



WWTP discharges as Environmental Flows

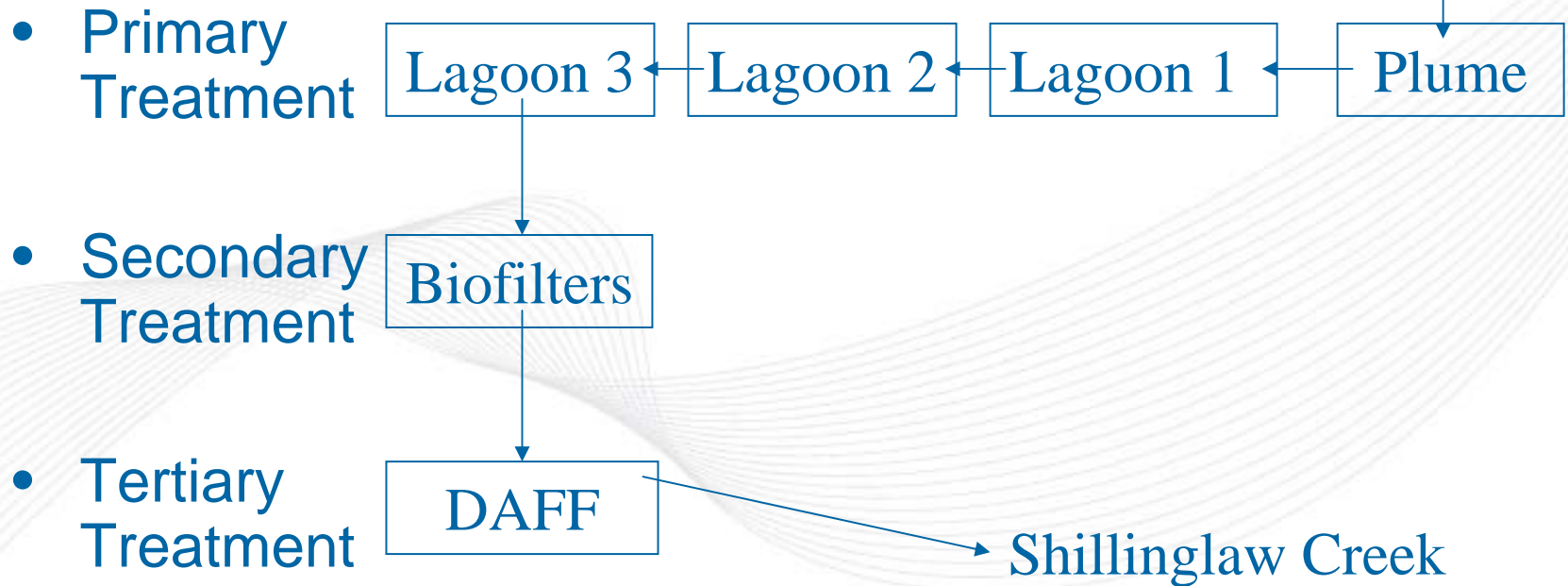
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Background

- Drouin, ~ 90 km south-east of Melbourne, Victoria
- Drouin WWTP discharges into Shillinglaw Creek during the wetter months (June-November)

The WWTP

- Inflow of ~ 1-1.5 ML/Day



Background cont.

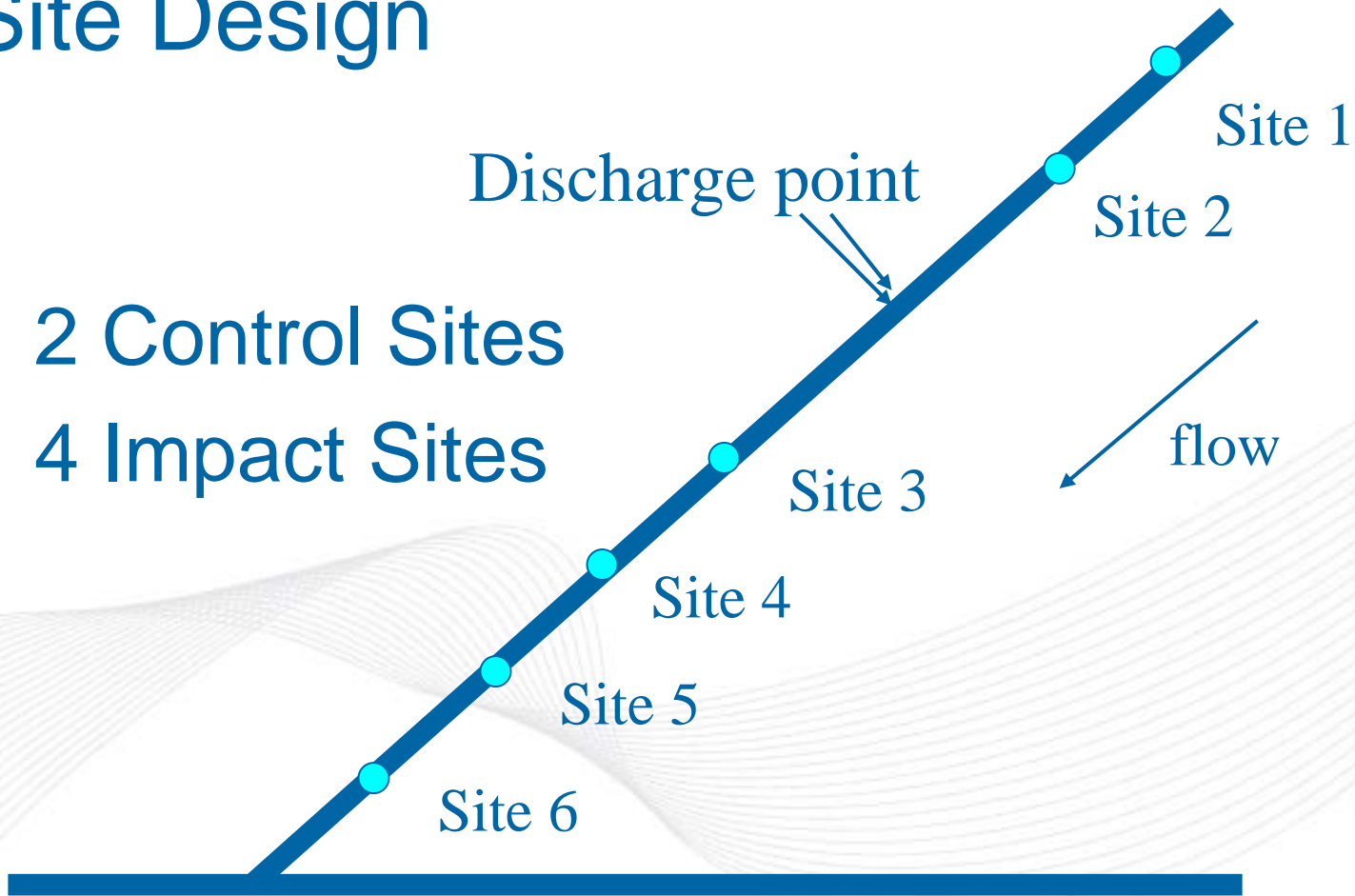
- Prior to June 2006 the WWTP produced secondary treated wastewater
- In June 2006 the DAFF facility was installed and then tertiary treated wastewater was produced

Study

- EPA Victoria requires a monitoring program for all point source discharges
 - It recommends the use of macroinvertebrate monitoring using standardised Rapid BioAssessment methodology

Site Design

- 2 Control Sites
- 4 Impact Sites



Sampling Design

- At each site, *in-situ* water quality and nutrients samples were collected
- Macroinvertebrates were collected using RBA protocols
- Modified macroinvertebrate sampling:
 - Combined 5m edge sample and 5m riffle sample
- Standard live picked method
- Identified to family level

Effect of effluent discharge

- Bray-Curtis Similarity Matrix
- ANOSIM Analyses
- **No Significant Effect**

Year	Significance Level
Spring 2004	0.733
Spring 2005	1.0
Spring 2005	0.667
Spring 2006	0.867
All Years Combined	0.620

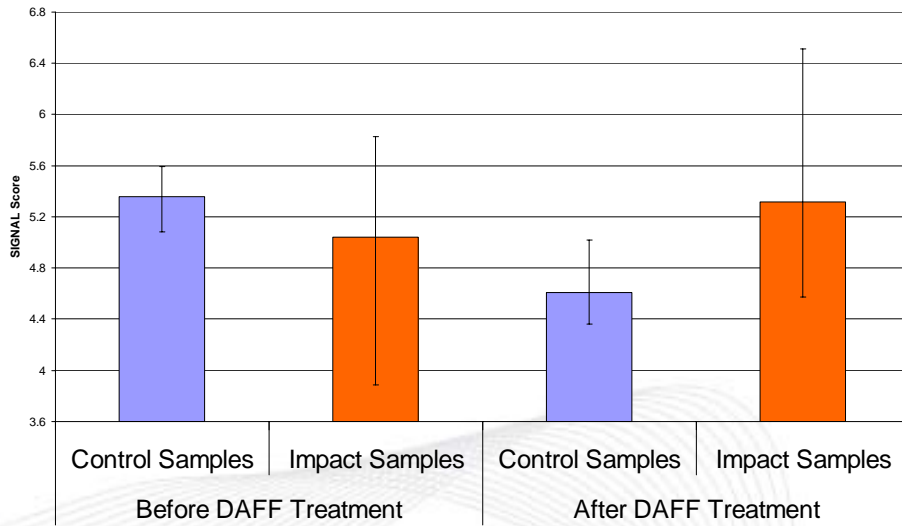
Influence of the DAFF Treatment

- Before and After the DAFF installation
- The DAFF treatment significantly changed the macroinvertebrate communities downstream of the discharge point

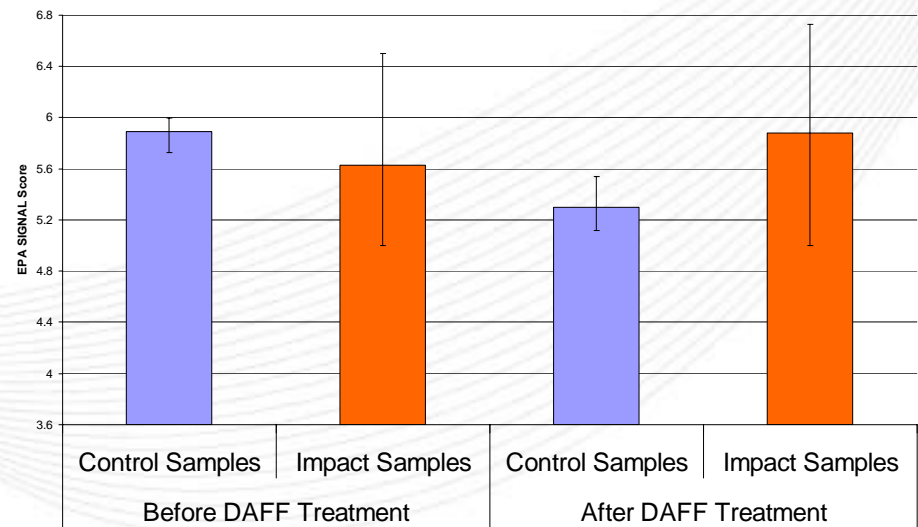
Treatment	Significance Level
Control Samples	0.086
Impact Samples	0.017

SIGNAL Scores

SIGNAL Score



EPA SIGNAL Score



Conclusions of study

- The discharge of wastewater from Drouin WWTP into Shillinglaw Creek is having no detrimental effect upon the macroinvertebrate communities

Conclusions of study cont.

- The addition of the DAFF treatment to the WWTP improves the quality of the discharge
- This significantly improved the macroinvertebrate communities downstream

Victorian Waterways

- One third of Victorian waterways are in a poor or very poor condition
 - as determined by the Index of Stream Condition (ISC)

Climate Change

- The Port Phillip and Western Port catchments, includes the study site and Melbourne, are predicted that:
 - By 2030, 4% less annual rainfall than the 1990 average
 - By 2030, 3% increase in evaporation than the 1990 average
 - Intensity of rainfall will increase
 - Number of rainy days will decrease

Use of reclaimed water

- In 2004, the Victorian Government set a target of 20% reuse of water by 2010
- EPA Victoria's Guidelines for the Use of Reclaimed Water, in 2003, encouraged the safe and sustainable use of reclaimed water
- Under current legislation the use of reclaimed water into the environment is not identified as beneficial reuse

The Victorian Environmental Water Reserve (EWR)

- Designed to set aside water to:
 - 1) maintain environmental values of a waterway
 - 2) sustain biodiversity, ecological functions and water quality of a waterway
 - 3) have legal status that is held by the crown

The Victorian Environmental Water Reserve (EWR) cont.

- Importantly, water for the environment gained the equivalent legal status to water allocated for consumption

Ecological Requirements of Priority Rivers

- There have been many investigations, of which have identified components of the flow regime which are not being met for priority rivers

Conclusions

- It is now common place for WWTPs to have tertiary treated wastewater that often meets Class A standards
- This study proved that tertiary treated wastewater can improve the condition of a waterway

Conclusions cont.

- Wastewater is just one method that can be used to improve environmental flows
- It is recommended that river managers and regulators consider that high quality WWTP discharges can have a net environmental benefit