

# Use of a metric to track a mine soil's microbial community status over 9 years

A metric of mine soil biological health has been developed using two measurements of the soil microbial community.

1. The ratio of actinomycetes to non-filamentous bacterial colonies on soil dilution plates is a primary bio-indicator of the degree of soil disturbance. *Lower values are associated with increased disturbance of the soil microbial communities.*
2. The proportion of copiotrophic (fast-growing) bacteria is a bio-indicator of the level of labile soil organic carbon. *Higher values are associated with increased labile soil organic carbon and with more biological activity and greater potential for nutrient turnover.*



0 mo.

6 mo.

5 yr.

9 yr.

Native site

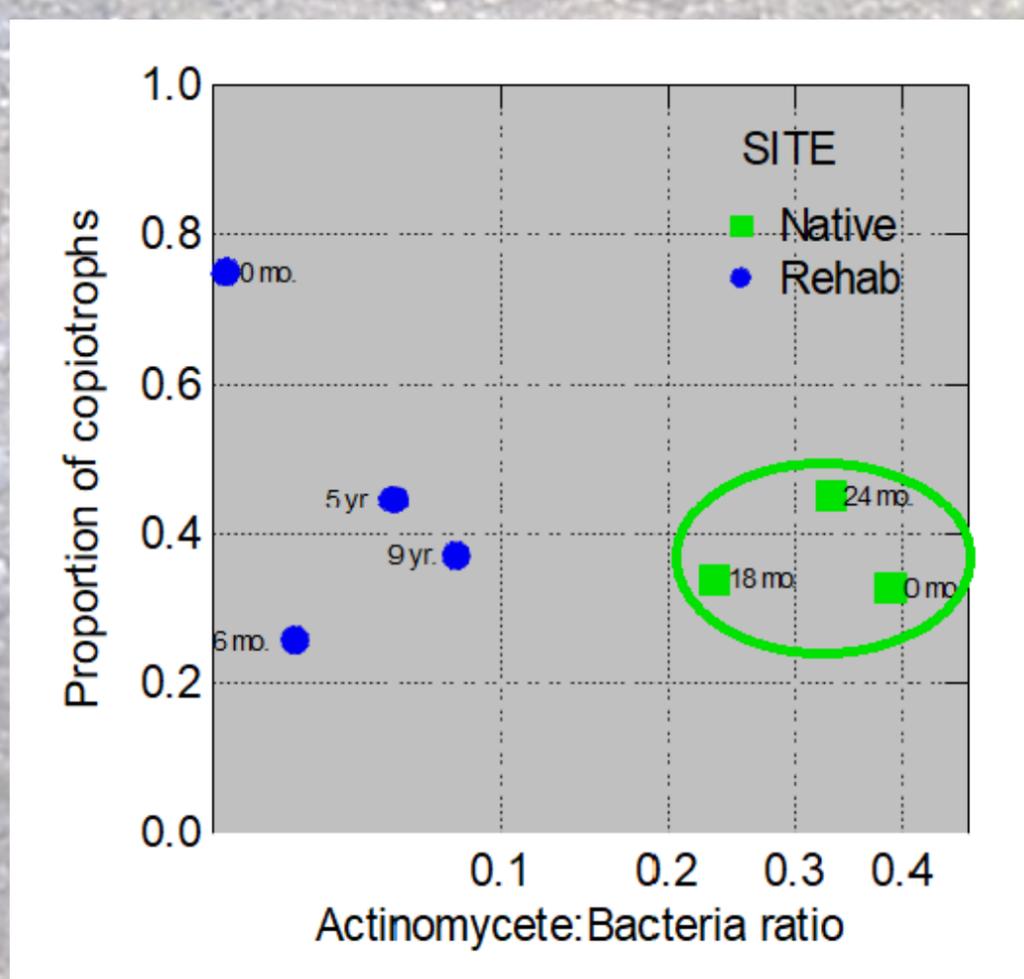
Rehabilitation site

0 mo. = Spoil freshly amended with topsoil

6 mo. = Groundcover of mostly weeds

5 yr. = Some tree cover and leaf litter present on soil surface

9 yr. = Soil cover of leaf litter, grasses and weeds under a tree story



## What are the metric values for native and revegetated mine soils?

Native and revegetated sites are characterised as having undisturbed soil microbial communities (usually actinomycete:bacteria ratios of  $> 0.2$ ) and consistent labile carbon characteristics (depending on their soil type and vegetation). Their microbial decomposer communities support a self-sustaining vegetative cover through ecosystem processes such as nutrient cycling.

## How long does rehabilitation of soil microbial communities take?

Sites undergoing rehabilitation should track towards these values over time as is evident on the graph. But it can take from 5–10 years or more for the status of soil microbial communities of rehabilitating sites to approach those of native sites, and not all rehabilitating sites will follow the same recovery trajectory.

Regular monitoring of rehabilitating soils will highlight issues that may impact this recovery and allow remedial actions to be taken at an early stage to save both time and money.

The metric is a reliable, cost-effective measure which provides meaningful insights into the biological health and quality of rehabilitating mine soils.