



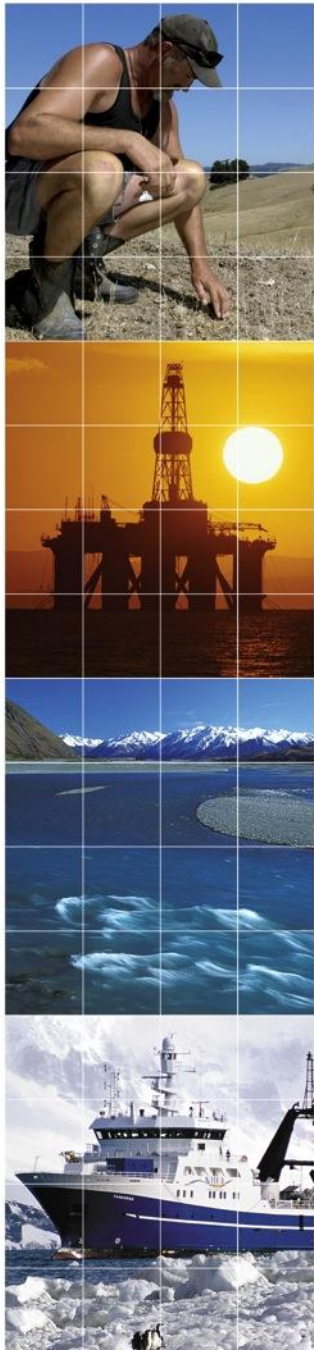
Introducing ROTAN-Annual

Kit Rutherford, Alastair MacCormick

Brief update for Rotorua Lakes Technical Advisory Group

29th May 2016





Summary

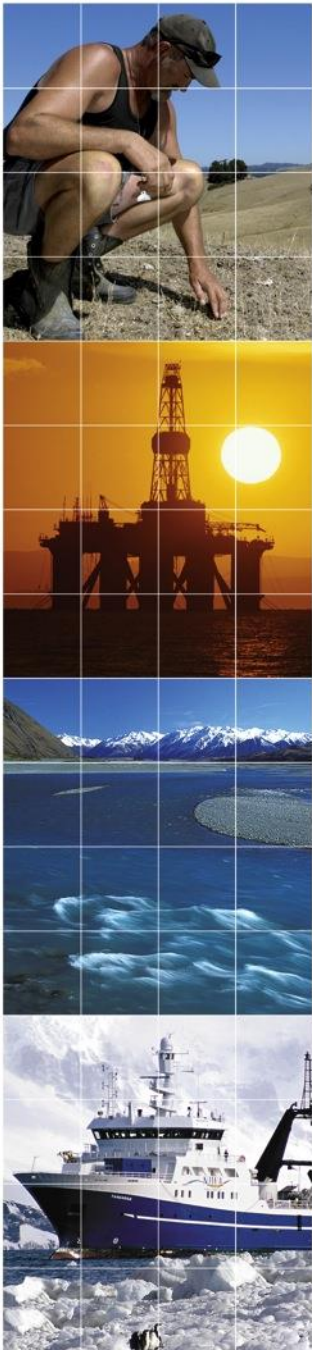
- ROTAN-Version2 is behind schedule ☹️
- ROTAN-Annual likely meets BoPRC's immediate needs
- ...but not UoW's or BoPRC's longer term needs

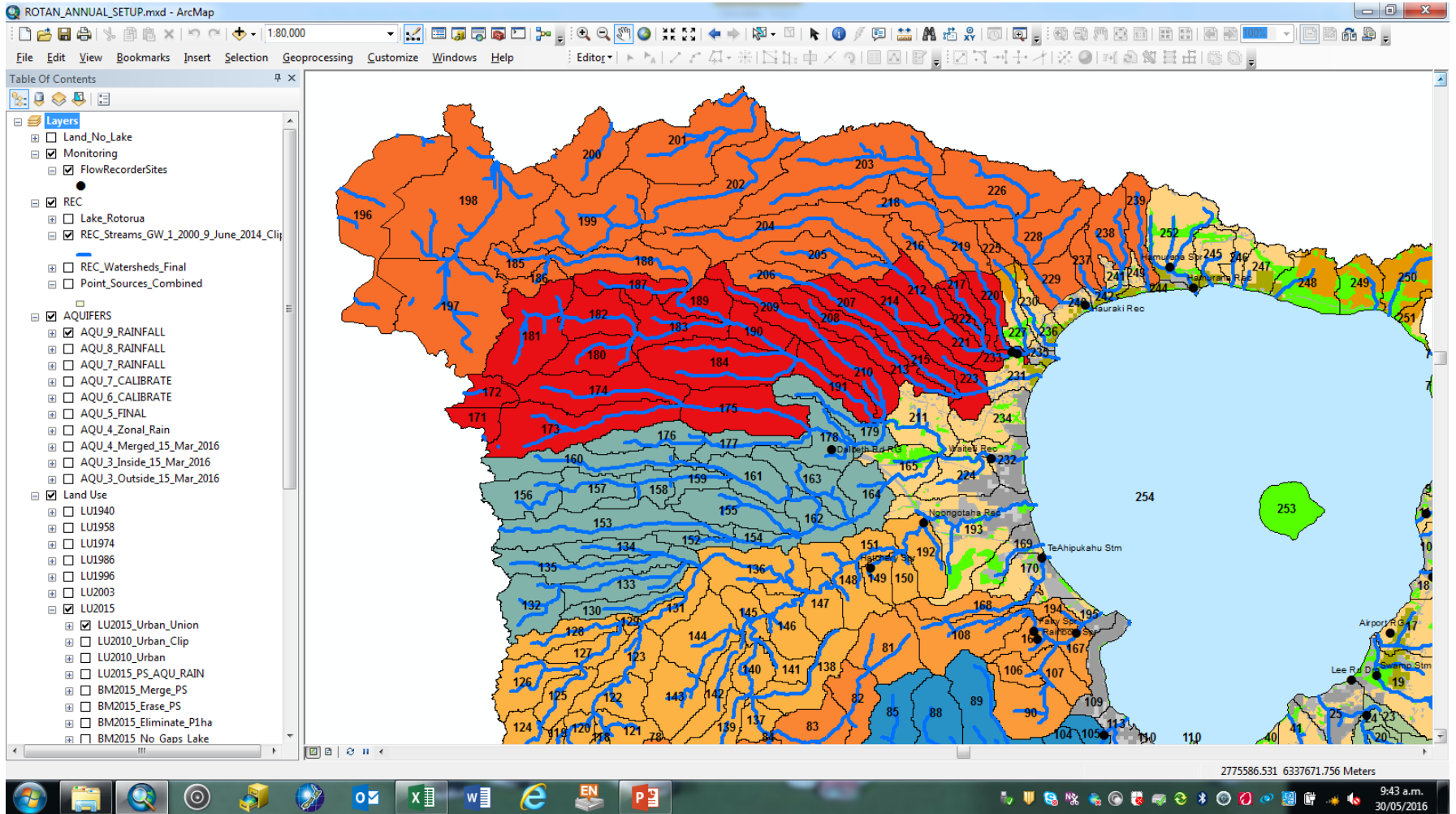
- ROTAN-Annual
 - Model up and running – code does what it is asked to!
 - Hydrology module – calibrated 😊😊
 - Nitrogen module – partially calibrated 😊

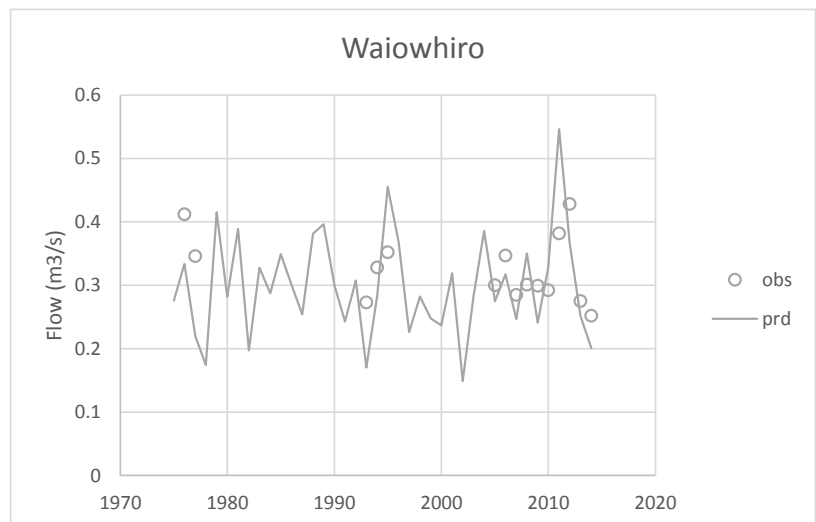
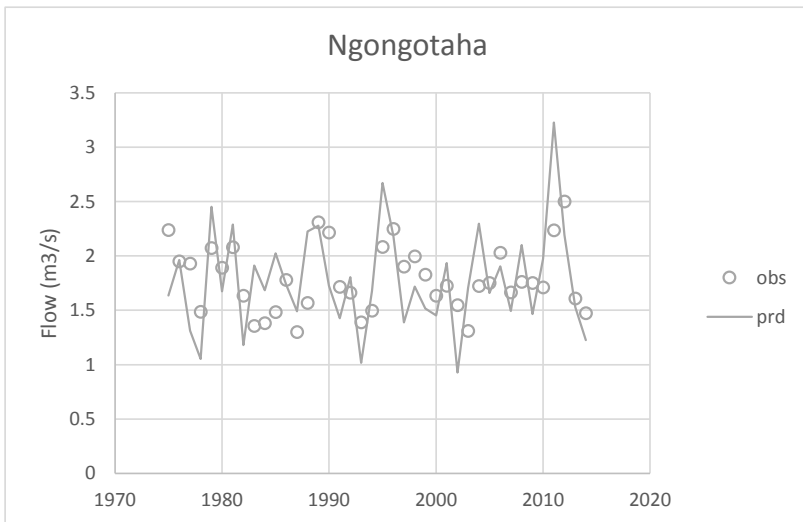
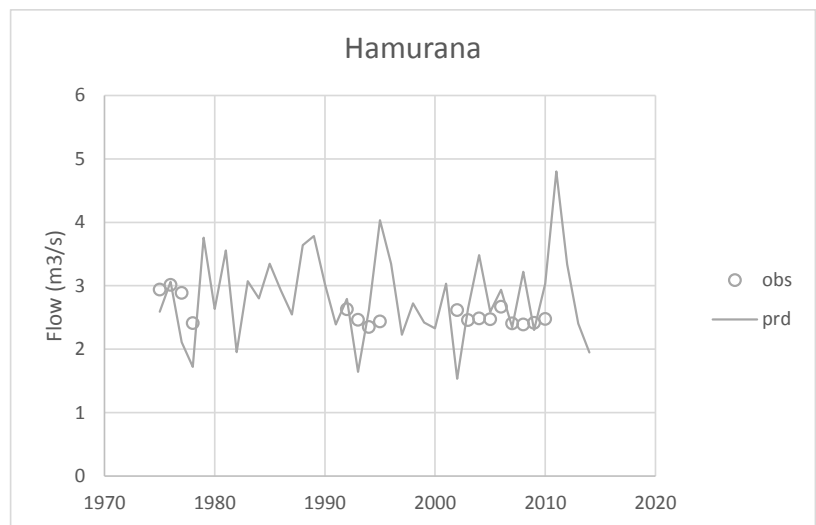
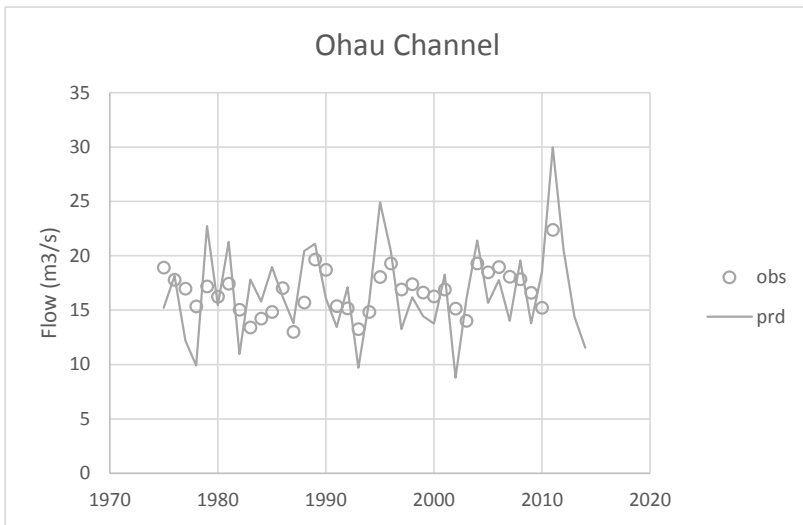
- To do
 - Farmers meeting (this evening) to revue historic land use 😊
 - AgResearch review of OVERSEER – possibly
 - Fine tune nitrogen calibration
 - Scenarios & sensitivity analysis

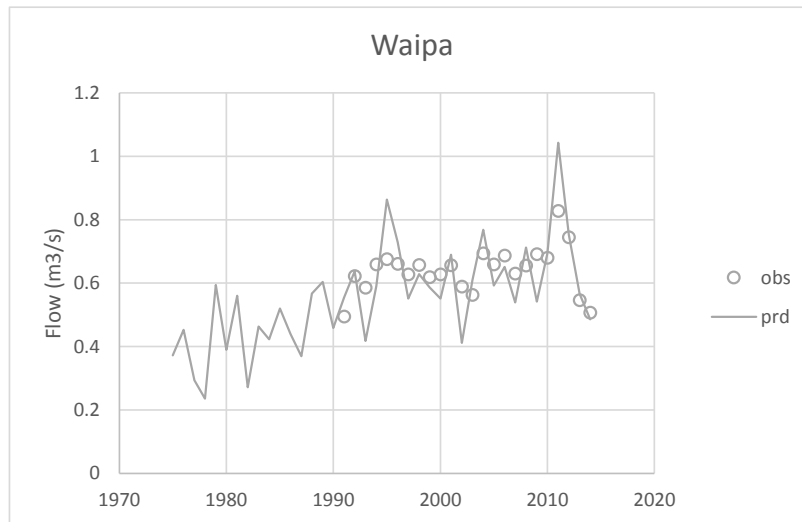
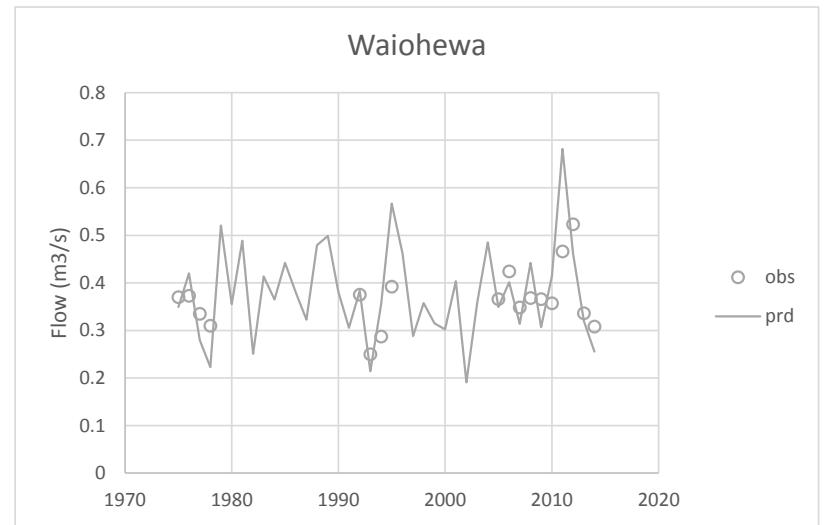
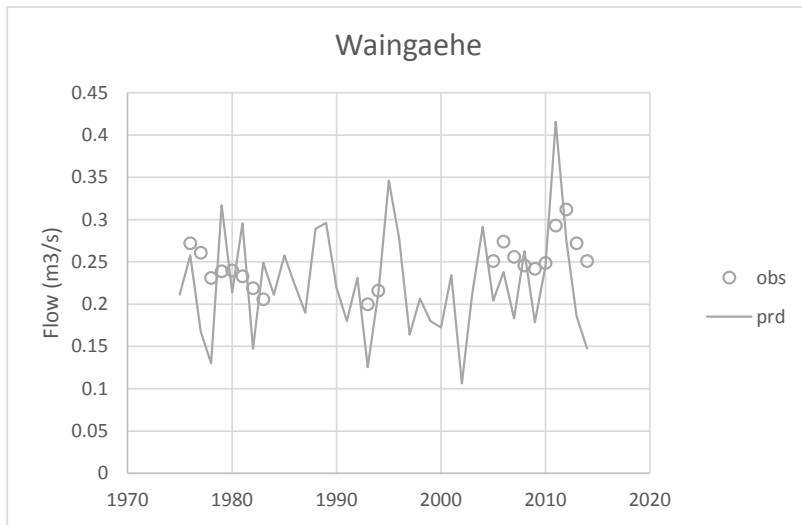
Hydrology – more detail

- 254 surface sub-catchments – REC
- REC also used to define 254 aquifers – cf ROTAN-Version1
- GNS surface and aquifer OUTER boundaries used
- INNER aquifer boundaries – calibrated to stream flow
- PET calculated as in 2009 report
- AET calculated from RAIN & PET using the Zhang equation
- Towards a ‘gold plated’ dataset of stream flows



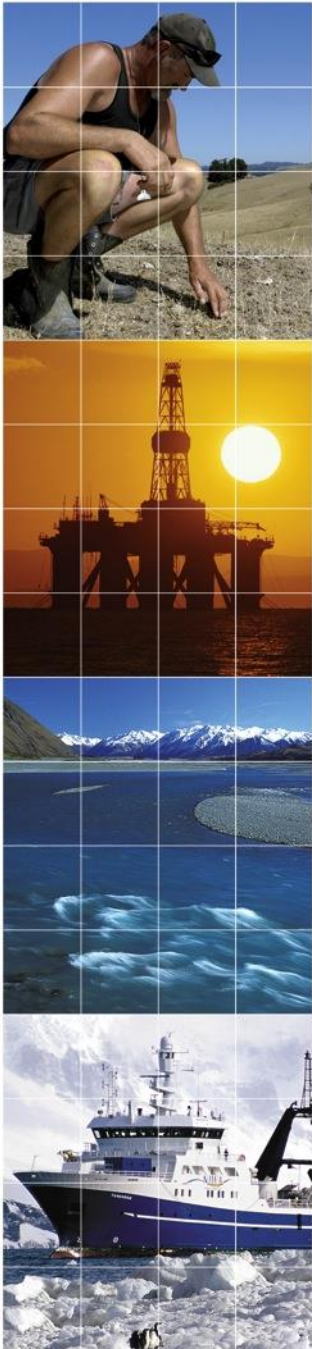


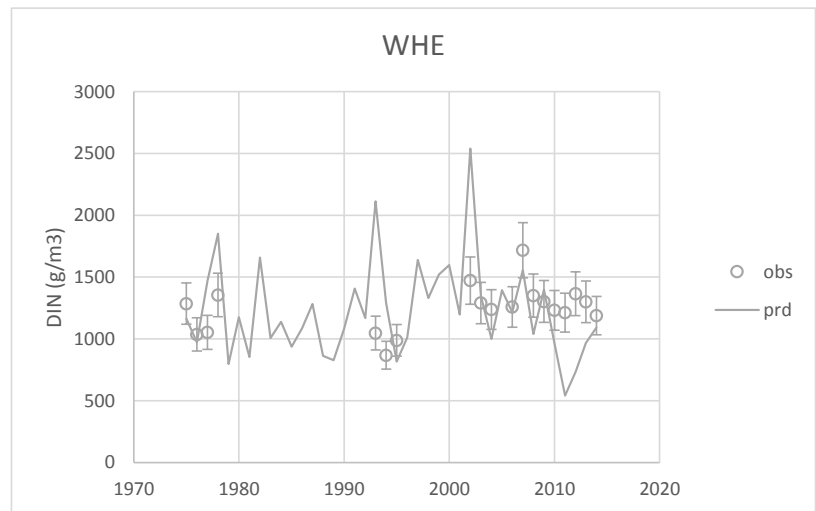
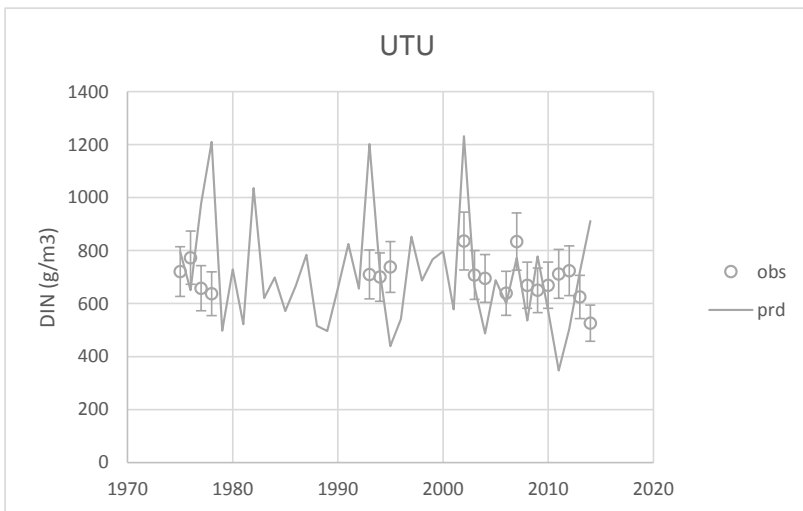
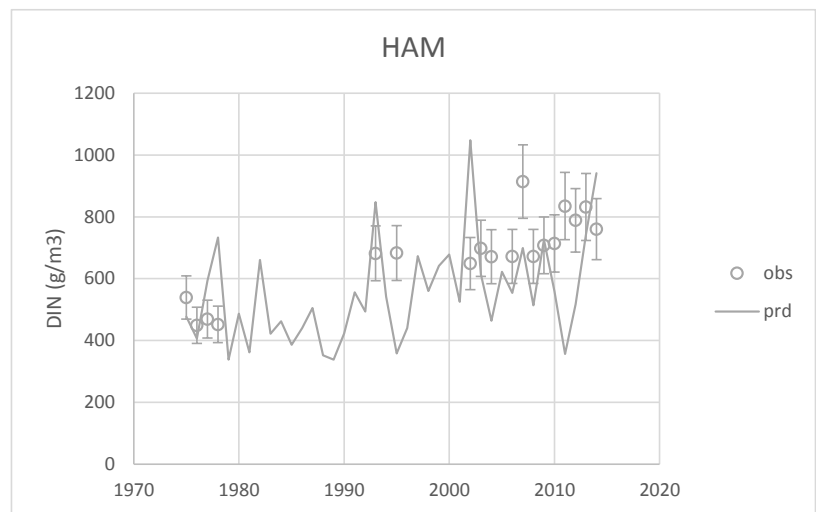
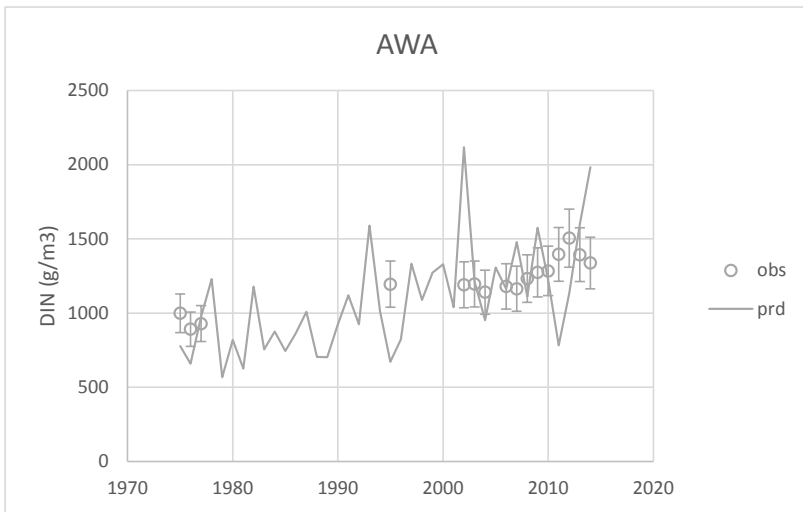


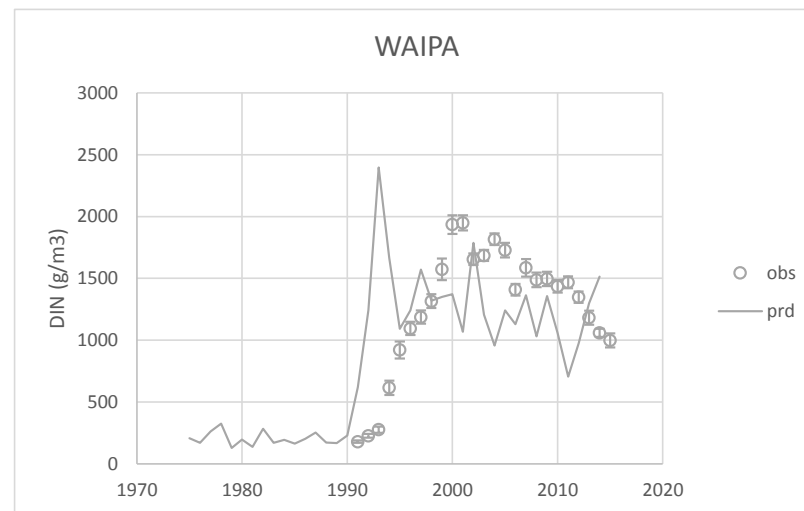
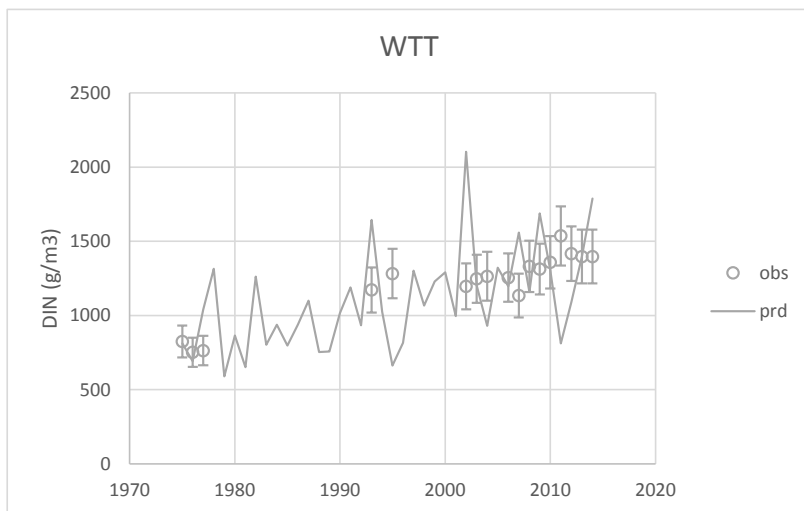
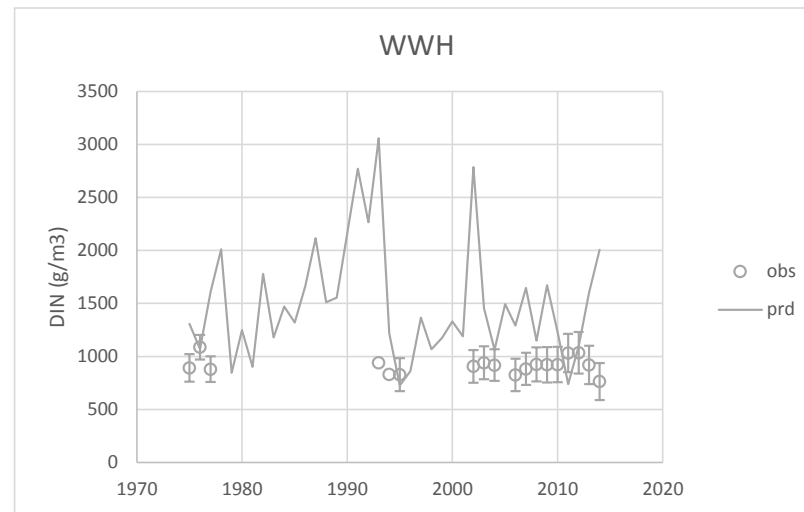
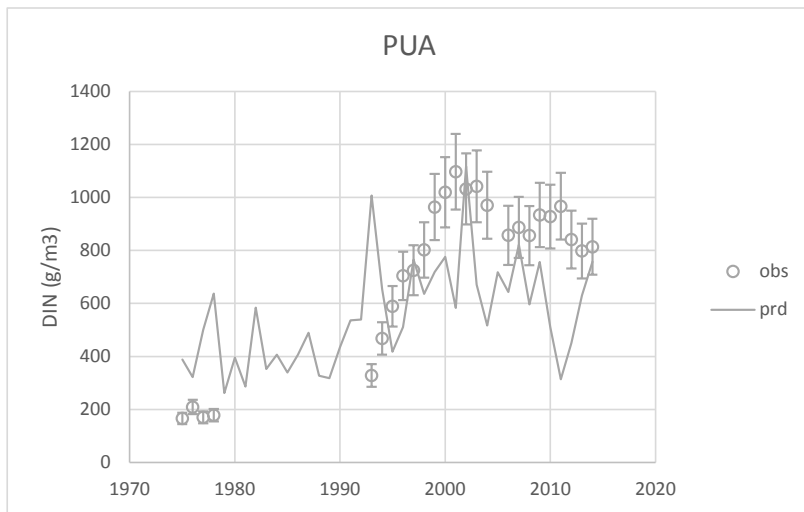


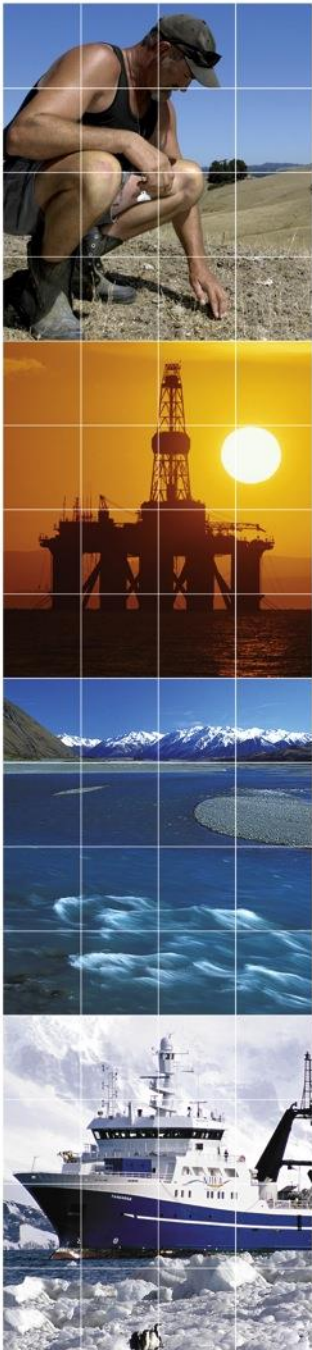
Nitrogen– more detail

- Alastair et al – calculated N losses 1940-2015 – OVERSEER v6
- Compared 2003 losses
 - BoPRC benchmarking data (detailed)
 - NIWA 2011 farming enterprise (generic)
- Similar for DAIRY but different for DRYSTOCK
- Morgenstern et al. (2015) – revised aquifer MRTs
- $MRT = f(\text{distance})$ so that average MRT matches
- Best fit to HAM & WNG with slightly shorter MRT
- Issues with timing of LU change (eg upper Puarenga)
- Towards ‘gold plated’ dataset for stream nitrogen









Nitrogen – to do

- Three attenuation processes
 - Root zone to stream (QUICKFLOW attenuation)
 - Groundwater (SLOWFLOW attenuation)
 - Stream (STREAM attenuation)
- Over-determined system – uniqueness problem
- Gorse effect
- Lead time for OVERSEER

- Investigate sensitivity OF MANAGEMENT DECISIONS to uncertainty
- On track to report mid-June