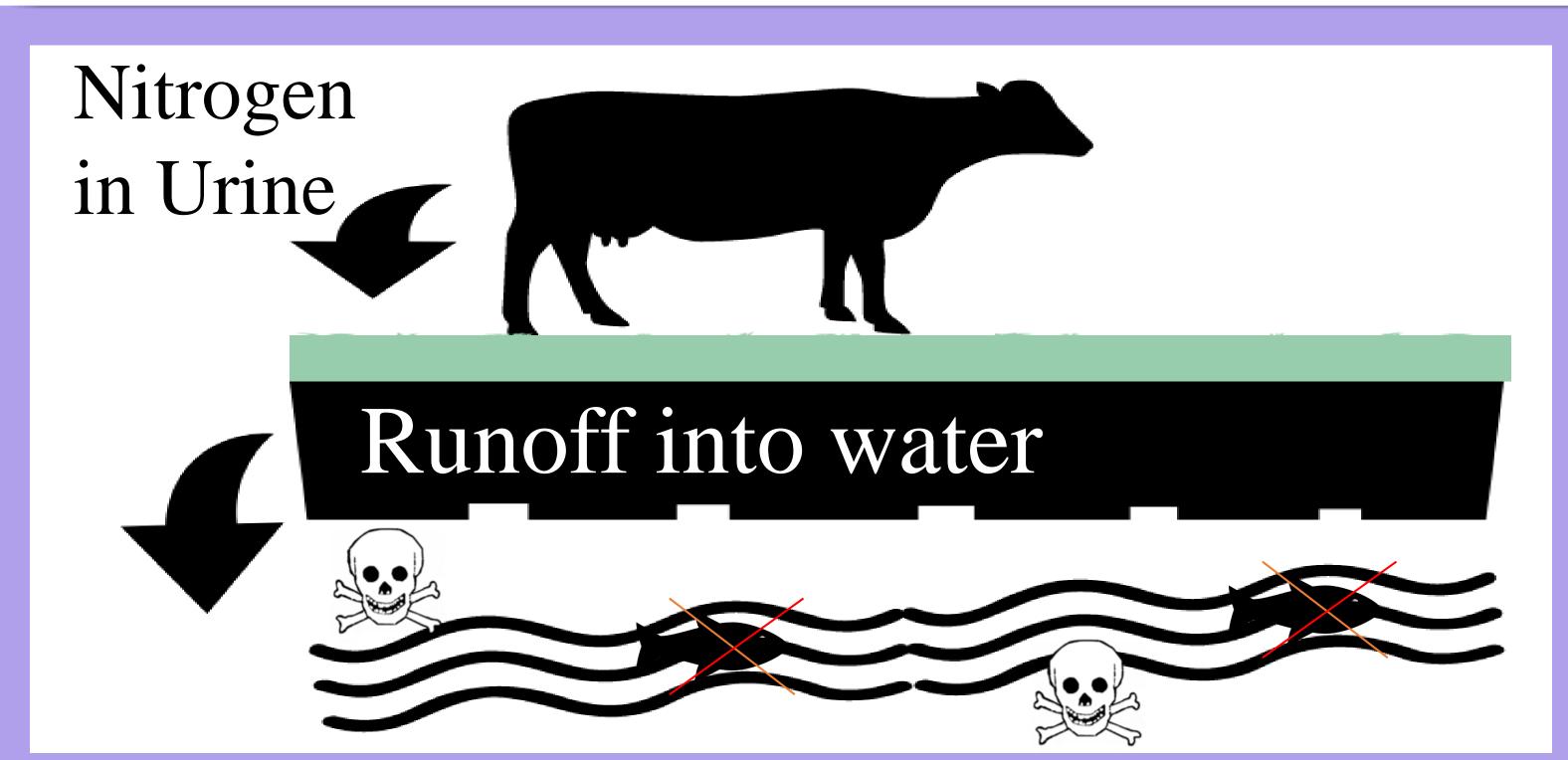


## Nutrient Pollution in Lake Rotoehu from Dairy Farming

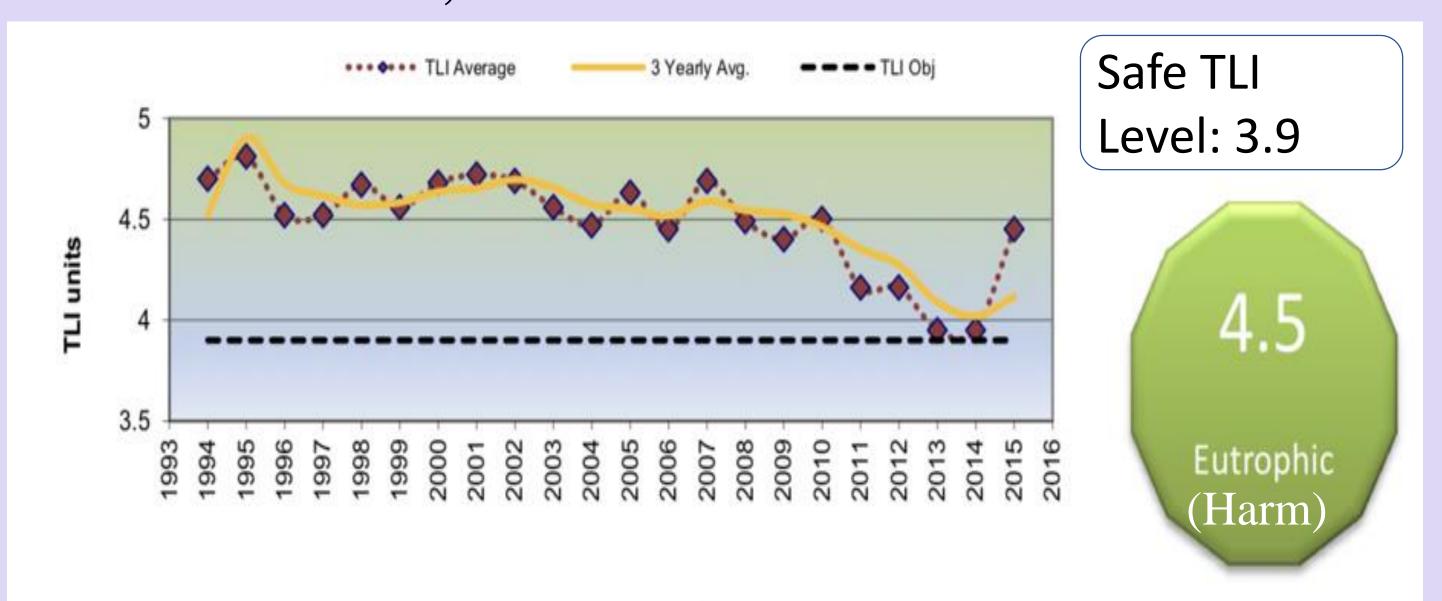
Presented by: Wayne Nolette (BME), Vikram Dolinak (BME), Jeffrey Tallan (CE), & Spencer J. Hoagland (CE)

Advisors: Professor Elisabeth Stoddard (SSPS) & Professor Derren Rosbach (CEE)



### Problem 1: Pollution in Lake Rotoehu

Trophic level index (CTLI) measures nutrient status in lakes. Lake Rotoehu's nutrient index has exceeded the safe level for over 20 years — with health, environmental, and economic losses.



## Problem 2: Environmental Injustice



The Maori community is evenly impacted by the pollution and lacks political and economic power to address it.

### **Solution Decision Matrix:**

	Algal Turf Scrubber	Omni Processor	Constructed Wetlands	Conservation Buffers	Hybrid Catalyst Ionizer	Spikey
Cost (.3)	4	1	2	5	3	5
Suitability (.3)	1	1	5	5	1	5
Culturally Appropriate (.2)	2	1	5	5	2	4
Farmer Acceptable (.2)	1	1	5	4	2	4
Total	2.1	1	4.1	4.8	2	4.6

### Solution Implementation:



### **Benefits of Our Solutions:**

	Pollution Present:	Amount reduced
Nitrogen	34,000 Kg/yr	23,800 Kg/yr
Phosphorus	1,400 Kg/yr	800 Kg/yr
2017:	2018:	2019:

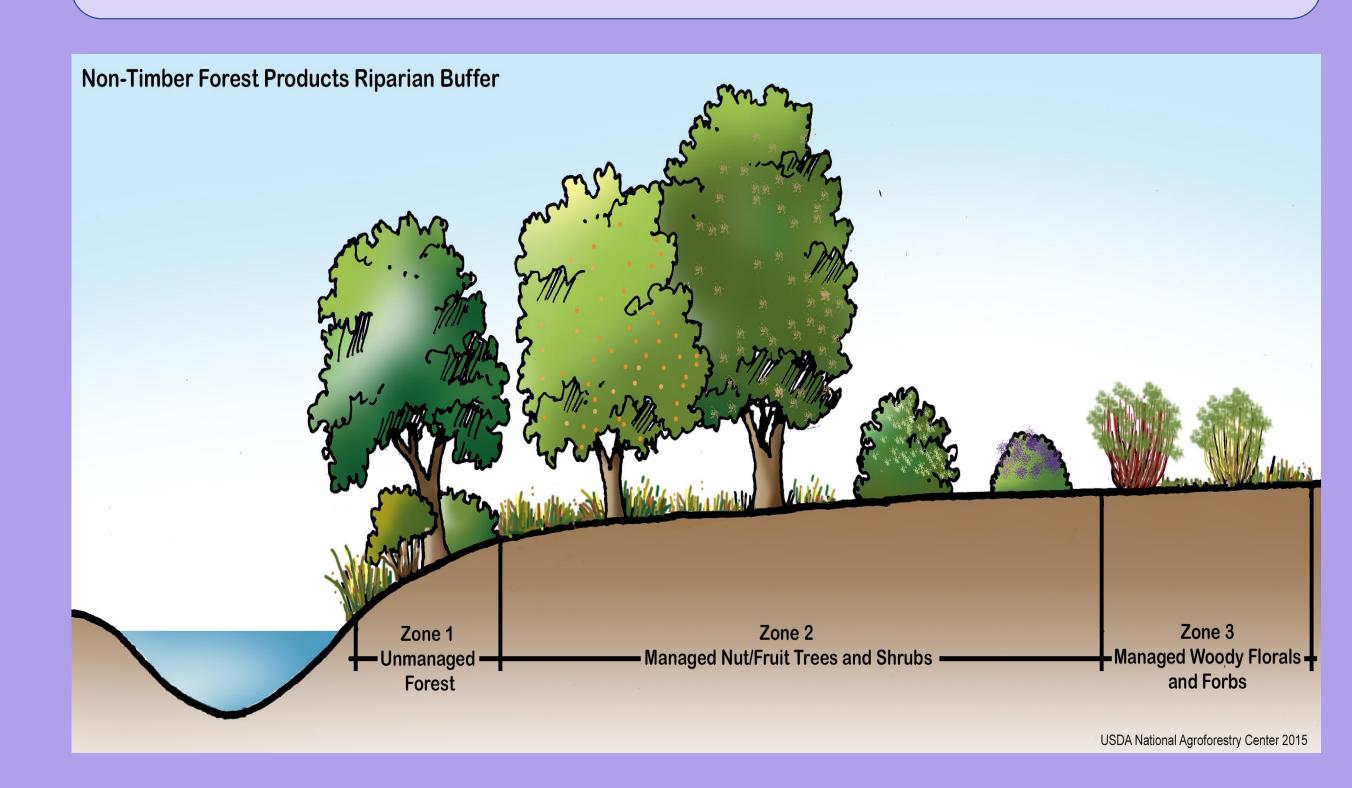
# 2017: 2018: 2019: Propose Solution to Plant seeds, Purchase Collect data on the Rotorua Lakes Spikey, and Hire a operation of Spikey team to operate it

## Solution 1: Spikey



Spikey locates urine patches and treats them with the chemical ORUN allowing the grass to absorb the nitrogen more effectively.

### Solution 2: Conservation Buffers



### Acknowledgements:

We would like to acknowledge Elisabeth Stoddard, Derren Rosbach, Sarah Butts, and Al Rotz for their help throughout the project.

#### **References:**

Matthews, S. (May 2015) Water Reclamation *Water Wheel*, 14(3), 26-29.

Tyrrel, S. (May 2005) Treatment of dirty water from dairy farms using a soil-based batch recirculation system *Water Science and Technology*, 51(9), 73

Mayer, P. M., Reynolds, S. K., Mccutchen, M. D., & Canfield, T.

J. (June 27, 2007). Meta-Analysis of Nitrogen Removal in Riparian Buffers. *Journal of Environment Quality, 36*(4), 1172. doi:10.2134/jeq2006.0462
Sanderson, M. A., Jones, R. M., Mcfarland, M. J., Stroup, J., Reed, R. L., & Muir, J. P. (Feb. 7, 2001). Nutrient Movement and Removal in a Switchgrass Biomass–Filter Strip System Treated

with Dairy Manure. *Journal of Environment Quality*, 30(1), 210 doi:10.2134/jeq2001.301210x
Pell, A. N. (1997). Manure and Microbes: Public and Animal Health Problem? *Journal of Dairy Science*, 80(10), 2673-2681. doi:10.3168/jds.s0022-0302(97)76227-1

### Timeline

2020-2040:

Start collecting data
on the effectiveness
of the conservation
buffer

2040:

The buffer is at maximum
efficiency and last
evaluation should be
conducted