



To: All interested Parties

Via email

From: Ms V King

Ref: Umhlanga Estuary Fish Kill incident – 6 April 2024

Date: 11-05-24

To Whom it May Concern

As coordinator of the Specialists working on the UPL Cornubia Incident, it was brought to my attention, via Whatsapp, that there was a fish kill incident in the Umhlanga estuary early on the 6th April 2024.

It should be noted that there were no fish deaths in the tributary which was affected by the UPL spill in July 2021 and into which the treated PCD water is discharged.

UPL requested it's freshwater and estuarine specialists to undertake an immediate investigation to determine the likely cause of the incident, in order to determine whether there is any link to the UPL incident which occurred 33 months previously.

GroundTruth (team freshwater specialists) and MER (the team's estuarine and marine specialists), were commissioned by UPL to undertake the required investigations to determine likely cause of the fish kill.

Both teams immediately mobilised and undertook investigations and sampling necessary to collect sufficient information regarding the water quality status and impacts at the time of the fish deaths, as well as identifying other possible/potential sources which may have caused this issue. Details of the investigations undertaken are presented in the attached specialist reports:

1. GroundTruth Umhlanga Estuary Fish Kill Investigation, April 2024 – dated 10 May 2024.

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2. MER Investigation of the Fish Kill in the uMhlanga Estuary during April 2024 - dated 4 May 2024

The GroundTruth investigation involved various site inspections, (on the initial site inspection, Dr Mark Graham was joined by a representative from DWS), in-situ and ex-situ water quality (WQ) analyses, electrofishing and aquatic biomonitoring, and these results were combined with comparisons and interpretation of historical water quality data from various sites and inputs to the affected system.

The GroundTruth report concludes that the Tributary and PCD discharge are not linked to the fish kill event, whilst a number of key sewage pollution sources were identified and which are clearly impacting on the estuarine system.

Their Summary of results is presented below:

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1. *Visual surveys for dead fish along the freshwater ecosystems upstream of the Estuary*
 - a. *No dead fish observed at any of the sites assessed*
 2. *In-situ testing undertaken at multiple sites down the system and upstream of the Estuary for key water quality parameters, specifically Dissolved Oxygen (DO)*
 - a. *DO concentrations above 60-80% – fundamental to healthy fish populations.*
 - b. *Both alive and dead fish noted on the beach. Fish noted as stressed on the Umhlanga beaches, still alive but with apparent hypoxia – from video interpretation of these fish.*
 - c. *No DO issues noted on the Ohlanga Tributary below UPL, but significant stress levels for DO noted within the main stem Ohlanga draining into the Estuary.*
 3. *Electrofishing surveys at several critical and strategic sites undertaken.*
 - a. *Numerous, diverse and healthy fish populations within the freshwater reaches of the rivers noted upstream and into the Estuary.*
 4. *A thorough review of the historical, antecedent and current water quality data and conditions within the freshwater environment draining into the Estuary illustrated:*
 - a. *No out of range or significant variation in any of the routinely monitored aspects of the WQ.*
 - b. *This recent WQ data is similar to and when no fish kills had been recorded previously in this system – i.e. no antecedent WQ signals highlighting any significant changes to the WQ ahead of the fish kill within the freshwater environment.*
 - c. *This included aquatic ecotoxicological data and aquatic biomonitoring data (both benthic aquatic macroinvertebrates and benthic diatoms).*
 5. *Analysis of recorded pesticide concentrations, pre- and immediately post-spill, in the treated PCD water revealed:*
 - a. *Very low concentrations, just above analytical limits of quantification,*
 - b. *No increase or spike in pesticides, particularly in the days preceding the fish kill.*

6. *Other potential source areas of pollution/stressors which may account for the reported fish kill and which noted several discrete high-risk areas/ sources potentially affecting fish health - namely:*
- a. *Raw sewage having recently surcharged from the Blackburn/Ohlanga Pumpstation and entering the Ohlanga River at the head of the Umhlanga Estuary – objective analytical data and observations show this has been a regular occurrence for several months now.*
 - b. *Raw, ongoing sewage flow from the Izinga catchment, and entering the head of the Umhlanga Estuary between the N2 and Umhlanga WWTW. The sampled water here contained over 2.4million E.coli counts/100mL. This raw sewage is still ongoing (2nd May 2024) -almost a month after the reported fish kill in the estuary.*
 - c. *Sludge rich, black anoxic water draining from the Umhlanga WWTW and directly into the Umhlanga Estuary.*
 - d. *Discharge from the Phoenix WWTW, upstream of the confluence of the Ohlanga and the Ohlanga Tributary recorded E.coli counts in excess of 241000 MPN/100mL – over 240 times the DWS General Limit Values.*
 - e. *Several other parameters out of range from this WWTW in terms of the DWS General Limit Values (GLVs).*
 - i. *DWS discharge limits in the form of GLVs designed for the protection of water resources and receiving water bodies and biota therein – including fish.*
 - f. *The high E.coli (sewage) signal from the upper catchment is still very high and significant at the inflow to the estuary.'*

They conclude:

“The water quality, in-situ chemistry, biomonitoring, and electrofishing data show no significant negative impact on the Ohlanga and uMhlanga estuary by the Tributary, with the dissolved oxygen concentration in the Tributary measured at 100% and increasing in the Ohlanga from sites SW23 to SW24 after the confluence with the Tributary. This rules out the Tributary as a cause of the fish kill. The nutrients and organic rich sewage inputs, however, would have added significant stress to the estuarine environment, and are the most likely cause of this fish kill.”

The MER approach involved field surveys, investigation, and sampling to assess potential causes. An initial site visit was conducted late morning on the 6 April 2024, and revealed 100s to 1000s of dead fish along the closed estuary shoreline but no apparent sewage odours or water discoloration in the estuary sites visited. The in situ measures taken in the area of the fish kill indicated low dissolved oxygen concentrations in the region of the lower estuary. Water samples were taken at all sites visited and further laboratory analyses and additional critical data was included and integrated into the interpretations with those observations from the site visit.

MER concluded: *'After considering rainfall, mouth state, in situ physico-chemical parameters, the species affected and the extent and location of the fish kill, the primary cause of the fish kill was attributed to a rapid decline in dissolved oxygen concentrations due to the decomposition of sewage contamination and associated organic matter. Other factors, such as increased pesticide and metal levels, were ruled out by the analytical results. The closure of the estuary mouth and exacerbated the impact of the sewage on water quality and fish mortality.'*

It should also be noted from the reports presented that the current intermittent PCD discharge hydrologically represents less than 0.5% of the overall base water flow into the estuary and that the Ohlanga River itself, and above the confluence with the tributary draining the UPL site, contributes the majority of water into the estuary.

It is therefore concluded that fish recovery in the estuary had been significant prior to this fish kill, and the influx of several sources of sewage into the system, combined with the prevailing estuarine conditions, is likely to have caused this incident, which can, as presented in the specialist's reports, in no way be linked to the July 2021 UPL spill.

Please contact me if you need any additional information.

Regards

A handwritten signature in black ink, appearing to read 'V. King', with a stylized flourish at the end.

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Metamorphosis Environmental Consultants