

# Soil Erodibility mapping of the Fitzroy River Basin

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One of the main threats identified for the Great Barrier Reef (GBR) are the levels of sediments, nutrients and pesticides moving offsite from agricultural enterprises. The Fitzroy River Basin (FRB) covers an area of 142,665km<sup>2</sup> and discharges a total of 4,109kt/year of suspended sediments to the GBR (Kroon et al, 2012). Our project funded through the Reef Water Quality Science Program aims to gain an understanding of erodible soils throughout the FBR by modelling the soils inherent vulnerability to erosion (soil erodibility). The project outputs include 3 spatial datasets for surface soil stability, subsoil dispersibility and overall soil erodibility on a catchment scale. This data is not available from the current 1:500,000 land systems mapping for the FRB.

The project is using Digital Soil Mapping (DSM) techniques given the tight timeframes and study area size. The project outputs are based on soil chemistry attributes such as; soil texture, soil sodicity, soil salinity and clay type across the FBR. Unfortunately, soil chemistry data within large areas of the FBR is very sparse. In order to fill the data gaps the experience in similar mapping projects (Clifford et al 2014) was drawn upon to develop the soil sampling strategy and thus, a hybrid solution was born.

Our hybrid soil sampling strategy balances site selection between the traditional approaches of the soil surveyor who selects sites based on knowledge of landscape processes as compared to the statistically driven sampling techniques favoured for DSM. This 'statistically valid' site selection based on a range of environmental covariates does not necessarily provide the surveyor with an insight into landscape processes when looking at large areas. Our balanced sampling approach allows the soil surveyor to select sampling sites to understand the landscape while following up with statistical approaches to fill the covariate space.