EATLAS DATA CATALOGUE (AIMS)

Real Time Water Quality Monitoring Program dataset for Russell-Mulgrave catchment from 2016-2018. (NESP TWQ 2.1.7, JCU)

Metadata | Metadata (XML)
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Title	Real Time Water Quality Monitoring Program dataset for Russell-Mulgrave catchment from 2016-2018. (NESP TWQ 2.1.7, JCU)
Date	2014-10-13
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Abstract	This dataset consists of a single data file from a 2 year real-time water quality monitoring program (RTWQM) conducted across the Russell-Mulgrave catchment (south of Cairns). Data is the result of 2-3 hourly in situ logging of stream height (in metres) and nitrate concentrations (mg/L). * This dataset is under an embargo period until the end of the project extension The broad aim of this study dataset was to characterise the water quality impacts and relative signatures of a range of distinct landuse types found across the Russell-Mulgrave catchment, and quantify the sugarcane industry's specific role in end-of-catchment water quality. Subcatchment waterway sites were selected to represent the major land uses of the region, and were classed as sugarcane, urban, banana, or natural rainforest land use categories. Sites were also selected based on wet season accessibility to the site and the size of the waterway. A total of 9 sites were selected for the monitoring program through the period 2016-2018. Water quality monitoring for Project 25 is based around integration of relatively traditional monitoring approaches (discrete sample collection for subsequent laboratory analysis) as well as emerging real-time (sensor-based) monitoring approaches. The development of real-time information and feedback on local water quality dynamics is a relatively novel approach to landholder engagement that is yet to be meaningfully explored in natural resource management programs. Project 25 will trial these new technologies from both the perspective of an engagement-extension tool, and also their reliability in water quality monitoring applications across multiple spatial scales (paddock to catchment). This program utilises emerging real time water quality monitoring (RTWQM) technologies including sensor and telemetry technologies that provide continuous measurement of nitrogen water quality concentrations. Noting the inherent limitations associated with traditional grab sampling, such as extended analysis and holding times prior to reporting results, monitoring programs aiming at facilitating management change are increasingly shifting towards continuous measurements using in situ sensors. RTWQM equipment was deployed in three selected sub-catchments in the broader Project 25 monitoring design to provide real time water quality information on parameters such as nutrients (nitrate) back to local industry network. The spatial design aims to link to specific paddock management activities within the monitored catchment sites. This will eventually enable individual decisions making based on real rather than hypothetical average conditions. Localised comparative data will enable growers to compare performance with neighbours. The real time information from these systems provides a solid basis for farmers to adjust strategies at any time in a dynamic and autonomous manner. Methods: Real-time monitoring stations, based closely on those utilised in an earlier BBIFMAC case study (Burton et al., 2014), were installed at three sites identified in discussion with cane

	industry steering committee personnel, across the Russell-Mulgrave canefarming district. Sensors were current market?ready technologies, in this case TriOS NICO and OPUS optical sensors (https://www.trios.de/en/). Discrete manual sampling for nutrient water quality was also conducted at all sites on an approximate monthly basis during dry-season low flows to ground-truth sensor nitrate readings. Sampling frequency increased to daily (and occasionally several samples a day) during wet season flood events, particularly during early wet season 'first-flush' events to capture initial high concentration run-off dynamics from the immediate catchment area. Samples were manually collected by project scientists, or support staff trained individually in the correct sampling and quality assurance procedures developed in conjunction with the TropWATER Water Quality Laboratory. Calibration checks of each sensor were conducted at least every 3 months, using 0, 1 mg/L, 5 mg/L and 10 mg/L nitrate calibration standards provided by the TropWATER Water Quality Laboratory. Station design in 2017 initially involved water being pumped into a flow-through cell with the nitrate sensor housed in the sampling station. Some early power issues and equipment failures saw sites re-designed with the sensor installed instream in a PVC pipe, and subsequent measurements taken in situ. Optical sensors are susceptible to reduced performance from biofouling and sedimentation of the optical lens (Steven et al., 2013). Optical sensors utilised during Project 25 were initially cleaned utilising an integrated compressed air blast system to automatically clean the optical window. Early observations of optical window cleanliness, and periodic calibration testing of sensors highlighted that at least monthly physical cleaning of lens was also required for satisfactory performance at some sites. Recent development of automated, externally mounted lens wiper technologies by TriOS saw these new cleaning technologies added to some sites towards end of 2018. Other aspects of sampling station design and operation that can improve sensor performance also emerged during early stages of Project 25 sensor deployment and monitoring. The TriOS sensors utilised can operate theoretically with power supplies spanning 12V to 24V (±10%). Frequent initial situations of nitrate-N cycling emerged where system operating voltages approached or fluctuated around the lower 12V threshold (due to issues such as riparian shading of solar panels or sustained cloudy weather reducing battery recharge and voltage drop through cable lengths). Reconfiguring system design so nitrate sensor measurements were always taken at a nominal 24V power output reduced these effects significantly. Format: Data consists of an excel spreadsheet with stream height (m) and nitrate concentrations (mg/L) for each hydrological year of data recorded on separate, named spreadsheet tabs. References: Burton, E., T.J. McShane, and D. Stubbs D. 2014. A Sub Catchment Adaptive Management Approach To Water Quality in Sugarcane. Burdekin Bowen Integrated Floodplain Management Advisory Committee (BBIFMAC). 42pp. Steven, ADL, Hodge, J, Cannard, T, Carlin, G, Franklin, H, McJannet, D, Moeseneder, C, Searle, R, 2014. Continuous Water Quality Monitoring on the Great Barrier Reef. CSIRO Final Report to Great Barrier Reef Foundation, 158pp. Data Location: This dataset is filed in the eAtlas enduring data repository at: data\2016-18-NESP-TWQ-2\2.1.7_Engaging-farmers-WQ

Metadata language	eng
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Hierarchy level	Dataset

OnLine resource

Linkage	https://eatlas.org.au/data/uuid/c58a4322-b898-4398-bbd9-5441c7a07303
Protocol	WWW:LINK-1.0-http--metadata-URL
Linkage	https://nesptropical.edu.au/index.php/round-2-projects/project-2-1-7/
Protocol	WWW:LINK-1.0-http--related

Linkage	https://eatlas.org.au/data/uuid/71127e4d-9f14-4c57-9845-1dce0b541d8d
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Linkage	https://eatlas.org.au/nesp-twq-2/engaging-farmers-wq-2-1-7
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