CAWTHRON INSTITUTE

A SCIENTIFIC FRAMEWORK FOR SETTING FLOW AND ALLOCATION LIMITS - TAKAKA

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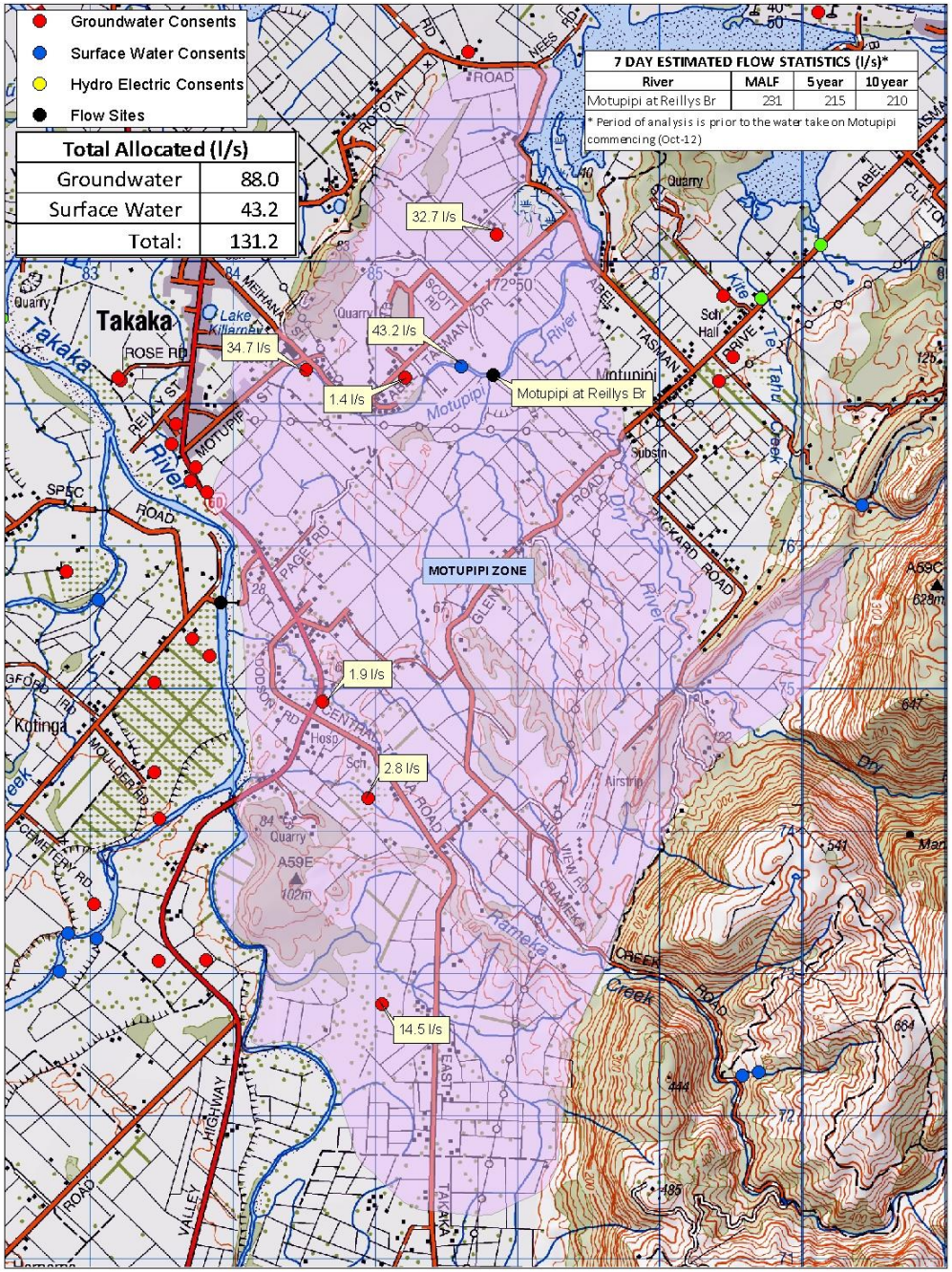
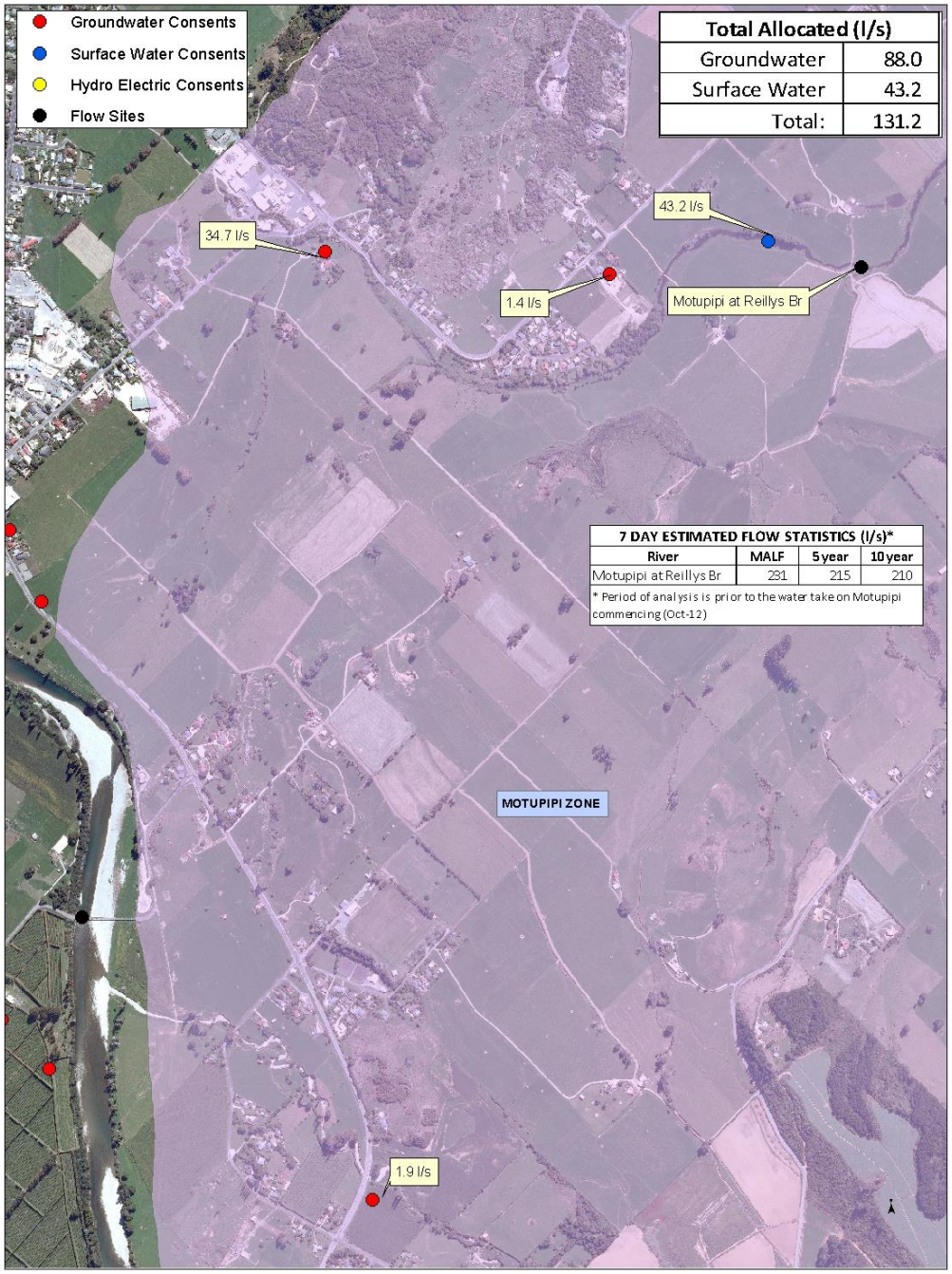
6 NOV 2015

MOTUPIPI

Motupipi Zone
Consents & Flow Statistics



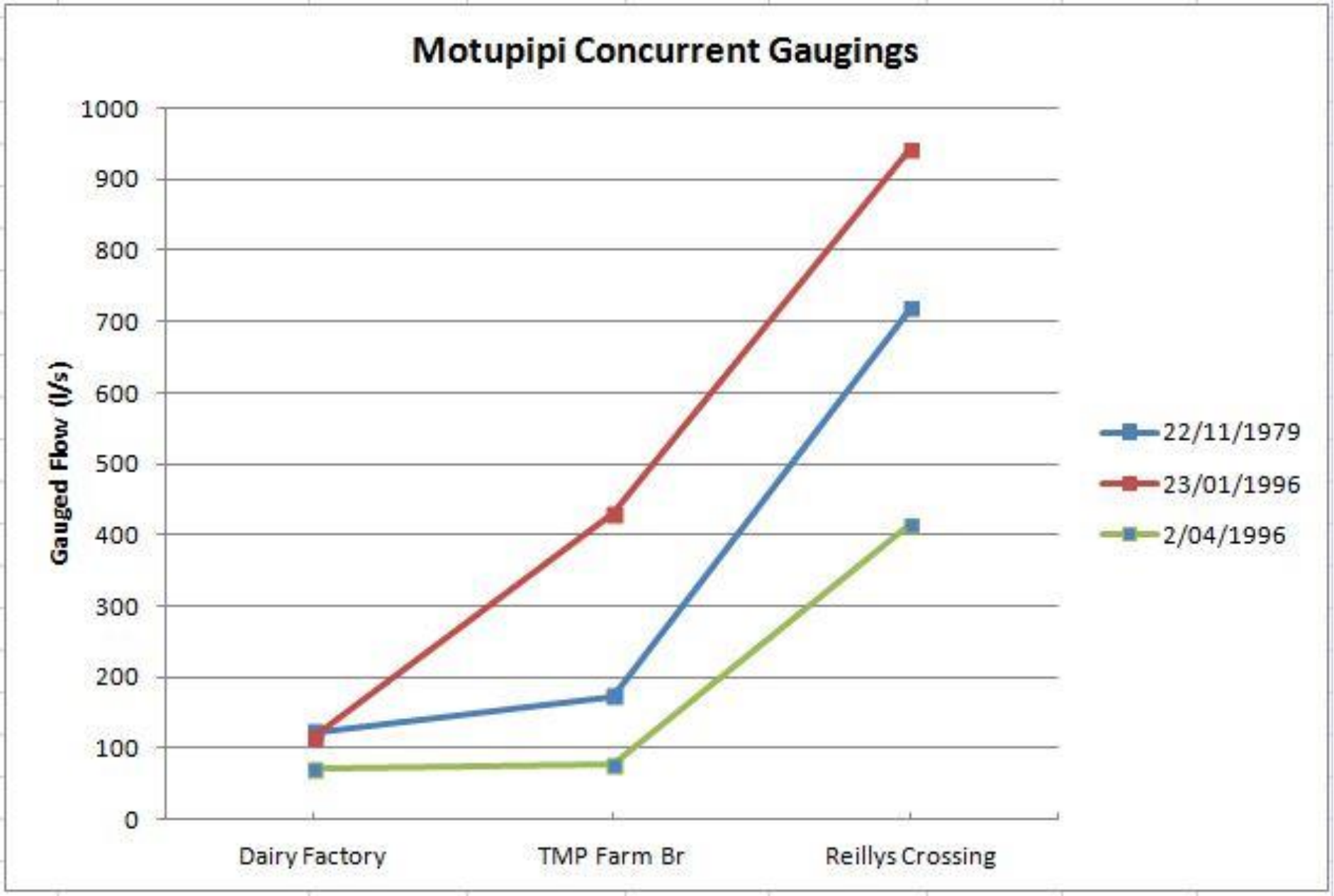
Upper Motupipi Zone
Consents & Flow Statistics

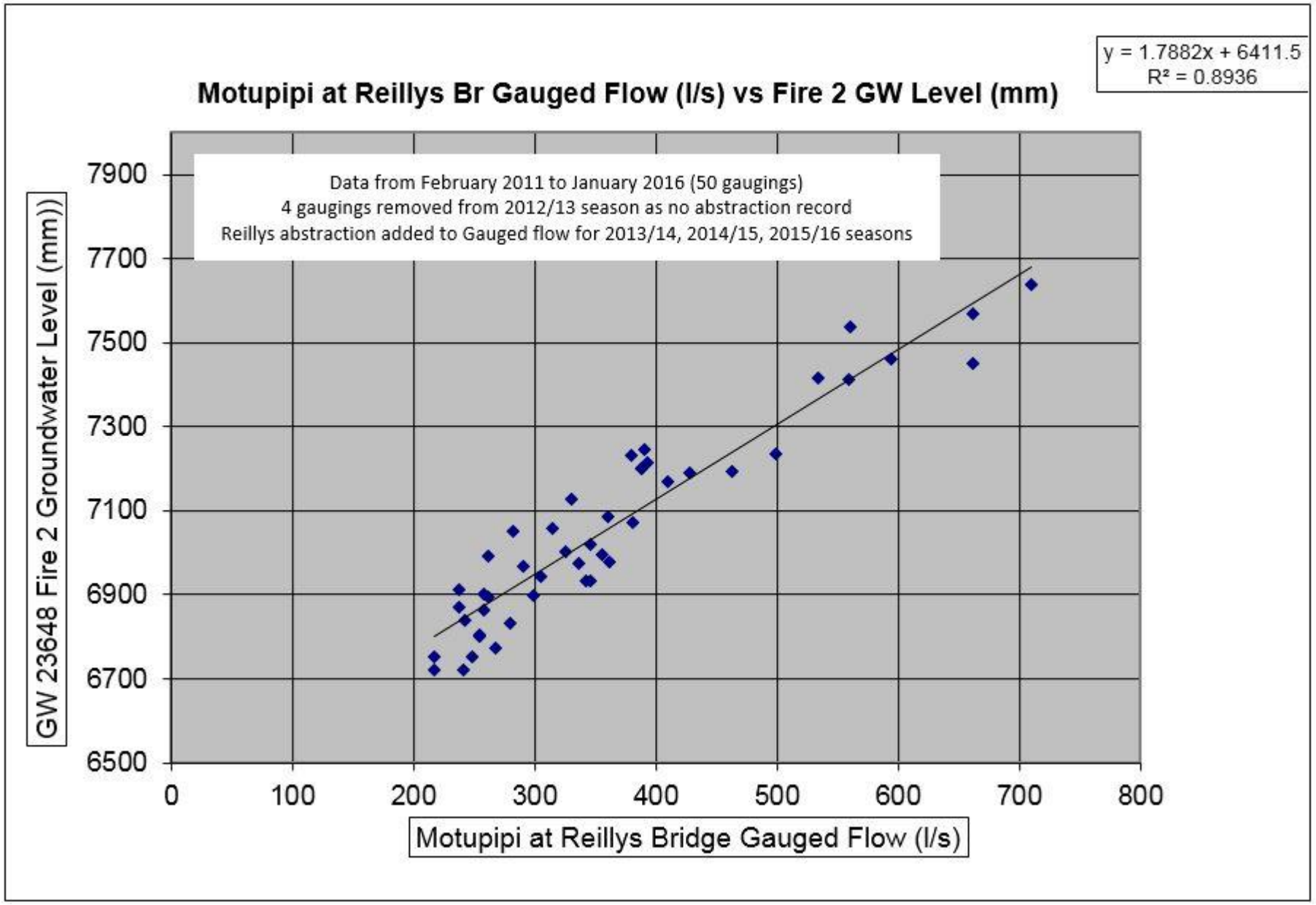


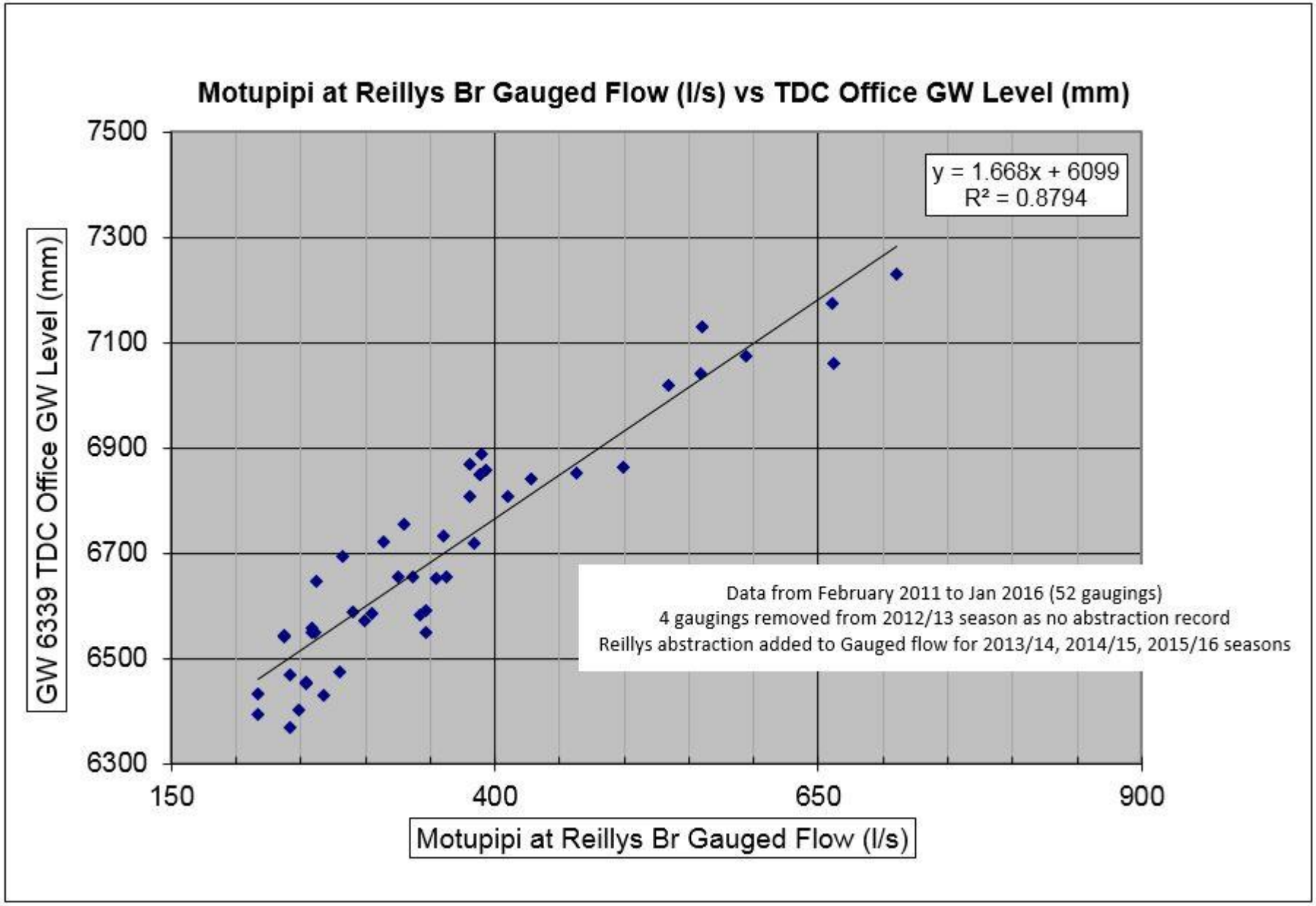
Total Allocated (l/s)	
Groundwater	88.0
Surface Water	43.2
Total:	131.2

7 DAY ESTIMATED FLOW STATISTICS (l/s)*			
River	MALF	5 year	10 year
Motupipi at Reillys Br	231	215	210

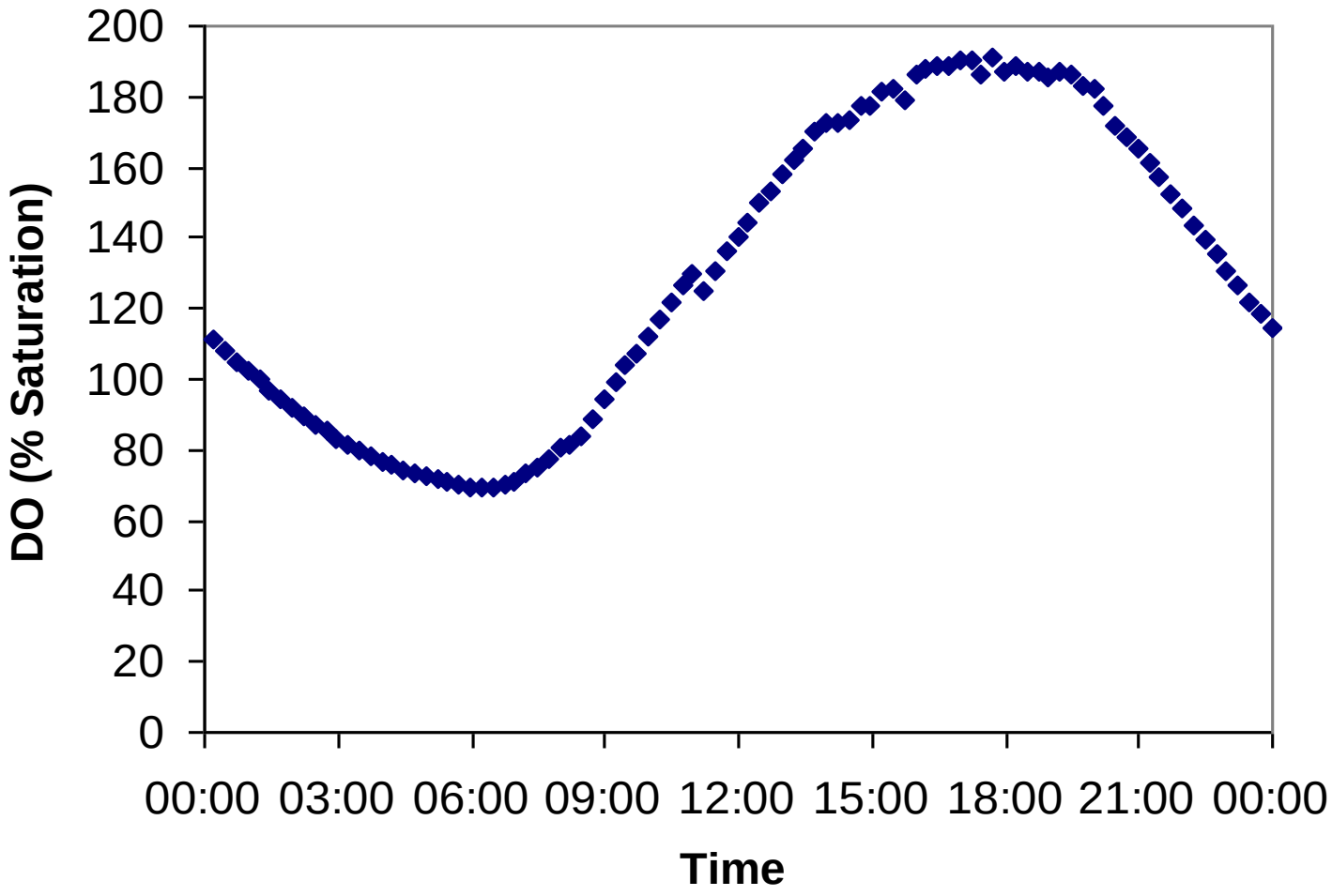
* Period of analysis is prior to the water take on Motupipi commencing (Oct-12)


Motupipi Concurrent Gaugings
Gauged Flow (l/s)
1000
900
800
700
600
500
400
300
200
100
0
Dairy Factory
TMP Farm Br
Reillys Crossing
22/11/1979
23/01/1996
2/04/1996

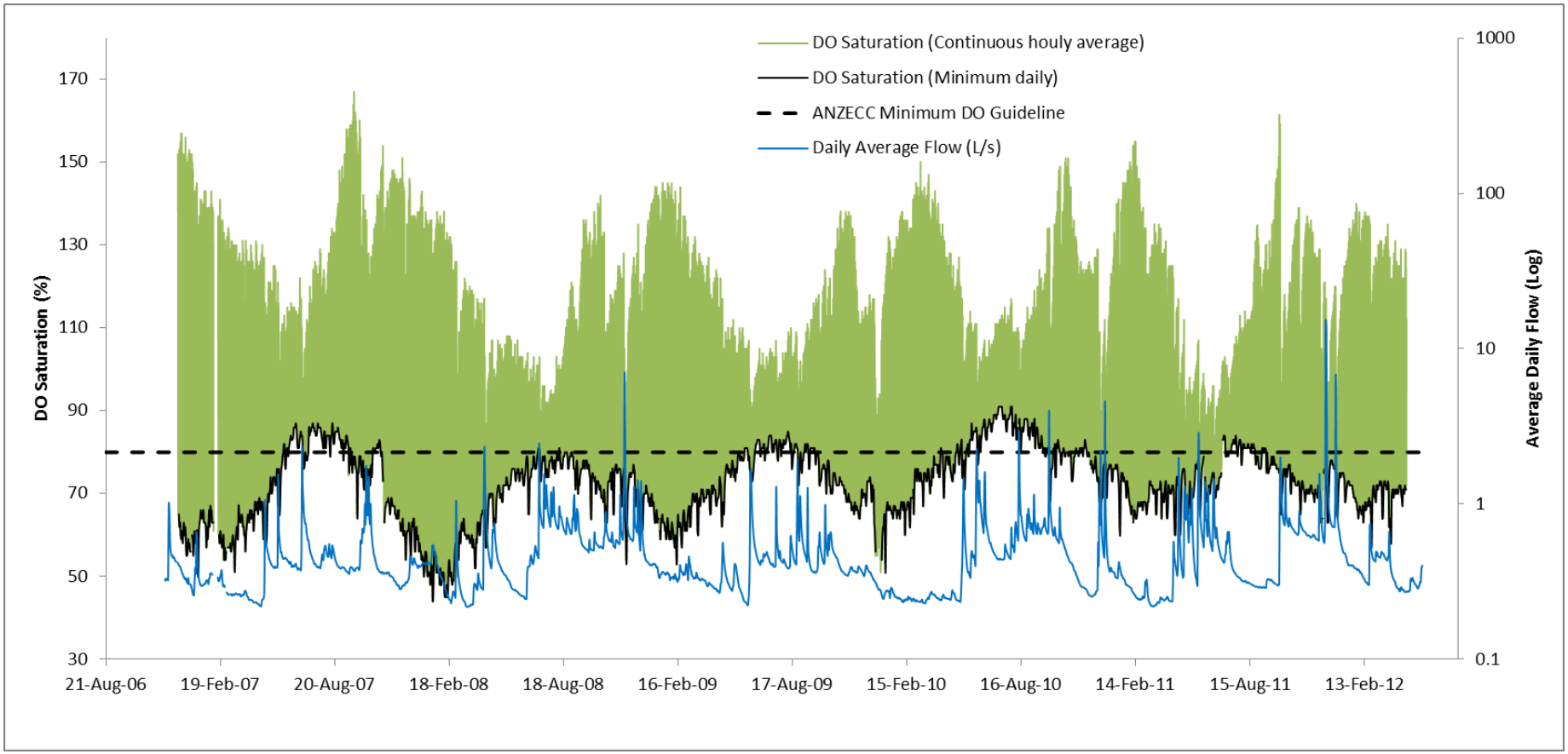

Motupipi at Reillys Br Gauged Flow (l/s) vs Fire 2 GW Level (mm)
y = 1.7882x + 6411.5
R² = 0.8936
Data from February 2011 to January 2016 (50 gaugings)
4 gaugings removed from 2012/13 season as no abstraction record
Reillys abstraction added to Gauged flow for 2013/14, 2014/15, 2015/16 seasons
GW 23648 Fire 2 Groundwater Level (mm))
7900
7700
7500
7300
7100
6900
6700
6500
0
100
200
300
400
500
600
700
800
Motupipi at Reillys Bridge Gauged Flow (l/s)


Motupipi at Reillys Br Gauged Flow (l/s) vs TDC Office GW Level (mm)
y = 1.668x + 6099
R² = 0.8794
Data from February 2011 to Jan 2016 (52 gaugings)
4 gaugings removed from 2012/13 season as no abstraction record
Reillys abstraction added to Gauged flow for 2013/14, 2014/15, 2015/16 seasons
GW 6339 TDC Office GW Level (mm)
7500
7300
7100
6900
6700
6500
6300
150
400
650
900
Motupipi at Reillys Br Gauged Flow (l/s)

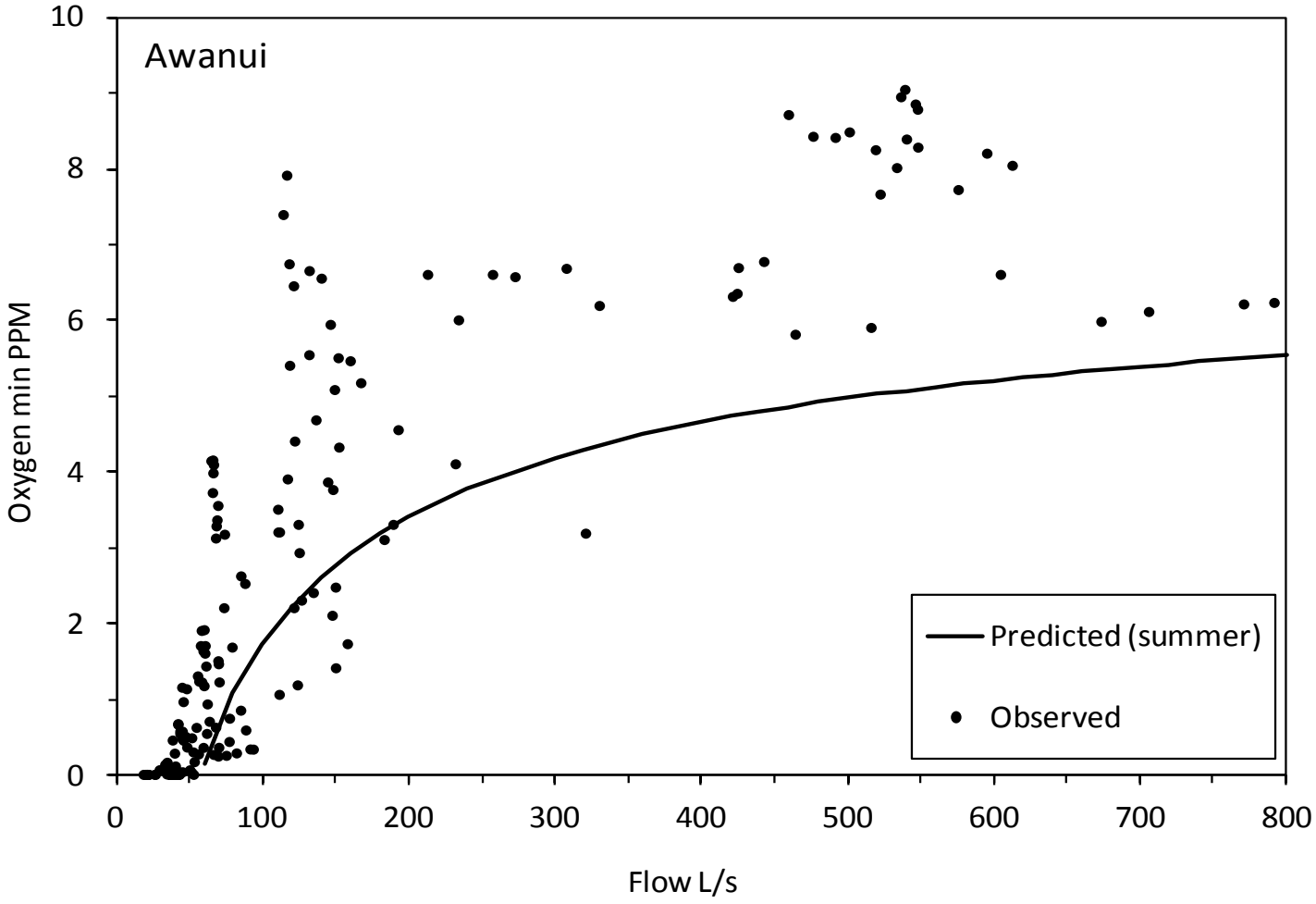
DISSOLVED OXYGEN



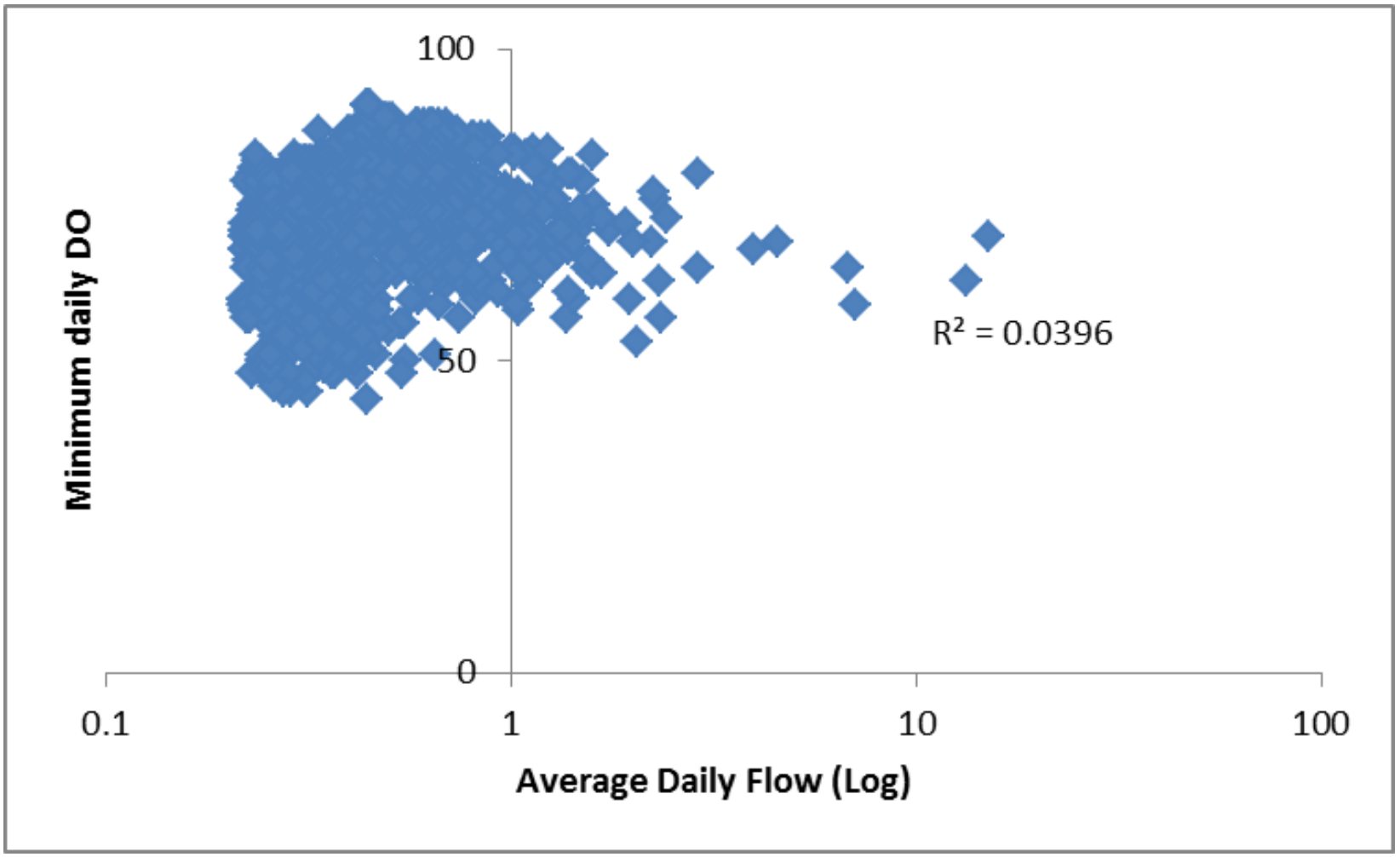
DISSOLVED OXYGEN VERSUS FLOW



DISSOLVED OXYGEN VERSUS FLOW – HAWKES BAY STREAM



DISSOLVED OXYGEN VERSUS FLOW – MOTUPIPI



MOTUPIPI

- Spring-fed streams class
- Moderate-high ecological values
- 201 l/s of current takes (43 l/s surface water)
- Complex groundwater/surface water interactions
- Near river groundwater takes in town included in restrictions?

- Minimum flow = 70-80% of 7 Day MALF
- Allocation limit = 20-30% of 7 Day MALF
- Minimum flow = cease take?
- Stage 1 Rationing trigger??
- Further monitoring of saltwater intrusion required

- Minimum flows and abstraction based on groundwater level at Fire2 well or TDC office well

MOTUPIPI – SECURITY OF SUPPLY

Flow statistic	Flow (l/s)	Groundwater level (TDC Office well)	Average number of days below this flow per year
7Day MALF	231	6484	19
80% 7Day MALF	185	6408	2
80% 7Day MALF + 10% allocation	208	6446	8
80% 7Day MALF + 20% allocation	231	6484	19
Potential 50% rationing trigger for takes from surface and upwelling area	224	6473	15

MOTUPIPI - OPTIONS

- Minimum flow = 185 l/s (80% of 7Day MALF at Reillys Br)
  Equivalent to 6408 mm at TDC Office groundwater level

- Allocation limit = 46 l/s (20% of 7Day MALF at Reillys Br)

- Current surface water take 43 l/s
- Adding groundwater takes means this zone is over allocated

- But does groundwater takes affect river flows/risk of saline intrusion
- Effects more pronounced within the ‘upwelling’ zone

- Cease take = minimum flow, but only for surface takes and takes from ‘upwelling’ part of the zone??
- 50% rationing trigger for surface takes and takes from ‘upwelling’ part of the zone
- Relatively high frequency of restrictions

DISCUSSION/QUESTIONS