
**The metagenomic signatures of impacted
environments: Unravelling the microbial
community dynamics in ecosystem function**

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Summary

Microbes are largely responsible for the turnover of energy and matter and are thus, integral players in ecosystem functioning. Despite the increasing awareness of the importance of microbial communities, there is still a critical lack of information on the complex relationship between microbial communities and the environment. Metagenomic analysis is thought to yield the most quantitative and accurate view of the microbial world, greatly increasing our ability to generate microbial profiles of the changing world. These methodologies have led to the growing interest in understanding and forecasting microbial responses to anthropogenic disturbances. This thesis investigates the microbial responses to two common forms of pollution, agricultural modification and hydrocarbon impact, to determine to what extent the resident microbial communities may be effected by introduced contaminants. The reoccurring theme of this thesis has been that major shifts in the structure and function of the resident microbial communities was observed following environmental change. Moreover, this thesis demonstrated that the microbial communities inhabiting impacted environments exhibited markedly different community responses based on contaminant type, allowing for the discrimination of their metagenomic signatures. This thesis provides detailed insight into how environmental change affects the inhabiting microbial consortia, and for the first time, demonstrates how the overall metagenomic signature can be used to detect and assess the extent to which anthropogenic disturbances have altered our planet.

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Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Renee Jade Smith

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