A satellite image of Queensland, Australia, showing various land use and land cover patterns. The image is overlaid with a semi-transparent blue rectangle containing text. The text is white and centered within the rectangle. The background image shows a mix of brown and green land, blue water, and a coastline with some islands.

# Mapping Land Use and Land Cover with Remote Sensing

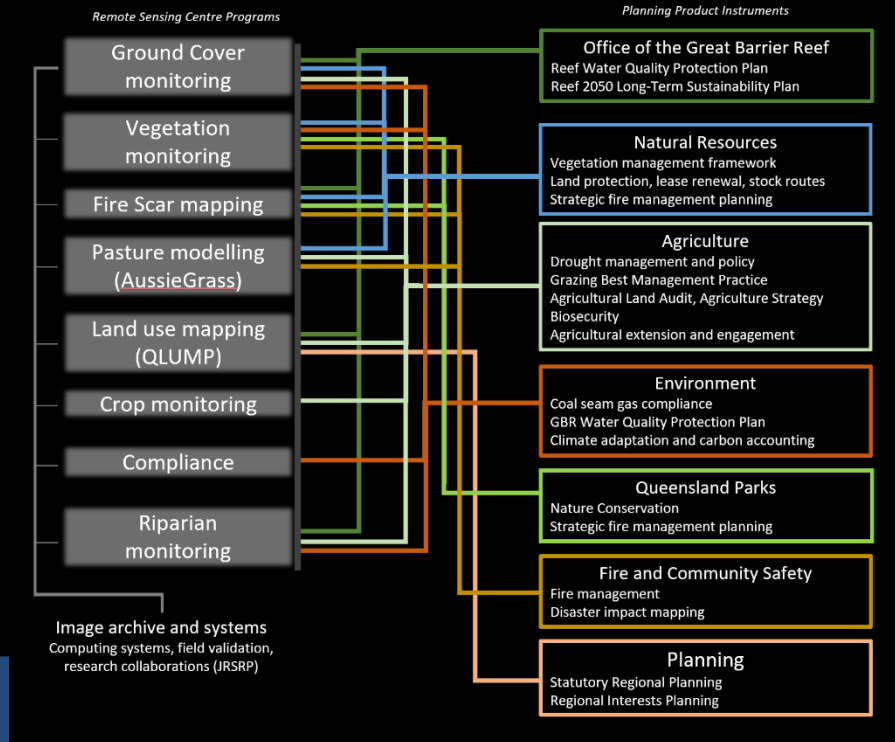
Andy Clark

Remote Sensing Centre

Department of Environment and Science

# Remote Sensing Centre

- Assess and monitor Queensland's landscapes
- Undertake research
- Provide remote sensing services



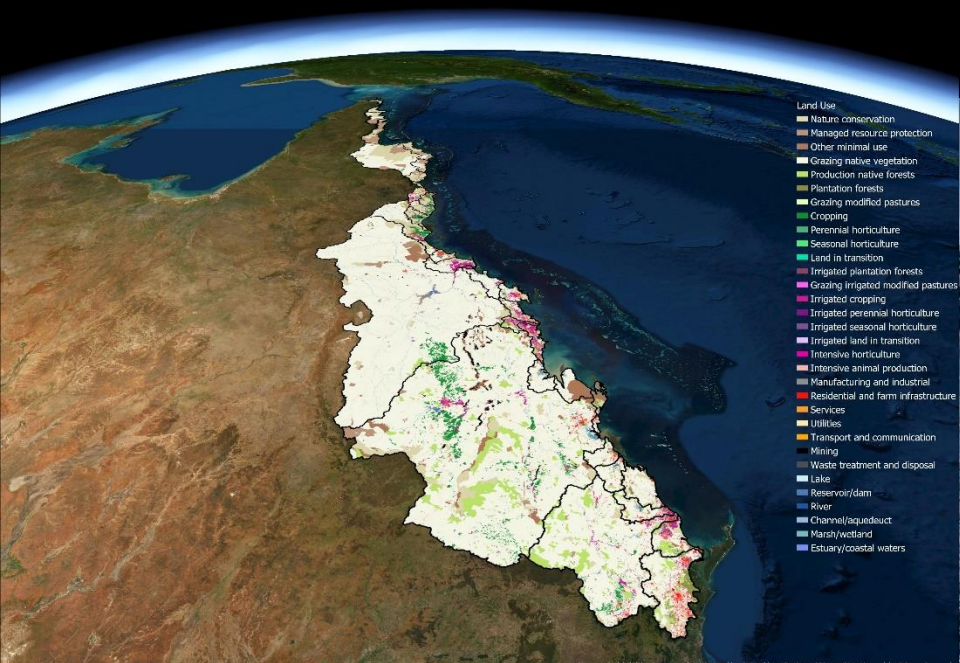






# Land use mapping - Applications

- Water quality modelling
- Biosecurity
- Natural disasters



Department of Science, Information Technology and Innovation

## Emergency Response Mapping Using Esri Technology

Andrew Morgan<sup>1</sup> and Joel McKechnie<sup>1</sup>

**Tropical Cyclone Debbie**

- Crossed the Queensland coast on Tuesday, 28 March 2017 near Airlie Beach.
- Category 4 system with wind gusts exceeding 250km/h and extensive rainfall of 1000mm in 48 hours.
- Severely impacted cropping and horticulture land uses.
- Cyclone track and wind data was obtained from the Australian Government Bureau of Meteorology.

**Emergency Response and Esri Technology**

- Esri technology was used to rapidly analyse land uses in predicted impact zones to provide real-time information through an ArcGIS Online web mapping service.
- Statistics on impacted land uses were produced in ArcGIS Pro and updated as the event unfolded.
- Satellite data was compiled to map areas impacted by flooding after the event.
- The project successfully provided time critical information for emergency management and response to government, industry organisations and the general public.

**Cyclone position/category/time**

Cyclone track

Low pressure system track

Flooding extent

Sugar

Cropping (other than sugar)

Perennial horticulture

Seasonal horticulture

**TOTAL**

	Impact zones by wind type (ha)	
	Damaging	Destructive
Sugar	112,550	28,558
Cropping (other than sugar)	9,324	1,680
Perennial horticulture	638	222
Seasonal horticulture	1,341	1,635
<b>TOTAL</b>	<b>123,863</b>	<b>32,095</b>

Cyclone Debbie captured by the NASA Aqua Satellite MODIS instrument, one day before landfall.

Flooding caused by the cyclone was experienced across Queensland and New South Wales.

Wind damaged sugar cane near Mackay.

The devastation was not limited to agriculture as seen at Shute Harbour, weeks after the event.

0 100 200 km

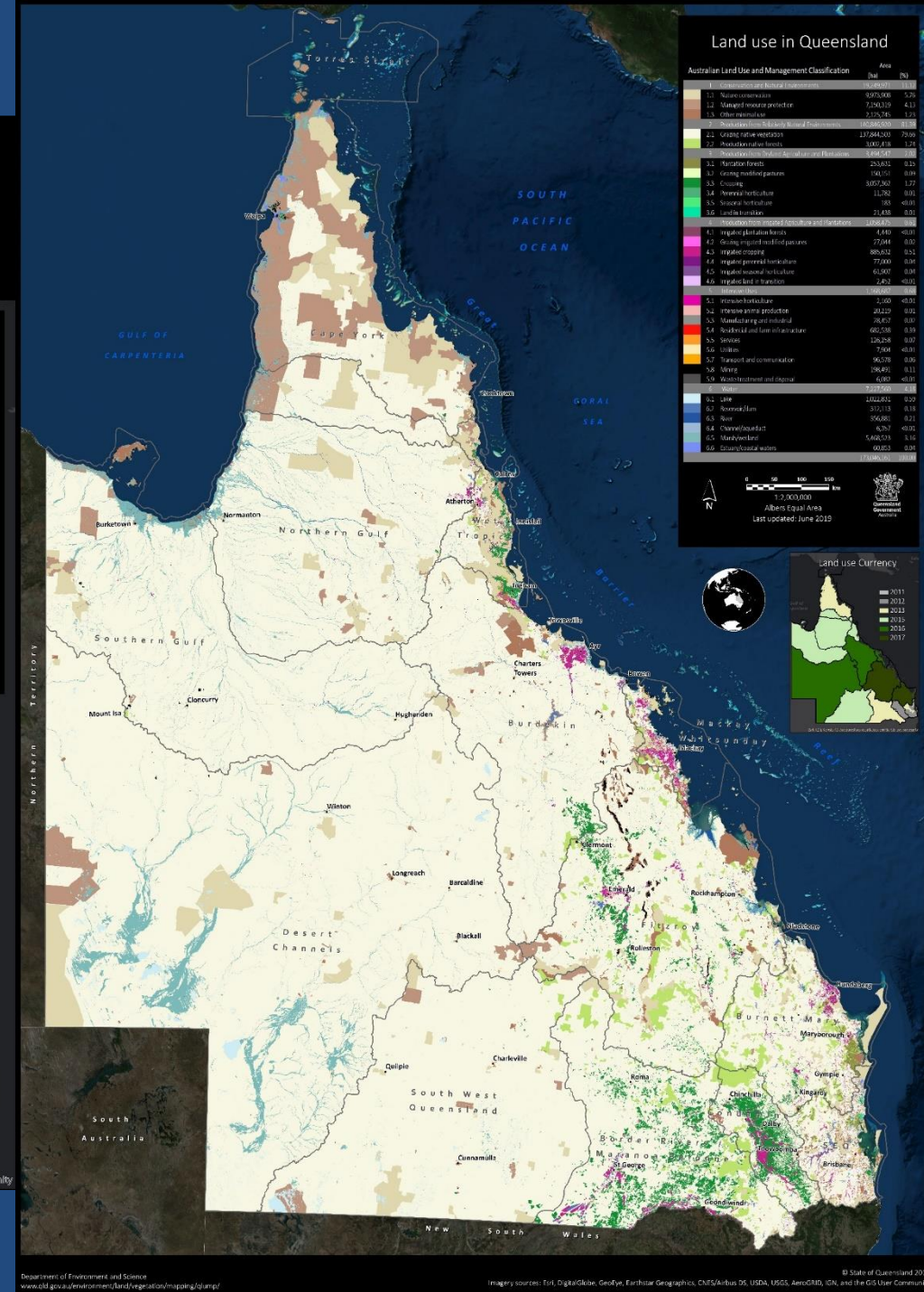
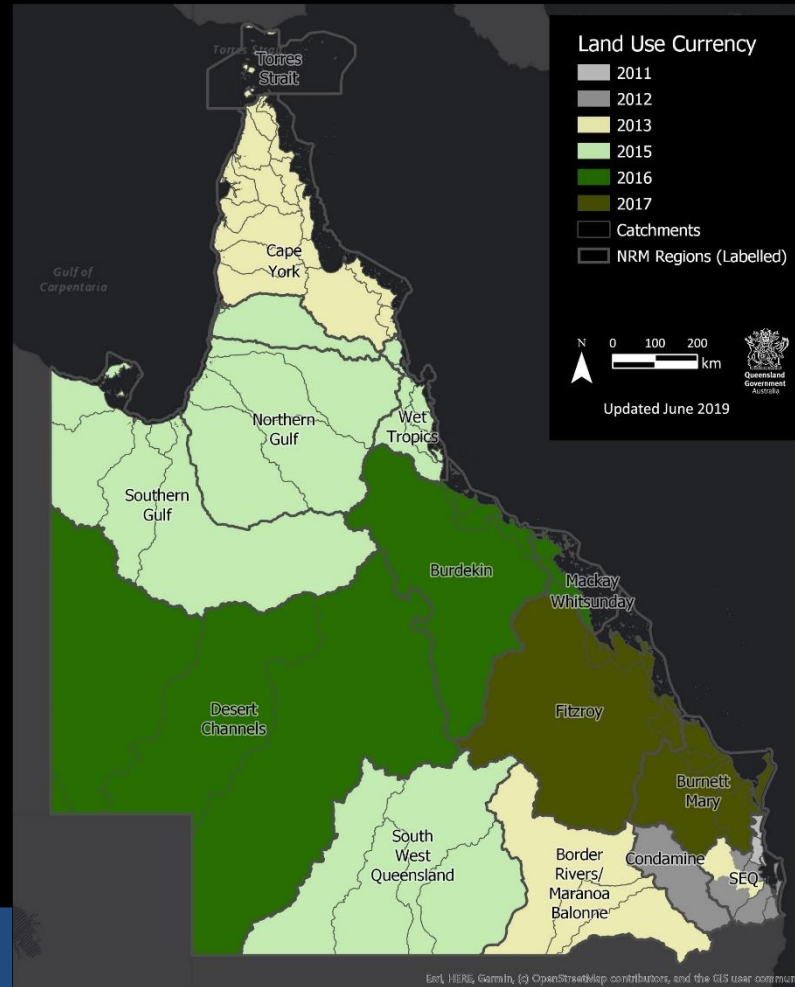
Abers Equal Area Projection (GEAR)

The Queensland Government, Australia  
www.qld.gov.au  
© State of Queensland  
www.qld.gov.au  
Imagery source: Esri, DigitalGlobe, GeoEye, IGN, GeoEye, IGN, and the USGS Earth Observatory



# Land use mapping - Problem

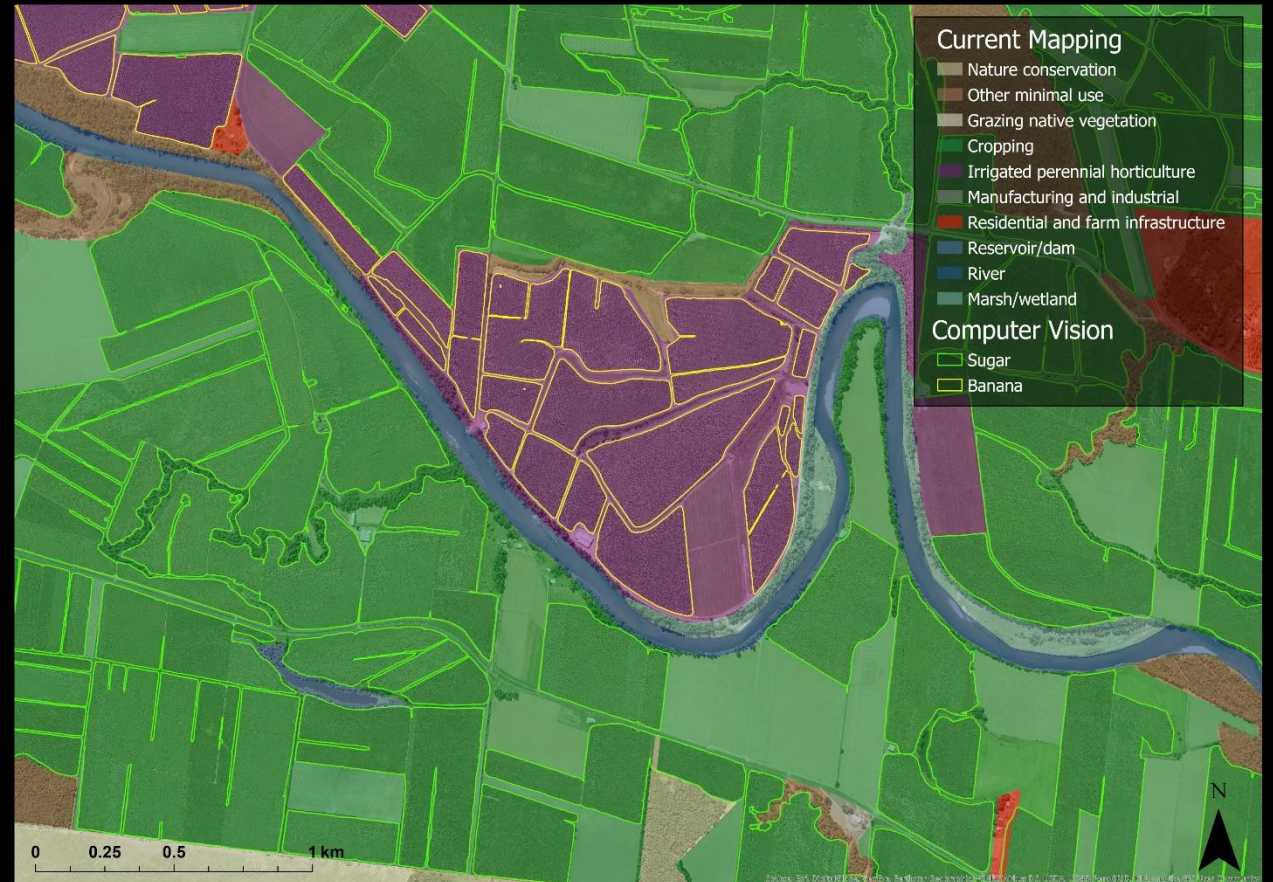
- Time and resource intensive
- Significant delays in the data release
- The data can be 2 years old when released





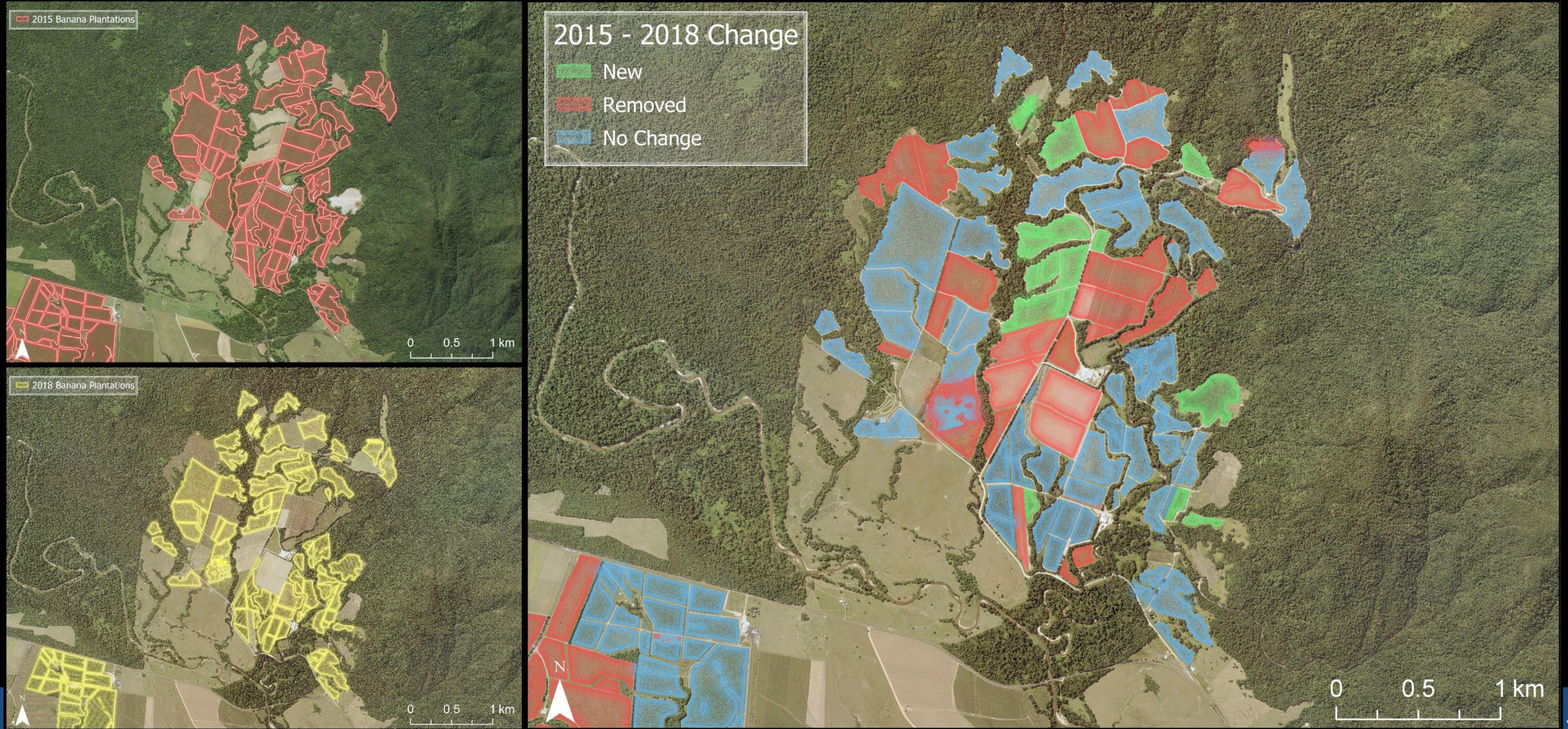
# Land use land cover mapping – Solution

- Remote sensing classification techniques
- Sugarcane and bananas crops





# Land use land cover mapping – Monitoring





# Land use land cover mapping – Other features



Water



Trees



Fallow



An aerial satellite photograph of a coastal region. The left side shows a brown, arid landscape with a network of roads and some small green patches. The right side shows a lush green coastal area with a city, a river, and a bay. The water is a deep blue, and there are some smaller islands or peninsulas visible. The text "Questions?" is overlaid in the center.

Questions?