

Water quality modelling to assess sources and transport of pathogens within uMsunduzi catchment, South Africa

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STUDY BACKGROUND

- UMsunduzi River is highly polluted
 - Uncontrolled grazing lands – runoff problems
 - Broken sewers
 - Lack of adequate sanitation facilities (septic tanks for those that can afford) → illegal discharges
- Peri-urban and rural communities rely on river systems
 - Agricultural (small-scale), recreational, domestic (*water tank issues*)
 - Indirect wastewater reuse?

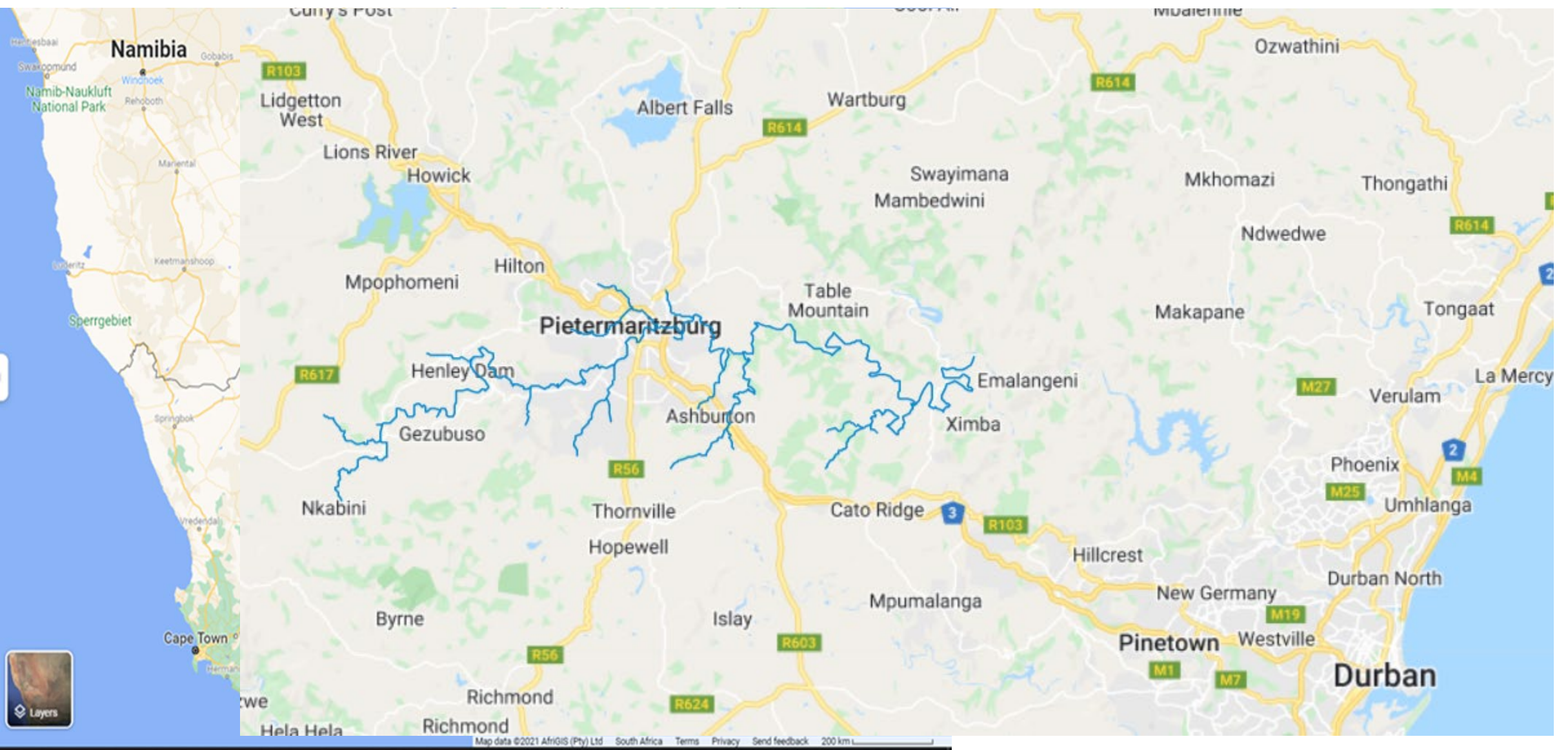


Fig 1:Study Location (Google Maps)

Tools

- A water quality modelling tool (QSWAT)
 - understanding of the spatial and temporal dynamics of microbial pollution in a river system
 - Point vs non-point source pollution
 - Where is it coming from?
- Quantitative Microbial Risk Assessment

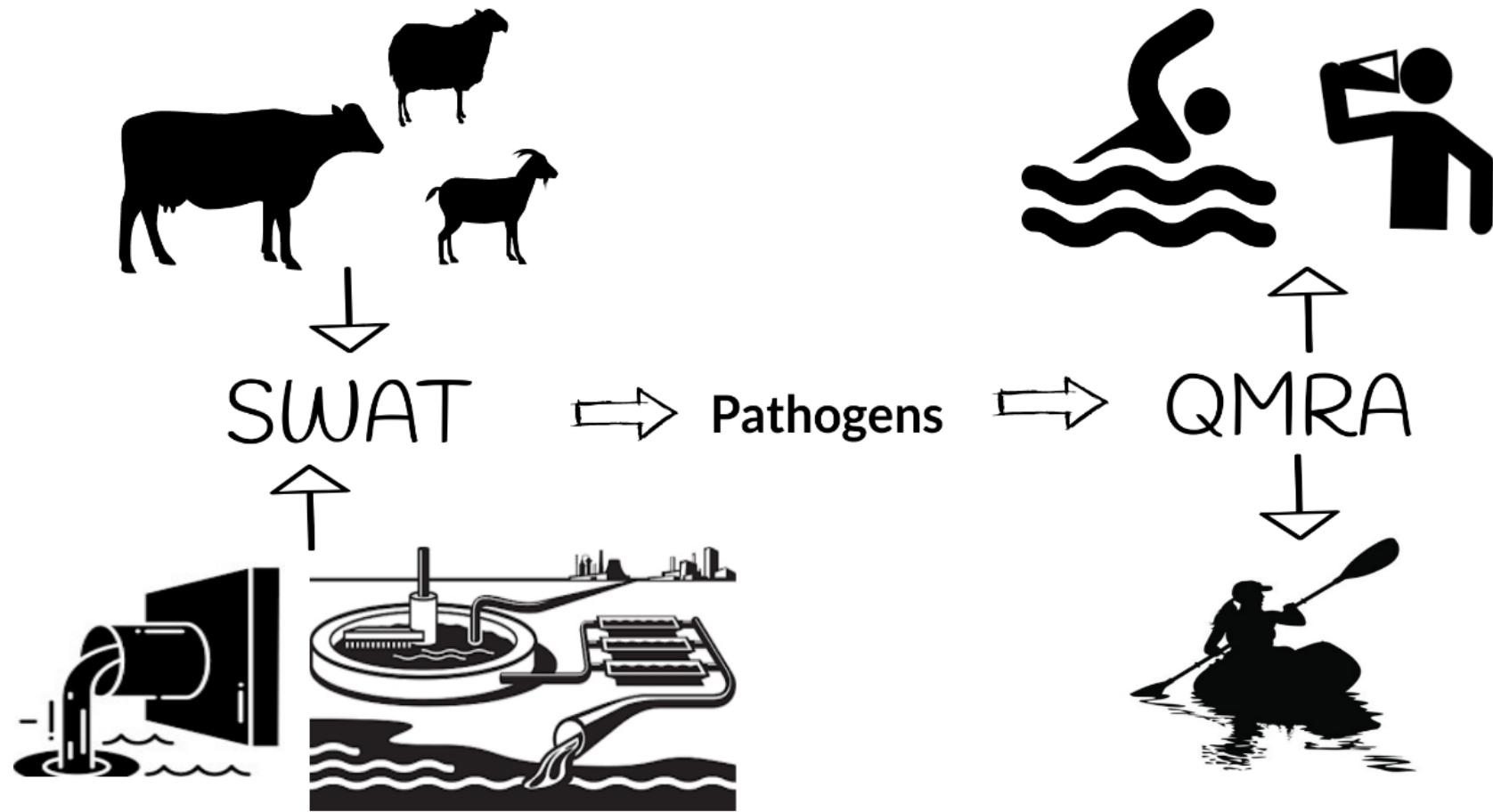


Fig 2: Research Methodology

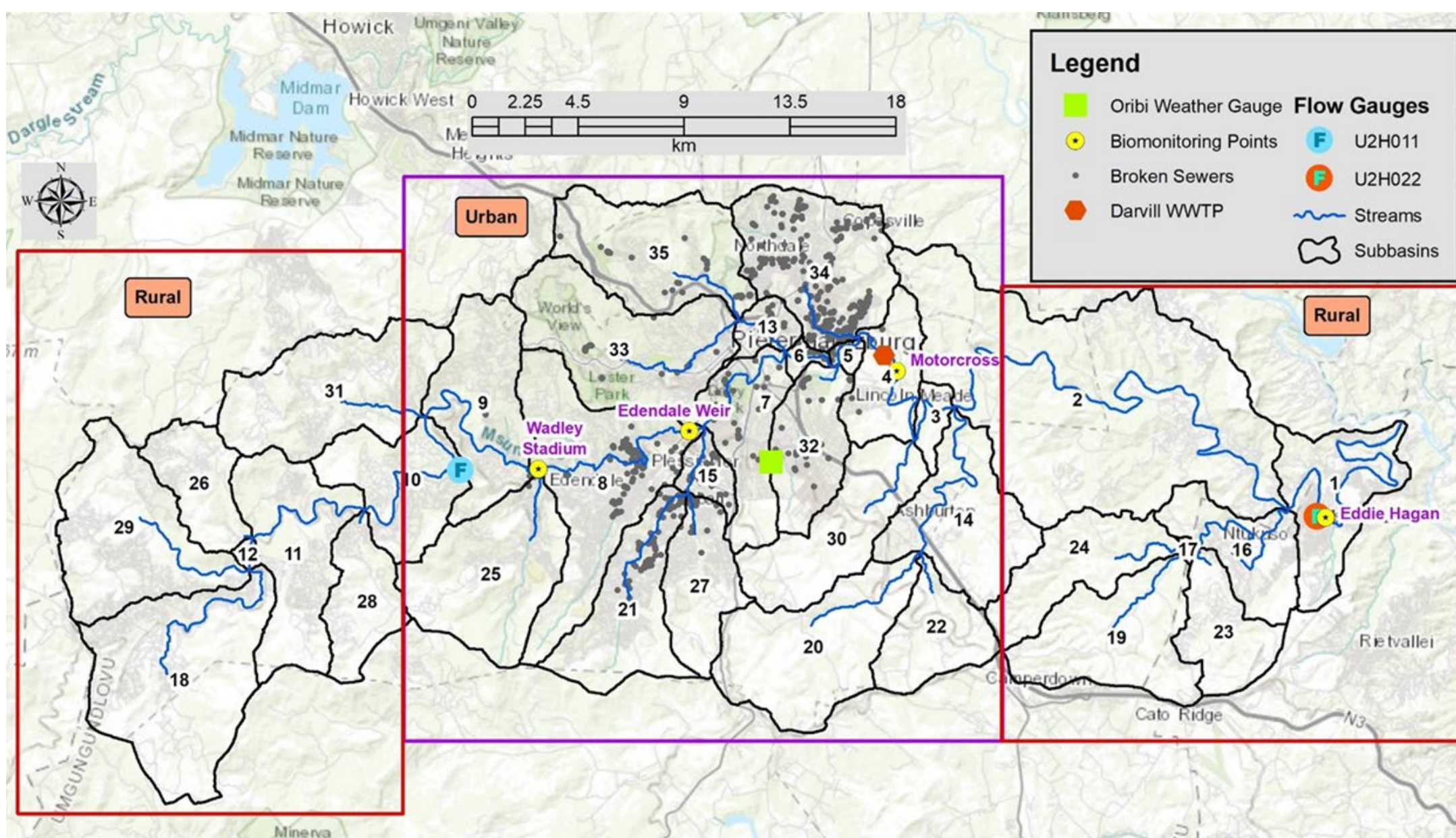


Figure 3: Catchment configuration in SWAT

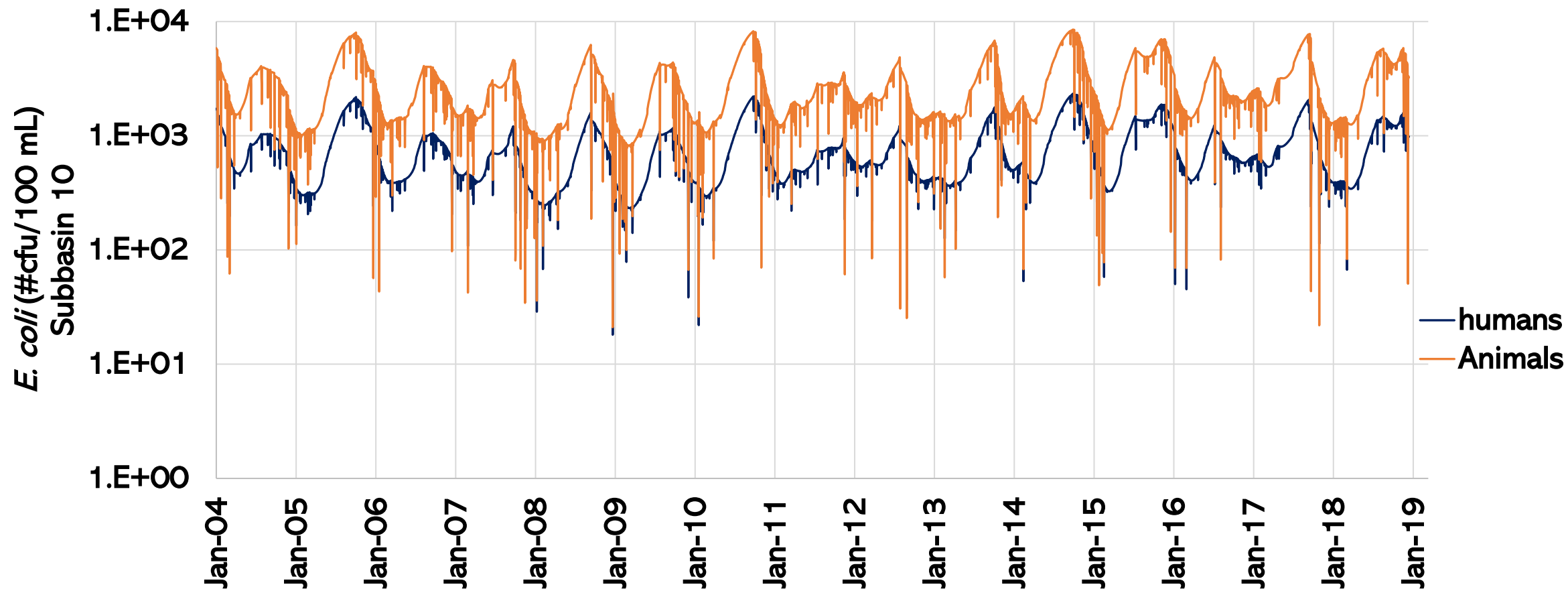


Fig 4: *E. coli* Concentrations (u/s WWTP)

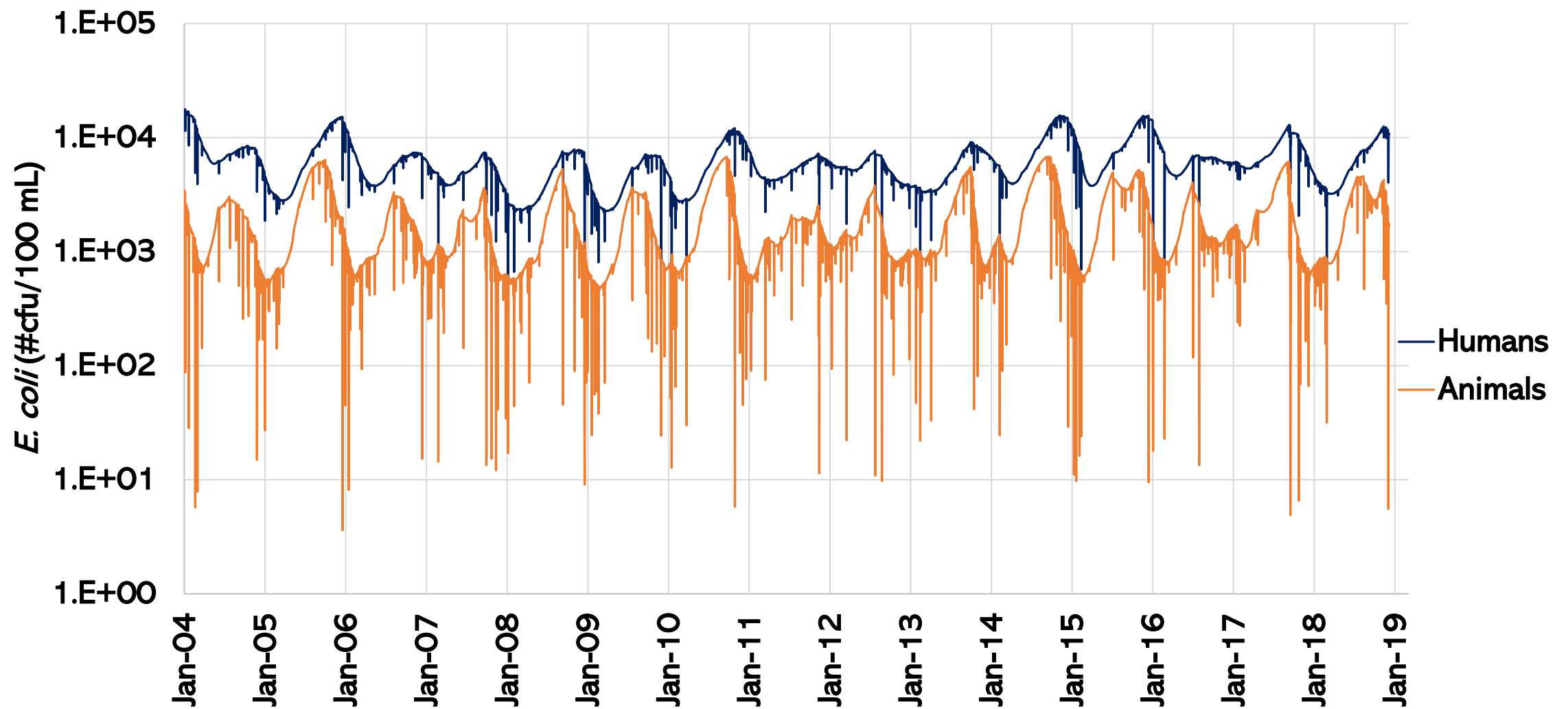


Fig 5: *E. coli* Concentrations (d/s WWTP)

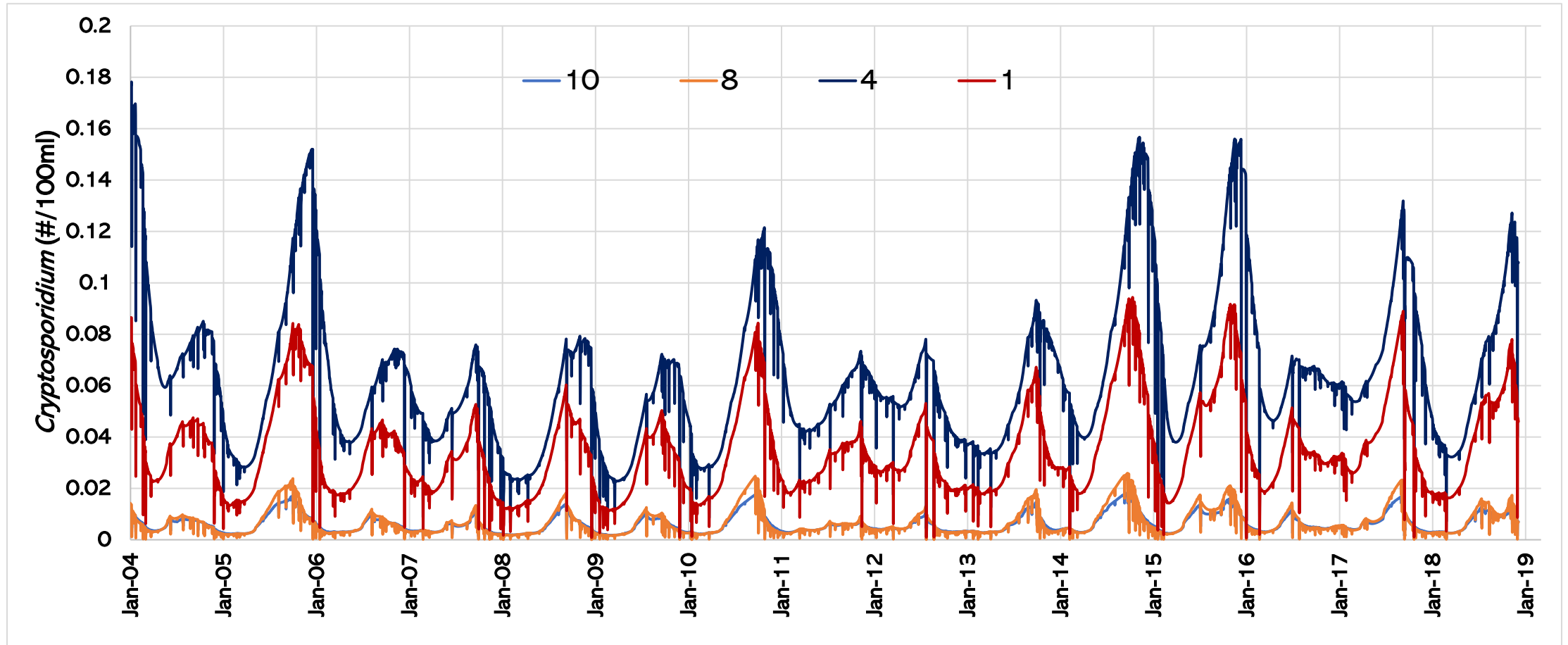


Fig 6: *Cryptosporidium* Concentrations

Conclusions

- **SWAT helped in the understanding of the spatio-temporal dynamics of pollution in the uMsunduzi Catchment**
- **The accurate prediction of pollution hot spots is a vital precursor to improving the microbial quality of surface water.**