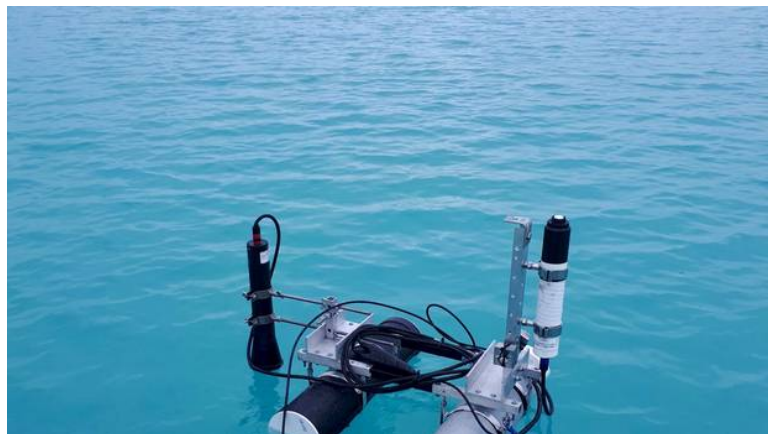


NEW ZEALAND **Death of a two-year-old at Mangawhai: Man charged with a**

The colour of our lakes - as seen from space

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2 minutes to read



A monitoring instrument in Canterbury's Lake Tekapo. Photo / Warrick Powrie



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The impact of farming, forestry and climate change on our lakes has been captured by four years of satellite observations.

The first comprehensive assessment of lake water colour, led by the University of Waikato's Dr Moritz Lehmann, revealed the full global range - some being a stable blue, some varying strongly through the seasons, and others suffering the effects of man-made pollution.

In the data, colour was expressed as "dominant wavelength" - an intensification of the colour as perceived by the human eye.

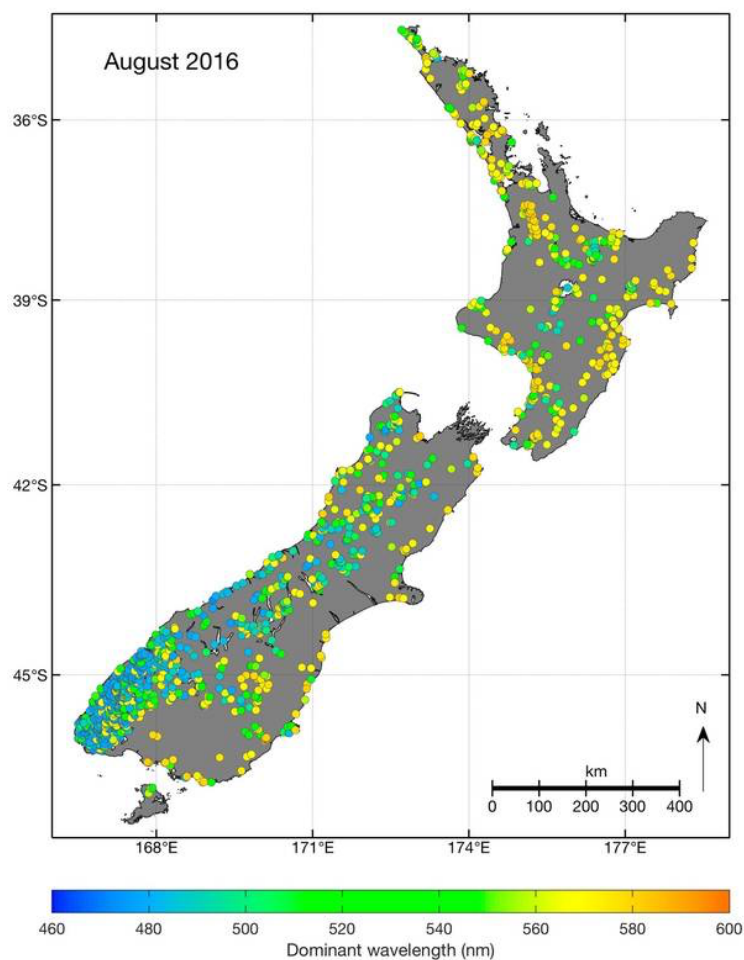
Lehmann said that while clear and pristine lakes were blue, a non-blue colour did not necessarily mean that the water was polluted.

The colour of water was related to the amount of algae, suspended sediments and tannins, or brown soil-derived organic material, he said.

"These substances are naturally present, but may also be enhanced by pollution."

The development of the space-based methodology was timely as water colour had recently been added to the New Zealand national environmental monitoring standards for lakes.

According to the most recent data, more than half of the lakes regularly monitored in New Zealand are graded from average to poor.



The colour of 1486 lakes, determined from satellite images taken in August 2016, and expressed as an intensification of the colour as perceived by the human eye. Image / Supplied

The main measure used is called the trophic level index, or TLI, which combines four water-quality indicators to signify a lake's life-supporting capacity.

Of 65 lake sites monitored between 2009 and 2013, 24 sites had median TLI scores of very good or good, 17 monitored sites had moderate scores, and 24 monitored sites had poor or very poor scores.

Over the same period, 12 sites had phosphorus levels too high to meet national bottom lines for ecosystem health, 11 had too much nitrogen, and 11 had unacceptably high levels of algae biomass.

This meant these lake sites could have ecological communities at high risk from nutrients causing algal blooms, or from not enough oxygen.

Long-term monitoring data showed levels of total nitrogen, total phosphorus, algal indicator chlorophyll-a and visual clarity were generally improving at lakes over the 2004 to 2013 period, but trends had been worsening for bottom-water dissolved oxygen and nitrate-nitrogen.

Among those lakes consistently rated bad are Lake Horowhenua, Lake Wairarapa, and Lake Ellesmere.

The Waikato researchers believed that in the near future, water-colour earth observation data would be complemented by observations made by a simple smartphone app created by fellow researchers at Vrije Universiteit Amsterdam.