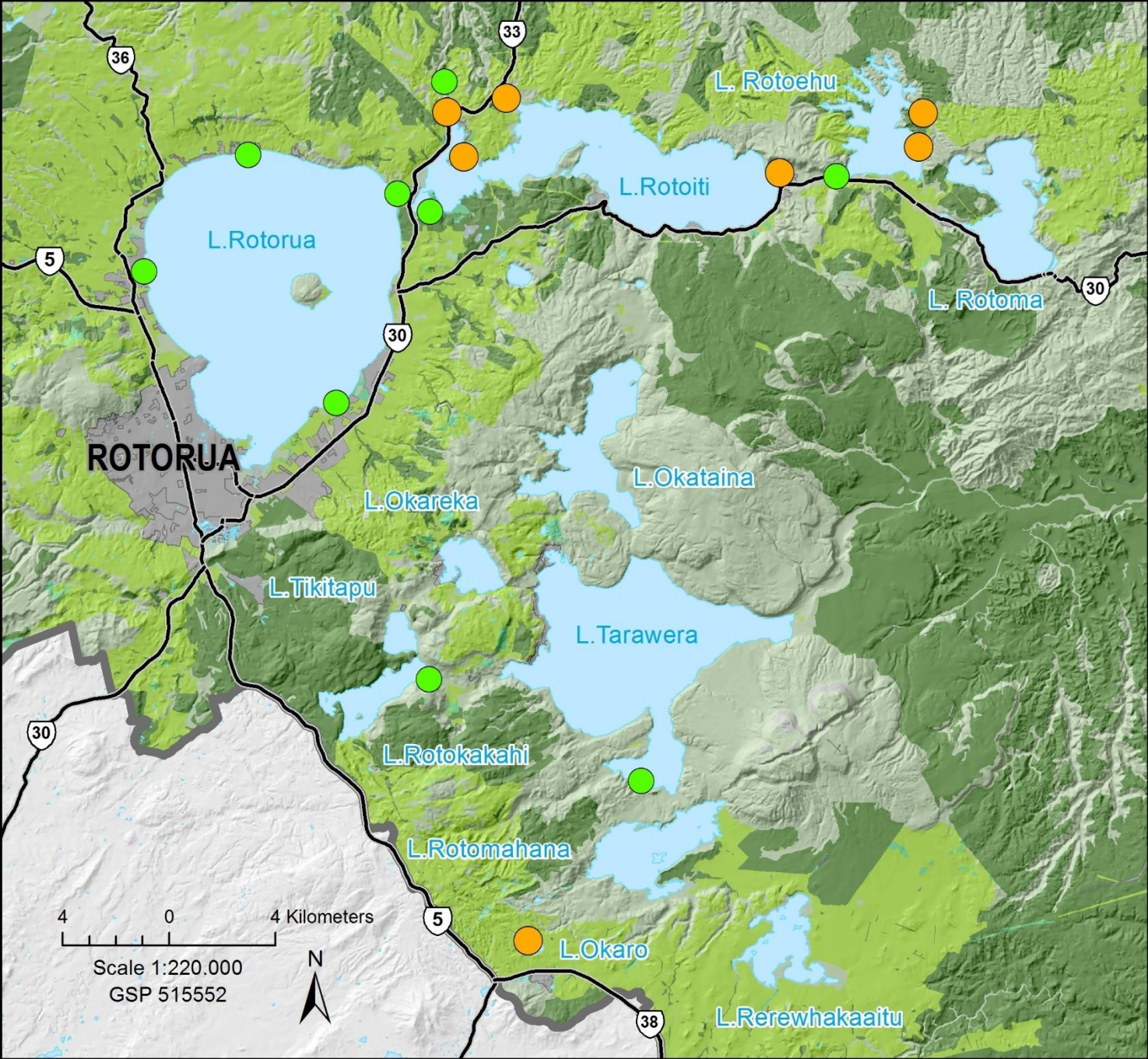
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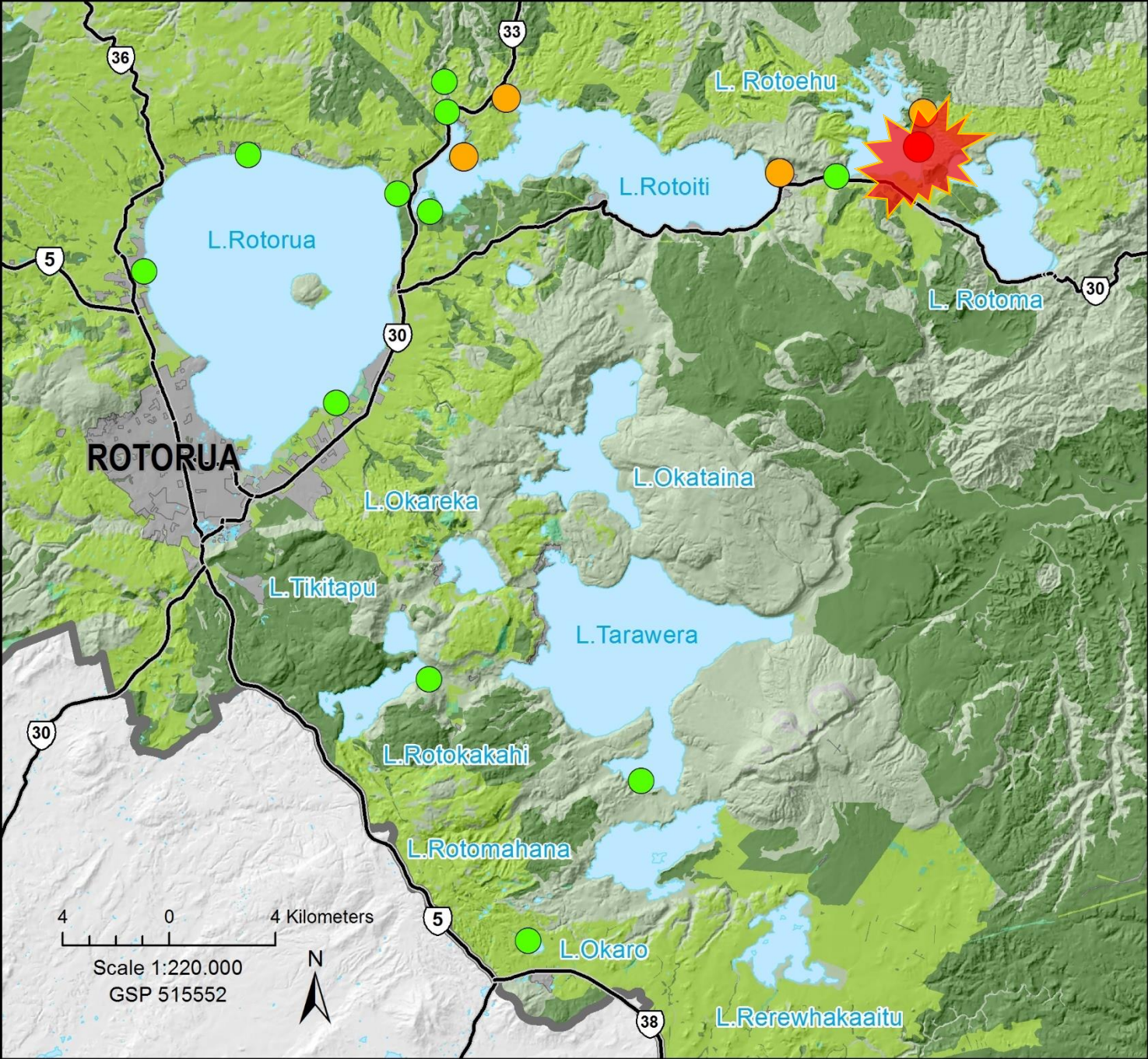
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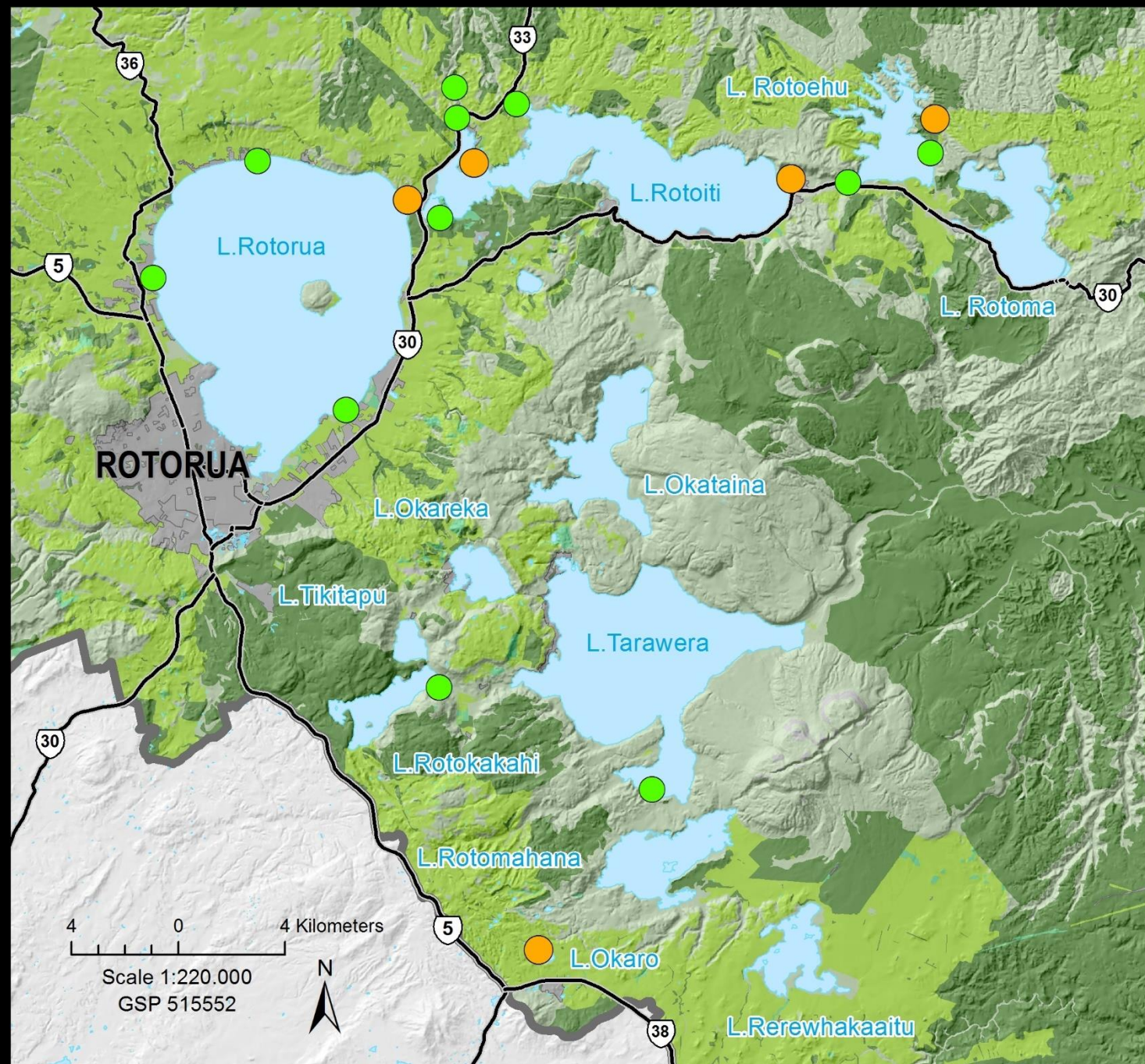
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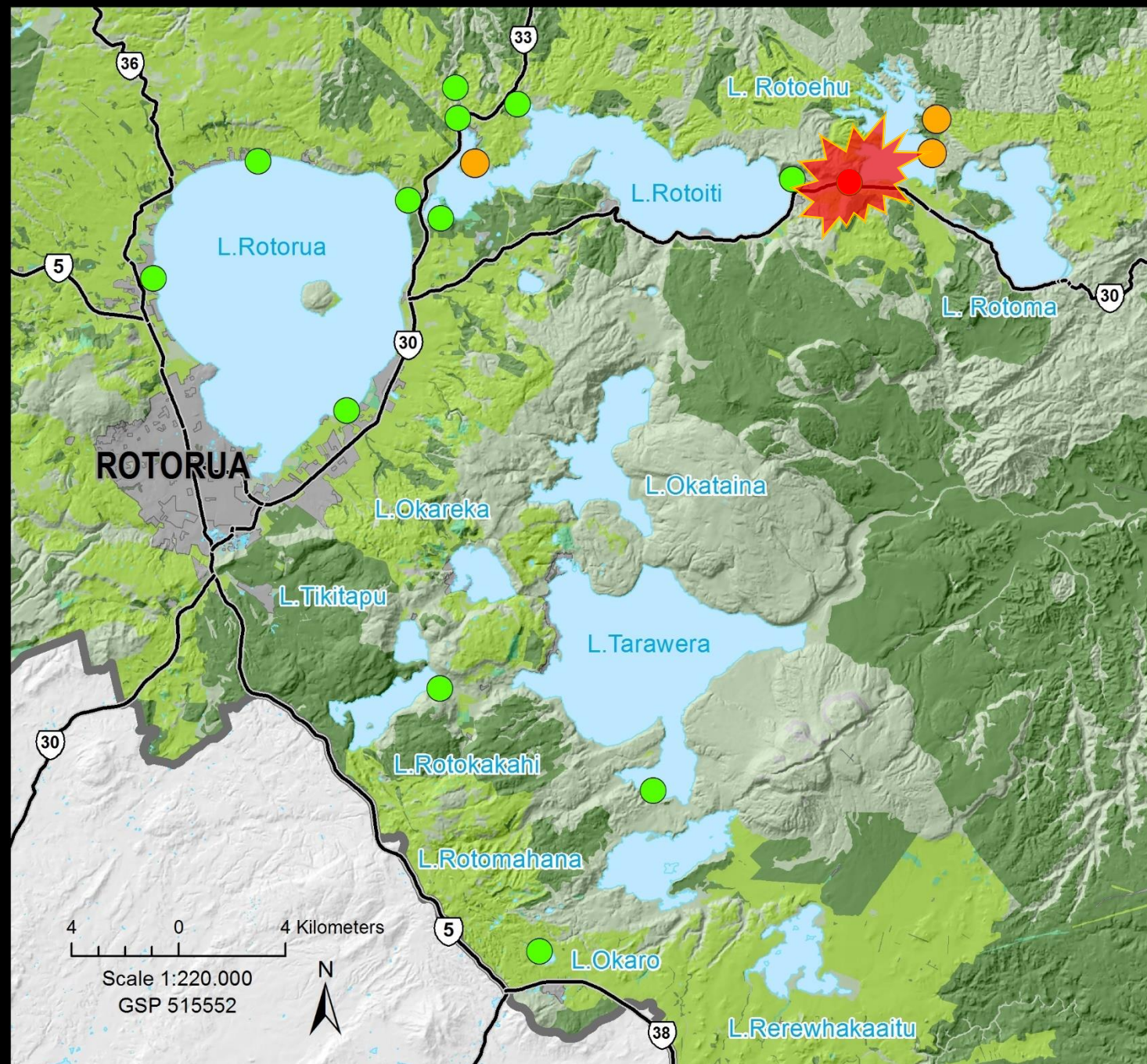
31 March 2016



04 April 2016



08 April 2016



Red Alert Comparison

Lake	Dec-April 2014/2015	Dec-April 2015/2016
Lake Rotoiti	0	0
Lake Tarawera	2	0
Lake Rotoehu	5	2
Lake Okaro	3	0
Lake Rotorua	1	0

2014/2015 Summary Last Summer

Four of the five regularly monitored lakes received an algae bloom, with the addition of Lake Rotokakahi

Red alerts occurred regularly throughout the summer in Lake Okaro and Lake Rotoehu

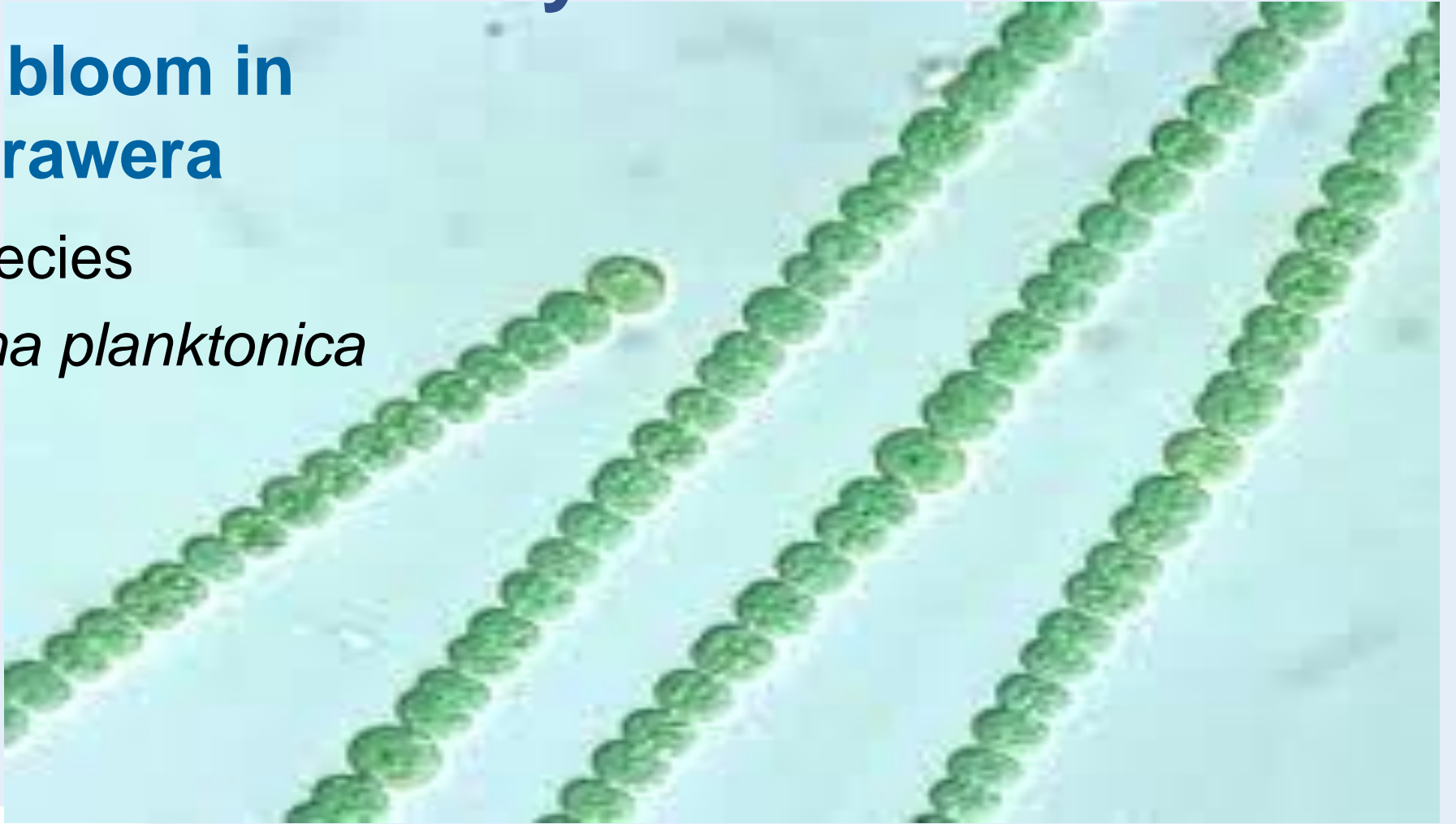


2014/2015 Summary Continued

A short bloom in Lake Tarawera

Bloom Species

- *Anabaena planktonica*



Picture: http://protist.i.hosei.ac.jp/PDB/images/Prokaryotes/Nostocaceae/Anabaena/sp_05.html

2014/2015 Summary Continued

A different bloom forming species found in Lake Rotorua

- Bloom species
 - *Aphanizomenon*
Issatsschenkoi

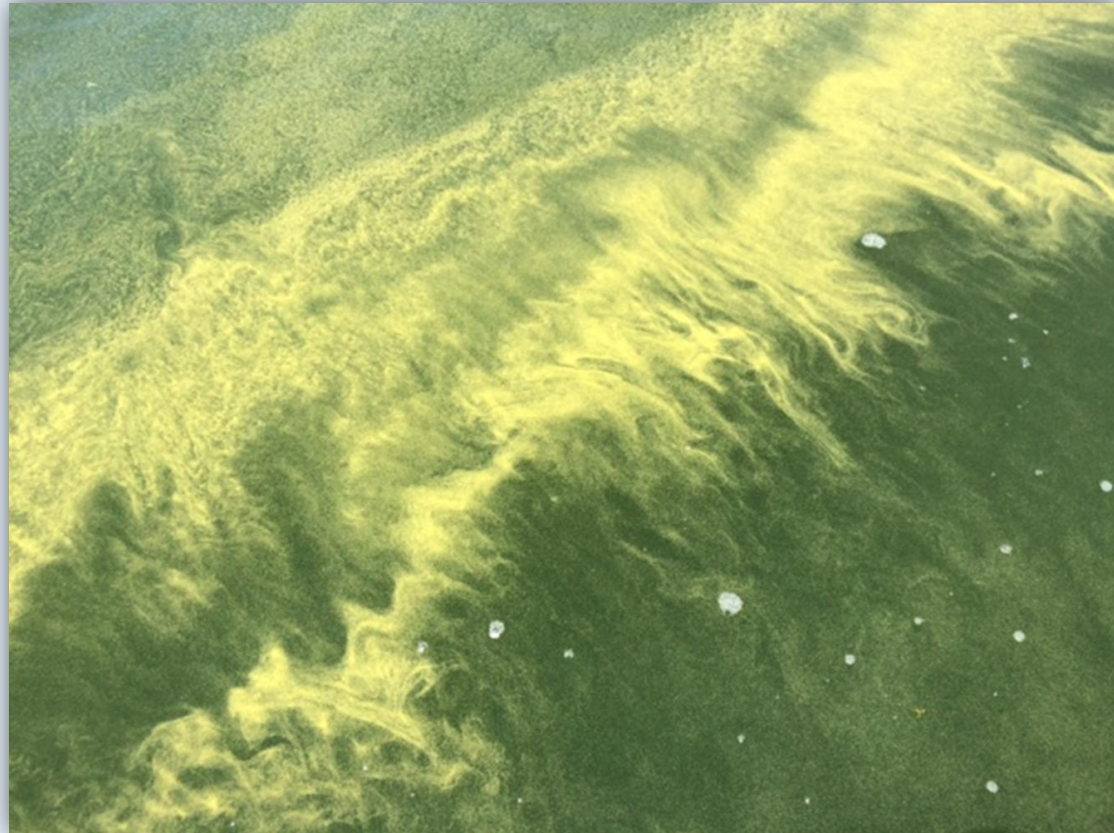


Picture: <http://nordicmicroalgae.org/taxon/Aphanizomenon%20issatsschenkoi>



2015/2016 Summary This year

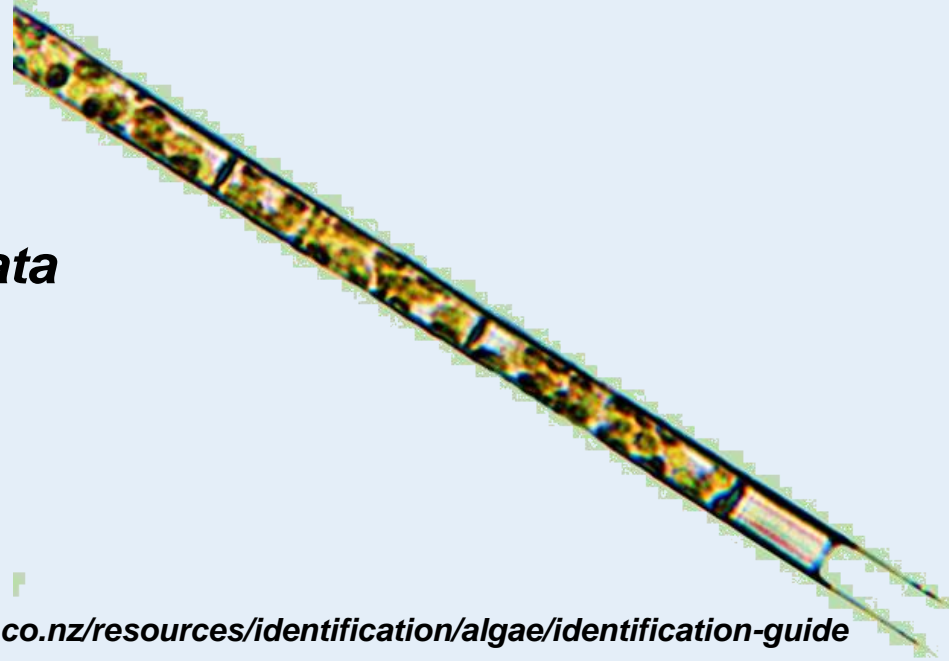
Early reports of algae in Lake Rotorua



2015/2016 Summary continued

Early reports of algae in Lake Rotorua

- Extra monitoring of mid lake sites where discolouration was occurring
- A diatom bloom
 - *Aulacoseira granulata*



Picture: <http://www.landcareresearch.co.nz/resources/identification/algae/identification-guide>

Conclusions

Why is this years results so different

	2014/2015	2015/2016
Weather	Hot, dry and calm	Frequent rain and wind events
First Red Alert	December 2014	March 2016
Lake Okaro	Early summer bloom	No summer early bloom
Additional lakes	Lakes Tarawera/Rotokakahi	No additional bloom reports

Thank you

Questions

