

Detecting subsidence-induced impacts
from longwall coalmining on wine grape
(*Vitus vinifera*) yields:
A case study from the Hunter Valley

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DECLARATION

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

A black rectangular redaction box covers the signature area. Below the box, there are faint, illegible handwritten marks.

Jeffery A. Thompson

Acknowledgements and Dedication

This thesis is testament to the fact that research is a journey and not simply a destination. As a journey, this project has been both magnificent and frustrating. On occasion it has even been magnificently frustrating. In the end however, I am quite satisfied with the finished product; quite satisfied indeed.

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Abstract

This thesis examines the impacts associated with active, longwall mining-induced subsidence on the yield of wine grape vines (*Vitis vinifera*) in vineyards located in the Broke-Fordwich region of the Hunter Valley. As longwall mining has a distinctive, systematic impact upon surface topography, the question is posed whether or not vine yields are similarly impacted. A series of null hypotheses were developed and tested using data collected at multiple scales. The analysis of vineyard block scale, vineyard scale, and regional scale data over a five-year period revealed that there was no clear evidence of systematic and significant mining induced impacts upon overall vine yields. Instead, vine biophysical responses to climatic factors appeared to best account for the apparent 'negative' trends observed in the pre- and post-mining periods. This suggests that where present, mining-induced subsidence impacts are likely to be localized and site specific rather than systematic.

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List of Acronyms

ASL	Above sea level
BA	Before-After
BA _v	Before-After Variant
BACI	Before-After, Control-Impact
BACIP	Before-After, Control-Impact Paired
BCM	Bulga Coal Management
B-F	Broke-Fordwich
BWI	Black-and-white Infrared
CP	Check Point
DEM	Digital Elevation Model
dGPS	differential Global Positioning System
EC _a	Apparent Electrical Conductivity
EM	Electro-magnetic
GCP	Ground Control Point
GIS	Geographic Information System
GPS	Global Positioning System
IQR	Inter-Quartile Range
LIDAR	Light Detection and Ranging
LMS	Longwall mining-induced subsidence
MS	Mining-induced subsidence
NSW	New South Wales
RMS	Root-mean Squared
UNE	University of New England

