

KEY KNOWLEDGE NEEDS – Monitoring Method Optimisation
November 2019

Title	Questions	Description
LANDFORM REHABILITATION THEME		
LAN4. Development of remote sensing methods for monitoring erosion	LAN4A. How do we optimise methods to measure gully formation on the rehabilitated landform?	Metrics for monitoring gully formation in the rehabilitated landform are required to assess achievement of closure criteria and for ongoing monitoring. New technologies, such as UAV derived LiDAR have the capability to capture high resolution Digital Elevation Models of the landform surface at an appropriate scale for such assessments and monitoring. In-situ monitoring technologies should also be investigated. The Pit 1 landform should be used to develop the monitoring methodologies which can then be applied to the remainder of the rehabilitated landform.
	LAN4B. What monitoring data are required for ongoing LEM validation?	Validation and calibration of the LEM software to date have focussed at the erosion plot scale. In order to ensure confidence in model output for the whole landform, model predictions should be calibrated and validated at the catchment scale – thereby requiring the collection of data at the catchment scale. Information will be required to show that the model can predict changes in surface topography resulting from gully formation and erosion, and in the volume and quantity of sediment transported.
LAN5. Development of water quality monitoring methods for assessing landform erosion	LAN5A. How can we use suspended sediment in surface water (or turbidity as a surrogate) as an indicator for erosion on the final landform?	Monitoring of erosion from the rehabilitated landform can potentially be achieved through measuring turbidity as a surrogate of suspended sediment at key monitoring points in creeks and possibly billabongs. Turbidity versus suspended sediment relationships have been developed for Gulungul Creek, Magela Creek and Georgetown Billabong, but may also need to be developed for other key locations (e.g. Coonjimba Billabong). Periodic checks of turbidity-suspended sediment relationships would need to be undertaken to confirm their continued applicability.
WATER AND SEDIMENT REHABILITATION THEME		
WS9. Optimisation of water quality monitoring programs and assessment methods	WS9A. How do we optimise methods to monitor and assess ecosystem health and surface and groundwater quality?	Ongoing review and innovation is required to ensure that the methods used in the water quality monitoring program are providing useful and reliable information and are cost-effective. This ranges from data collection methods through to data management practices and analytical techniques. Ensuring the use of proven state-of-the-art technologies for equipment, instruments and methods is a key requirement for optimisation.
HEALTH IMPACTS OF RADIATION AND CONTAMINANTS REHABILITATION THEME		
RAD10. Optimisation of radionuclide monitoring and assessment methods	RAD10A. How do we optimise methods to monitor and assess radionuclides?	Ongoing review and innovation is required to ensure that the methods used to monitor and assess radionuclides are providing useful and reliable information and represent effective use of available resources. This includes sample collection and preparation, radiochemistry and analysis methods, data quality assurance and management, dose modelling, etc. Ensuring the use of proven state-of-the-art technologies and leading practice methods is a key requirement for optimisation.
ECOSYSTEM RESTORATION REHABILITATION THEME		
ESR9. Developing best-practice monitoring methods for ecosystem restoration	ESR9A. How do we optimise methods to measure revegetation and faunal community structure and sustainability on the rehabilitated site, at a range of spatial/temporal scales and relative to the areas surrounding the RPA?	An ecosystem restoration monitoring program needs to be developed, based on the risks and mitigations identified through trajectory models (see ESR5B). Monitoring needs to be able to account for both short (e.g. 1-2 years) and long-term (e.g. decadal) time scales and be implemented at an appropriate spatial resolution. This is likely to be optimised through an integrated ground (field) and drone-based approach to measuring and monitoring revegetation on the rehabilitated site.