Glorious Water
Water Quality Specialists

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Date 18 June 2024

ATT: [redacted]

Dear [redacted],

Re: Report GWR000216

The water tested from samples collected and supplied indicated that there is the presence of pyriproxyfen (PPF) in two of the samples analyzed by an independent laboratory. There needs to be a correction where the sample labelled pond should read Pine Rivers sample 2.

This report analyzes the test results for the presence of Methoprene and Pyriproxyfen in water samples collected from the South Pine River and Dawson Creek in Australia. Methoprene and Pyriproxyfen are insect growth regulators commonly used in pest control. Their presence in waterways is concerning due to potential adverse effects on aquatic ecosystems, particularly fish and crustaceans. This report discusses the test results, the ecological impact of these compounds, and the regulatory limits for safe concentrations in Australian waterways.

Test Results

Client Reference			GWSPRHV	GWDCHV	GWDHV
Sample Type			Water River Untreated	Water Creek Untreeted	Water Pond Untreated
Sampling Time/Date			11:45 26-May-2024	14:25 26-May-2024	14:00 26-May-2024
Sample Description			Southpine River 842 Mt Glorious Rd	Dawson Creek Highvale	842 Mt Glorious Rd Highvale
Analyte	**Units**	**Reporting Limit**	**24KE6111**	**24KE6112**	**24KE6113**
Methoprene	ug/L	1	< 1	< 1	< 1
Pyriproxyfen	ug/L	0.04	< 0.04	**81**	**3.3**

Discussion

Regulatory Limits and Ecological Impact

Methoprene and Pyriproxyfen are used to control insect populations by disrupting their growth and development. However, their presence in aquatic environments can pose

significant risks to non-target species. According to Australian guidelines, the allowable limits for these compounds in surface water should ensure the protection of aquatic life.

For instance, Pyriproxyfen has been shown to be particularly harmful to crustaceans and fish, causing developmental and reproductive issues even at low concentrations. The detected level of Pyriproxyfen in Dawson Creek (81 µg/L) is alarmingly high, significantly exceeding safe environmental concentrations. This could lead to severe ecological consequences, such as reduced fish populations and impaired ecosystem health.

The recommendation from WHO (https://cdn.who.int/media/docs/default-source/wash-documents/wash-chemicals/pyriproxyfen-background.pdf?sfvrsn=ef4b9372_4) is that drinking water should not exceed 10 µg/L , i.e. 10 ppb. Dawsons Creek having the highest concentration at 81ppb and Pine Rivers sample 2 with 3.3ppb. According to fireants.org, PPF should not be used within 8 m of water ways as they are toxic (https://www.fireants.org.au/treat/treatment-types-and-bait-safety/fish-and-aquatic-life).

The regulatory body that the National Fire Ant Eradication Program claims to approve its use does not have any supporting data on its current website. Further research is being done and will be reported as obtained.

Sample Analysis

South Pine River (11:45 sample): Both Methoprene and Pyriproxyfen were below detectable levels, suggesting minimal contamination at this site during the sampling time.

Dawson Creek (11:45 sample): Pyriproxyfen concentration was 81 µg/L, indicating a serious pollution event. Methoprene was below detectable levels.

South Pine River (14:00 sample): Pyriproxyfen was detected at 3.3 µg/L, still above typical safe limits, although not as extreme as in Dawson Creek. Methoprene remained below detectable levels.

Conclusion

Note that the main aim of Glorious Water Pty Ltd testing and reporting is focused in drinking water, so the reporting is focused on the potential for the water tested to be used for human consumption with appropriate precautions such as filtration and disinfection. Any environmental ramifications are a secondary nature to the ethos of Glorious Water Pty Ltd.

The presence of Pyriproxyfen at high concentrations in Dawson Creek raises significant environmental concerns, and negates the use of water a source of potable water under this conditions. This thus causes the imposition of immediate investigation and mitigation measures to prevent further contamination. Regular monitoring and stricter regulation of pesticide use near water bodies are essential to protect aquatic ecosystems. Methoprene

levels in the tested samples were below detectable limits, suggesting that, at least in the locations and times tested, this compound is not a current concern.

Pyriproxyfen:
Description: Pyriproxyfen is an insect growth regulator that acts as a larvicide against public health insect pests, especially dipterans (flies and mosquitoes). It is also widely used in agriculture and horticulture.
Mechanism: Pyriproxyfen disrupts the endocrine system by mimicking the activity of juvenile hormones, interfering with insect metamorphosis. Larvae treated with pyriproxyfen cannot successfully molt to reach the adult stage.

Aquatic Ecotoxicity: Pyriproxyfen can directly or indirectly contaminate aquatic ecosystems. It photodegrades quickly in water, especially in the absence of organic matter. Its toxicity varies within taxonomical groups, influenced by abiotic and biotic factors. It disrupts the development of various species and impacts physiological events. Behavior, such as predatory and swimming performance, can also be affected(https://link.springer.com/article/10.1007/s11356-020-08345-8).
Research Gap: While some studies focus on pyriproxyfen metabolites' environmental fate, research on its aquatic ecotoxicity assessment remains scarce.

Methoprene:
Description: Methoprene is another insect growth regulator used for mosquito and fire ant control. It prevents larvae from developing into adults.
Aquatic Ecotoxicity: Although specific studies on Methoprene's aquatic ecotoxicity are limited, it is generally considered less harmful to non-target organisms than traditional insecticides. However, further research is needed to understand its impact fully.

Future Actions

- **Enhanced Monitoring:** Increase the frequency of water quality monitoring in affected areas to detect and address contamination early.
- **Public Awareness:** Educate local communities and industries about the impact of pesticides on waterways and promote safer alternatives.
- **Policy Review:** Reevaluate current regulations regarding the use of Methoprene and Pyriproxyfen near water bodies to ensure they are adequate for protecting aquatic life.

Should you have any questions regarding this report please do not hesitate to contact me.

Sincerely,

Dr. Washington H. Sanchez
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Managing Director
GLORIOUS WATER Pty Ltd.