

Soil Material Mapping is essential for understanding and managing Alluvial Gullies



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What is Where?

Soil Material Mapping Methods for Queensland Alluvial Gullies

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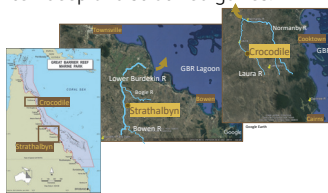


PRESENTER: Robin Thwaites

INTRO

Investigations into large, complex alluvial gully erosion in Great Barrier Reef (GBR) catchments requires tools to describe, classify, and map the soil and sediments, or **soil-materials**, in detail.

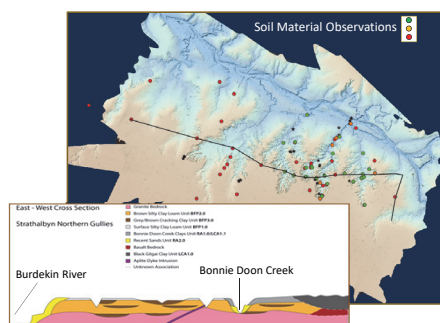
- **Why do we need it?** Customary soil mapping methods are inadequate for these complex gully systems.
- **What's different?** **Soil Materials Mapping** assigns greater significance to sub-solum **geomorphic materials and processes** within the often deep and stratified gullies.



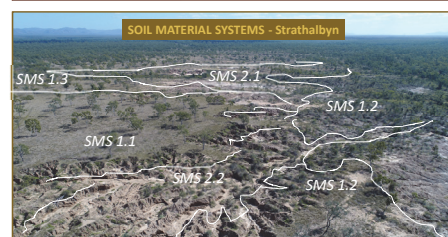
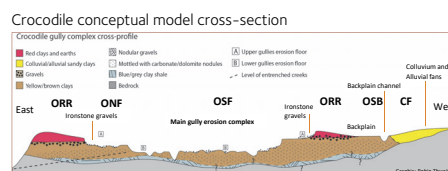
METHODS

- Augering and vehicle-mounted corer, up to 1.8 m, in and around the gully system;
- Detailed observations of exposures for **soil material layers** within gullies;
- **Sampling** for laboratory analysis of layers in gully walls and spatially representative;
- In-gully **soil material layer** description of sections using **database-specific** data-entry sheets.
- Observation points are **precisely geo-located** using GPS drone photogrammetry, terrestrial and aerial LiDAR

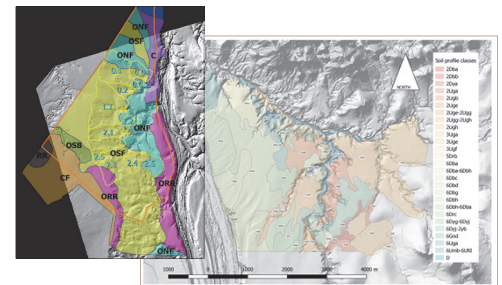
RESULTS



Site observations at Strathalbyn with conceptual model cross-section

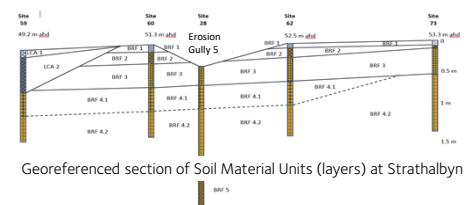


Soil Material Units (layers) at the head of Gully 7 at Strathalbyn



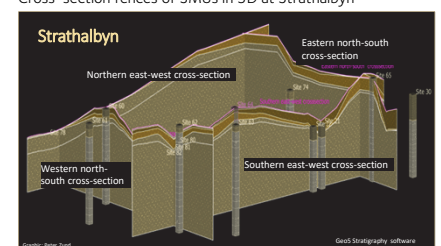
Soil Material System maps of Crocodile (left) and Strathalbyn (right)

Soil Material Unit	SOIL MATERIAL UNIT DESCRIPTION	Sites
ICA - Transition and/or passive phase of local clay shales		
ICA1	Dark, self-mulching cracking finely structured medium clay, non-saline, non-dispersive	50
ICA2	Dark, lenticular structured medium clay, slightly saline, sodic, non-dispersive	50
BRF - Burdekin River flood plain		
BRF1.1	Dark grey, clay loam fine sandy, hardsetting, massive or weakly structured	40, 41, 73-74, 80-81
BRF1.2	Bleached to grey, massive fine sandy loam to loam fine sand	54-55, 57-58, 63-65
BRF2	Brown, light medium clay, lenticular structure	54, 55, 56, 60-61, 64, 73-74
BRF3.1	Brown, prismatic breaking to angular blocky, light to light medium clay with calcium carbonate segregations, slightly saline, strongly sodic, highly dispersible	54-56, 58, 60-67, 73-74, 80
BRF3.2	Saline and sulfonated faces of BRF3.1, highly saline, very strongly sodic and highly dispersible	81-82
BRF4	Brown, structured light medium clay with manganese nodules, saline, strongly sodic, magnetic, highly dispersible	54, 56-60, 62-67, 73-74
BRF5	Dark, finely structured light medium to medium clay with manganese nodules, non-saline, sodic, moderately dispersible	56
BRF6	Dark, lenticular structured medium to medium heavy clay	67
BRF7	Grey brown, fine structured silty clay loam to silty medium clay, non-saline, non-sodic, non-dispersive	67, 73
BR8 - Burdekin River Loess		
BR8.1	Bleached to brown, massive, clayey fine sand to fine sandy loam	51
BR8.2	Brown, strong prismatic parting to moderate fine structured, fine sandy clay loam	51-52
BR8.3	Brown, prismatic structure, sandy light clay	51-52



Georeferenced section of Soil Material Units (layers) at Strathalbyn

Cross-section fences of SMUs in 3D at Strathalbyn



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