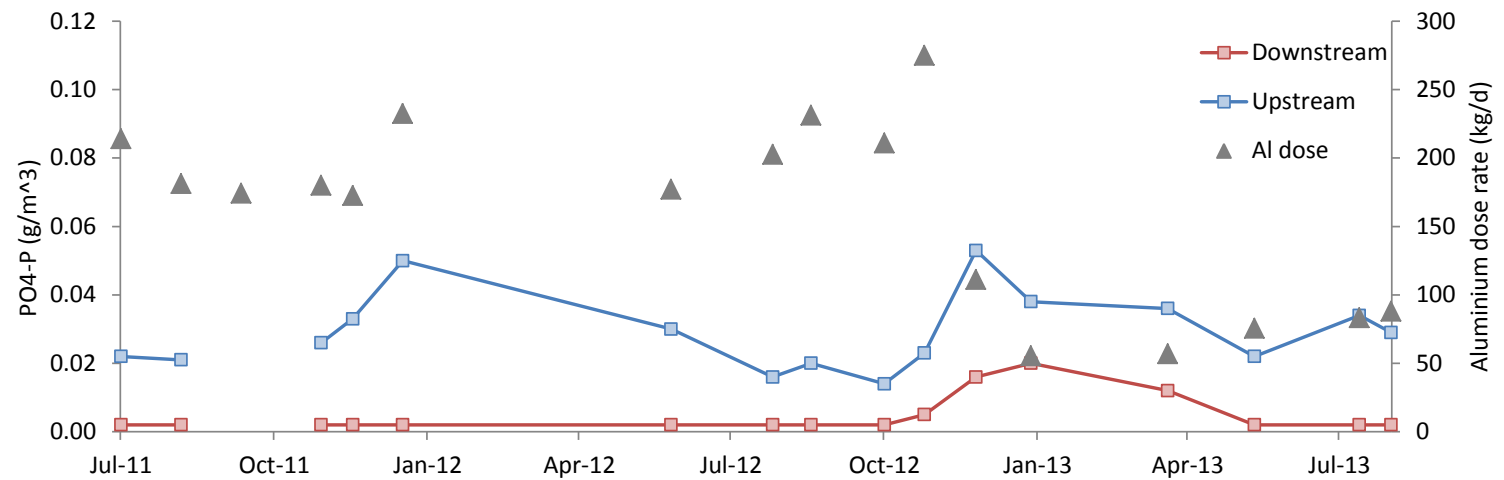
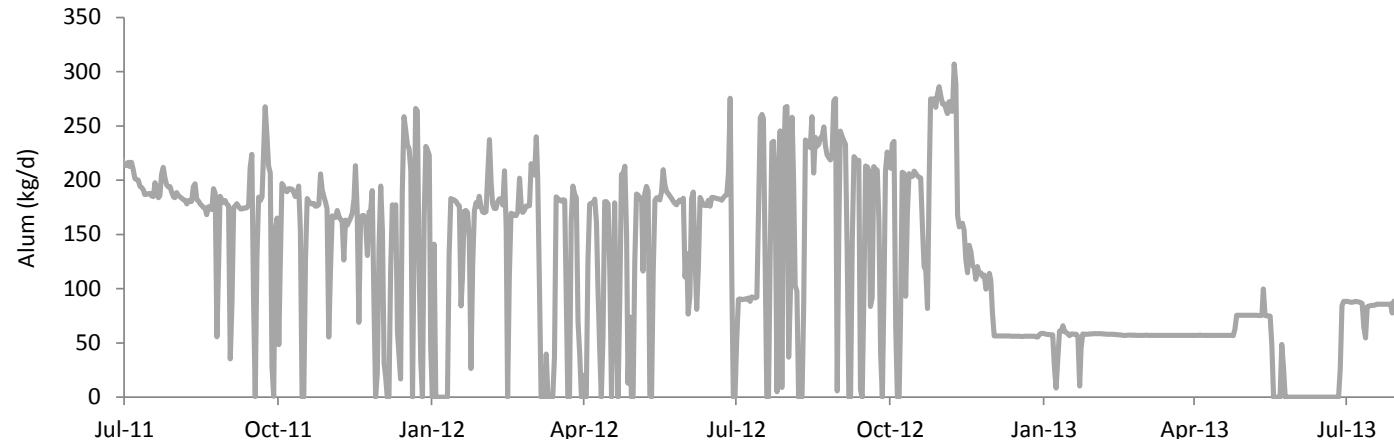
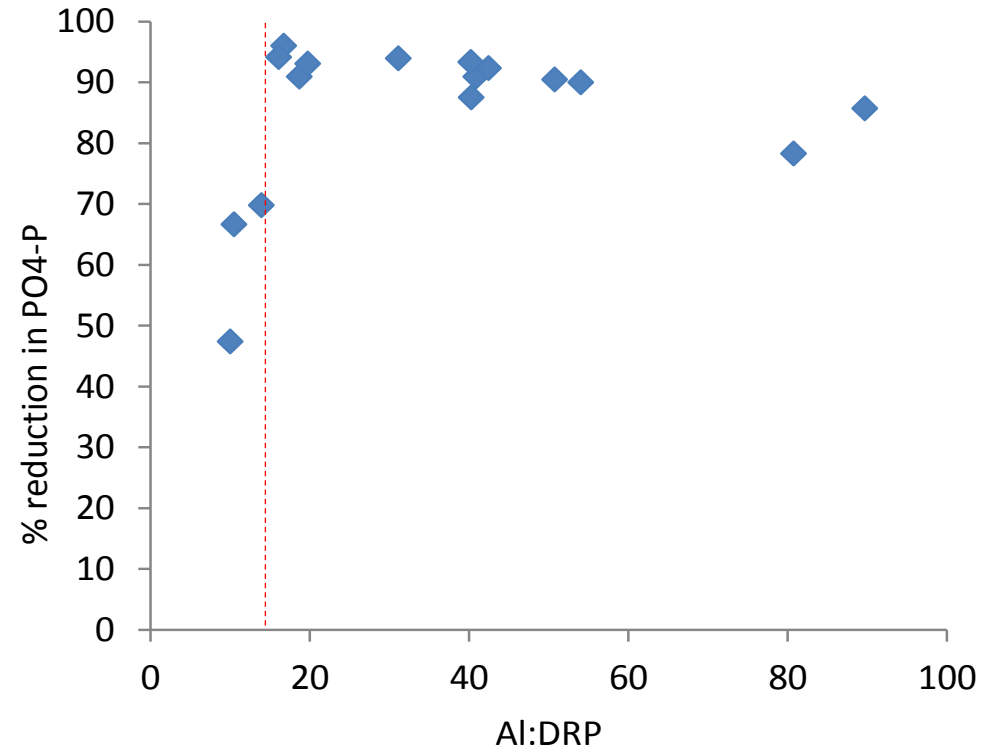
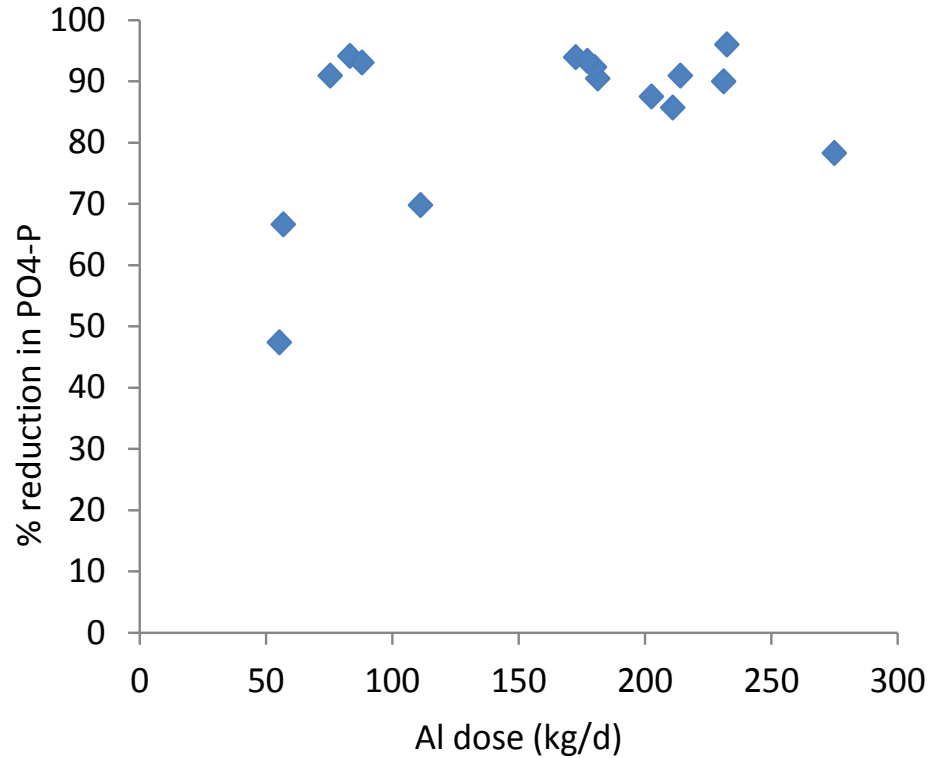


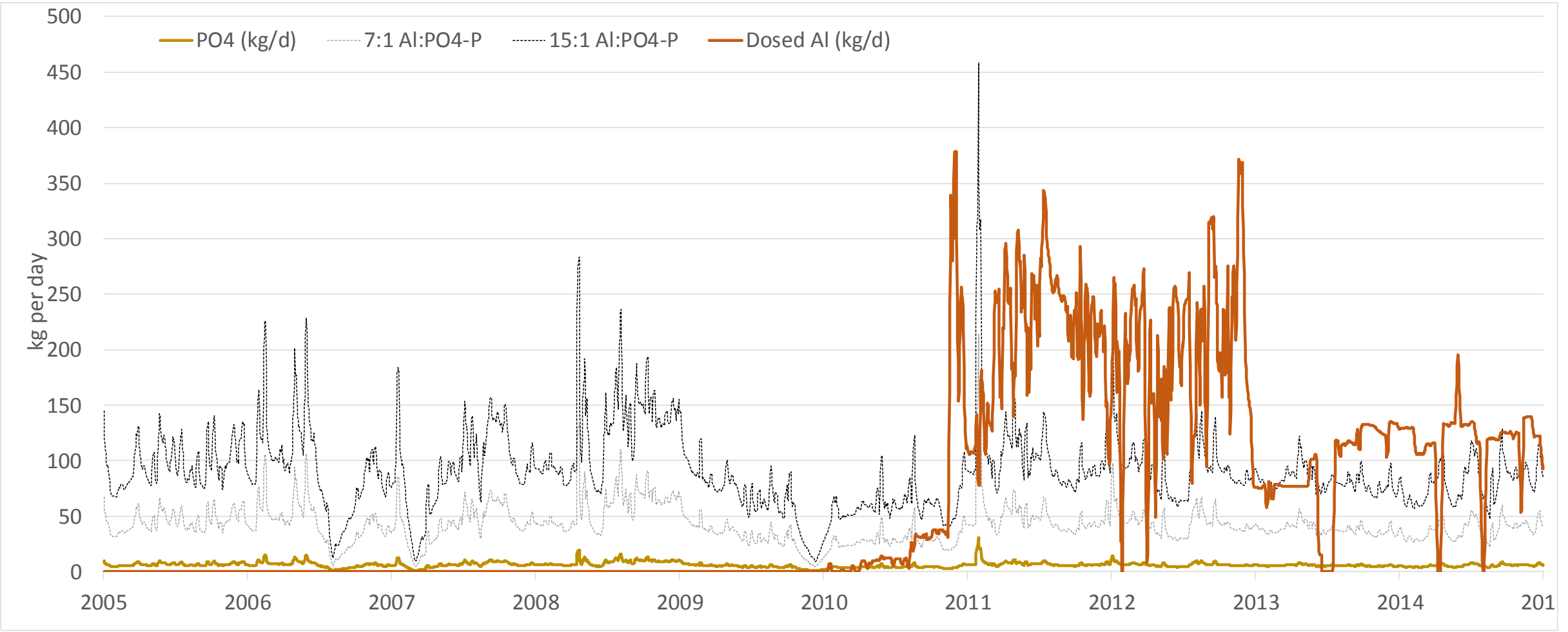
# Puarenga upstream/downstream sampling (John McIntosh)



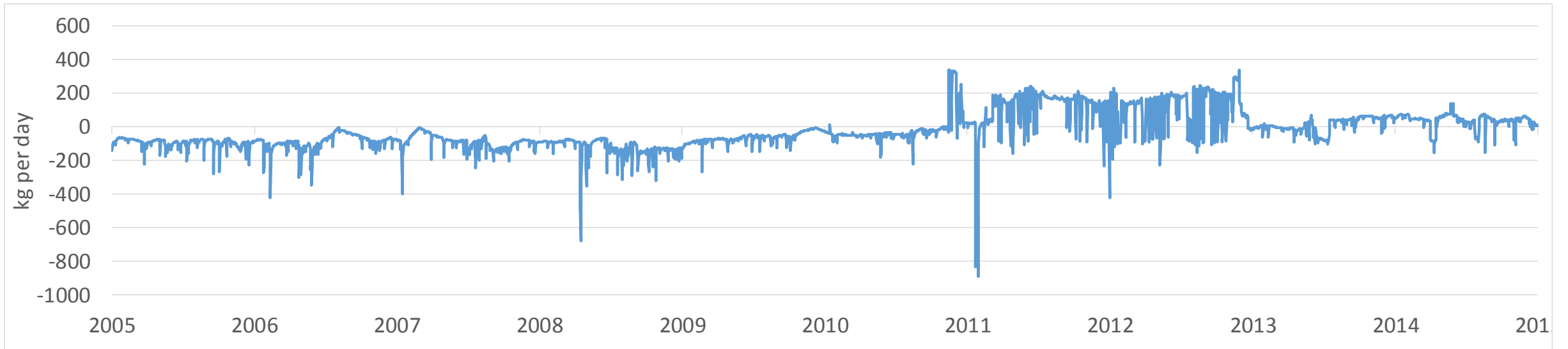
# Aluminium to phosphate dosing ratio



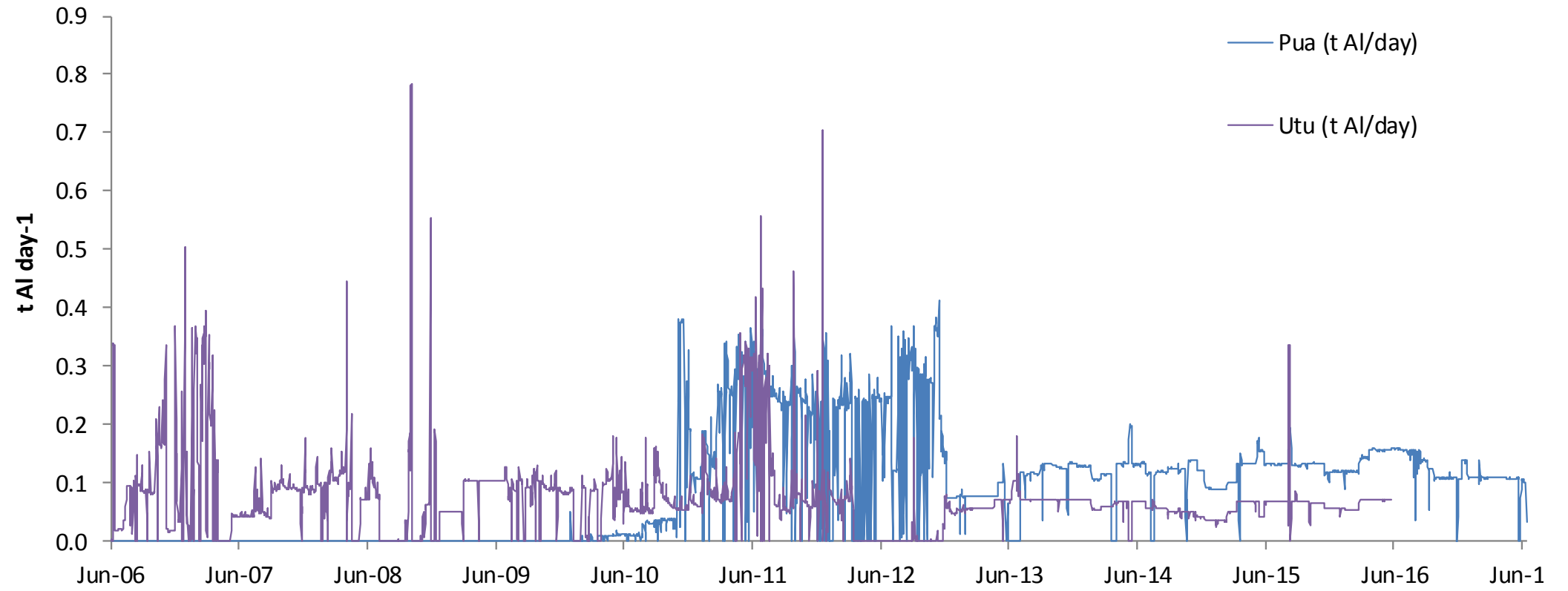
# Puarenga (weekly average)



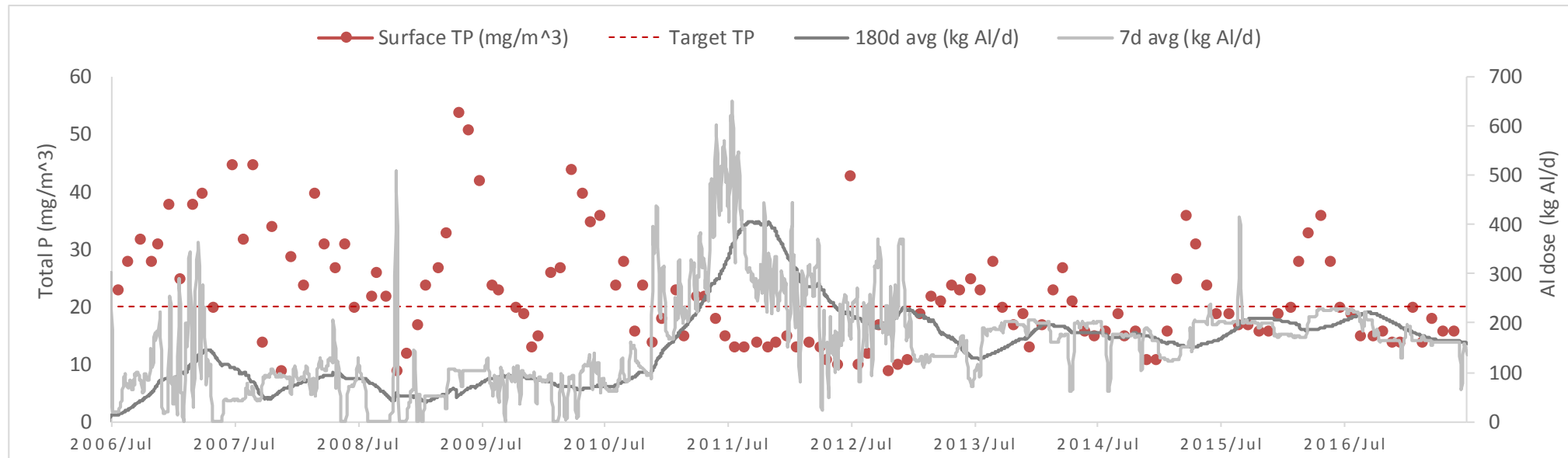
# Puarenga: daily excess Al over and above 15:1 for Al:PO<sub>4</sub>-P

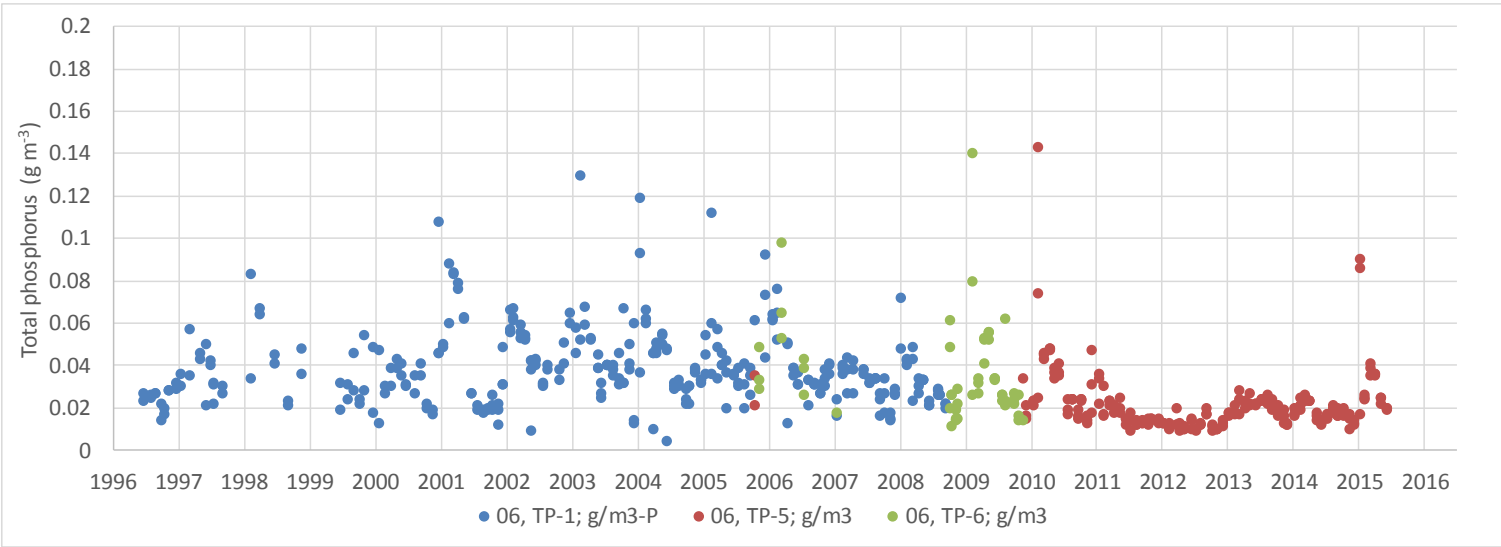


# AI dose rate: Puarenga and Utuhina

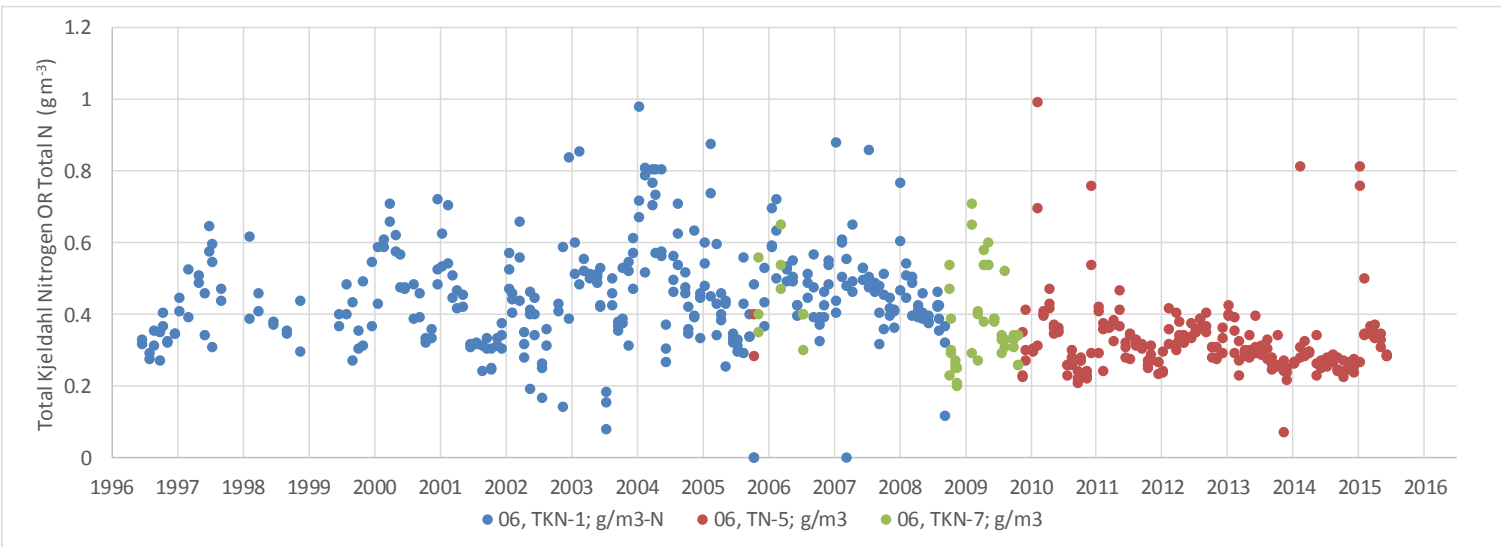


# Al dose rate (both streams combined) and in-lake phosphorus





Lab	Method	LOD	UOM
EnvBOP	APHA 4500-Norg B, pages 4-131 to 4-132 (modified) Catalyst changed, colourmetric method phenol-hypochlorite.	0.09 $\text{g/m}^3$ (at internal request down to 0.020 $\text{g/m}^3\text{-N}$ )	CL +/- 0.04
Hills	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-Norg. C. (Modified) 4500 NH <sub>3</sub> F (Modified) 21st ed. 2005	<0.10	+/-20%
NIWA	Persulphate digest, auto cadmium reduction, FIA - Lachat	0.01	+/-0.02 mg
BOPRC	Persulphate digest, auto cadmium reduction, FIA - Lachat	0.01	+/-0.02 mg



Internal Method Ref:	Date in use	Description	Lab	Detection Limit $\text{g/m}^3$
TP-1	Upto Sept 08	NWASCO Misc. Pub. No38, 1982 Antimony – Phosphate Molybdate, derived Murphy-Riley Method (1962)	BOPRC (Env. BOP)	historically listed as 0.008
TP-6	Sept 08 – Dec 09	Total phosphorus digestion, ascorbic acid colorimetry. Discrete Analyser. Apha 4500-P E(modified)		0.004
TP-2	Dec 09 – Aug 10	Acid persulphate digestion/ molybdenum blue colorimetry	NIWA	0.001
TP-5	Aug 10 - present	Acid persulphate digestion, molybdate colorimetry. FIA. Apha 4500-P H	BOPRC (20.08.10)	0.001