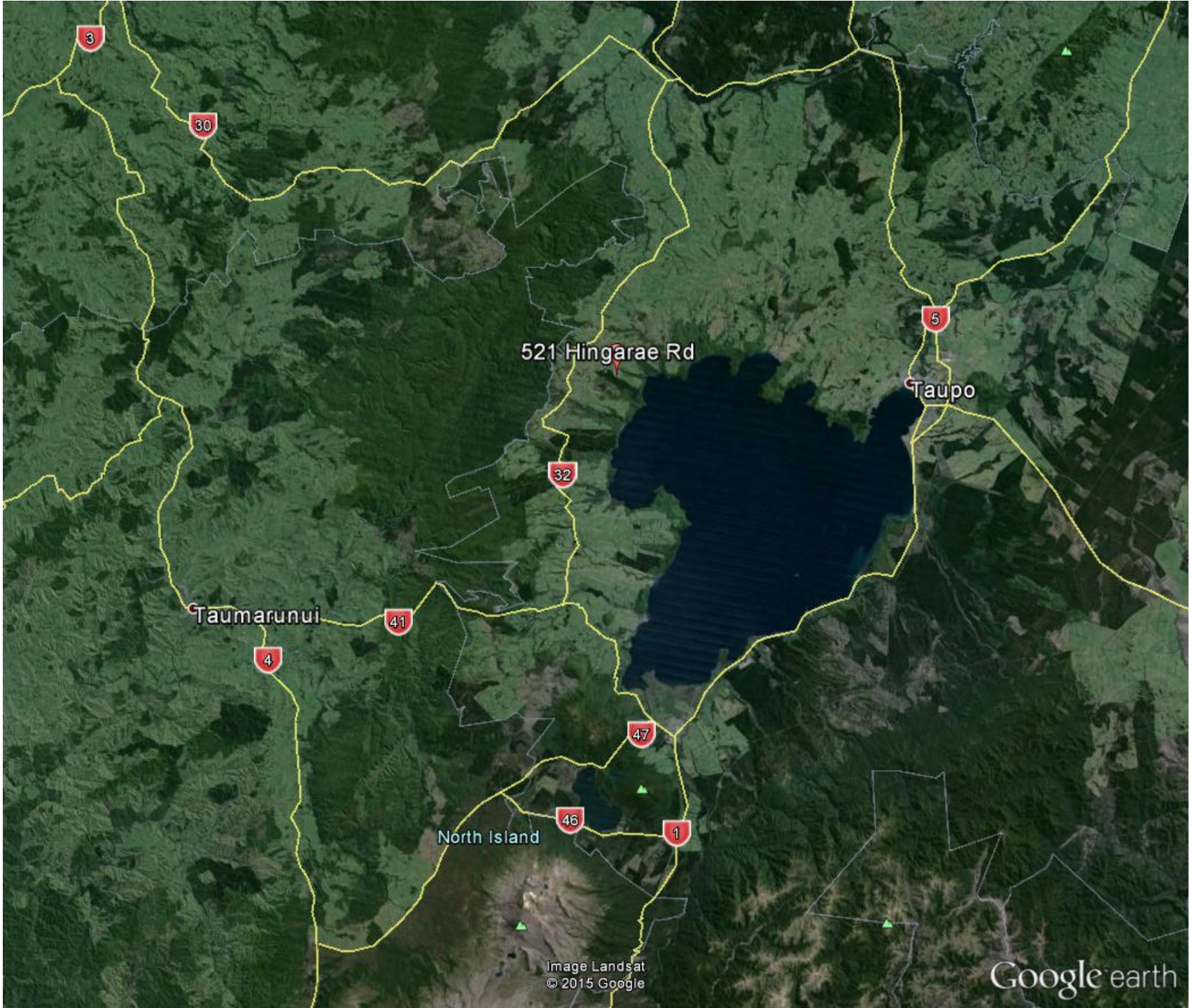
Landcare Research
Manaaki Whenua

Nitrogen leaching from cut-and-carry lucerne

Malcolm McLeod
Landcare Research


3
30
521 Hingarae Rd
5
Taupo
32
Taumarunui
41
4
47
46
1
North Island
Image Landsat
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Google earth

Context

- Water in Lake Taupō is deteriorating due to increasing nitrogen levels
- WRC adopted a target of 20% reduction in manageable-N entering the lake
- Now, each farm in the Taupō catchment has a nitrogen discharge allowance

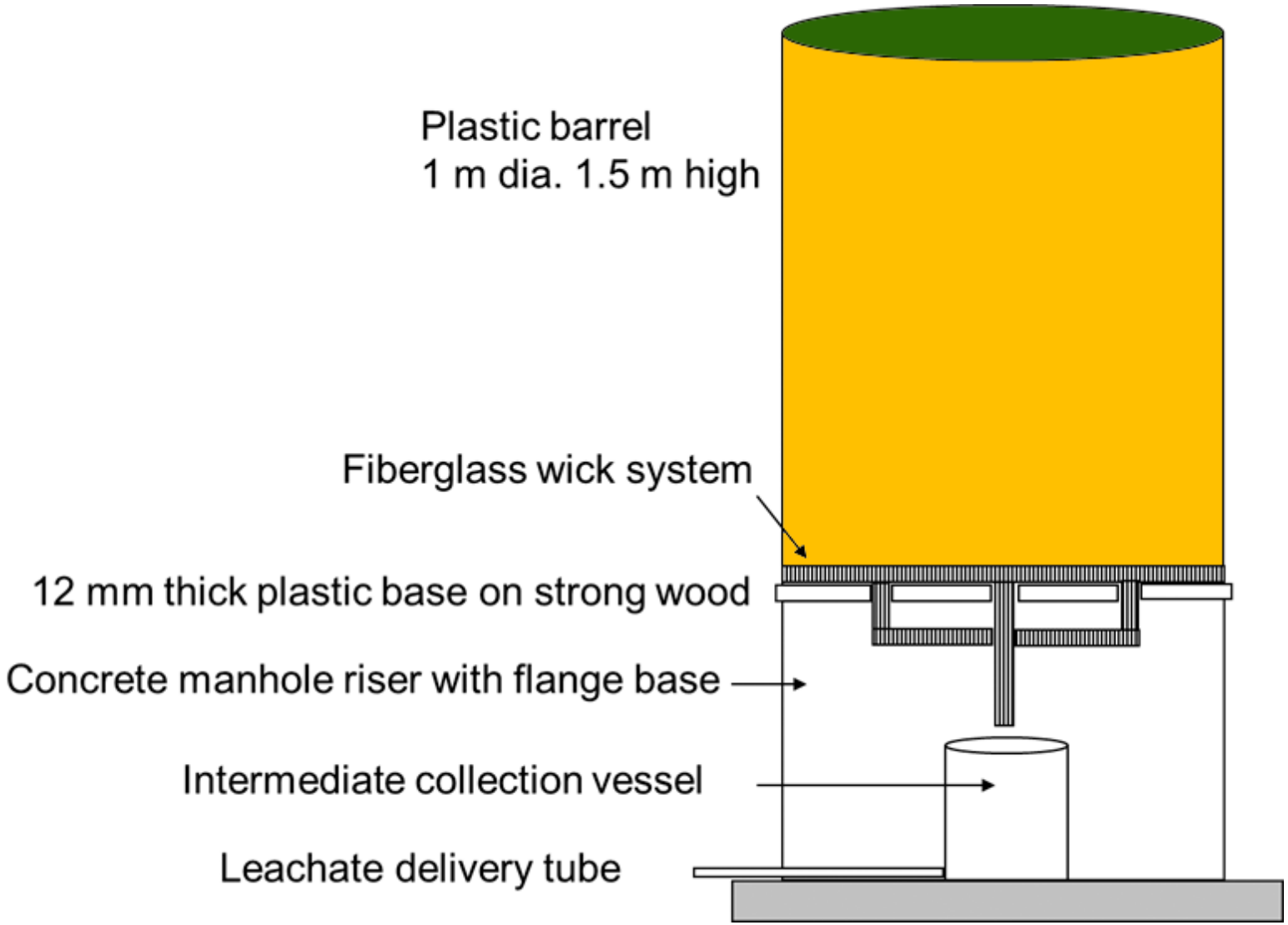
Lucerne

- Lucerne is a high value crop requiring no nitrogen fertiliser - potential
- Allowance modelled using Overseer® V5
- Then, no module for cut-and-carry lucerne

Published rates of N leaching under lucerne

- 2 to 26 kg/N/ha/y (native forest 3, dairying ~35)
- 26 kg/N/ha/y was down the road, Puketapu
  - Different aim – production
  - 20 kg/N/ha added as fertiliser
  - Measured at 60 cm
    - using suction cups
- Current research
  - Measure N leaching at a depth of 1.5 m
    - Using barrel lysimeters

Lysimeters


Plastic barrel
1 m dia. 1.5 m high
Fiberglass wick system
12 mm thick plastic base on strong wood
Concrete manhole riser with flange base
Intermediate collection vessel
Leachate delivery tube

Experimental setup

- 4 replicates **ryegrass/clover**
  - Not cultivated
  - Harvested on same rotation as farm
- 4 replicates **lucerne**
  - Cultivated to plant crop
  - Harvested at 10% flowering
- 4 replicates **lucerne + biochar**
  - Cultivated to plant crop
  - Harvested at 10% flowering


12.


FOR LIFTING-USE
SPREADER BEAM

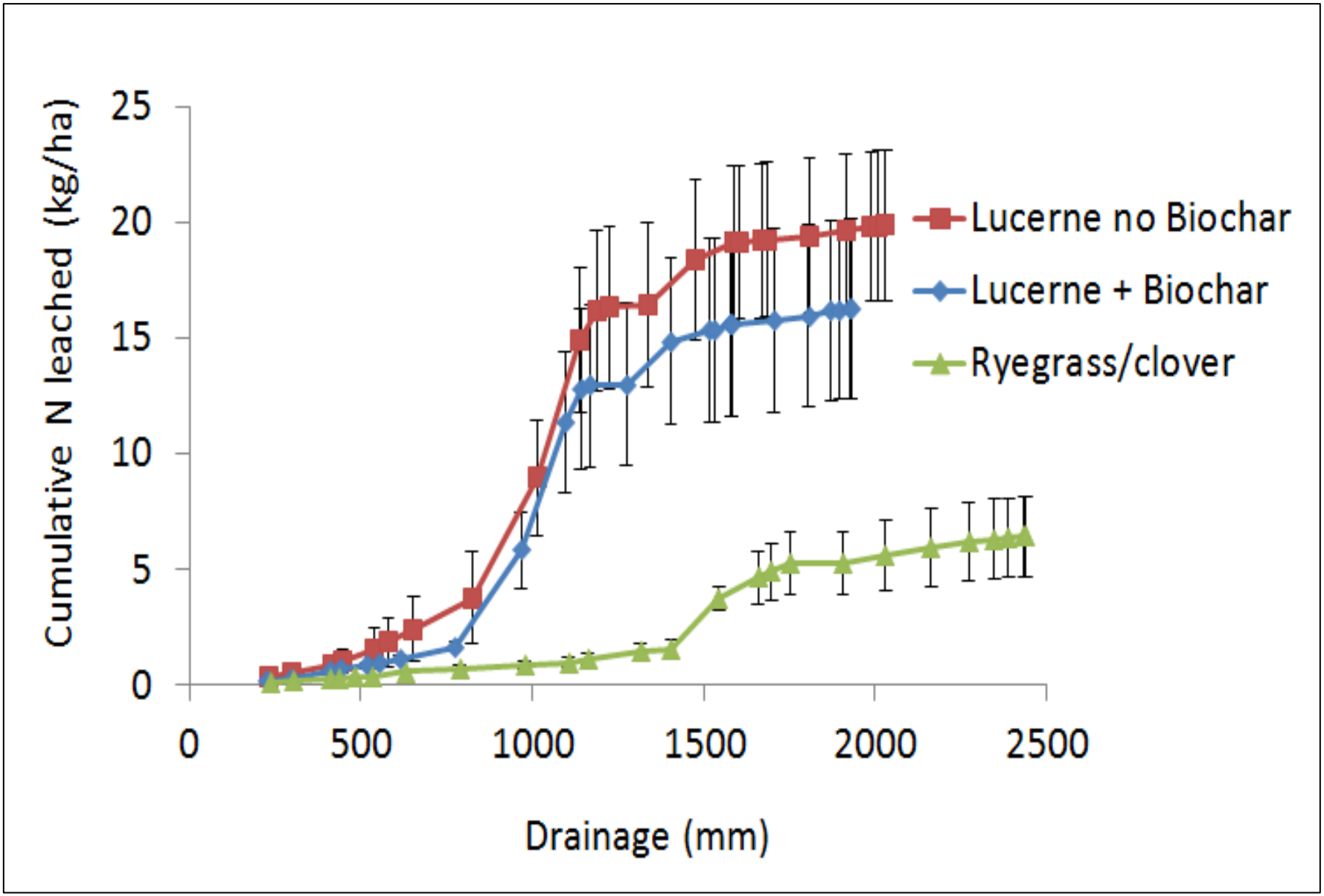

HYNDS
1050 SPUN MANHOLE
HYNDS
FOR LIFTING USE
SPREADER BEAM

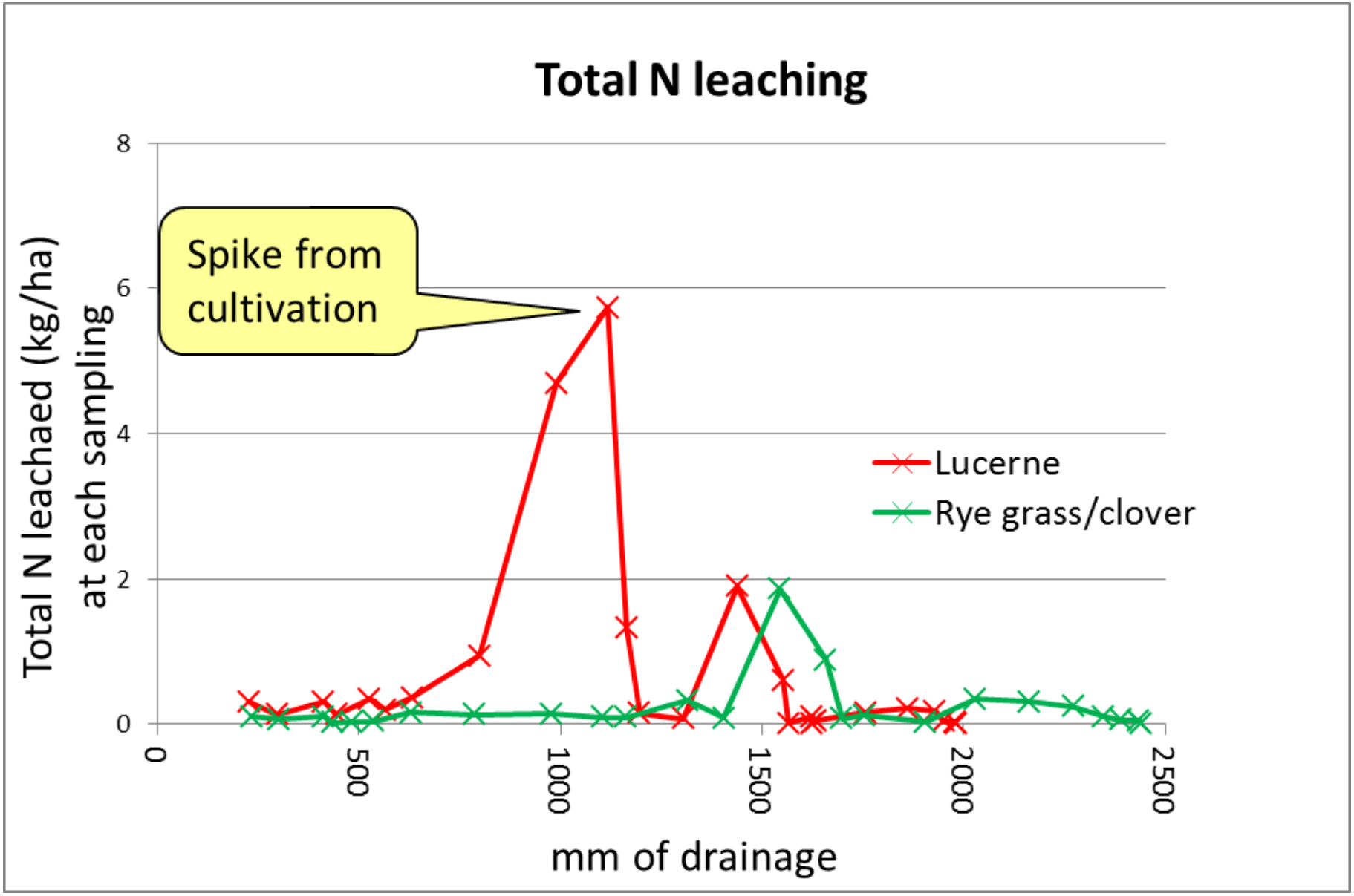

HYNDS


SHERLOCK

Ryegrass/clover

Lucerne


Cumulative N leached (kg/ha)
25
20
15
10
5
0
0
500
1000
1500
2000
2500
Drainage (mm)
Lucerne no Biochar
Lucerne + Biochar
Ryegrass/clover



After the cultivation peak lucerne and ryegrass/clover similar

Why grow lucerne?

	Ryegrass/clover	**Lucerne**
	DM (kg/ha)	DM (kg/ha)
Year 3	9	13
Year 4	7	14

Thanks
LTPT and SFF for funding the work
Taupo Lake Care for hosting the SFF grant
Mike and Sharon Barton (landowners) for ongoing input
Pioneer seeds for the lucerne
Genetic Technologies for fertiliser advice
Bowers Concrete for water tank
Digger operator Darrin Sherlock for keeping us safe

Advertisement
If you want to undertake research
at the facility, there is plenty of room