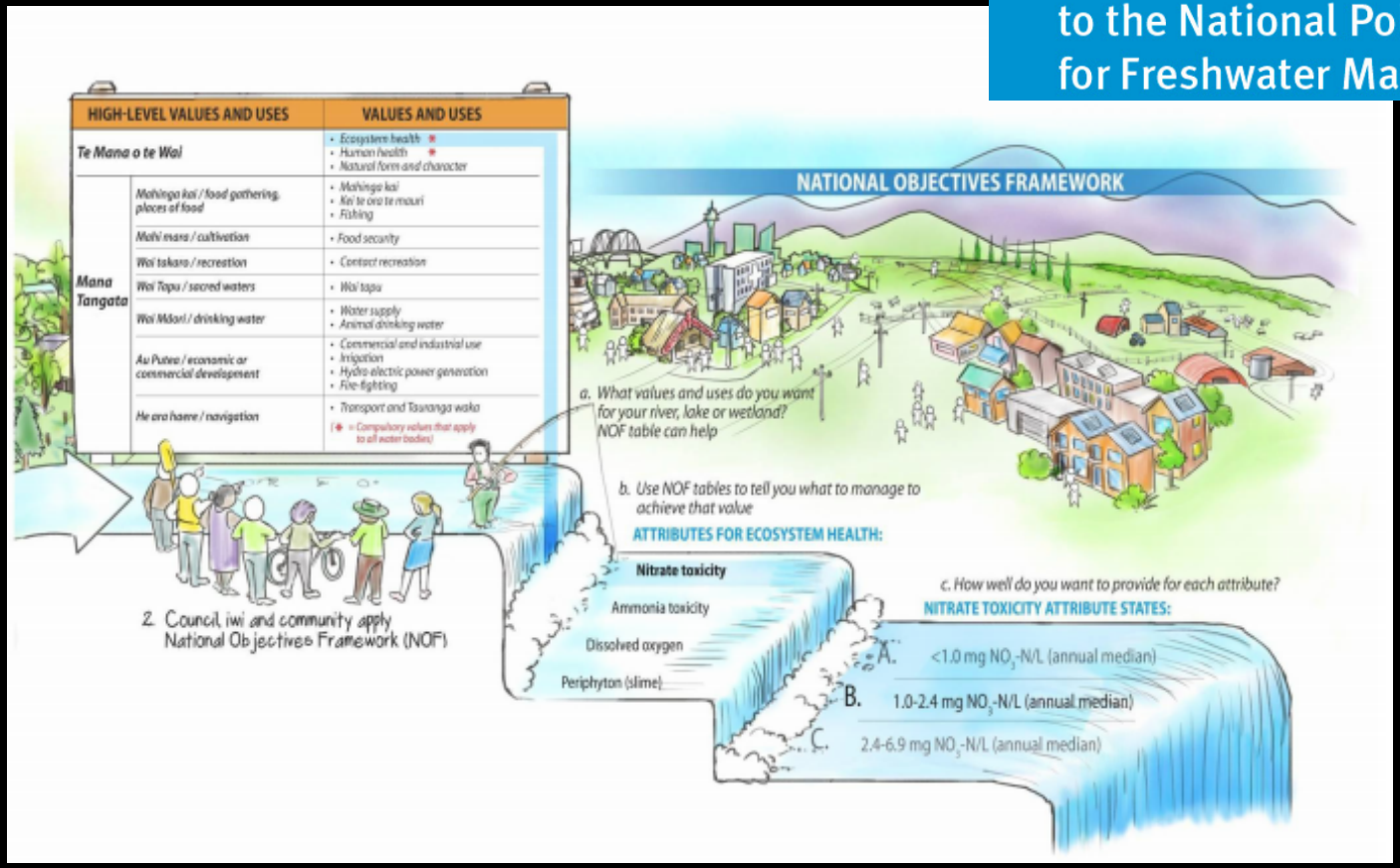
Use of sensors, GIS,
& detailed farm diaries
for engagement, extension
& education
in the Waipa

National Framework

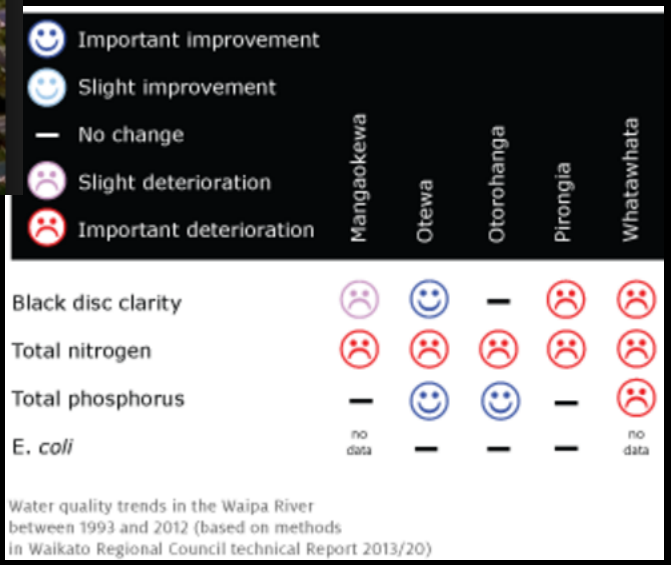


Regional implementation

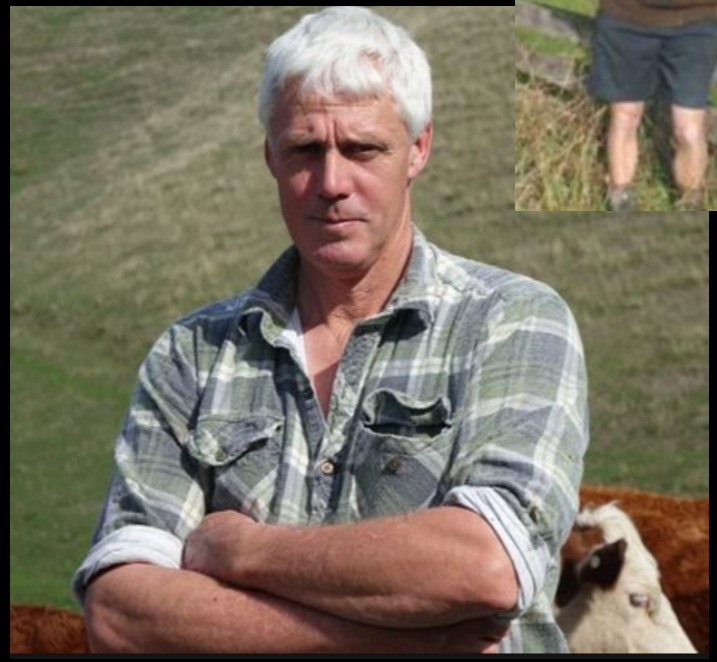
Sector representativ
Dairy
Horticulture
Rural advocacy
Energy
Industry
Sheep and beef
Environment/NGOs
Local government
Tourism and recreation
Forestry
Māori interests
Water supply takes
Rural professionals

Healthy Rivers
PLAN FOR CHANGE

Community representatives
People living in the Waikato or Waipa river catchments



The context



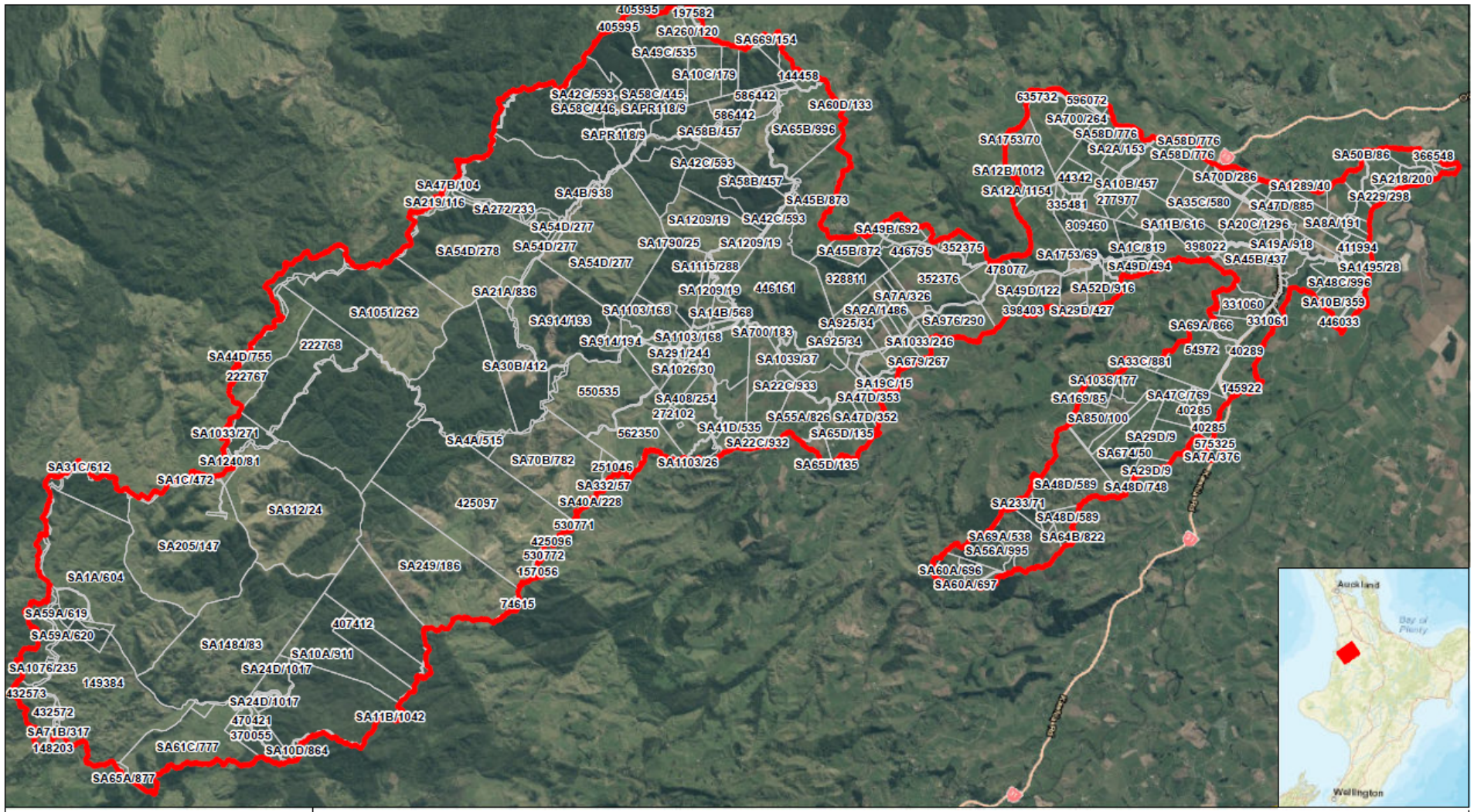
According to Statistics NZ (2013) the average age of a - beef cattle farmer was 56 years, the average age of sheep farmers was 53.

“Older farmers are more likely to have the capital to expand their farms , & there is the propensity for farmers to keep farming well into their sixties……

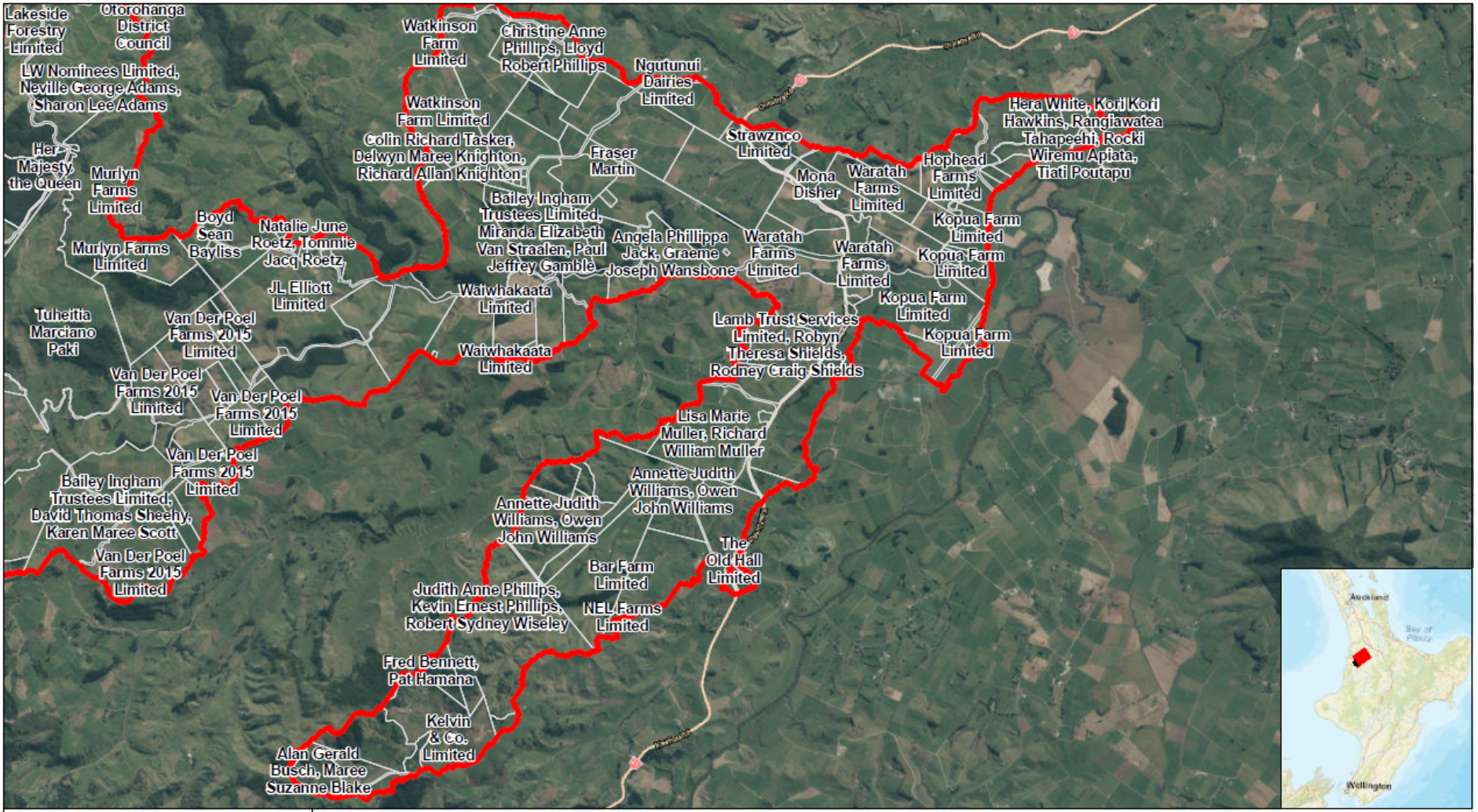
How did we approach it

- Needed to understand the river and catchments
  - Soils
  - Slope
  - LUC
- Define business types
- Find waterways that suited out purposes
- Find out WHO owned these farms
- Work with some of these farmers intensively to promote the concept

Catchment Titles



Catchment who



New Zealand
Moakurarua Catchment

Property Map

Date: 12-09-2016

Legend

Parcels

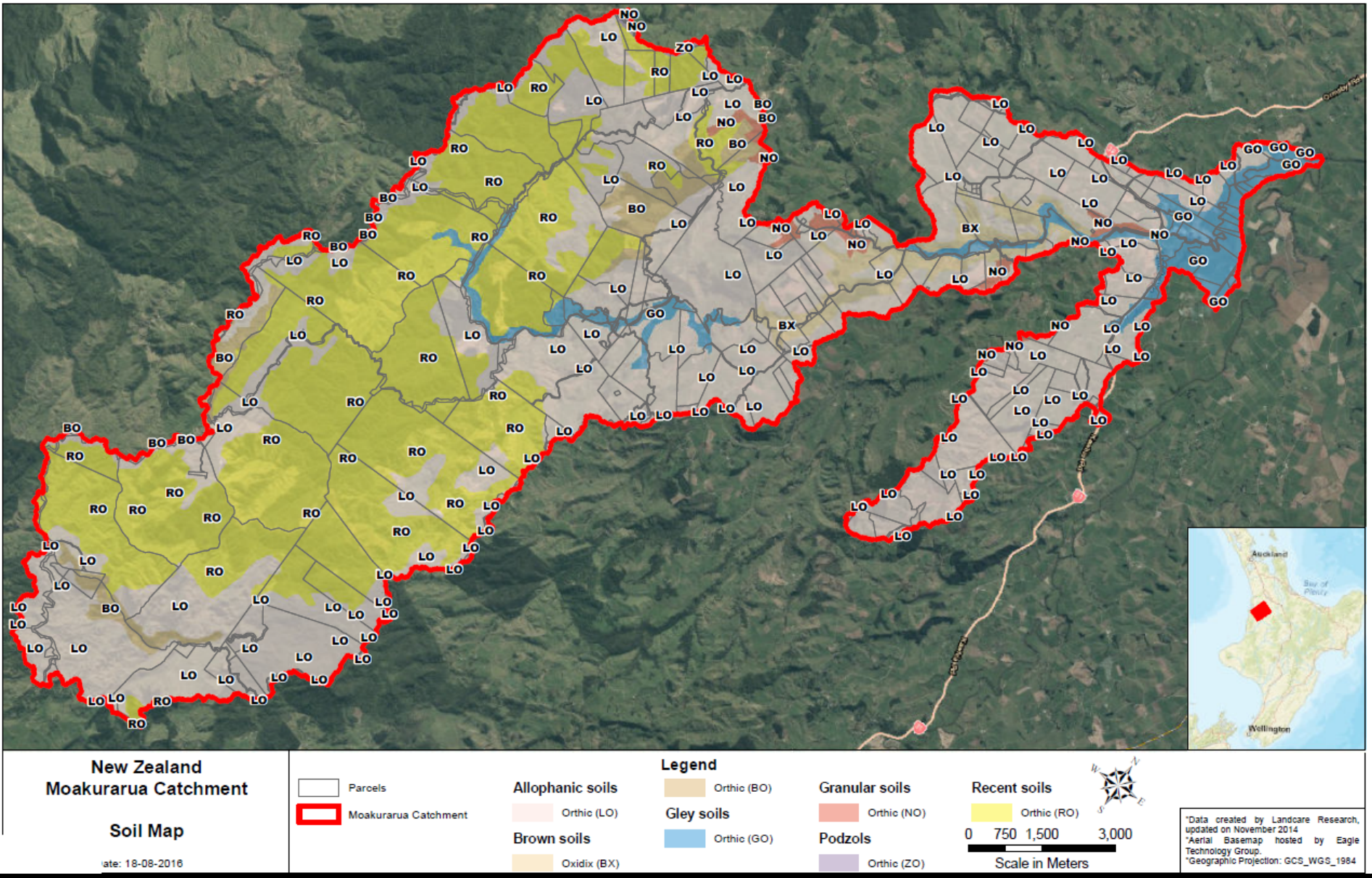
Moakurarua Catchment

0 475 950 1,900

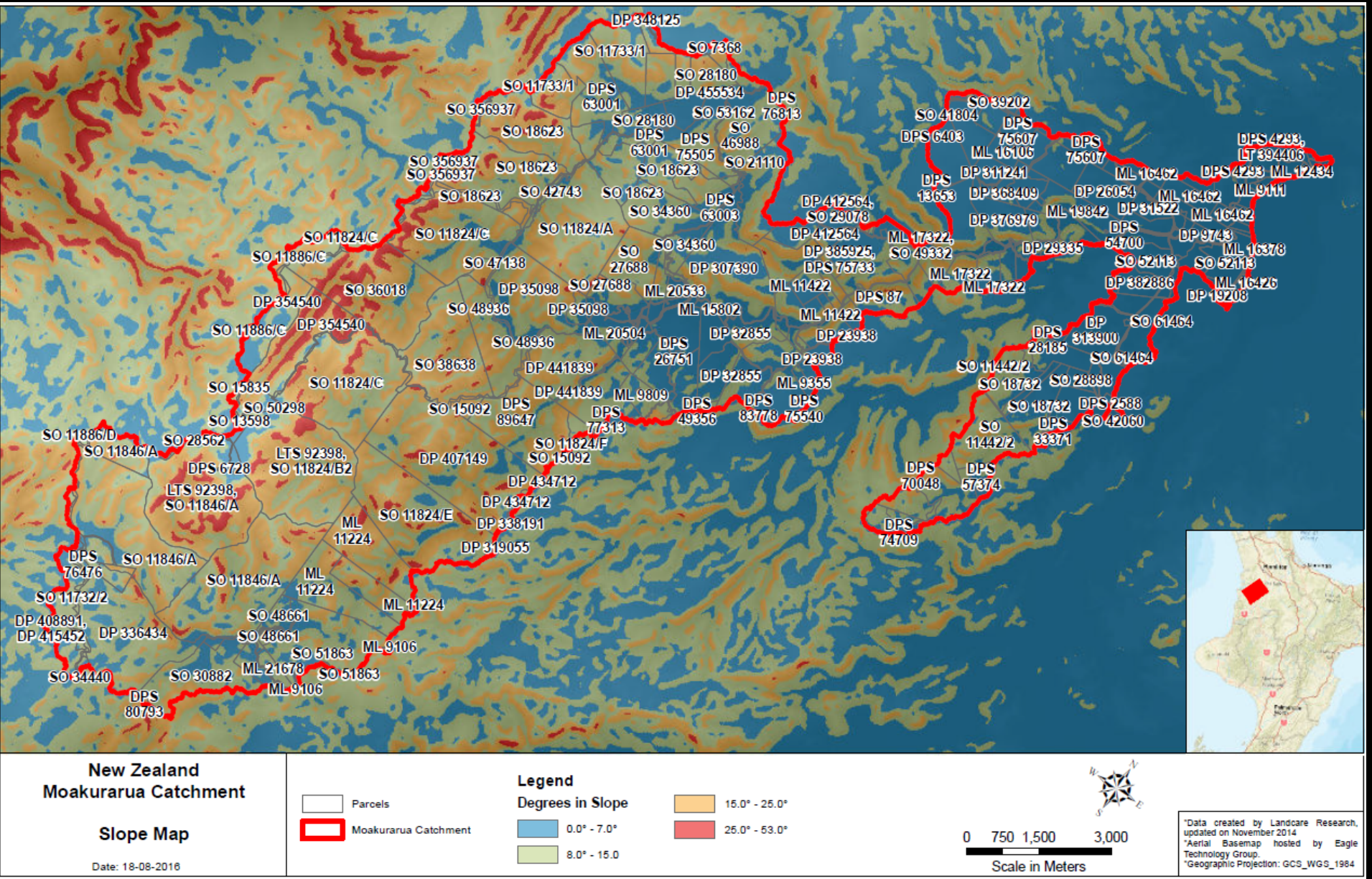
Scale in Meters

*Data created by Landcare Research, updated on November 2014
*Aerial Basemap hosted by Eagle Technology Group.
*Geographic Projection: GCS_WGS_1984

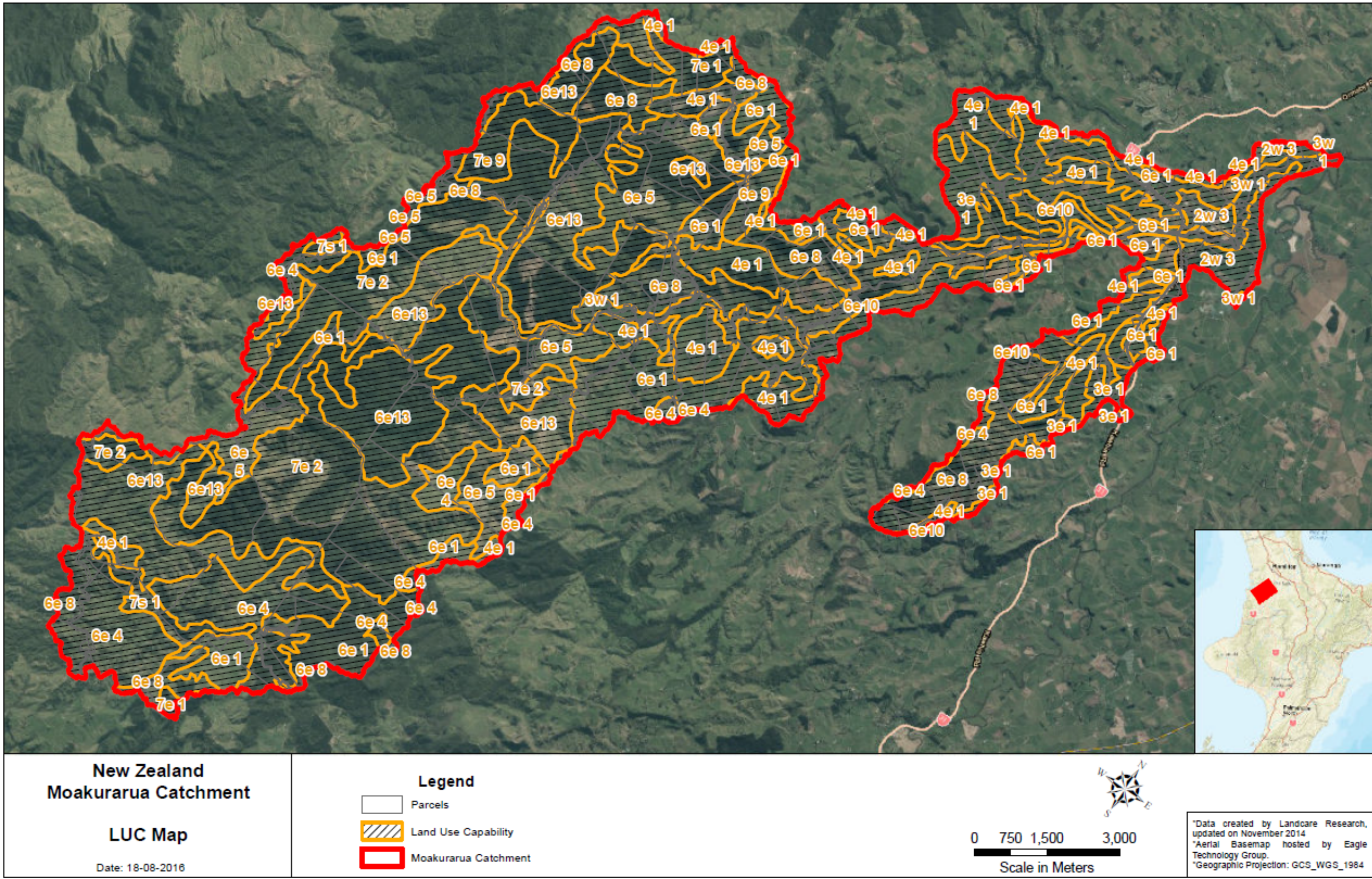
Catchment soil



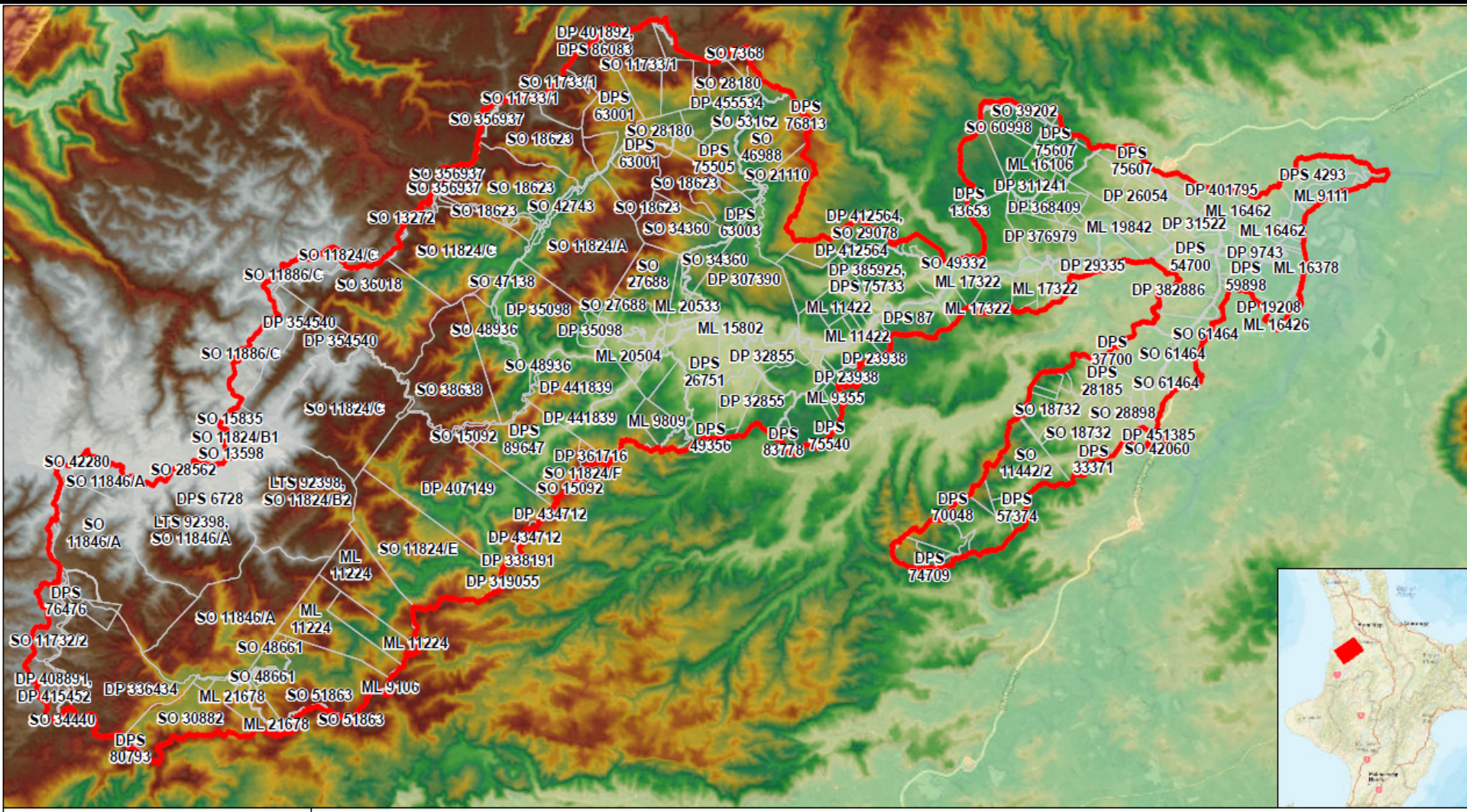
Catchment slope



Catchment LUC



Catchment DEM



New Zealand
Moakurarua Catchment

Elevation Map

Date: 18-08-2016

Legend

Parcels

Moakurarua Catchment

DEM in Meters

High : 940.701

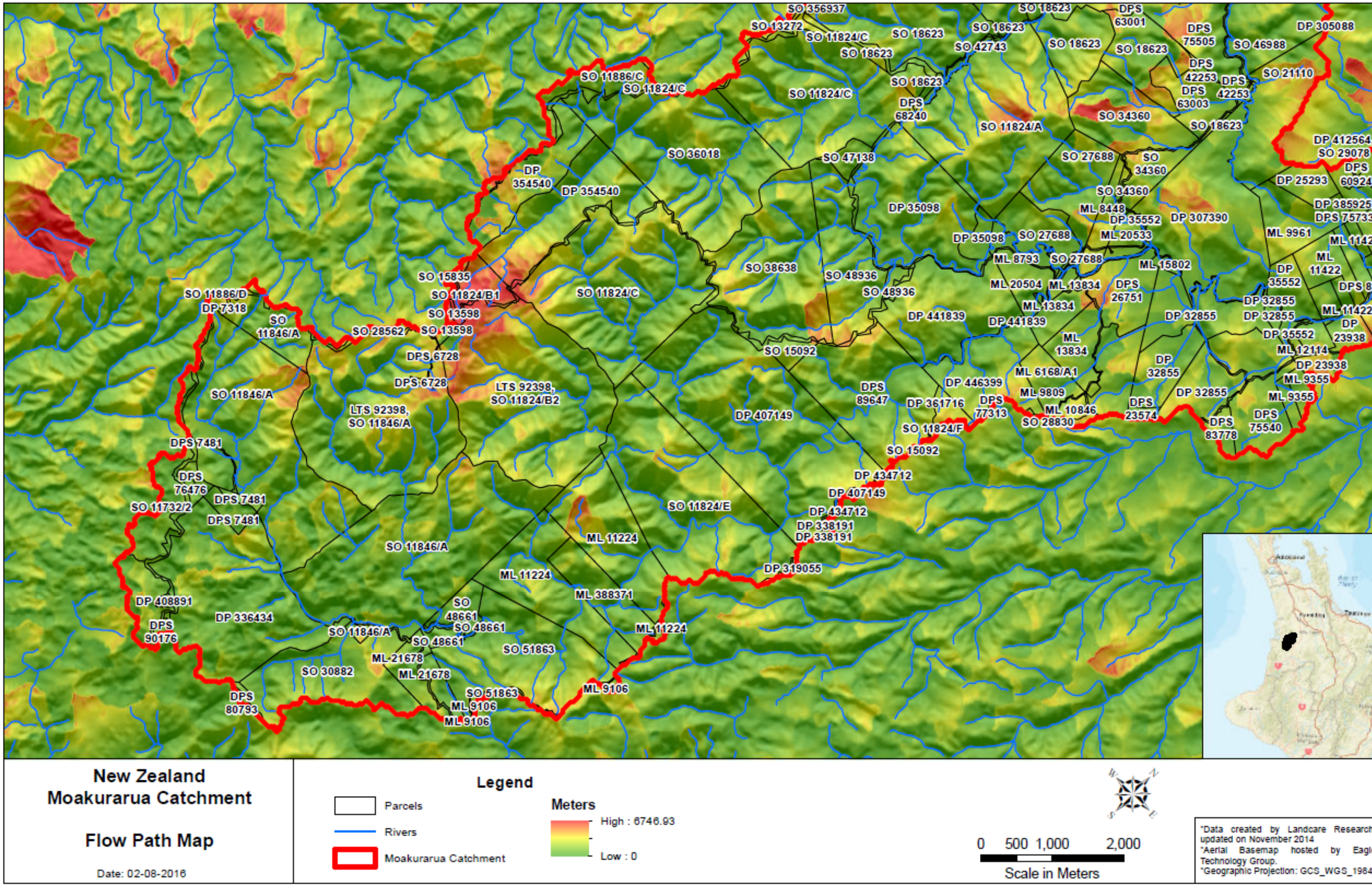
Low : -1.69774

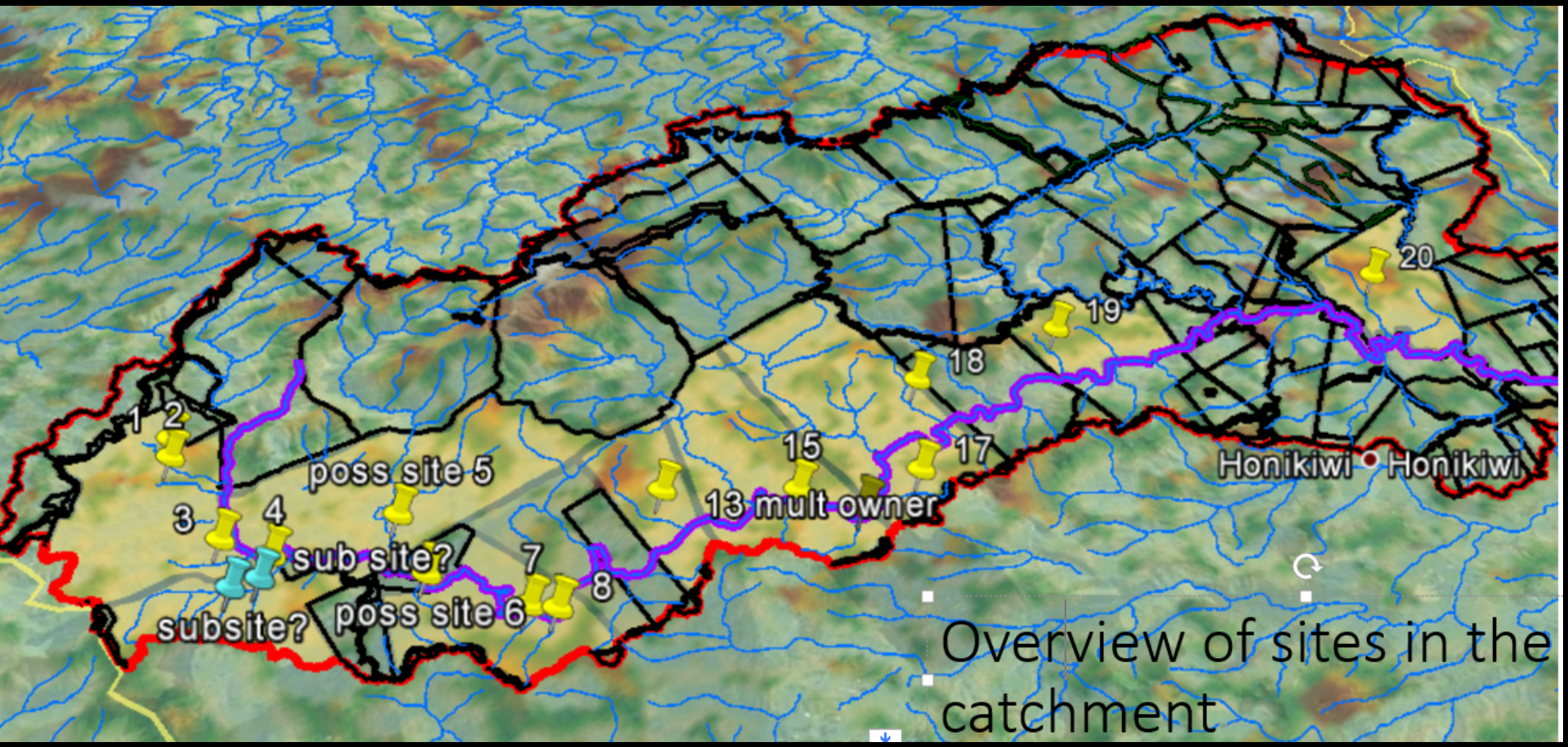
0 800 1,600 3,200

Scale in Meters

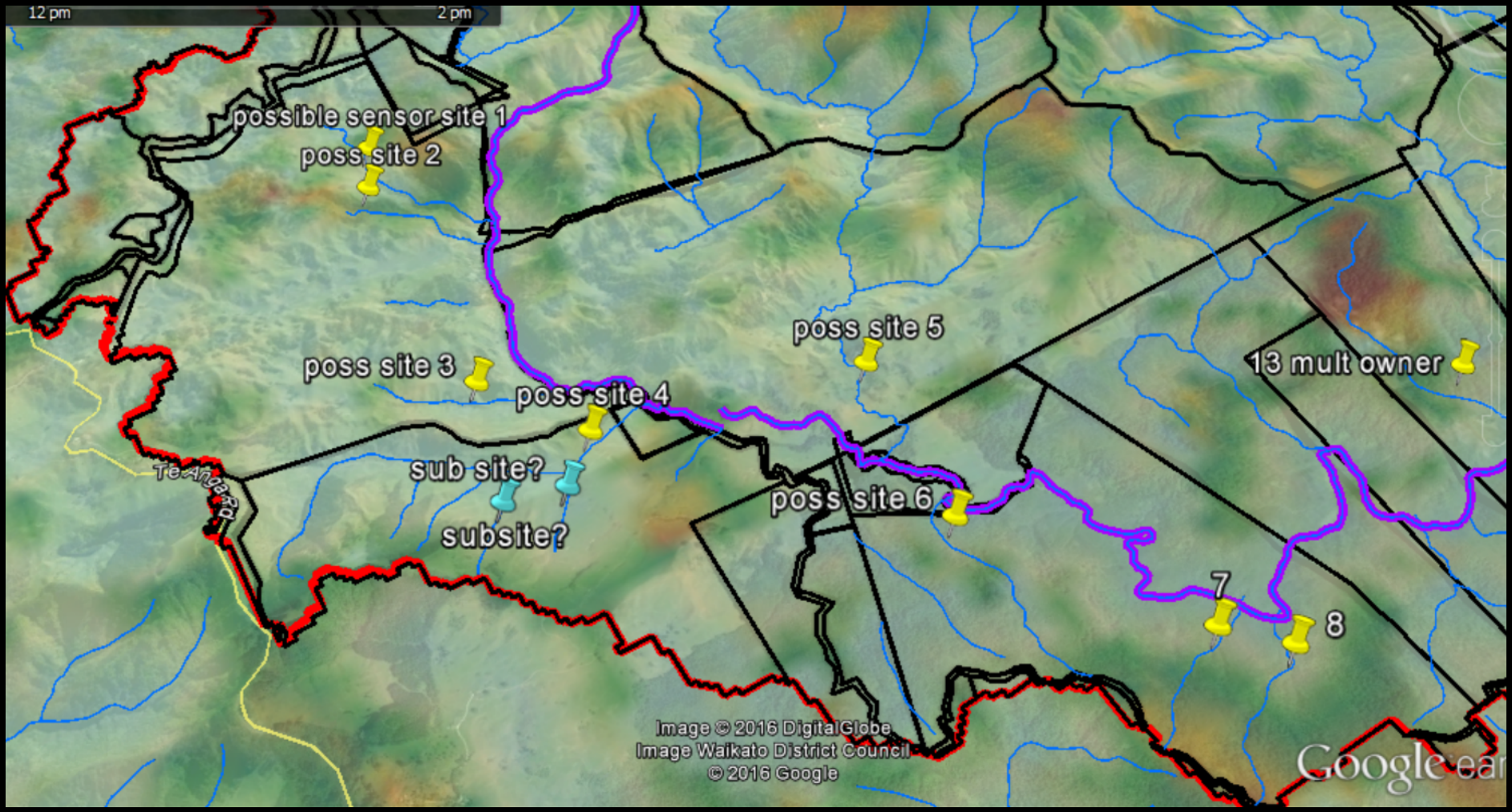
*Data created by Landcare Research, updated on November 2014
*Aerial Basemap hosted by Eagle Technology Group.
*Geographic Projection: GCS_WGS_1984

Catchment Flow

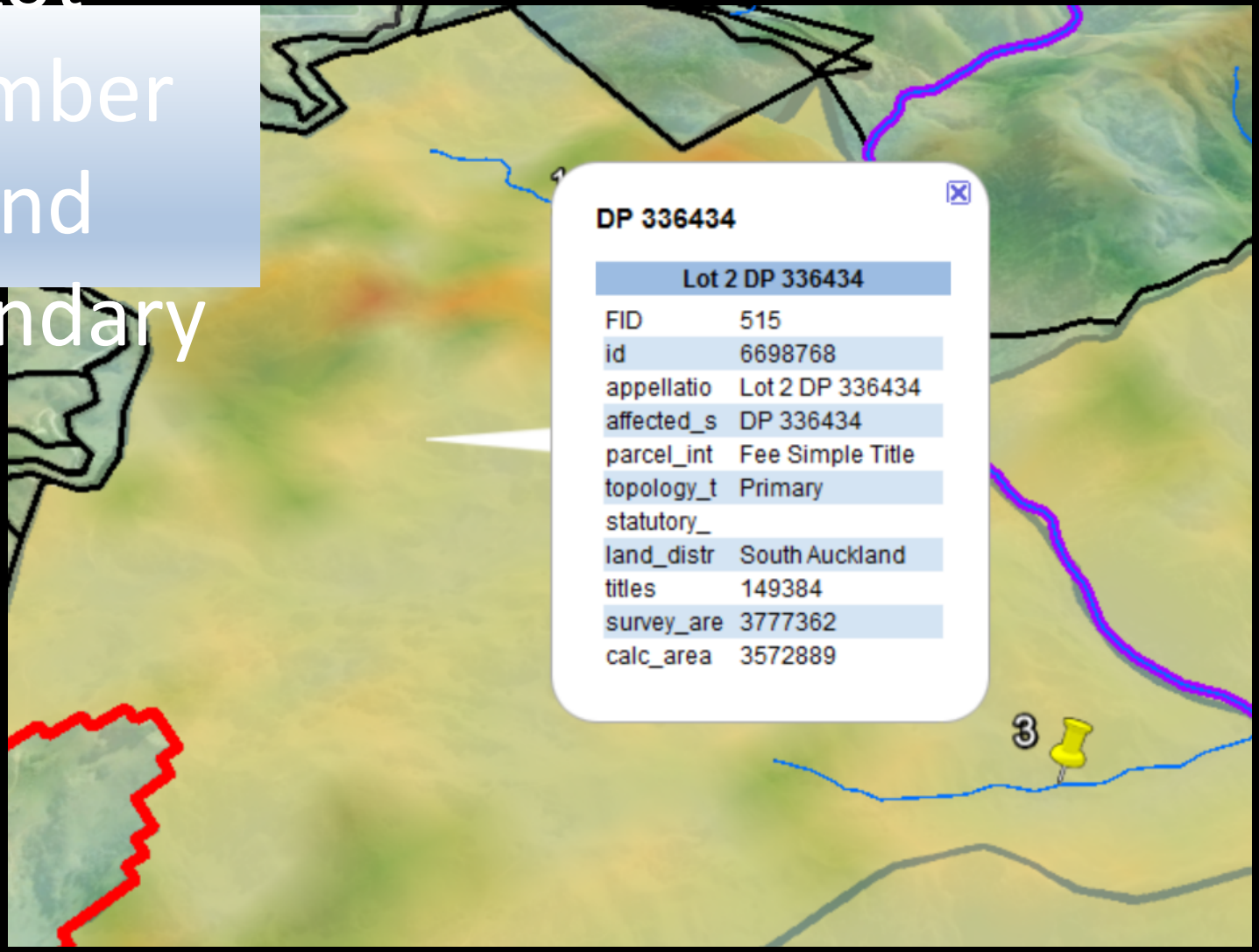


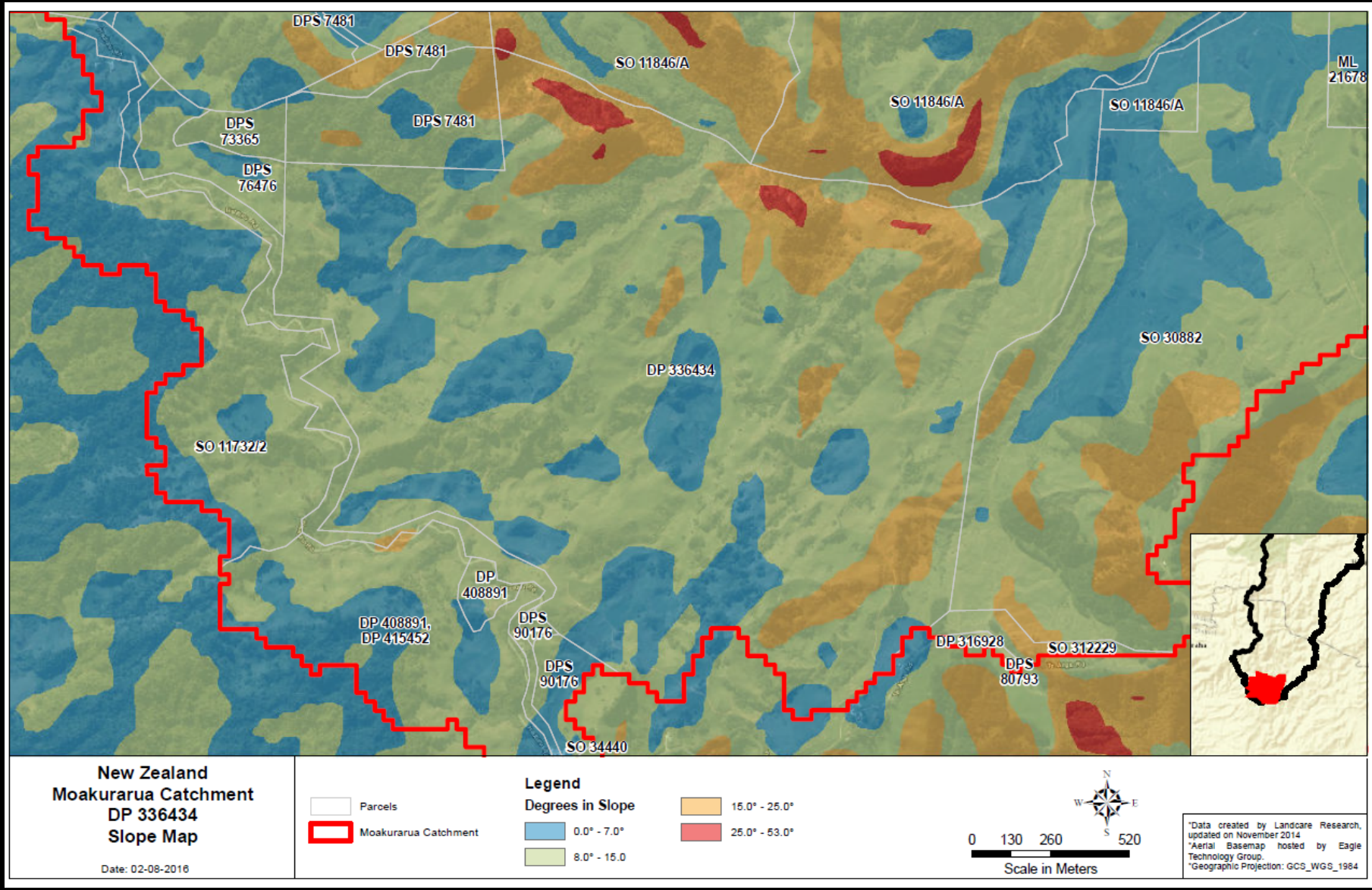


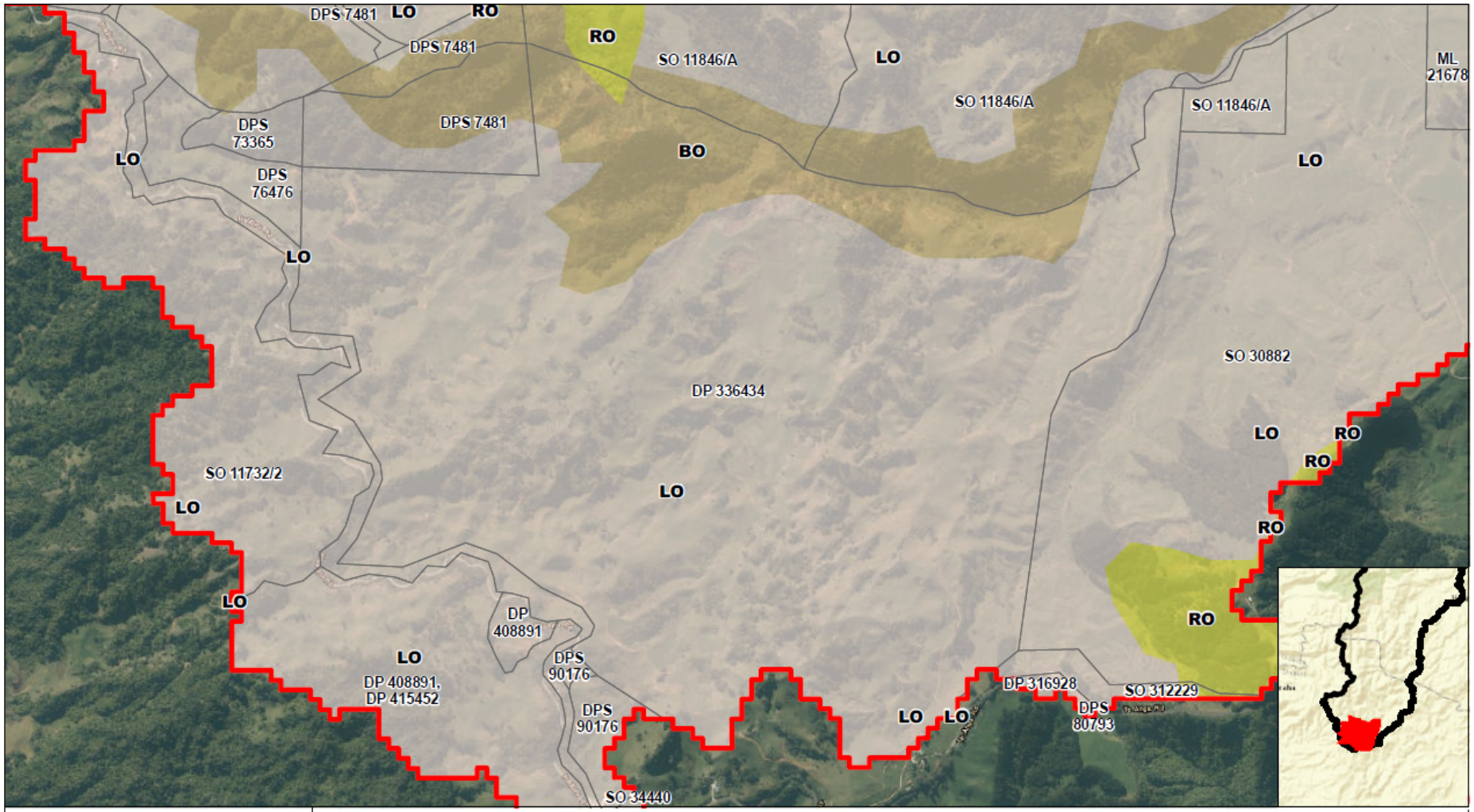
Overview of sites in the catchment


12 pm
2 pm
possible sensor site 1
poss site 2
poss site 3
poss site 4
poss site 5
poss site 6
13 mult owner
sub site?
subsite?
7
8
Te Angiangi
Image © 2016 DigitalGlobe
Image Waikato District Council
© 2016 Google
Google

Lot number and boundary




DPS 7481
DPS 7481
SO 11846/A
ML 21678
SO 11846/A
SO 11846/A
DPS 73365
DPS 7481
DPS 76476
SO 30882
DP 336434
SO 11732/2
DP 408891
DP 408891, DP 415452
DPS 90176
DPS 90176
DP 316928
SO 312229
DPS 80793
SO 34440
New Zealand
Moakurarua Catchment
DP 336434
Slope Map
Date: 02-08-2016
Parcels
Moakurarua Catchment
Legend
Degrees in Slope
0.0° - 7.0°
8.0° - 15.0
15.0° - 25.0°
25.0° - 53.0°
N
W
E
S
0 130 260 520
Scale in Meters
*Data created by Landcare Research, updated on November 2014
*Aerial Basemap hosted by Eagle Technology Group.
*Geographic Projection: GCS_WGS_1984



New Zealand
Moakurarua Catchment
DP 336434
Parcel Map

Date: 01-08-2016

Legend

- Parcels
- Moakurarua Catchment

Allophanic soils
- Orthic (LO)

Brown soils
- Orthic (BO)

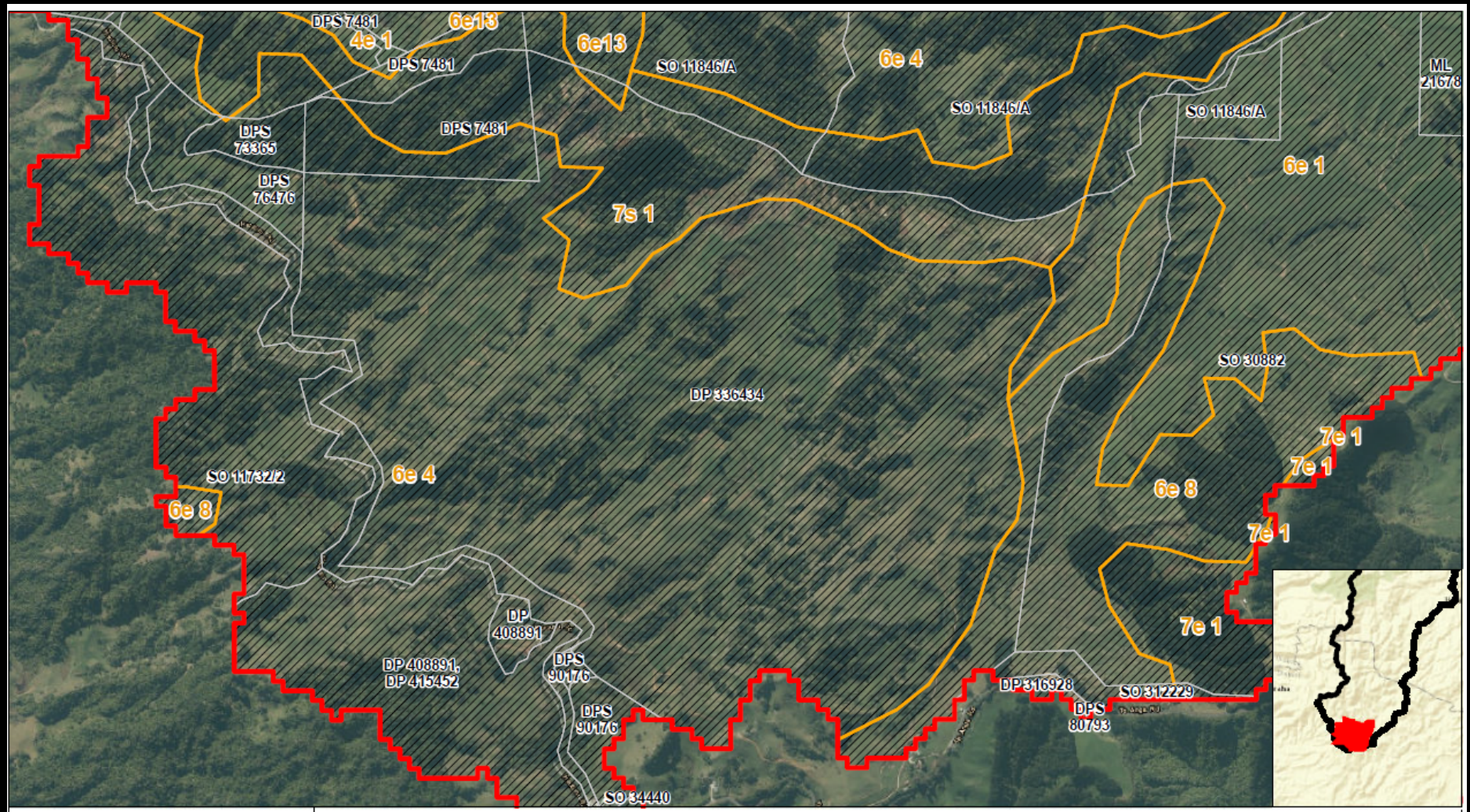
Recent soils
- Orthic (RO)

N
W E
S

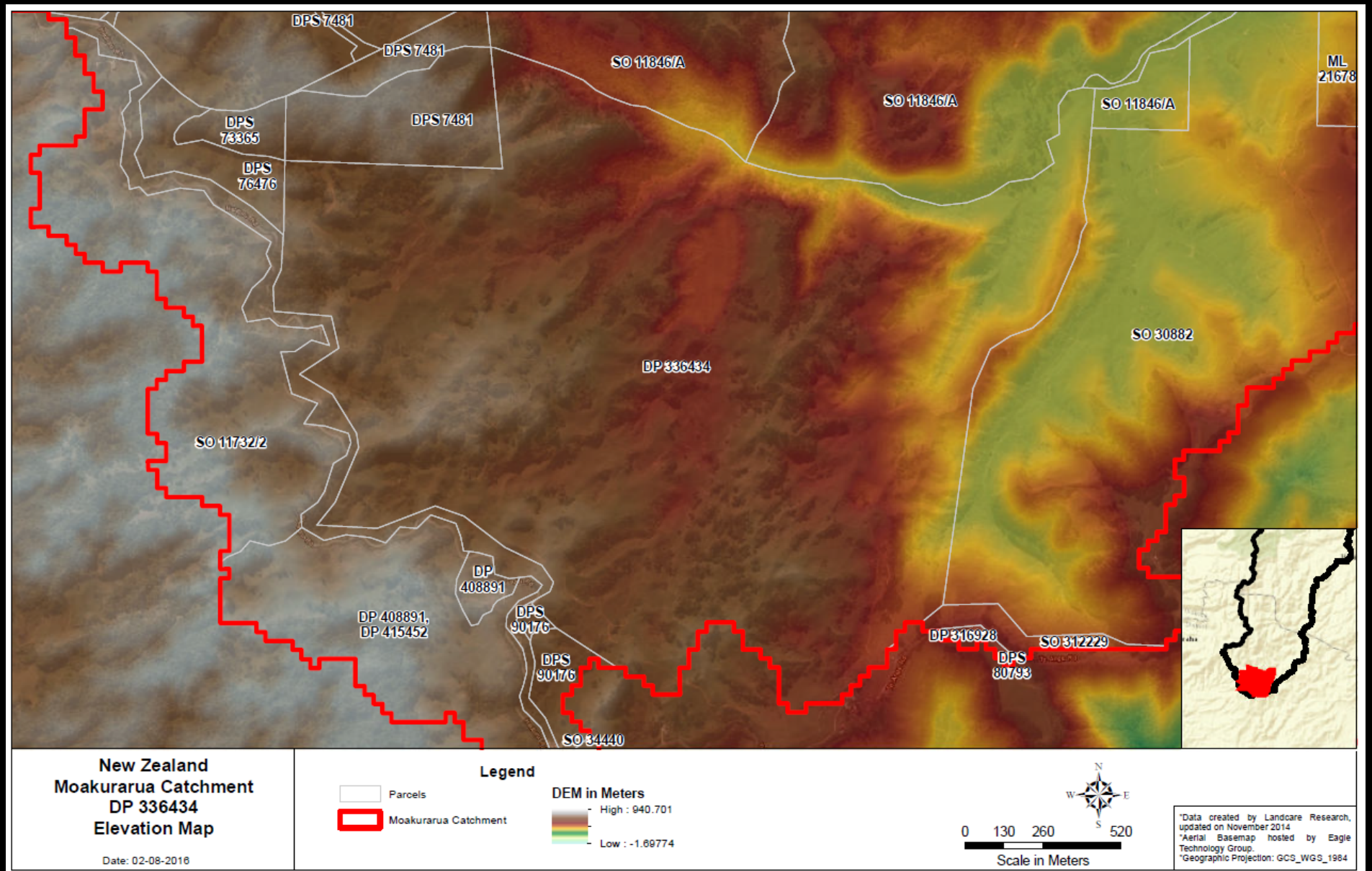
0 130 260 520
Scale in Meters

*Data created by Landcare Research, updated on November 2014
*Aerial Basemap hosted by Eagle Technology Group.
*Geographic Projection: GCS_WGS_1984

LUC


DPS 7481
4e 1
6e13
6e13
DPS 7481
SO 11846/A
6e 4
SO 11846/A
SO 11846/A
ML 21678
DPS 73365
DPS 7481
DPS 76476
6e 1
7s 1
SO 30882
DP 336434
7e 1
7e 1
SO 11732/2
6e 4
6e 8
6e 8
7e 1
7e 1
DP 408891
DP 408891, DP 415452
DPS 90176
DPS 90176
DP 316928
SO 312229
DPS 80793
SO 34440
New Zealand
Moakurarua Catchment
DP 336434
Parcel Map
Date: 01-08-2016
Legend
Parcels
Land Use Capability
Moakurarua Catchment
N
W
E
S
0 130 260 520
Scale in Meters
*Data created by Landcare Research, updated on November 2014
*Aerial Basemap hosted by Eagle Technology Group.
*Geographic Projection: GCS_WGS_1984

DEM


DPS 7481
DPS 7481
SO 11846/A
SO 11846/A
SO 11846/A
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N
W
E
S
0 130 260 520
Scale in Meters
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*Geographic Projection: GCS_WGS_1984


17 12 pm
Sampling point

The results to date

- Storymap is used to do project milestone reporting and is main farmer communication
- Farmer diaries are varied (“70 cows in the Tombstone”)
- Technology leaps
- Ownership – digger…
- Importance of imagery to support

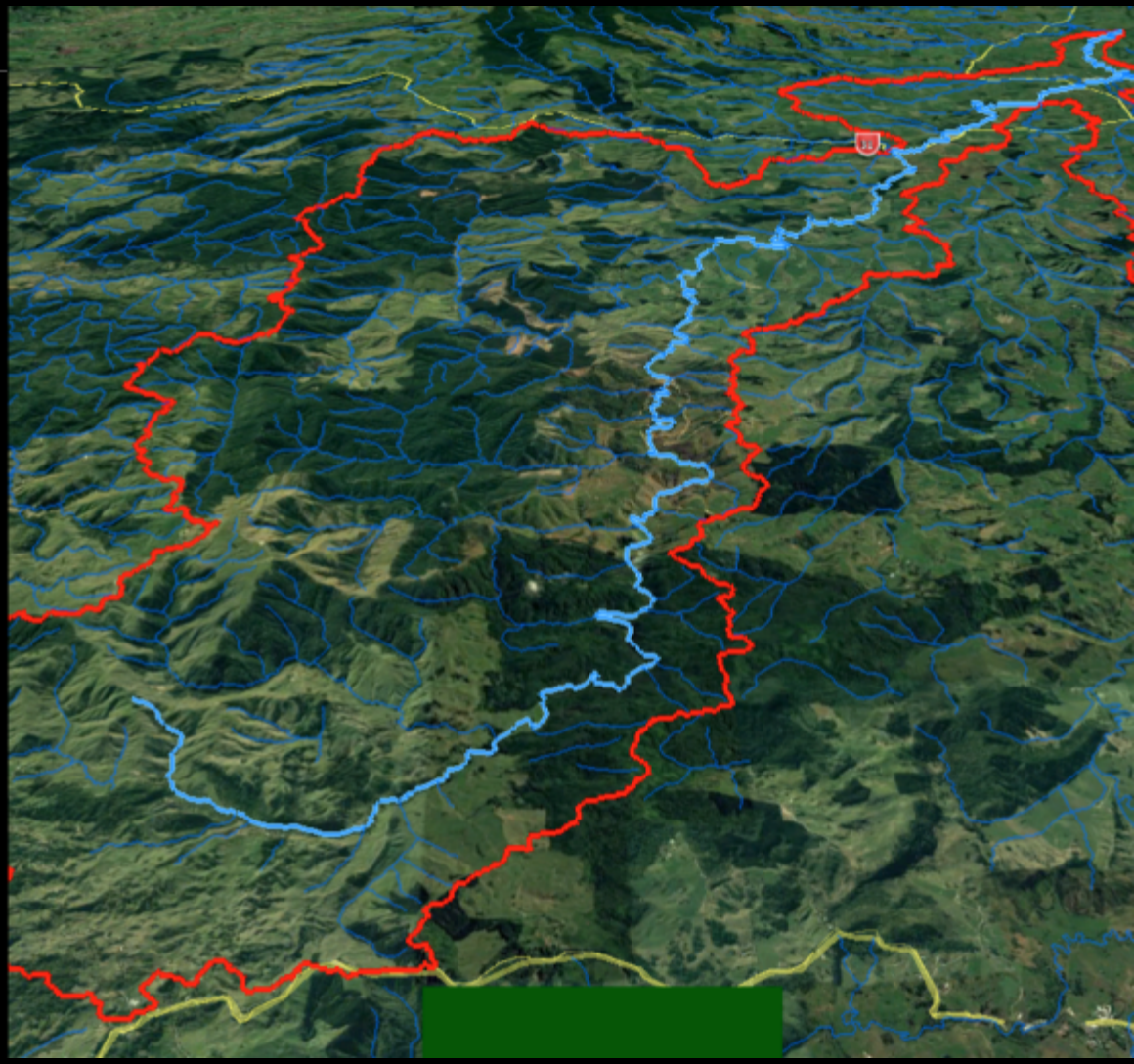
http://arcg.is/2mG5G2O

Monitoring the Moakurarua

The Moakurarua River has been identified as a Priority 1 catchment within the recently released Waikato Region Healthy Rivers Plan Change 1.

This project is centred around installing remote sensing tools in several locations within the catchment that aim to measure various indicators of water quality. This in turn provides real-time results that will give an indication of the effect that day-to-day farm management decisions have on the health of this river.

Right: Overview of the Moakurarua River catchment and tributaries



Project Goals

- Develop and implement outcome based sub catchment study to link farm bas[illegible]ons directly to water quality changes

Remote sensing for engagement

Monitoring the Moakurarua

Project Goals

- Develop and implement outcome based sub catchment study to link farm based actions directly to water quality changes.
- Establish whether the new approach of providing real-world results through intensive sub-catchment monitoring will engage farmers and landowners.
- Discover if intensive sampling and imagery collection will demonstrate cause and effect between land management and water quality enabling better decision making on farm.

Wintec
WAIKATO INSTITUTE OF TECHNOLOGY

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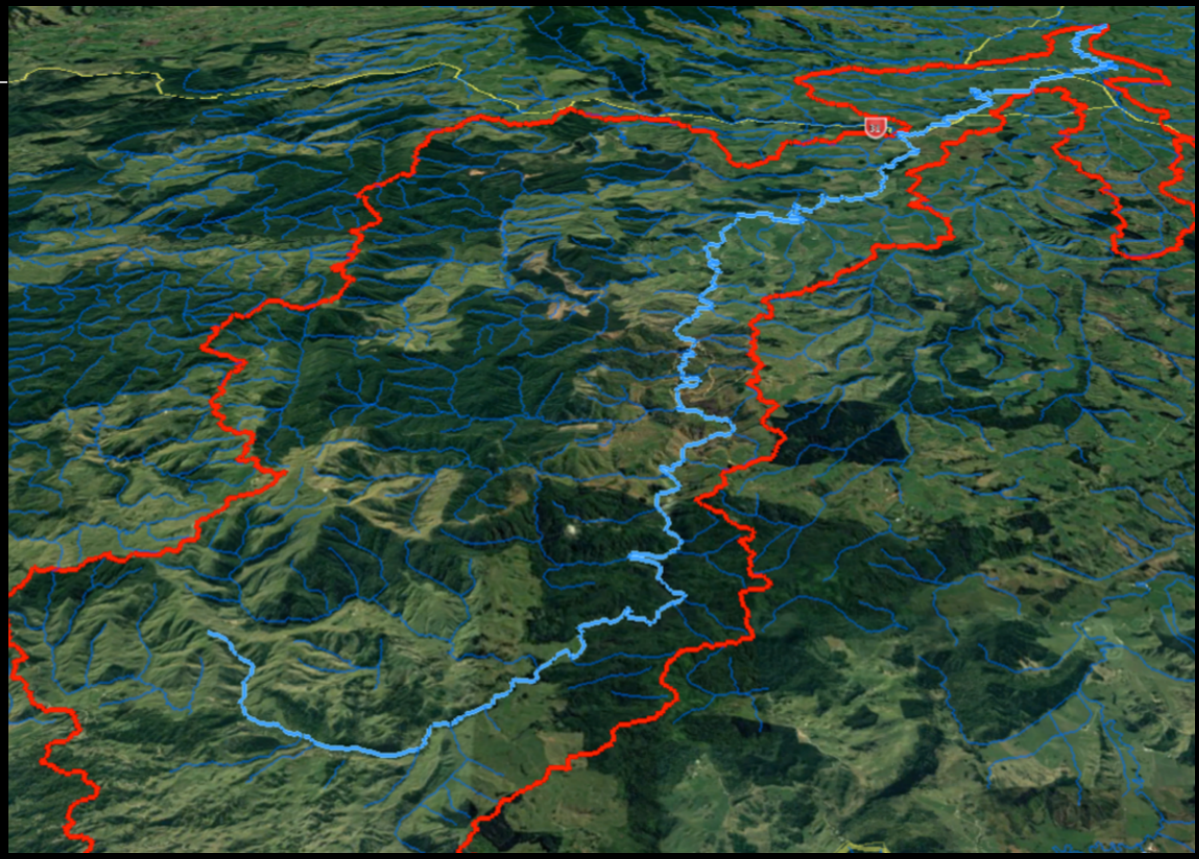

Monitoring the Moakurarua

Riparian land use	Conservation Filter Strip Woodlot Urban Stopbank Whitebaiting Cattle Sheep Deer Crop Horticulture Esplanade reserve Waterfowl shooting Engineered floodway Other:
Widths (m):	Water = Channel = Bankfull = Valley Bottom =
Channel plan shape:	Channelised Straight Meandering Sinuous — Valley form: V U Plain
Flow:	Ephemeral Intermittent Perennial Regulated Wetland — Stream shade (%) =
Streambed:	Clay Mud Sand Silt Gravel Cobble Boulder Bedrock — % riffle/run/pool: / /
Left Bank	Height (m) lower = Upper = % stable: % undercut: % slumping: % earthflow:
Right Bank	Height (m) lower = Upper = % stable: % undercut: % slumping: % earthflow:
Stabilised by:	Left: Grasses Shrubs Sedges/rushes Trees Bedrock Riprap/artificial Other:
	Right: Grasses Shrubs Sedges/rushes Trees Bedrock Riprap/artificial Other:
Macrophytes:	% cover = Type =
Periphyton:	None Slippery Obvious Abundant Excessive (>30%) — Wood: Absent Sparse Common Abundant
Livestock Access	Y / N Damage: None Minor Moderate Extensive Details/Other:
	Y / N Damage: None Minor Moderate Extensive Details/Other:
Riparian Vegetation:	Grass Bare soils Annuals Herbs Tussock Flax Treeferns Low shrubs High shrubs Native trees Coniferous Deciduous Exotic Details/Other:
Dominant Riparian Plant Species:	Left: Right:
Local Runoff Potential:	Left Slope Length (m) = Left Land Slope Class: <2° 2-5° 5-10° 10-15° 15-25° >25°
	Right Slope Length (m) = Right Land Slope Class: <2° 2-5° 5-10° 10-15° 15-25° >25°
Riparian Wetlands:	Left: Absent Sparse Common Extensive — Right: Absent Sparse Common Extensive

Above: A site state assessment form was filled out at each location. These forms will be updated on subsequent visits to record any changes over time

Above: Underwater camera footage

Remote sensing for engagement

Monitoring the Moakurarua

Above: Time-lapse camera in situ

Above: Securing the sample chambers in the streams

Right: Equipment install and sensor site 1

Remote sensing for engagement

Monitoring the Moakurarua

Right: Equipment install and sensor site 1

Contact Us

For more information about this project, contact:
Debbie.Care@wintec.ac.nz

Scan the QR Code above to find out more about
Wintec Innovate - Real World Solutions

Right: Flooding after Ex-Tropical Cyclone Debbie, April 2017. Note the the turbidity of the main stream is caused by two slips originating in the native bush at the top of this sub-catchment.