

Biological and Water Quality Monitoring Spring 2010

Sydney Water presentation for City of Ryde WQMSC

Monday 20th December

Sites

- Archers Creek
 - 3 additional WQ sites
- Shrimptons Creek
 - 2 additional WQ sites
- Porters Creek
 - 3 additional WQ sites
- Terrys Creek



Reporting & Analysis

- Ecological Monitoring
- Rainfall
- Water Chemistry
 - Tabulation and Analysis
 - BIOENV Analysis
- Macroinvertebrates
 - Taxa Analysis
 - Univariate Analysis
 - Multivariate Analysis



Ecological Monitoring

Activity involving the repeated measurement of an ecological variable including:

- Macroinvertebrates; Fish; Vegetation; Algae; Platypus etc

Investigated for 2 main reasons:

- Changes over time
- Future predictions

Use of Macroinvertebrates

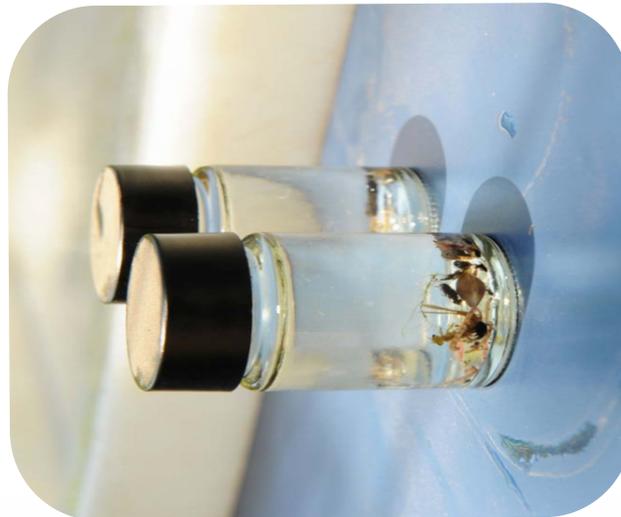
Advantages

- Integrative indicators
- Wide range of responses to environmental stresses
- Provide a direct assessment of biological health
- Sampling is relatively inexpensive
- Ubiquitous
- Sedentary
- Relatively long life cycles
- Taxonomic keys are available for identification



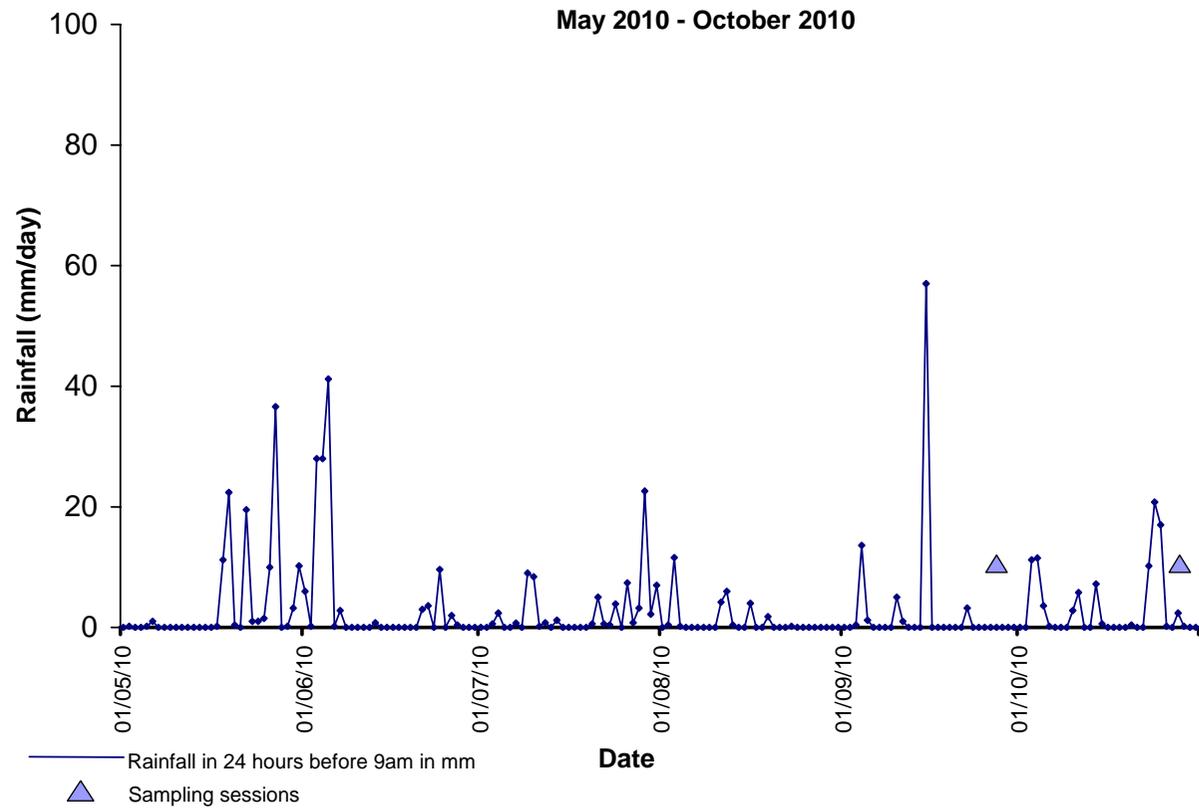
Disadvantages

- Need to be killed
- May not respond to all types of pollution
- Distribution influenced by a number of natural features such as altitude, stream size, climate and geology
- Need to arrange long-term storage/archive of samples



Rainfall

455 mm of rainfall in 5 months preceding October sampling



Water Quality

● Dissolved Oxygen

- Most creeks outside levels
- Porters Creek within levels

● Faecal Coliforms

- Archers, Shrimptons and Terrys Creek were within levels
- Buffalo Creek exceeded levels d/s Burrows Pk in September – 5,200 CFU/100mL
- Porters Creek exceeded levels at main branch at Wicks Rd in September & November – 3,800 & 7,200 CFU/100mL



Water Quality

- Oxidised Nitrogen
 - All creeks except Terrys Ck exceeded levels
- Total Nitrogen
 - All creeks exceeded levels
- Ammonium levels
 - All creeks and some additional WQ sites except Terrys Ck exceeded levels



Water Quality

● Total Phosphorus

- Archers, Shrimptons and Buffalo Creeks were within levels
- Levels were exceeded in September at Buffalo Ck d/s Spur Branch – 55 $\mu\text{g/L}$ and Terrys Ck – 136 $\mu\text{g/L}$

● Turbidity, Conductivity & pH

- Creeks were mostly within levels

● Alkalinity, TDS & Temperature

- Were reflective of historical results



EPT taxa

- EPT taxa richness
 - Very low taxa richness
 - Shrimptons Ck averaged 1 taxa per sample
 - Limited use for program
- EPT indicator taxa
 - 2 Antipodoecidae at one Porters Ck rep in Spring 2010
 - More appropriate measure of Stream Health



Archers Creek

Univariate analyses

- Indicate seasonal trend
- Spring 2010 saw decrease in stream health back to spring baseline level
- Comparison with AUSRIVAS is difficult

Multivariate analyses

- Indicates slight shifts in assemblages are seasonal
- Non-insects in Spring, insects in Autumn

Creek rehabilitation

- No significant change observed.



Shrimptons Creek

Univariate analyses

- Slightly poorer health
- Stream health peaked in Autumn 2007, has since dropped and remained consistent until small increase Spring 2010

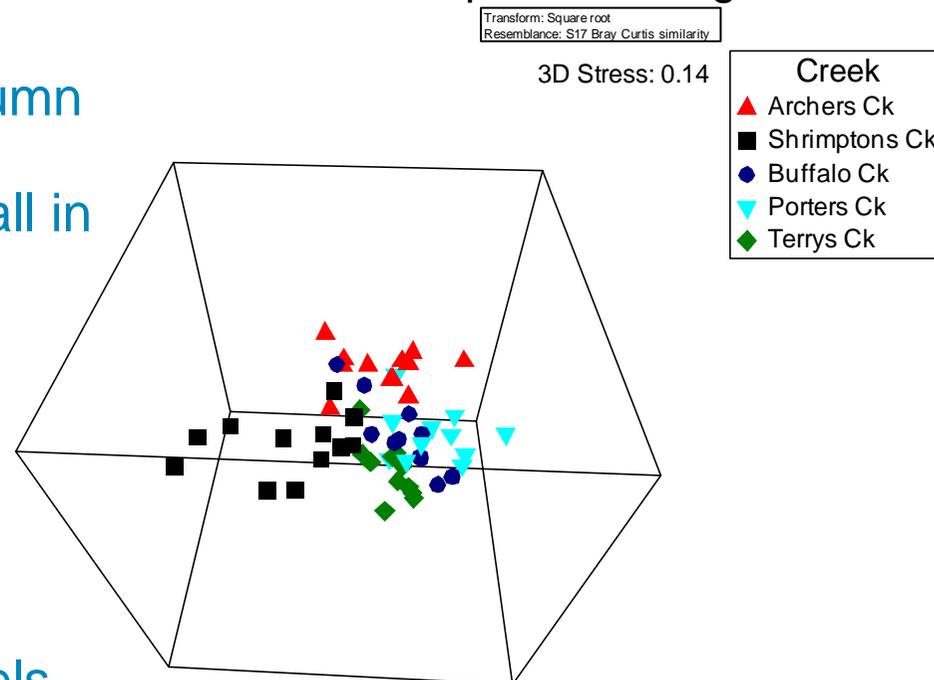
Multivariate analyses

- The most different of the five creeks

Stream Health factors

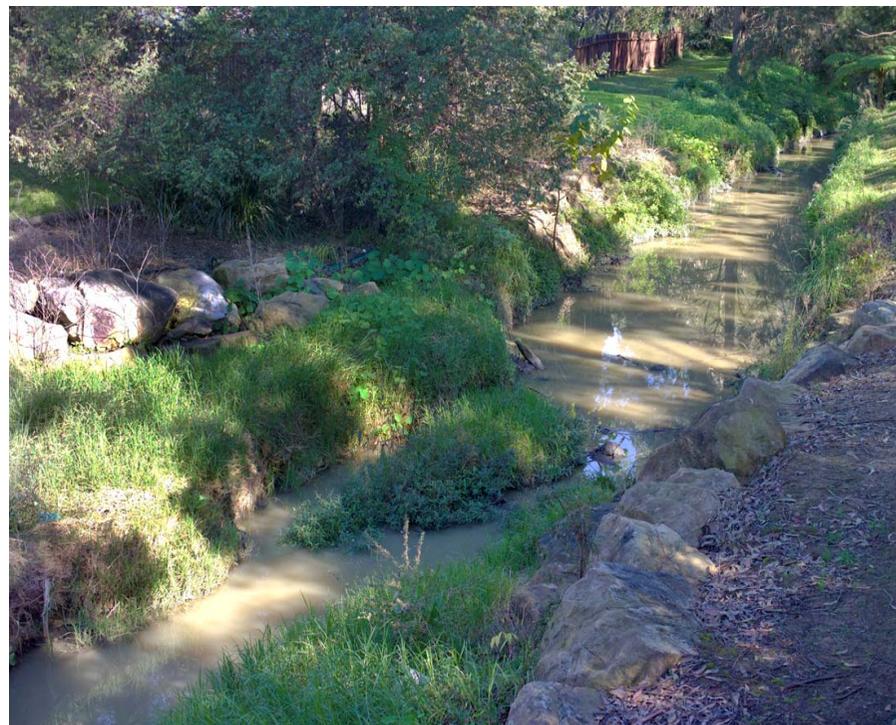
- Faecal coliforms, low DO levels and total dissolved solids

All five creeks replicates merged



Buffalo Creek

- Univariate analyses
 - Significant drop in Spring 2008
 - Improvement through 2009 to Autumn 2010 then small drop in Spring 2010
- Multivariate analyses
 - Spring 2008 SIMPER, 80% contribution from 3 taxa
- Impact recovery
 - Analyses suggest creek has returned to pre Spring 2008 conditions



Porters Creek

Univariate analyses

- Indicate seasonal trend, marginally higher stream health in Autumn compared to the respective Spring season
- Marginally highest Spring stream health results in Spring 2010

Multivariate Analyses

- Little variation through time
- Slight seasonal variation



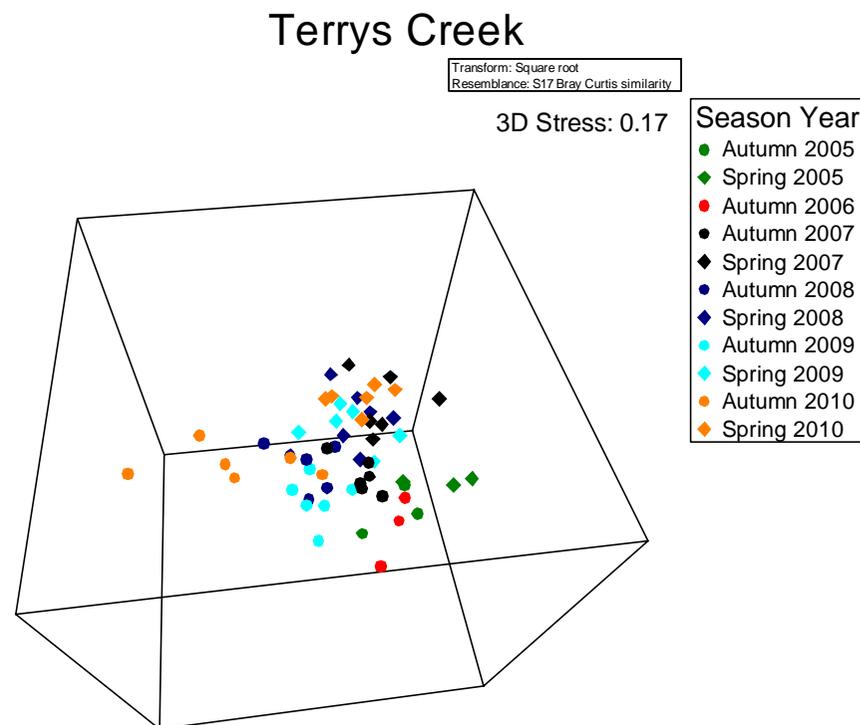
Terrys Creek

Univariate analyses

- Little variation through time - <math><0.4</math> SIGNAL-SF range
- Spring 2010 results in the mid range of stream health

Multivariate analyses

- Community assemblage has little variance through time
- SIMPROF separate Autumn 2010 samples from all other samples
- SIMPER indicates taxa shift



BIOENV

• BIOENV all creeks

- Mild correlation
- Oxidised nitrogen, DO, cobble & surrogates of stormwater drainage connection

• BIOENV individual creeks

- Weak to mild correlations, Porters Creek again returned strongest correlation
- Each Creek has a range of variables highlighted in strongest correlations



Stream health monitoring

Baseline data

- 11 seasons of comparable data

Evidence to date

- Currently not evident in Archers Creek
- Shrimptons Creek, future evidence

Potential evidence

- Buffalo Creek impact
- Shrimptons Creek stream health variation

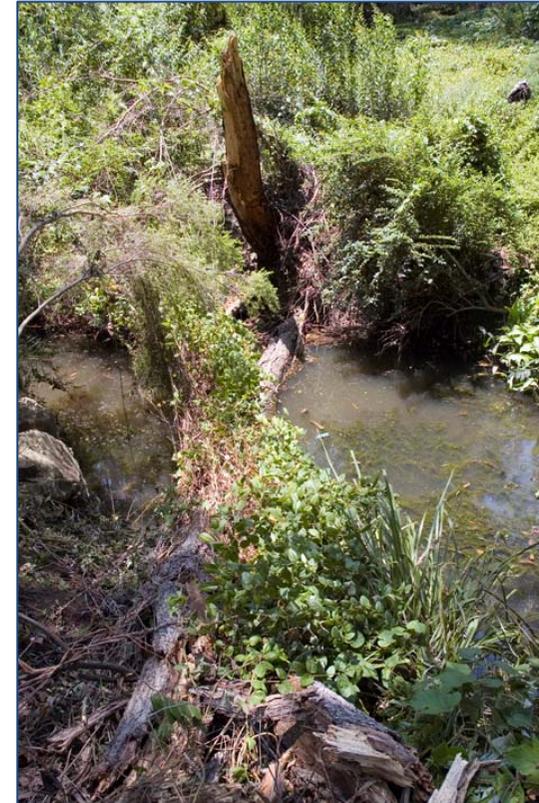
Future direction

Reporting

- Data presentation
- Program outcomes
- Recommendations

Community reporting

- Simplified report with creeks summarised



Questions

