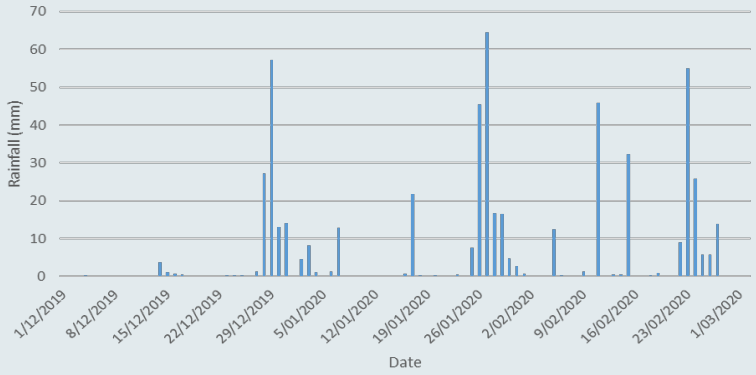
PATHWAYS TO WATER QUALITY IMPROVEMENTS IN THE MYRTLE CREEK SUB-CATCHMENT PROJECT

SNAPSHOT OF MYRTLE CREEK CONDITIONS DEC-FEB 2019/2020 CASE STUDY

- ***Samples collected across 14 weeks from 2 December 2019 to 1 March 2020.***
- 'Top' samples only collected six times when flow was available.
- Samples collected from:
  - Top - located at the top of Bates Road, upstream of all cane paddocks. Areas of disturbed grazing land are located above this site.
  - Mid - at the first Myrtle Creek crossing on the Bruce Highway heading North from Proserpine (after Up River Drain enters Myrtle Creek).
  - End - Cantamessa's Crossing.



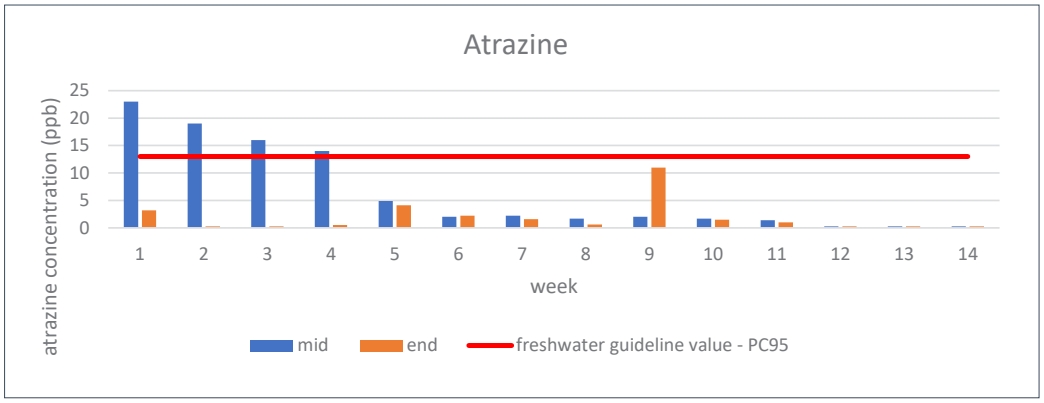
Total rainfall from 1 December 2019 to 1 March 2020: 538mm

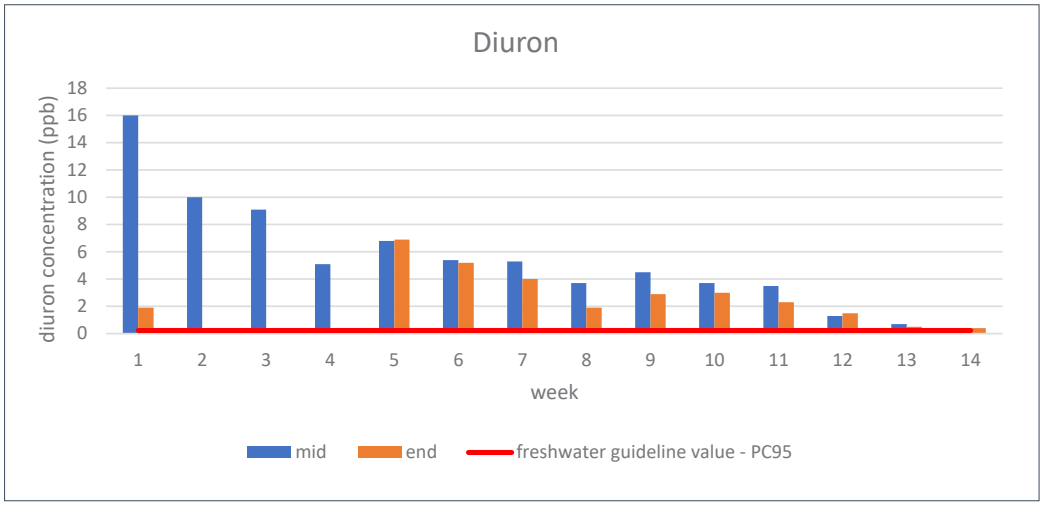
Figure 1 *Proserpine rainfall data for January 2019 – read from Glen Isla weather station*

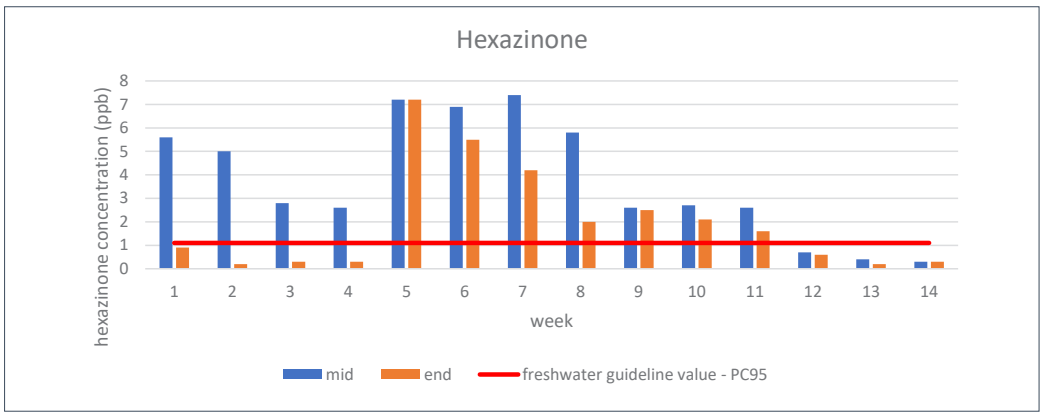
Figure 2 *Google Earth image of sample locations.*

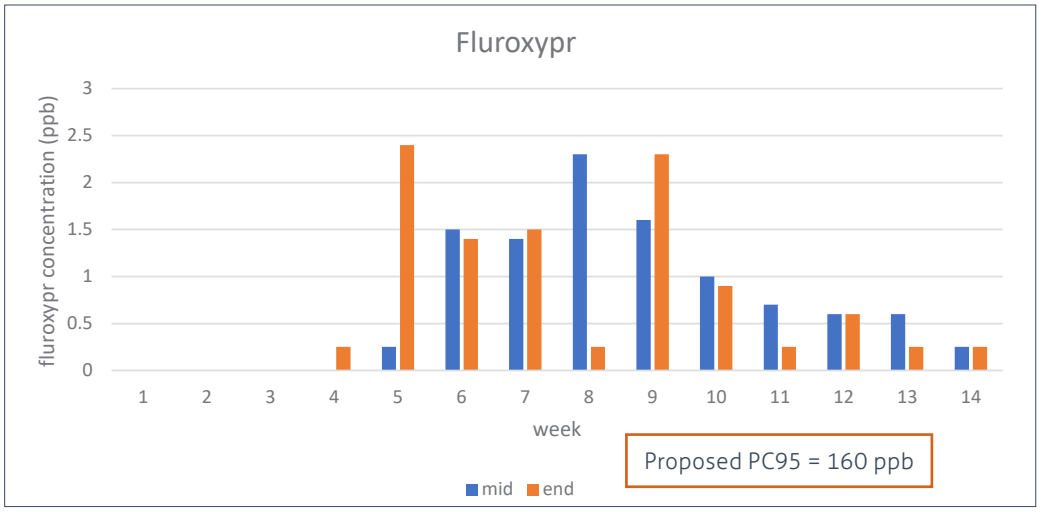
The following figures show the concentration of pesticide in grab samples collected from 'Mid' and 'End' sampling locations across 14 weeks from 2 December 2019 to 1 March 2020. The "freshwater guideline value - PC95" provided on the pesticide figures represents the freshwater default guideline value at the 95% level of species protection for the pesticide as provided by the Australian & New Zealand Guidelines for Fresh & Marine Water Quality. Fluroxypyr value is a proposed value provided by King et al (2017).

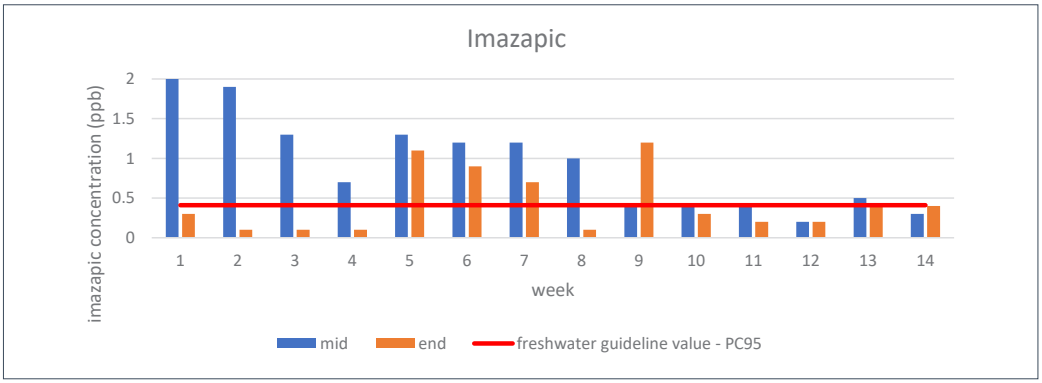
Dissolved Inorganic Nitrogen (DIN) and Filterable Reactive Phosphorous (FRP) concentrations at all three sampling locations are presented. The Mackay Whitsunday Water Quality Plan's DIN water quality in 2014 event conditions is 0.429 ppm and 2021 event target is 0.300 ppm. FRP water quality in 2014 event conditions is 0.200 ppm and 2021 event target is 0.193 ppm.

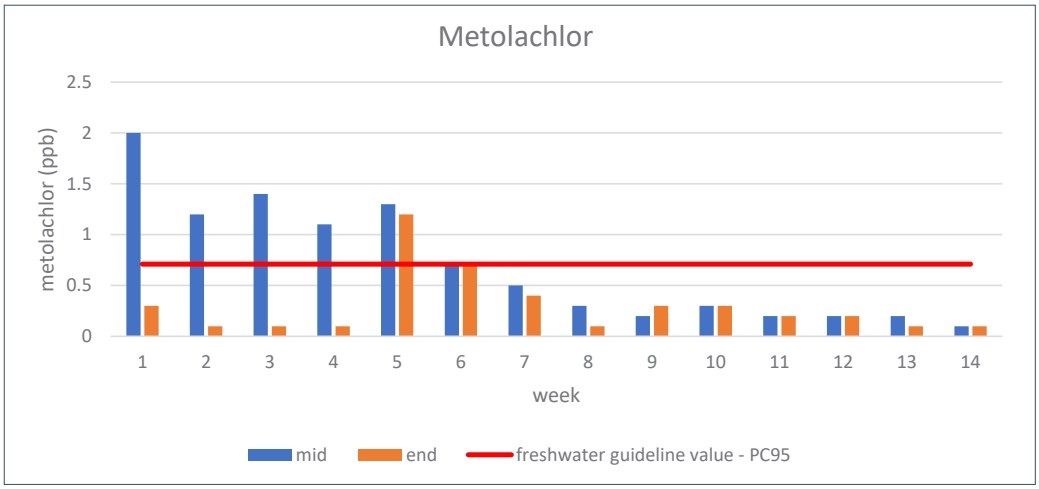

Atrazine
atrazine concentration (ppb)
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
freshwater guideline value - PC95

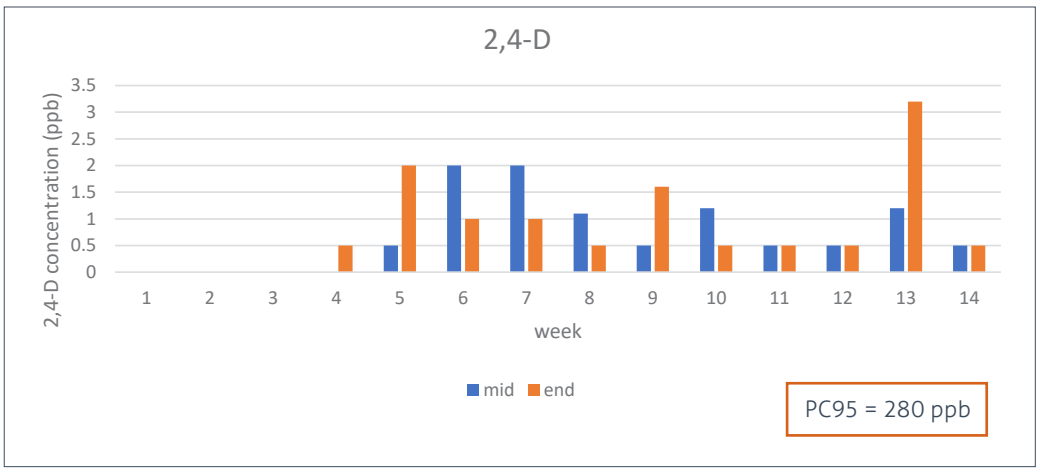

Diuron
diuron concentration (ppb)
18
16
14
12
10
8
6
4
2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
freshwater guideline value - PC95

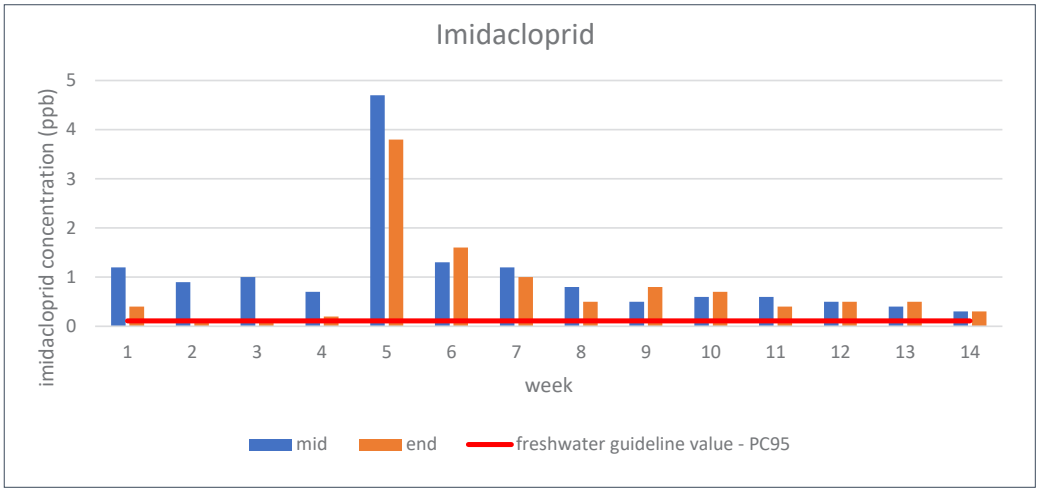

Hexazinone
hexazinone concentration (ppb)
8
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
freshwater guideline value - PC95

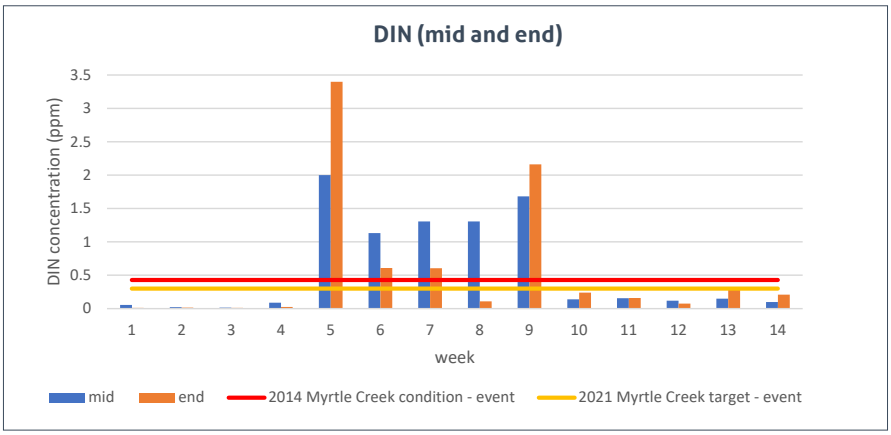

Fluroxypr
fluroxypr concentration (ppb)
3
2.5
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
Proposed PC95 = 160 ppb
mid
end

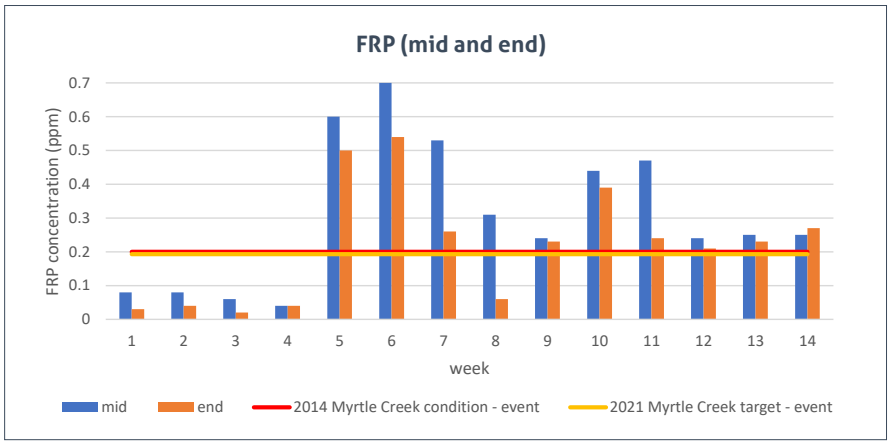

Imazapic
imazapic concentration (ppb)
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
freshwater guideline value - PC95

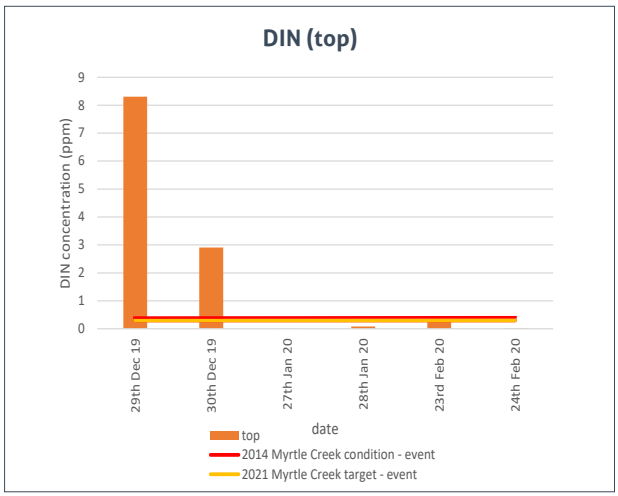

Metolachlor
metolachlor (ppb)
2.5
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
freshwater guideline value - PC95

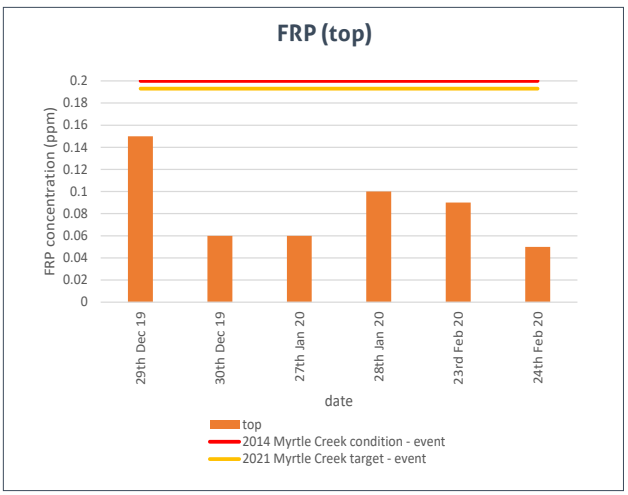

2,4-D
2,4-D concentration (ppb)
3.5
3
2.5
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
PC95 = 280 ppb


Imidacloprid
imidacloprid concentration (ppb)
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
freshwater guideline value - PC95


DIN (mid and end)
DIN concentration (ppm)
3.5
3
2.5
2
1.5
1
0.5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
2014 Myrtle Creek condition - event
2021 Myrtle Creek target - event


FRP (mid and end)
FRP concentration (ppm)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14
week
mid
end
2014 Myrtle Creek condition - event
2021 Myrtle Creek target - event


DIN (top)
DIN concentration (ppm)
9
8
7
6
5
4
3
2
1
0
29th Dec 19
30th Dec 19
27th Jan 20
28th Jan 20
23rd Feb 20
24th Feb 20
date
top
2014 Myrtle Creek condition - event
2021 Myrtle Creek target - event


FRP (top)
FRP concentration (ppm)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
29th Dec 19
30th Dec 19
27th Jan 20
28th Jan 20
23rd Feb 20
24th Feb 20
date
top
2014 Myrtle Creek condition - event
2021 Myrtle Creek target - event

DISCUSSION

The sugar industry is taking ownership and playing an active role in understanding water quality issues. The first step is to determine the size of the issue. These results provide a project baseline for the 2019-2020 year. This sets the stage for future work in the area. Future samples can now refer back to these results to measure progress over time.

It is important to note that samples were taken once weekly over the sampling period at the top and mid sites, and once daily during flow events at the top site. The samples only provide a snapshot of the water quality at that point in time, and may not be representative of the entire season.

Results from the official Department of Environment and Science (DES) monitoring station in the Proserpine River will be released at a later date.

It is evident that many samples have pesticide levels which exceed the guideline values. The data generally follows typical pesticide loss curves, where concentrations peak during the first run-off events for the season, then decrease overtime. This season, the first event started just prior to the week five sample being taken. It is this point that many of the pesticide concentrations increase as more product is flushed out of the system. Where high concentrations are detected prior to the run-off event, product is likely being lost in irrigation water.

Pesticide values are not provided for the 'Top' site due to minimal detections.

The 'Top' site has intermittent flow and could only be sampled during rainfall events. Due to the site's location, there was low flow which may result in DIN and FRP readings being more concentrated than mid and end sites where nutrients may be diluted by large flow volumes. The total nutrient lost from the 'Top' site is likely less than the other sites.

FOR FURTHER INFORMATION PLEASE CONTACT

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SSP

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Queensland Government