Developing Baseline Data for Landscape Rehabilitation Standards

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1. Introduction

Mine sites provide a "blank slate" in terms of ecosystem creation. Issues of land degradation and climate change can be addressed by designing more sustainable and productive landscapes.

This can be made possible by developing data on natural systems. **Here, data is presented from four study areas in the Hunter Valley, to provide baseline data of what more sustainable agricultural systems may look like.**

2. Study Areas

The study areas are four grazing field sites from the central to NW Hunter Valley. They represent the various climate regions occupied by mining land in the area with rainfall ranging from 300-1000 mm/yr (Figure 1).

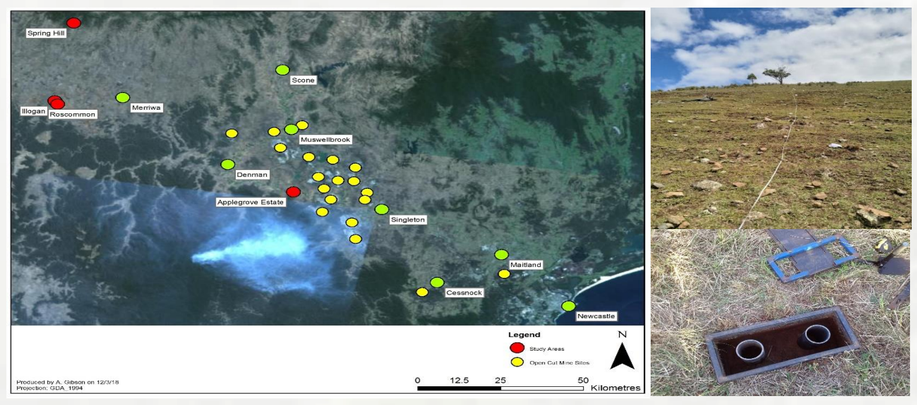
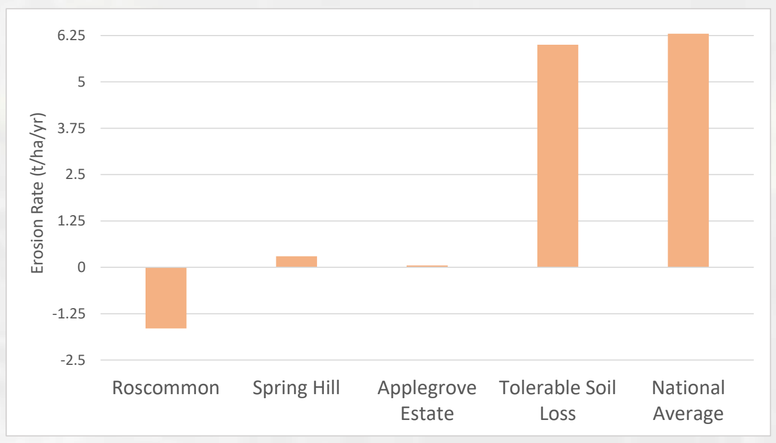


Figure 1: Location of study areas and open cut mine sites in the Hunter (left), a field transect (top right), and soil sampling cores (bottom right).

3. Soil Erosion and Denudation Rates



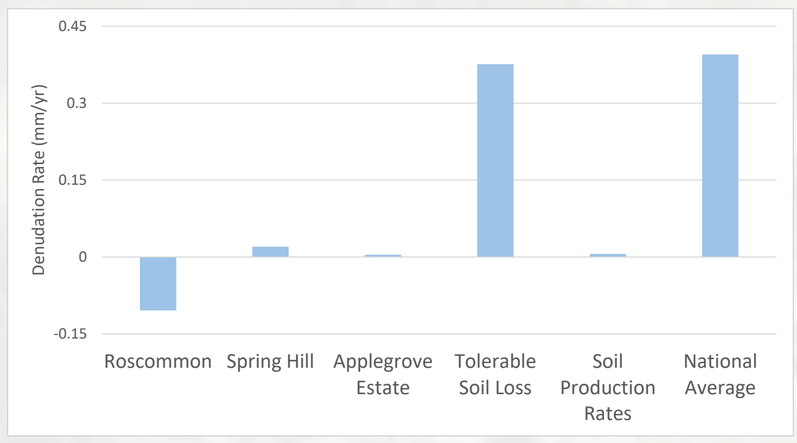
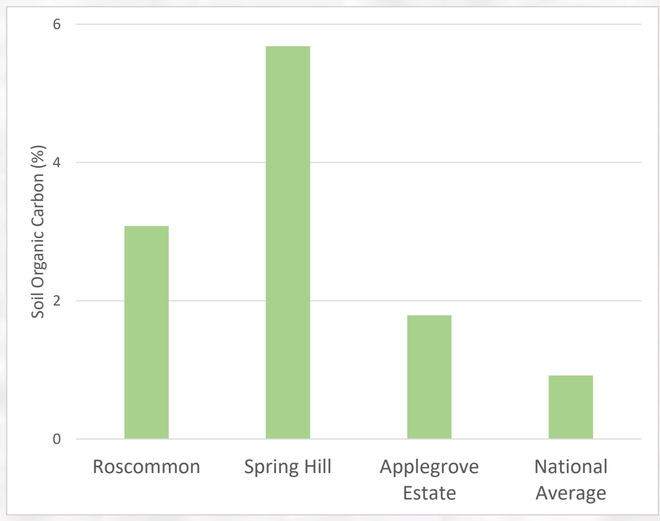


Figure 2: Soil erosion rates (left) and soil denudation (lowering of land surface) (right) for the study areas, the national average, and soil production rates.

Soil erosion rates are lower than the national average, while rates of denudation are comparable with soil production rates. Soil loss is sustainable for the areas and unlikely to negatively impact agricultural productivity or the environment.

4. Soil Organic Carbon

Soil organic carbon levels are higher in each study site than the national average, and increase with elevation and average annual rainfall. These levels translate to total storage of 50-100 t/ha. This indicates good soil health in the study areas.



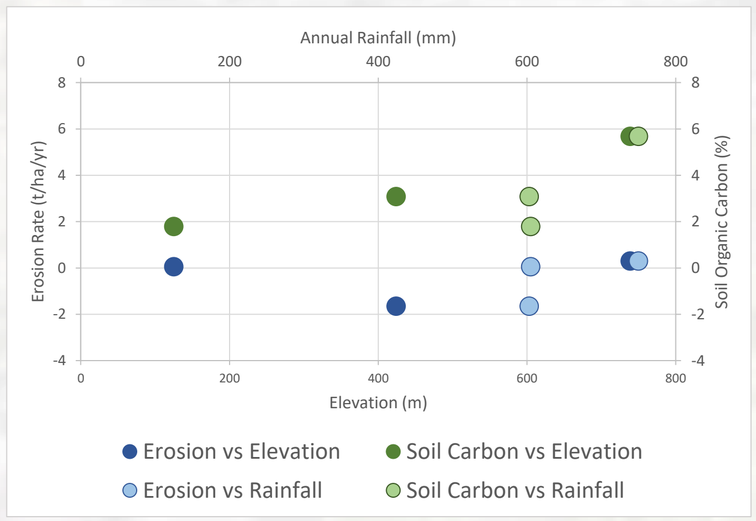


Figure 3: Soil organic carbon at each of the study areas and the national average (left) and the relationship between soil erosion, soil organic carbon, and, elevation and rainfall (right).

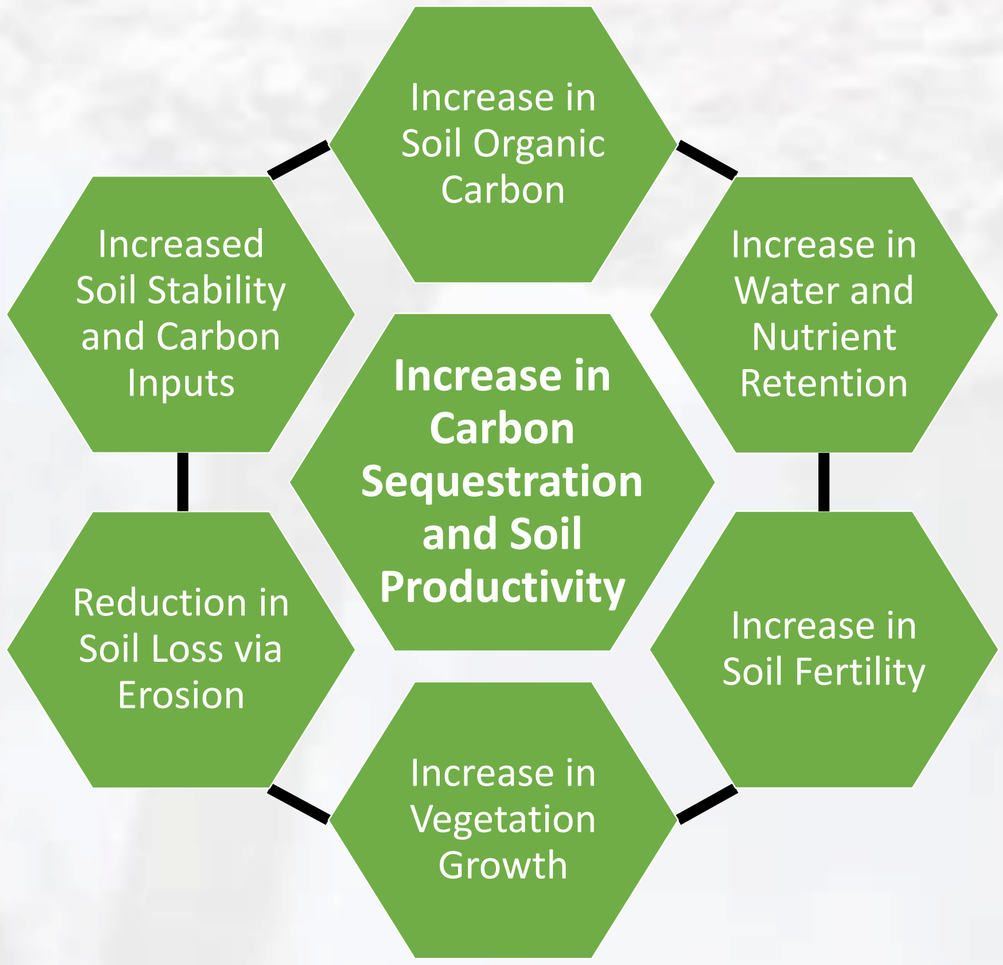


Figure 4: The relationship between soil organic carbon and soil erosion.

5. Why Are Sustainable Mine Landscapes Important?

Soil erosion and soil organic carbon form a positive feedback. Increasing soil organic carbon improves soil quality and vegetation and therefore reduces erosion.

This in turn increases soil organic carbon development. This leads to better soil quality and more carbon sequestered in soils.

6. Conclusion

Climate and land use conditions of the Hunter Valley are represented here, providing background data. Designing more sustainable landscapes can help address issues of land degradation and climate change through carbon sequestration and increased soil fertility.

References:

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