

Before the Auckland Council (Hearing Panel)

UNDER: the Resource Management Act 1991 (RMA)

IN THE MATTER OF: an application for regional resource consents for the Huia Water Treatment Plant, Woodlands Park Road, Waima.

Further Evidence statement: Dr Amanda Black

Qualifications: 2010: PhD in Soil Chemistry, Lincoln University
2000: MSc in Environmental Science, University of Otago
1998: BSc (Geology) University of Otago

Work experience:

2013-present Lecturer (2013-2015), Senior Lecturer (2016-), Principal Research Officer (2018-); (2021 – 2028), Co-Director, Bioprotection Aotearoa, a Centre of Research Excellence, Lincoln University
2001-2013 Ministry of Science and Innovation Postdoctoral Fellow at Bio-Protection Research Centre and Te Mātāpuna Kaupapa Unit, Lincoln University (2010-2013); Research Associate and Contract Lecturer (2008-2009) and Research Associate (2010), Lincoln University; Environmental Scientist, CRL Energy Ltd (2002-2006); Junior Research Fellow, University of Otago (2001-2002); Environmental Compliance and Contaminated Sites Officer, Otago Regional Council (2000-2001).

Speciality:

Soil chemistry, biogeochemistry, specifically: 1) role of trace elements in major nutrient cycling (transcription and activity of specific enzymes), 2) abiotic influences on soil pathogen spread and virulence across landscapes, and, 3) protection of culturally significant species from biosecurity risks and threats.

Relevant Projects:

2017-2019 MBIE Smart Ideas (Assistant Investigator). *Mātauranga Māori guided discovery and development of new control methods for Phytophthora.*
2017-2020 RSNZ Marsden Fast Start (Principal Investigator). *Reindigenising the Biosecurity System.*
2017 Ngā Pae o te Māramatanga scoping fund (Principal investigator). *Te Tira Whakamātaki – A Māori Biosecurity Network.*
2017-2019 New Zealand's Biological Heritage National Science Challenge (Co-Assistant Investigator). *Stopping kauri dieback in its tracks.*
2015 - 2020 BioProtection Research Centre (TEC Contract Principal Investigator). *Do fragmented landscapes facilitate pathogen spread – case of kauri dieback.*
2015 - 2017 Biological Heritage National Science Challenge (Project Leader) *Māori responses and solutions for mitigating risks and threats to taonga species Programme 2 Vision Mātauranga Flagship Project.*

- 2015 - 2017 Lincoln University Research Fund (Principal Investigator). *Exploring Phytophthora agathidicida resistance in kauri forest soils, Waipoua, Northland.*
- 2015 - 2017 MBIE Vision Mātauranga Capability Fund contract LINX1405. (Programme Leader) – Development of a National Māori Biosecurity Network.

Relevant Outputs:

1. Byers, A. Condrón L. Donavan T. O'Callaghan, M. Patuawa T. Waipara, N. **Black, A. 2021.** The response of soil microbial communities to the infection of kauri (*Agathis australis*) seedlings with *Phytophthora agathidicida*. ***Forest Pathology in press***
2. Byers, A. Condrón L. O'Callaghan, M. Waipara, N. & **Black, A. 2020.** Soil microbial community restricting and functional changes in old growth kauri (*Agathis australis*) forests impacted by the invasive pathogen *Phytophthora agathidicida*. ***Soil Biology and Biochemistry* 150** <https://doi.org/10.1016/j.soilbio.2020.108016>
3. Byers, A. Condrón L. Donavan T. O'Callaghan, M. Patuawa T. Waipara, N. & **Black, A. 2020.** Soil microbial diversity in adjacent forest systems- contrasting native, old growth kauri (*Agathis australis*) forest with exotic pine (*Pinus radiata*) plantation forest. ***FEMS Microbial Ecology*** <https://doi.org/10.1093/femsec/fiaa047>.
4. Bradshaw, R. Bellgard, S. **Black, A.** et al. **2019.** *Phytophthora agathidicida*: Research progress, cultural perspectives and knowledge gaps in the control and management of kauri dieback in New Zealand. ***Plant Pathology*** <https://doi.org/10.1111/ppa.13104>
5. Lawrence, S.A. Burgess, E.J. Pairama, C. **Black, A.** Patrick, W.M. Mitchell, I. Perry, N.B. Gerth, M.L. **2019.** Mātauranga-guided screening of New Zealand native plants reveals compounds from kānuka (*Kunzea robusta*) with anti-*Phytophthora* activity. ***Journal of the New Zealand Royal Society*** doi.org/10.1080/03036758.2019.1648303
6. Lewis, K. **Black, A.** Condrón, L. Scott, P. Waipara, N. Williams, N. O'Callaghan, M. **2019.** Land-use changes influence the sporulation and survival of *Phytophthora agathidicida*, a lethal pathogen of New Zealand kauri (*Agathis australis*). ***Forest Pathology*** <https://doi.org/10.1111/efp.12502>
7. **Black A,** Mark-Shadbolt, M. Garner, G. Green, J. Malcolm, T. Marsh, A. Ropata, H. Waipara, N. & Wood, W. **2019.** How an Indigenous community responded to the incursion and spread of myrtle rust (*Austropuccinia psidii*) that threatens culturally significant plant species – a case study from New Zealand. ***Pacific Conservation Biology*** <https://doi.org/10.1071/PC18052>
8. **Black, A.** Waipara N. Gerth, M. **2018.** Calling time on New Zealand's oldest tree species. ***Nature*** 561, 177 doi: 10.1038/d41586-018-06629-1
9. Condrón, L.M., Hopkins, D.W., Gregorich, E.G., **Black, A.,** and Wakelin, S.A. **2014** Long-term irrigation effects on soil organic matter under temperate grazed pasture. ***European Journal of Soil Science* 65:** 741-750.
10. Boitt, G. Tian, J. Condrón, L. **Black, A.** Wakelin, S. **2017.** Effects of long-term irrigation on soil phosphorus under temperate grazed pasture. ***European Journal of Soil Science*** online: 1 JAN 2018 | DOI: 10.1111/ejss.12512
11. Wakelin, S. Condrón, L. Gerard, E. Dignam, B. **Black, A.** O'Callaghan, M. **2017.** Microbial biomass and activity lead to stabilisation of soil organic matter levels in fertilized pastures. ***Biology and Fertility of Soils*** 53:511–521 DOI 10.1007/s00374-017-1212-2.
12. Tian, J. Boitt, G. **Black, A.,** Wakelin, S. Condrón, L. M. & Chen, L. **2017.** Accumulation and distribution of phosphorus in the soil profile under fertilized grazed pasture. ***Agriculture, Ecosystems & Environment*, 239,** 228-235.
13. Lambert, S., Waipara, N., **Black, A.,** Mark-Shadbolt, M. and Wood, W. **2018.** Indigenous Biosecurity: Māori Responses to Kauri Dieback and Myrtle Rust in Aotearoa New Zealand. *The Human Dimensions of Forest and Tree Health: Global Perspectives*, ed. J.

Urquhart, M. Marzano and C. Potter, Cham: Springer International Publishing, pp. 109-37.

14. Preeti, P. Sturrock, S. McDougal, R. Scott, P. Lewis, K. **Black, A.** Condrón, L. O'Callaghan M. Williams, N. **2019**. Characterizing the growth and gene expression profile of *Phytophthora agathidicida* in (the soils of) alternate land managements. *9th International Society for Molecular Plant-Microbe Interactions*, 2019.
15. **Black, A.**, Dickie, I. **2016**. Independent review of kauri dieback research. Commissioned by the Ministry of Primary Industries for the Kauri Dieback Programme.

Evidence:

1. I advise that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and have complied with it in preparing this evidence. I confirm that the issues addressed in this evidence are within my area of expertise and I have not omitted material facts known to me that might alter or detract from my evidence.
2. I have been asked to comment further on the biosecurity risk to the spread of *Phytophthora agathidicida*, the causal agent of kauri dieback, from the proposed earth works to be carried out as part of the planned Huia Replacement Water Treatment Plant Resource Consent as a result of the kauri dieback testing that has been performed since the original hearing. I refer you to my previous evidence which should be read in conjunction with this statement.
3. The site is described as regenerating into kauri-podocarp-broadleaved forest. Titirangi-Waitakere Ranges is known to have the one of the highest prevalence of symptomatic kauri trees infected by the pathogen *P. agathidicida*. The proposed activity includes the movement of 97,000m³ of topsoil and cut volume that potentially could harbor this kauri dieback causing pathogen.
4. The Biosense surveillance report produced to inform the expert caucusing has shown the presence of *Phytophthora agathidicida* right across the site, not just associated with the presence of kauri trees, but also in other soil, watercourses and on tracks. This means that all soil disturbance activity undertaken anywhere on the site can disturb and spread the pathogen in soil and water.
5. The original applicant's evidence Erosion and Sediment Control and Stormwater (5.13 Campbell James McGregor, 4 February 2020) makes comment that he "*understands the presence of the disease is likely to be within the surficial topsoil layers and not in the subsurface clays. Therefore, sediment run off and the volumes prescribed below relating to sediment loss are unlikely to contain the Kauri Dieback disease.*" However unless all the soil is tested it is not possible to know this and I disagree with this statement. The latest Management Plan proposed to mitigate the risk of spread of the pathogen similarly asserts that the pathogen will only exist in the topsoil and that the "bulk excavations" of soil deeper than 1.0m "are at low risk of

contamination". I do not agree with this statement as it is too speculative.

6. In our published and peer reviewed papers Lewis et al, 2019 and Byers et al 2020 we describe how this pathogen can exist in other land uses, and also these adjacent land uses can potentially create a disease reservoir. This is critical information that land managers should be aware of given the nature of the pathogen (which causes 100% mortality, ie every tree that gets infected dies) and the absence of any tools to prevent or cure infected trees, or decontaminate infected soil or water. Cross contamination, or indeed run off containing even small quantities of soil infected with *P. agathidicida* would go on to infect other areas, the worst case scenario, contaminating previously healthy regenerating and established kauri forest in the surrounding areas. Moreover, machinery used in the movement of soil would have to be decontaminated thoroughly to prevent the machinery transporting any potentially infected soil to other parts of kauri growing areas. The Management Plan does not provide sufficient control in my opinion to prevent potential spread of the pathogen to other areas.
7. In my opinion the activity proposed on the site is a very high risk of spreading the pathogen to the rest of the catchment downstream of the site and to other locations. I do not consider that the Management Plan proposed by the applicant is adequate to mitigate this risk because it cannot prevent soil and water from leaving the site and these are both highly likely to be contaminated with significant levels of the pathogen.