

Scott Base Redevelopment Environmental Monitoring Programme

A Comprehensive Environmental Evaluation is underway for the Scott Base Redevelopment (SBR). A monitoring programme is in place to verify the accuracy of the environmental impact assessment.



Antarctica
New Zealand

P. Sitter^a, T.A O'Neill^b, C. R. Beel^b, P. Roudier^{c,d}, B. Bollard^e, A. Doshi^f, S. Dyer^f, D. Lohrer^g



OVERVIEW OF SEASON 2018/19

25 monitoring plots established in the wider Scott Base operational area. Sites were selected by stratified sampling, using relevant environmental variables:

- Distance to road, Scott Base operational area and helicopter pads - sources of dust and contaminants
- Global solar radiation – soil temperature and associated melt
- SAGA Wetness Index – meltwater source versus sink



AIR QUALITY

12 Modified Wilson and Cooke (MWAC) dust collectors installed at monitoring plots:

- To establish baseline dust movement
- To assess dust impacts on vegetation and soil biology
- Because increased dust is an expected impact of SBR



BIOLOGY

- Macro and micro-invertebrate surveys, microbial 16S DNA analysis and vegetation transects
- Remote sensing multispectral survey (5cm) of vegetation and compaction
- Results:
 - Low macro-invertebrate abundance and scattered distribution of vegetation, distinct differences in biota between disturbed and less disturbed sites
 - Highlight need to preserve current diversity and vegetative habitats



SOILS

- Samples taken from 2 depths (0-2 and 2-5 cm) at each plot and analysed for soil pH, electrical conductivity (salt) and hydrocarbon contamination (spectroradiometry)
- Depth to ice cement and Visual Site Assessments (e.g. disturbed surface stones, visibly disturbed area, surface salts) were undertaken to:
 - Assess current visible degradation of landscape
 - Establish any relationships between soil characteristics and biology
 - Assess recovery rates through examples of disturbed surfaces of different ages



MARINE MONITORING

- Three cameras installed to monitor Weddell seal colony and relationship between presence and human activities
- During season 2019/20, monitoring of Scott Base coastal benthic communities using SCUBA and ROV to:
 - Establish transects at Scott Base and a control site
 - Measure bathymetry, describe community assemblages, assess sediment contamination



FUTURE WORK

- Season 2019/20 marine and terrestrial monitoring, repeating some elements of 2018/19, add meltwater runoff sampling and soil heavy metal contamination (portable XRF)
- Establish a terrestrial control site at Cape Evans
- Monitoring will be repeated during construction and following completion of SBR

(a) Antarctica New Zealand, Christchurch, New Zealand
(b) University of Waikato, Hamilton, New Zealand
(c) Manaaki Whenua – Landcare Research, Palmerston North, New Zealand
(d) Te Pūnaha Matatini, Auckland, New Zealand
(e) Auckland University of Technology, New Zealand
(f) University of Canterbury, Christchurch, New Zealand
(g) NIWA, Hamilton, New Zealand

