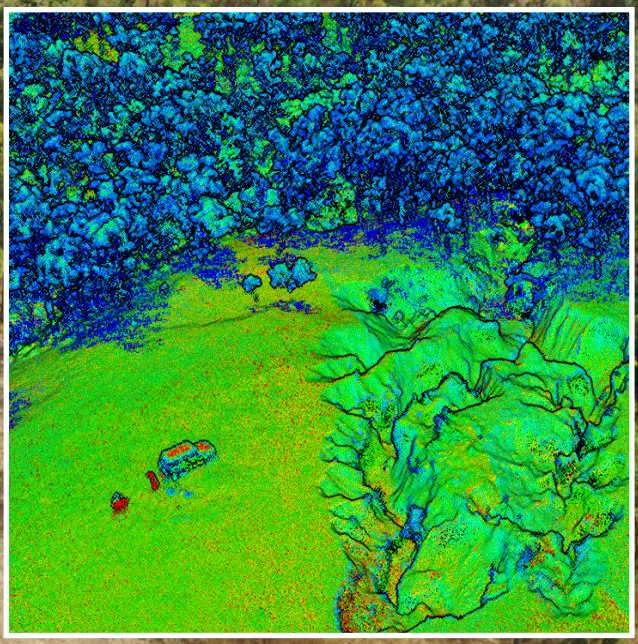
CASE STUDY

Streambank Erosion Remediation

LiDAR - Enhancing Local Capacity



QUICK FACTS

- **Local Business:**
  Origin Surveyors
- **Technology:**
  Laser Imaging, detection and ranging (LiDAR) imaging
- **Goal:**
  Building local capacity to target streambank erosion

ORIGIN
ENGINEERING SURVEYORS

The Targeted support to maximise soil, biodiversity and vegetation outcomes in the O'Connell and Proserpine basins of the Mackay Whitsunday NRM region Project is funded by the Australian Government's Reef Trust.

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Targeting High Priority Erosion Hot-spots

Streambank erosion in the O'Connell Basin has been identified as a significant contributor of fine sediment to the Great Barrier Reef Lagoon. The O'Connell & Proserpine Basins Water Quality Program (Reef Trust VII) targets streambank erosion and the improvement of riparian areas to reduce fine sediment loads entering the Great Barrier Reef Lagoon.

The program uses laser imaging, detection, and ranging (LiDAR) imagery as a key tool to identify high priority erosion hot-spots within the O'Connell Basin. Data collection in the forms of LiDAR imagery, Digital Elevation Models of Difference (DEMoD) and data interpretation allows accurate surveying of potential engineered works sites.

This initial data collection allows Reef Catchments and its contractors to meet best practice guidelines and data capture obligations for streambank work. Data collated through these methods is a component of the Reef Trust VII Monitoring & Evaluation Plan and will be utilised for site selection justification and to provide an accurate sediment savings estimate for each site.

Figure 1: LiDAR Drone and waypoint set up

What is LiDAR imagery?

LiDAR works by sending pulses of light to the earth's surface or a feature on it, and measuring the time it takes to reflect back. The lag time it takes for the pulse to return to the LiDAR source indicates the exact distance of the feature. This gives an accurate positioning point of where the laser has hit the earth's surface.

The sensor uses LiDAR units that blast hundreds of thousands of pulses per second, to build a detailed visualisation of what the sensor is focusing on. This can then be used to create 3D point clouds; an accurate visualisation representing the scanned area's terrain, topography, and features.

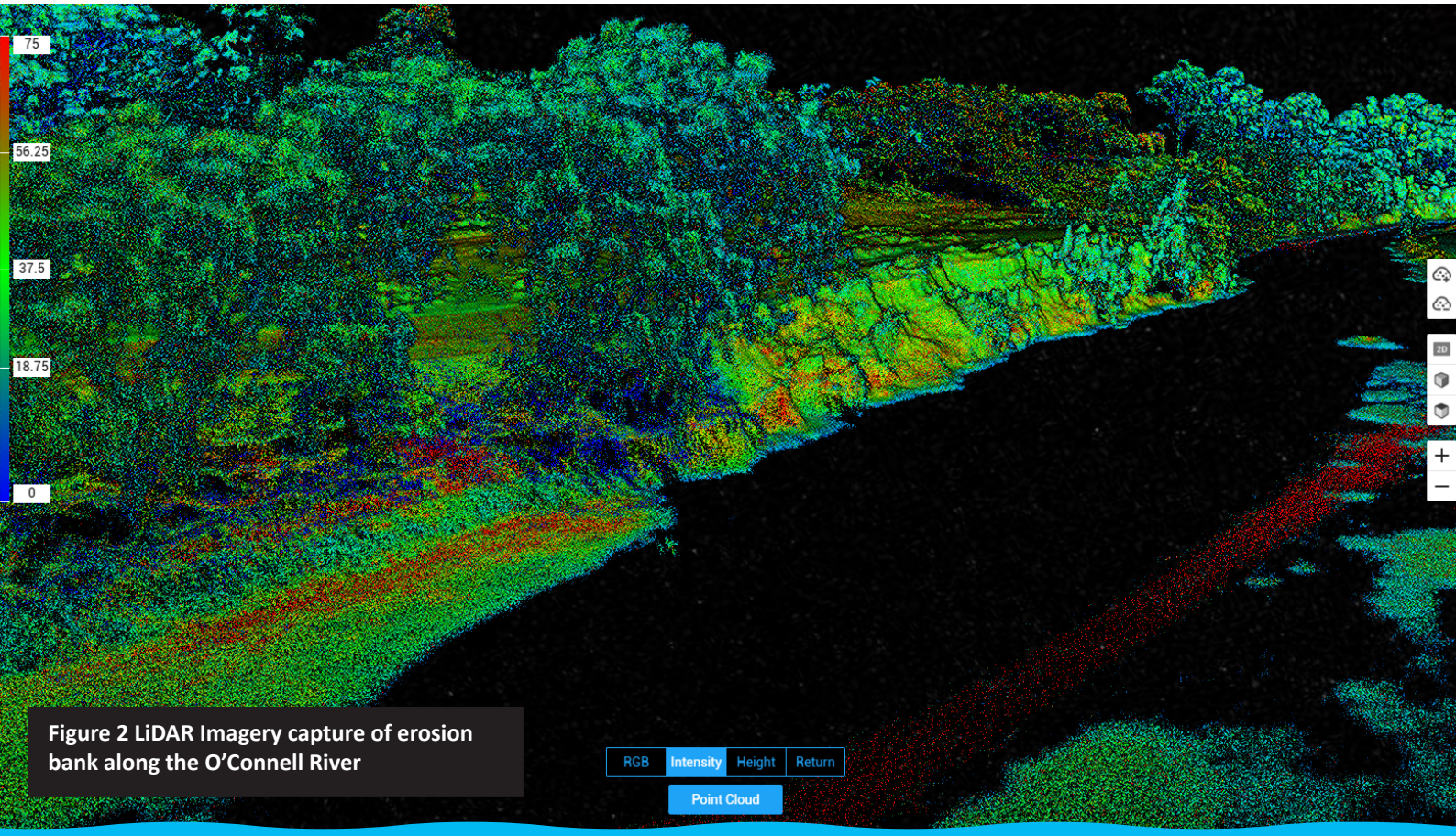


Figure 2 LiDAR Imagery capture of erosion bank along the O'Connell River

For a number of years, Reef Catchments have been required to engage specialist contractors to deliver LiDAR mapping and DEMoD calculations for streambank or gully restoration activities. Historically, this service has not been available locally from the Mackay, Whitsundays and Isaac Region and LiDAR Imagery works have needed to be outsourced to businesses located in Brisbane and further afield. This resulted in a loss of local investment to the Reef Catchments NRM Region across various streambank restoration programs.

Reef Catchment's Reef Trust VII project has taken a different approach to LiDAR acquisition opening the way for the technology to be sourced and delivered through a local supplier.

Building Local Capacity

Reef Catchments has partnered with locally owned business, Origin Surveyors, to increase the region's LiDAR capacity. Origin Surveyors are a family run business based in the Whitsundays, supplying specialised land surveying services throughout the civil construction, local government and development industry.

Through development of a strong relationship with Brett and Clare James at Origin Surveyors, Reef Catchments staff have been able to assist the company to expand its technical capability locally by ensuring a continuous pipeline of LiDAR Imaging work.

Both Clare and I are passionate about our local environment in the Whitsundays and felt that a LiDAR sensor would be a good addition to the expanding spatial services offering from our business. LiDAR has the capability to penetrate dense vegetation, common on rural project sites in within the region. Traditional photogrammetry sensors have their place and we also offer this service; however, the added capability LiDAR offers rounds out our capabilities.

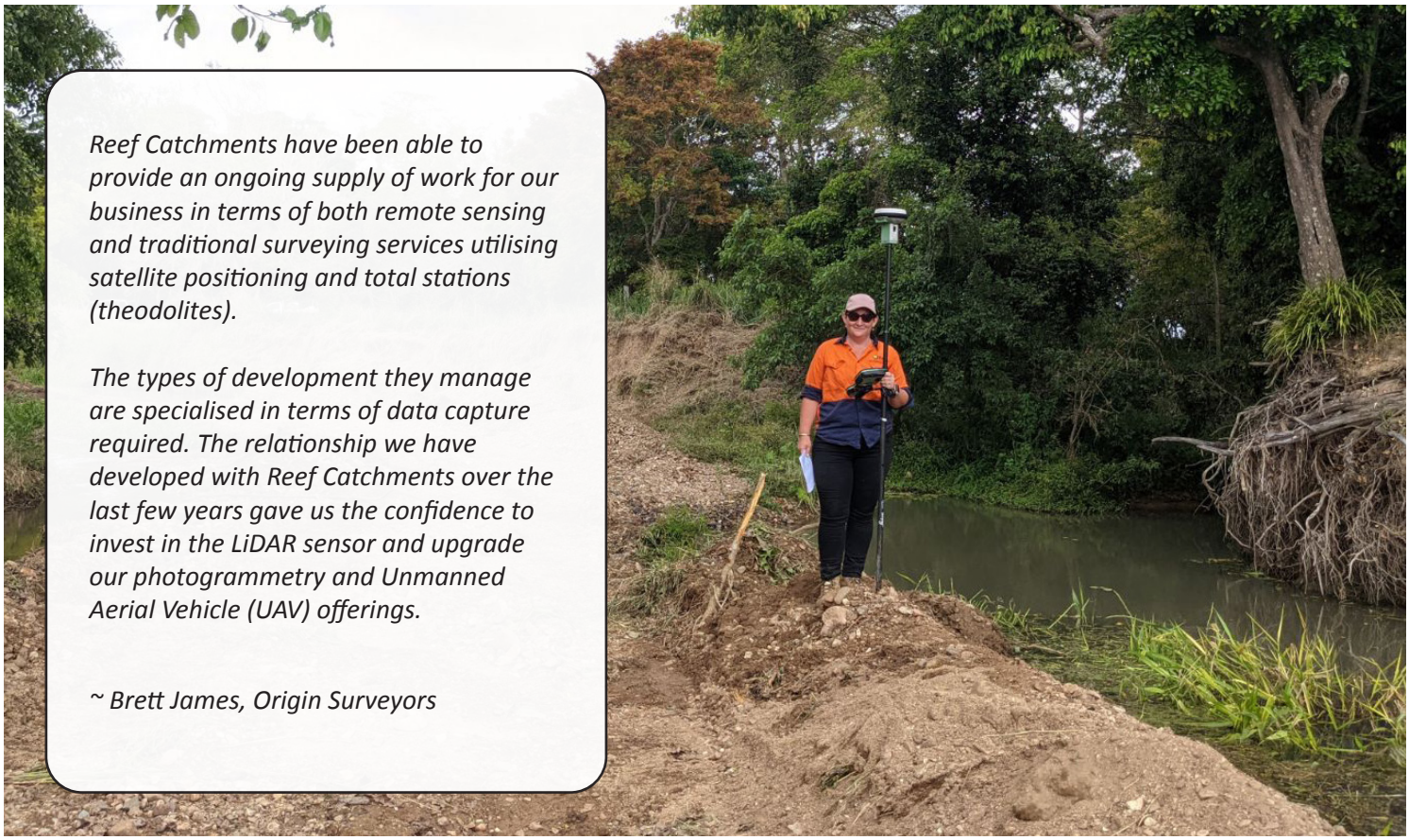
In the case of Reef Catchments, the generated models via the LiDAR point clouds have been able to identify bank erosion over time. This provides a solid basis for understanding which sites would make good candidates for engineering controls.

The bank infrastructure installed after survey prevents further erosion and mitigates downstream environmental degradation. The result is a happy property owner and healthier river systems.

~ Brett James, Origin Surveyors

Origin Surveyors have now acquired the equipment and know-how to deliver LiDAR Imagery and DEMoD data analysis, previously sourced outside the region. Origin Surveyors owns and operates a DJI Matrice 300 drone with a DJI L1 LiDAR sensor attachment.

Origin Surveyors has been contracted and delivered LiDAR Imagery and DEMoD for several Reef Trust VII streambank engineered design sites, refer to Figure 3 for the LiDAR analysis undertaken at one gully erosion site.



Reef Catchments have been able to provide an ongoing supply of work for our business in terms of both remote sensing and traditional surveying services utilising satellite positioning and total stations (theodolites).

The types of development they manage are specialised in terms of data capture required. The relationship we have developed with Reef Catchments over the last few years gave us the confidence to invest in the LiDAR sensor and upgrade our photogrammetry and Unmanned Aerial Vehicle (UAV) offerings.

~ Brett James, Origin Surveyors

The increase in local capacity is expected to offer a range of benefits across the region. It allows Reef Catchment to continue to invest in the local economy while also increasing local small business capacity and future prospects. This outcome is in line with the Reef Catchment vision for Resilient ecosystems and an engaged community.

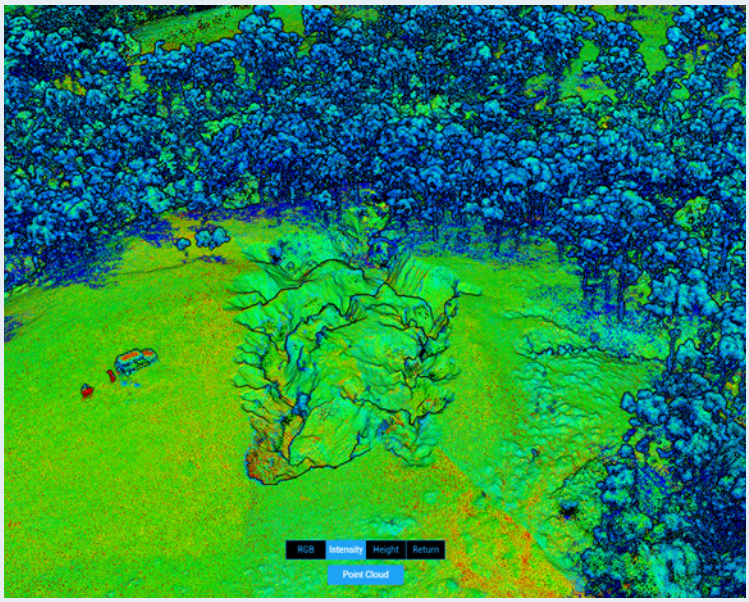


Figure 3: Upcoming Reef Catchments Gully Remediation Site Drone & LiDAR Imagery.

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