Wetlands, Australia

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Overview

- **Focused on classification of wetlands in Queensland using ALOS PALSAR data.**

- **Queensland Wetland Mapping and Classification Initiative (2005 onwards)**
  - ⬇ **Based on 2001 datasets**
  - ⬇ **Used existing Regional Ecosystem Mapping**

- **Wetlands occupy about 4 % of the mainland**
  - ⬇ **Very diverse**
  - ⬇ **Variable in extent and state**
    - **Permanent/semi-permanent on the coast**
    - **Seasonal in the inland areas**

- **ALOS PALSAR data used within a classification processed based on Definiens Developer software**
  - ⬇ **Object orientated**
  - ⬇ **Included optical and SRTM data**
  - ⬇ **Capacity to tile imagery and extend to the region**
  - ⬇ **Requirement for consistency in approach and classes selected**

# Integration of existing mapping

- **Classification generally utilises existing boundaries as mapped using the QMCW data.**

- **Within each class, more detailed mapping undertaken using the rule-based approach**

- **Some classifications cut across broad classes**

Category	Description
Marine*	Open ocean including shallow coastal indentations or bays within appreciable freshwater inflows; coasts exposed to oceanic waves and currents. Water regimes determined primarily by oceanic tides.
Estuarine*	Wetlands with oceanic water significantly diluted with freshwater derived from land drainage
Riverine	Wetlands and deep water habitats contained within a channel. Due to scale constraints, these areas may include fringing palustrine vegetation.
Lacustrine	Wetlands and deep water habitats situated in topographic depressions, dammed river channels or artificial waterbodies. Includes areas where the coverage of emergent perennial vegetation is less than 30 % and the total water body area exceeds 8 ha.
Palustrine	Wetlands dominated by persistent emergent vegetation or where water in the deepest part of the basin is less than 2 m in depth; lacks active wave-formed shores or bedrock features.

*Affected by tidal salinity

Integration of existing mapping

- **Classification generally utilises existing boundaries as mapped using the QMCW data.**

- **(Within each, QH Regional Ecosystem data are associated)**

- **Within each class, more detailed mapping undertaken using the rule-based approach**

- **Some classifications cut across broad classes**

Estuarine
Lacustrine
Marine
Non-wetland
Palustrine
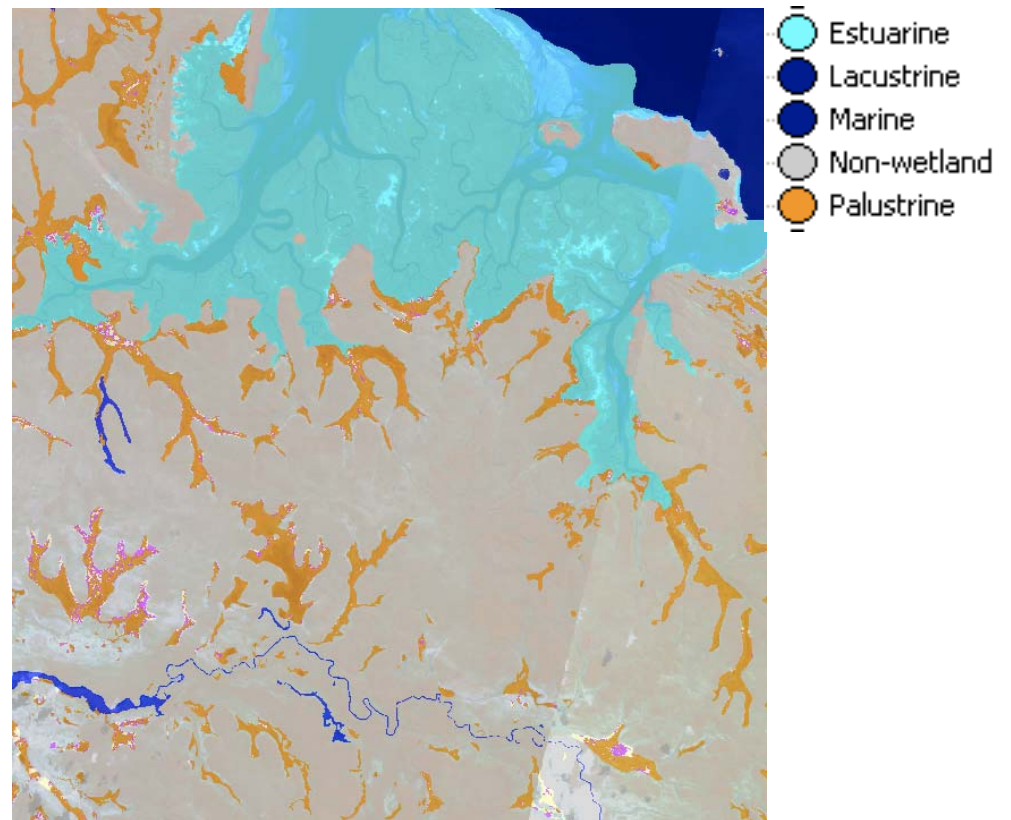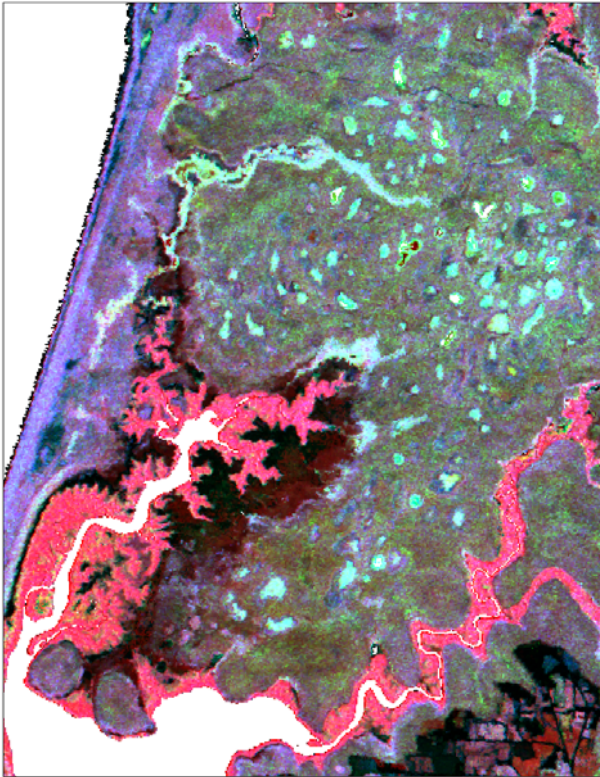
Selected wetland Sites Queensland
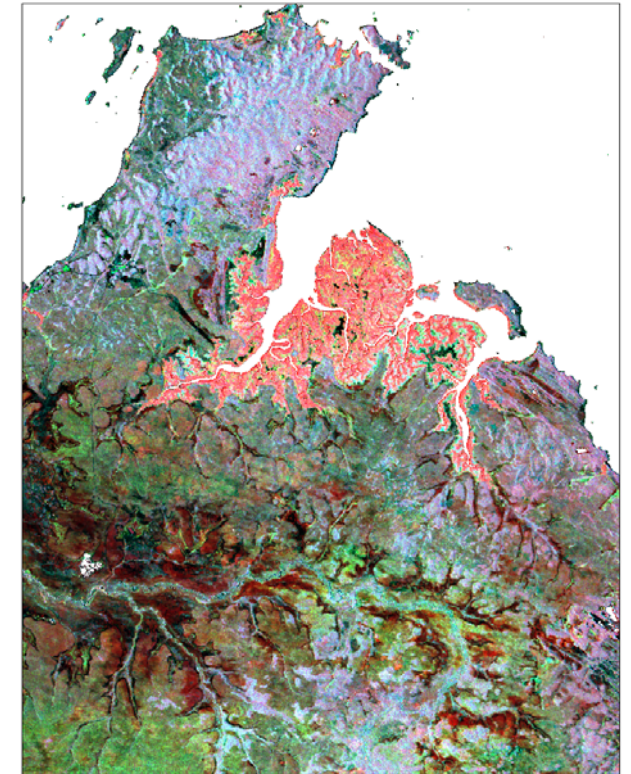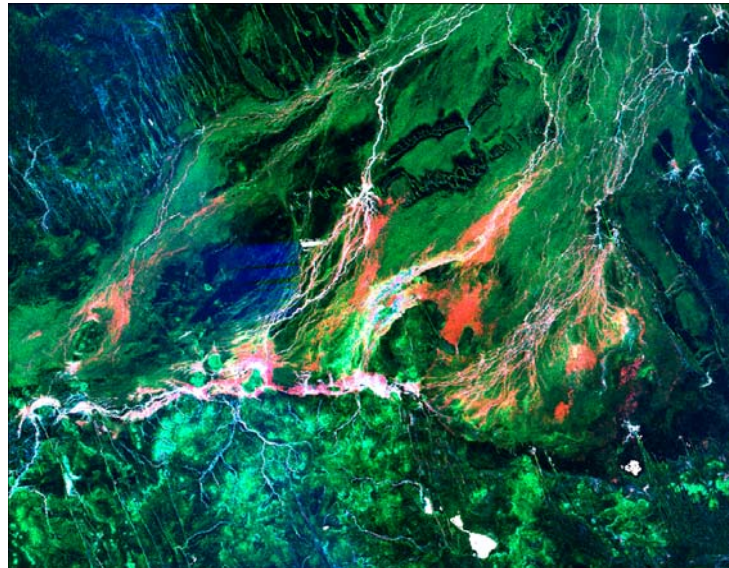
- **Sites representing major wetlands in northern Australia (Qld)**
- **Generally small in area**
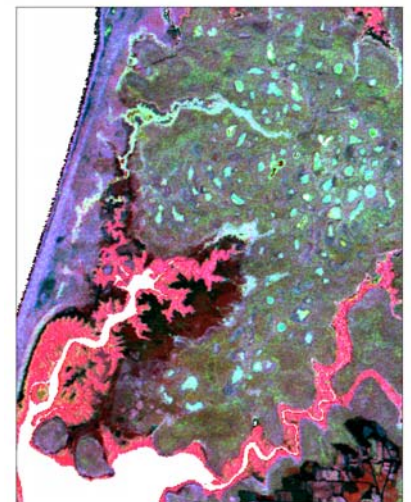- **Composites are Landsat FPC, ALOS L-band HH and HV**

Weipa, Cape York, Queensland

Queensland Wetland Mapping & Classification
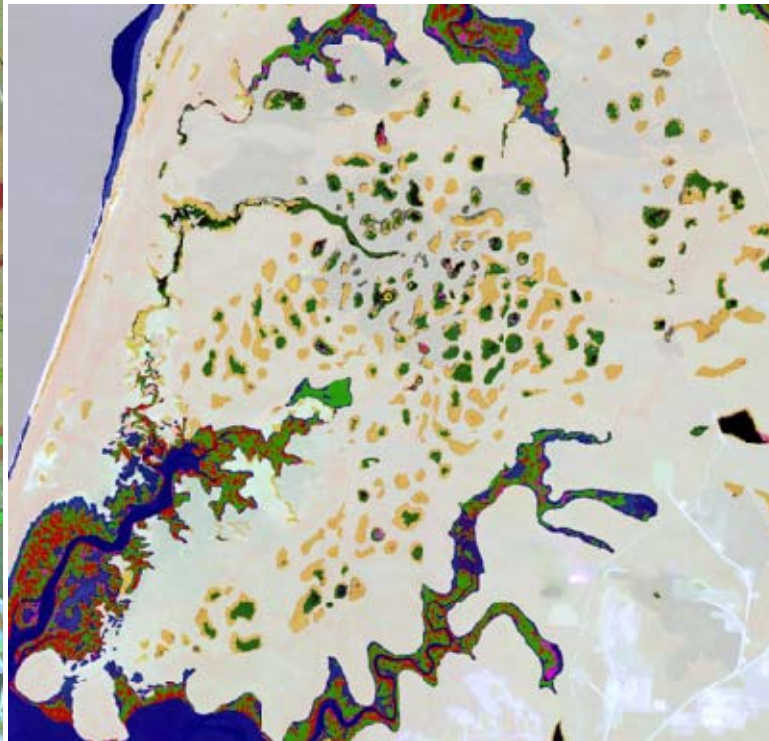
Definiens-based classification

FPC,HH,HV
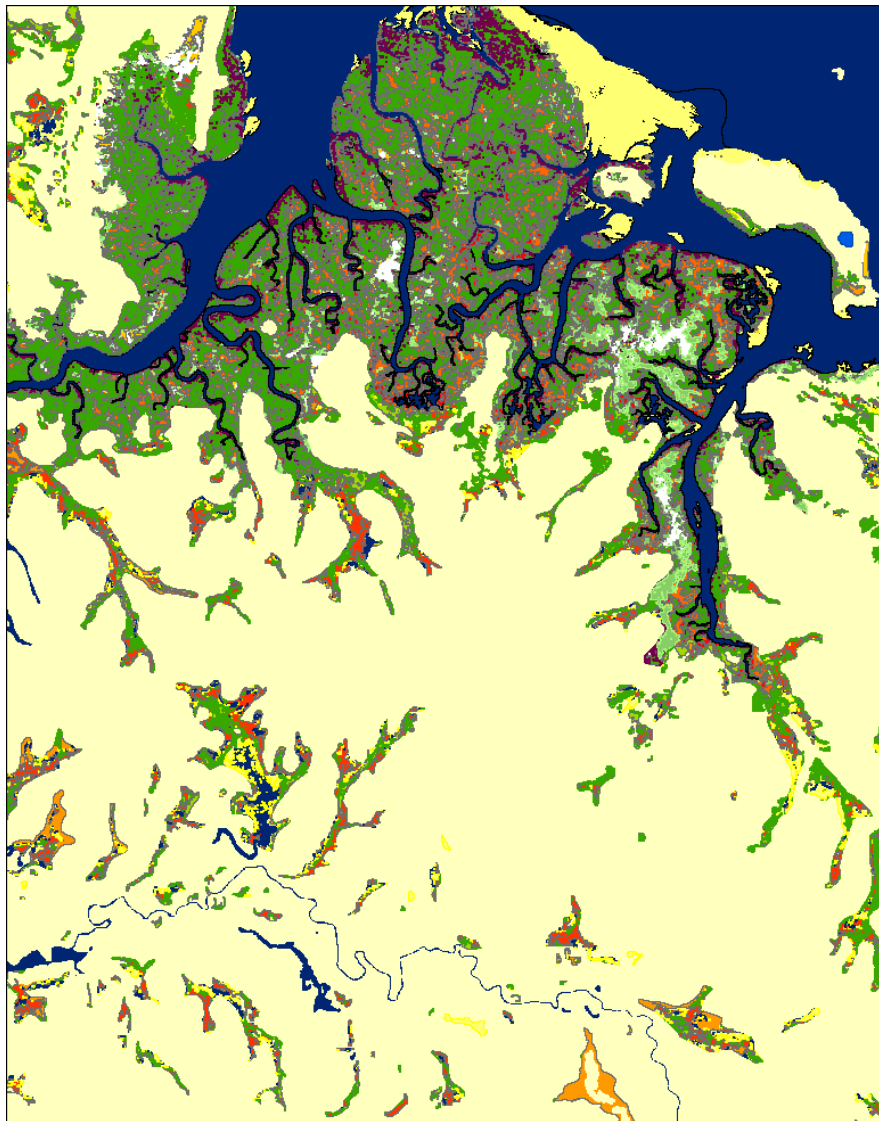
North Cape York
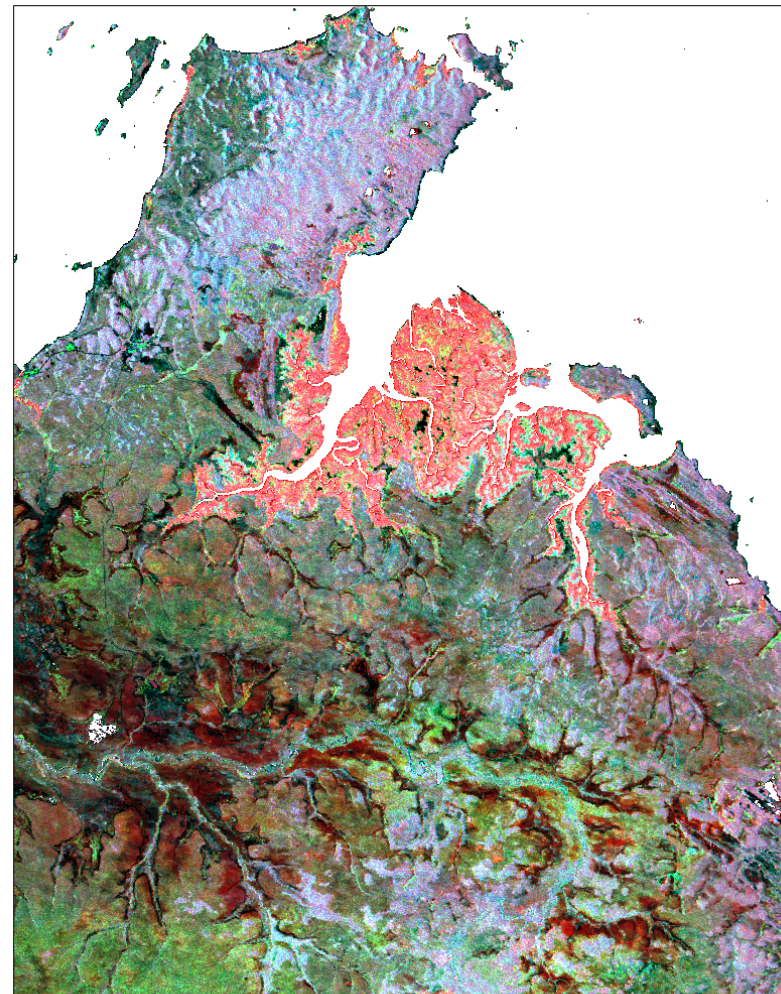
Classification

- **Mangroves**
  - ⬇ **SRTM (30 m) differentiates low (< 10 m) and high (>= 10 m)**
  - ⬇ **ALOS PALSAR differentiates high mangroves with root systems (e.g., *R. stylosa*)**
  - ⬇ **Landsat FPC differentiates sparse canopy from closed canopy mangrove (e.g., *A. marina*)**
- **Wetlands**
  - ⬇ **ALOS PALSAR differentiates forest within wetland area (not necessarily flooded), open water and macrophytes (in conjunction with optical data)**
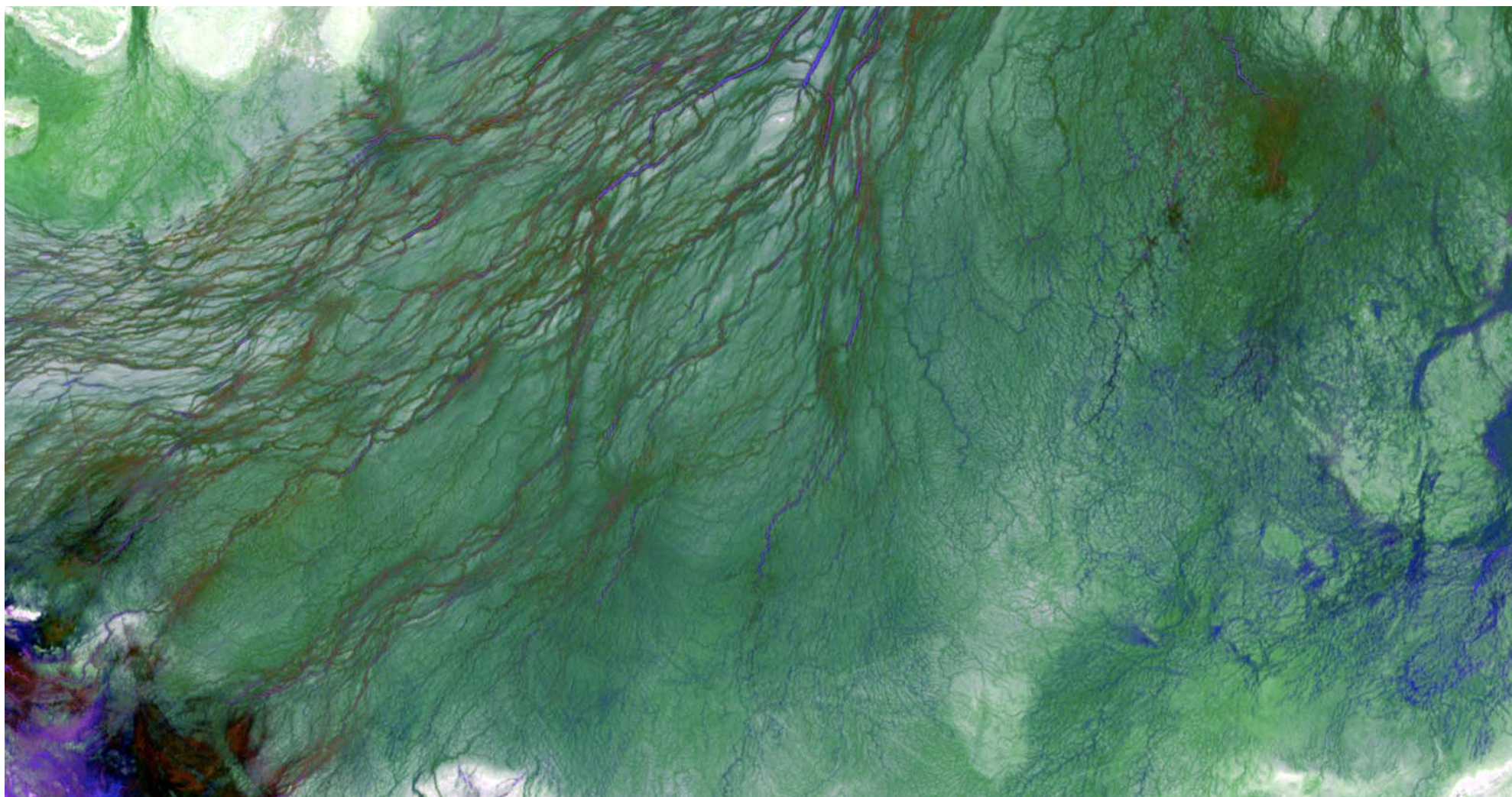
Example classification of wetlands: North Cape York
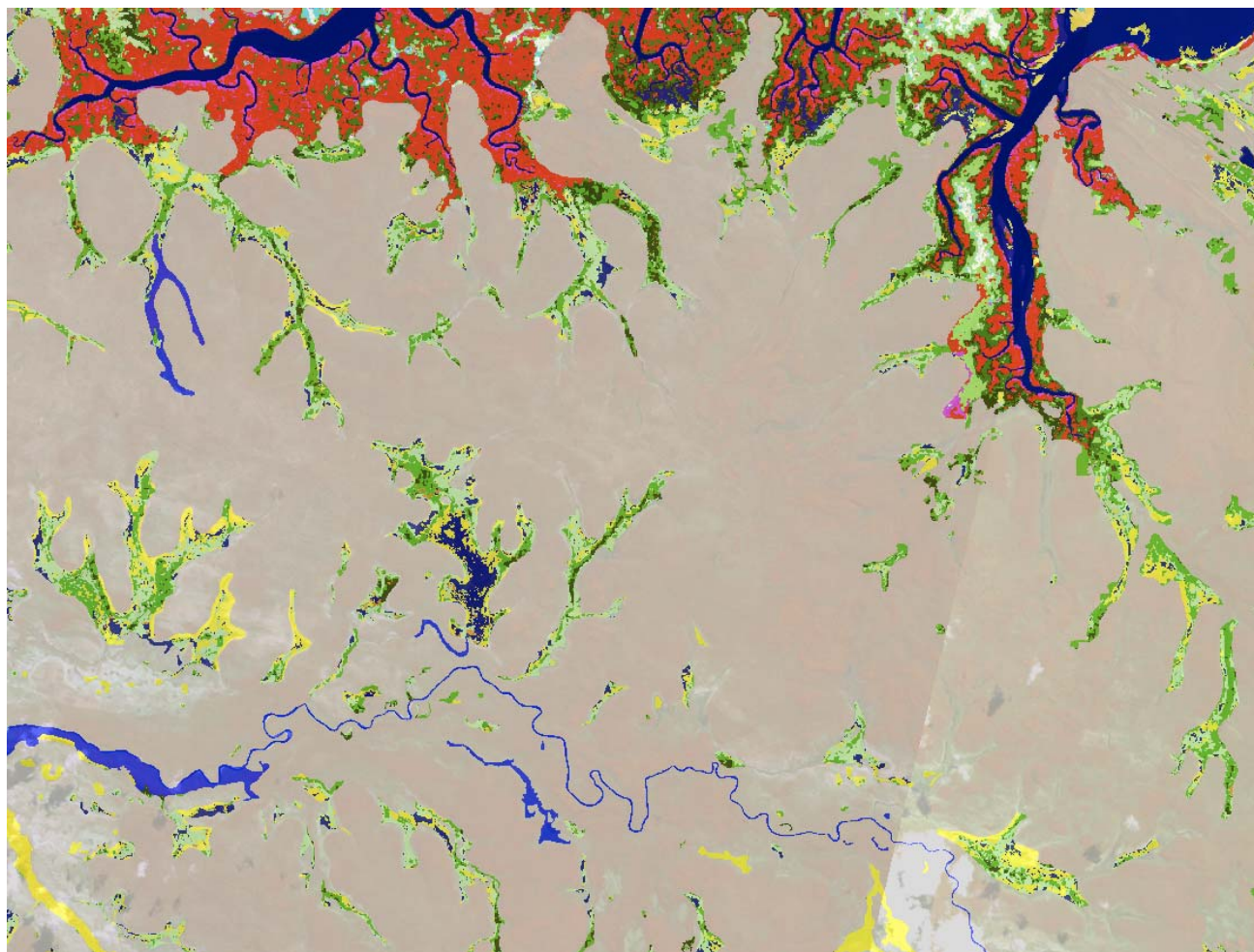
Channel Country: SPOT-5

Channel Country: Landsat FPC, ALOS HH and HV
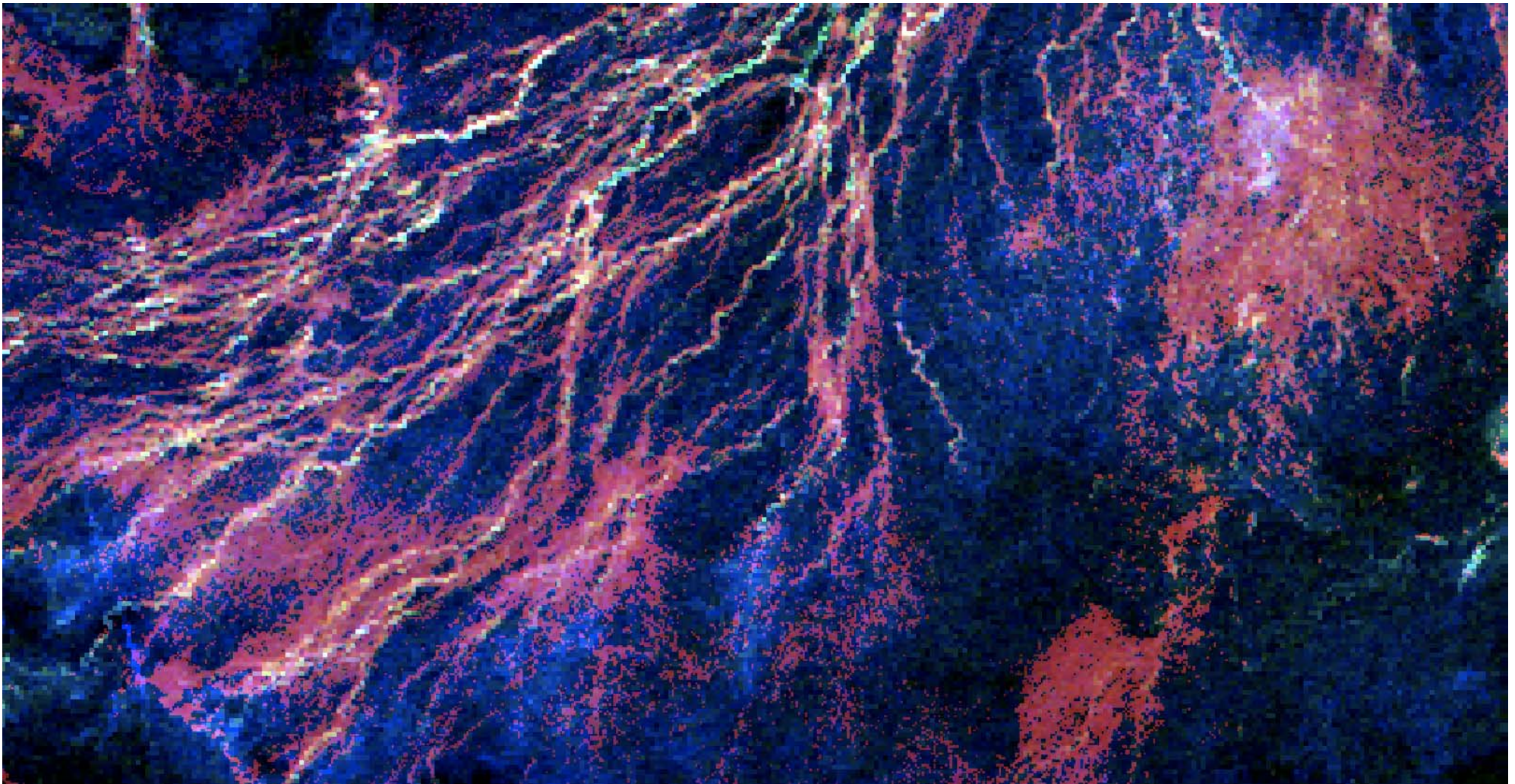
Channel Country: SPOT-5 NIR, ALOS HH and HV
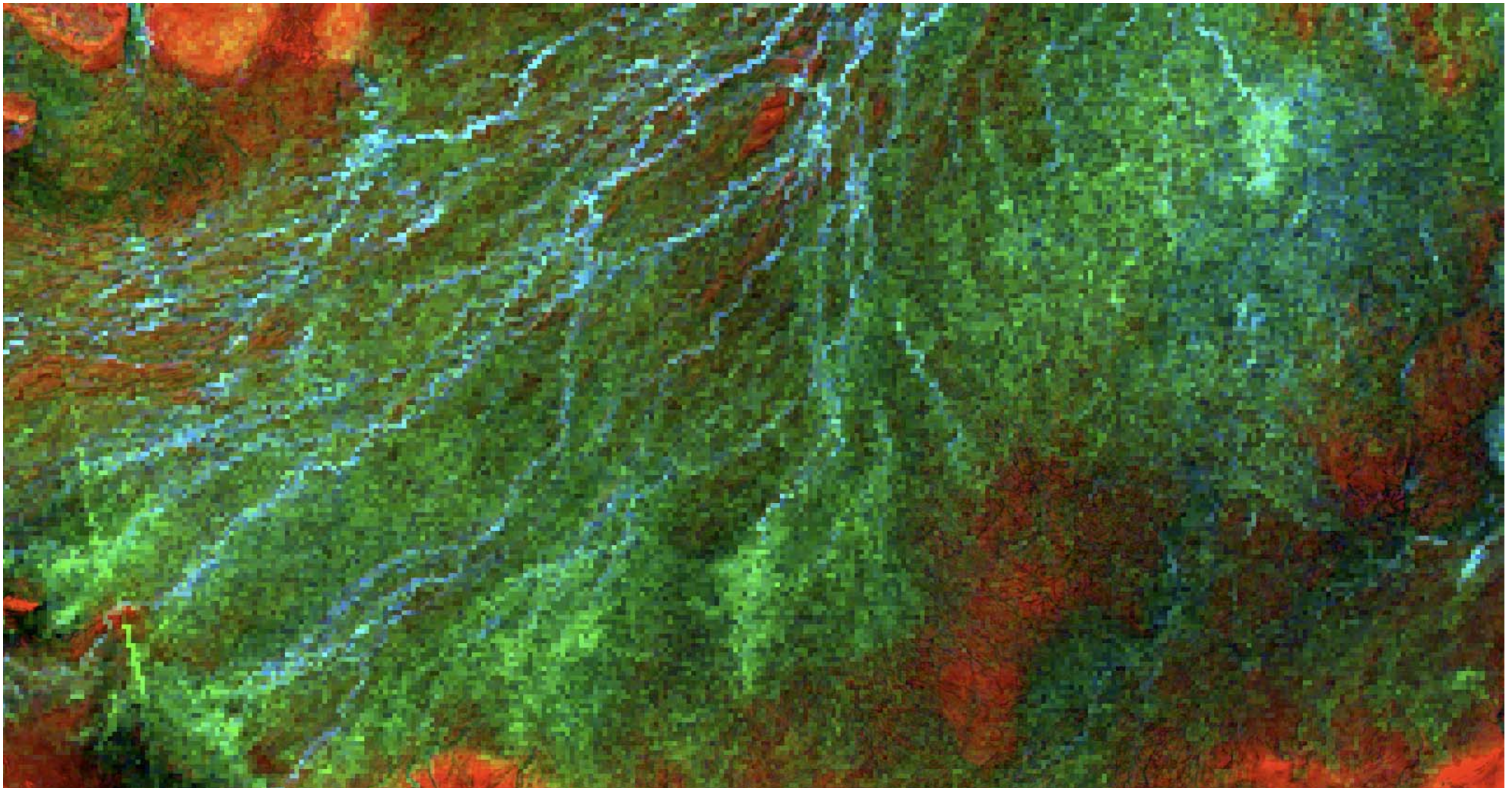
Classification: Channel Country, SW Queensland
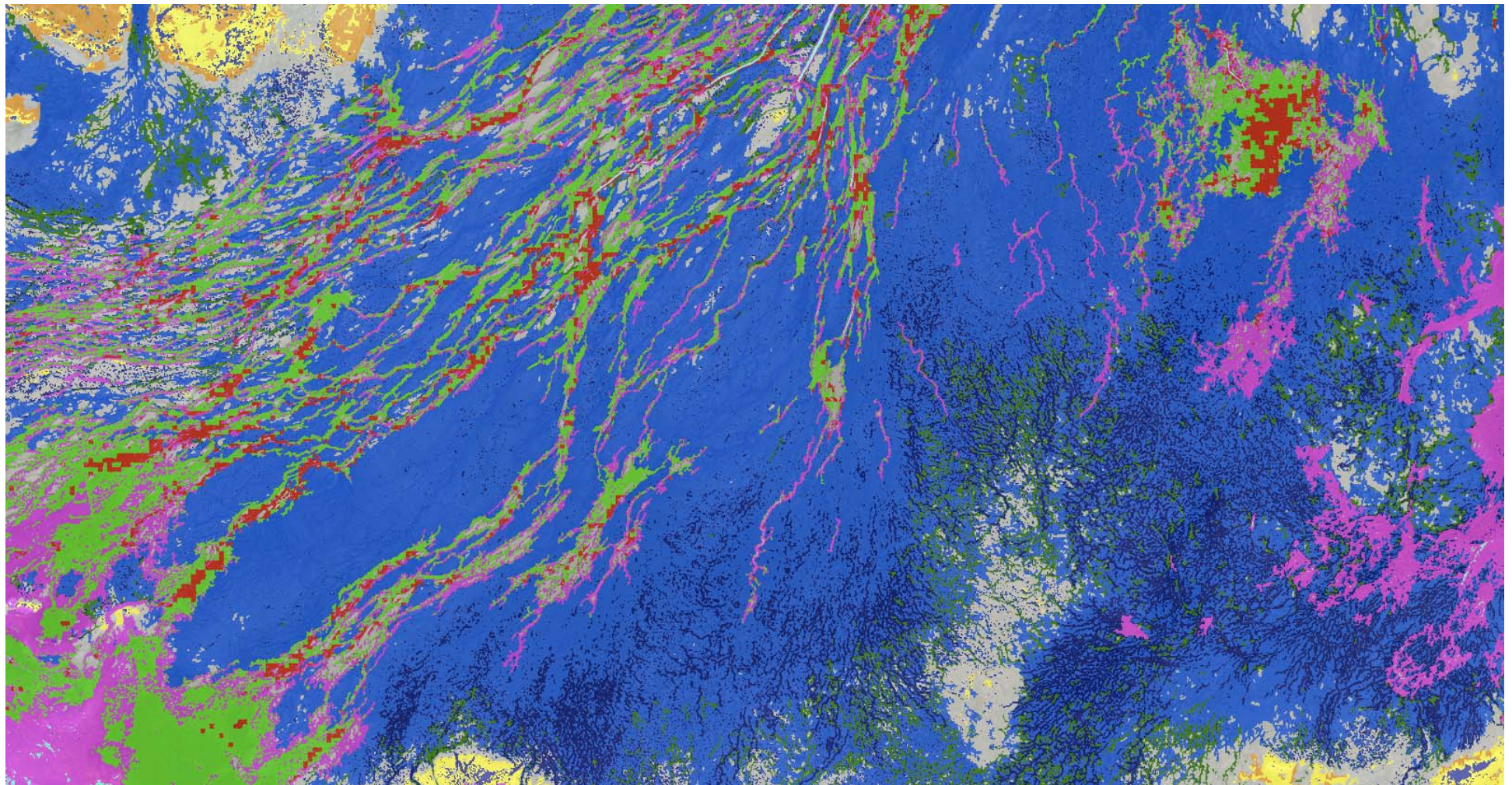
Flooding in Northern Australia: Requirement for ScanSAR

Gulf of
Carpentaria

sediment —

Flinders River —

N 25 km
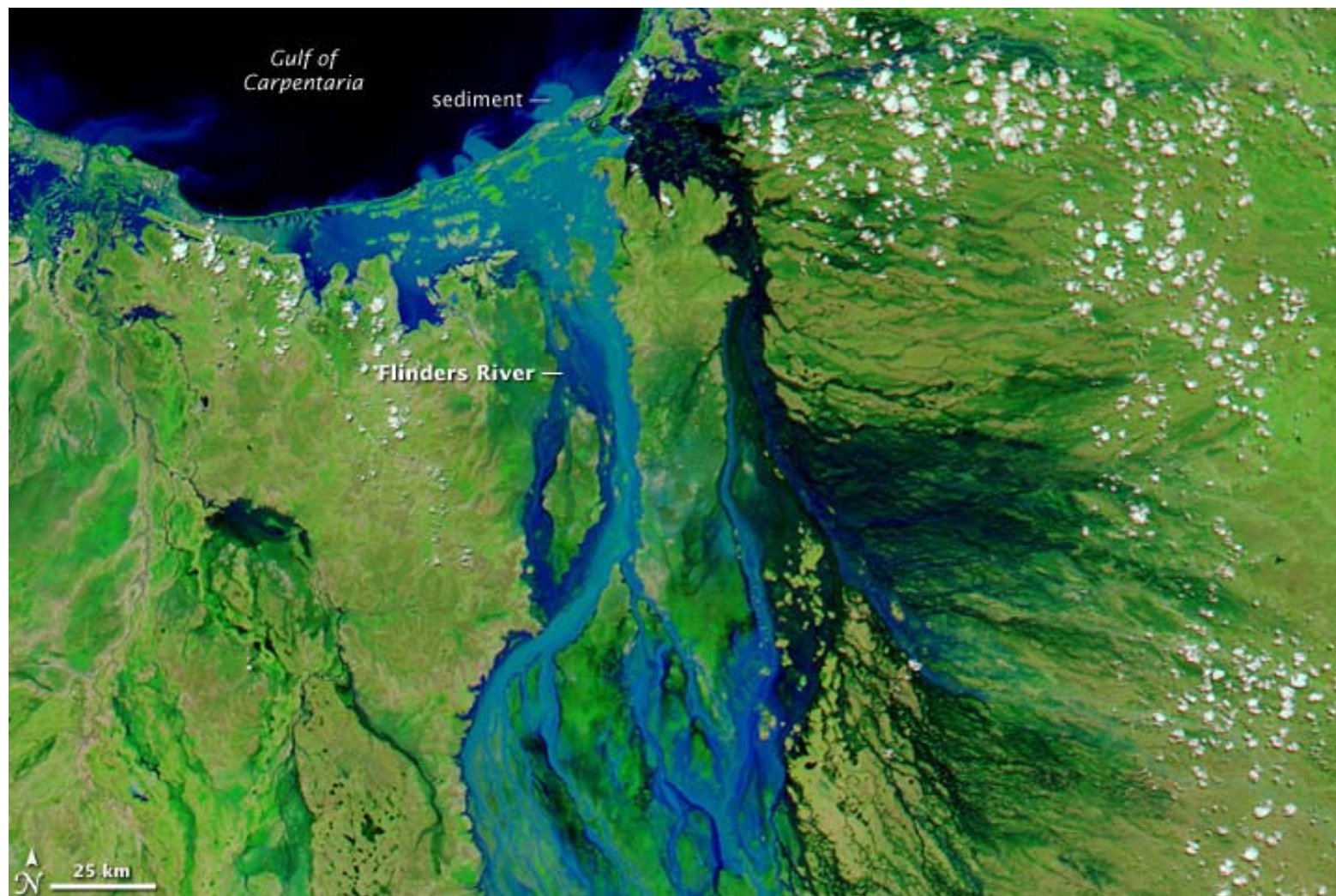
Associated changes in Australian Mangroves

Closed Avicennia
Closed Avicennia/Ceriops
Closed Ceriops
Closed Mixed
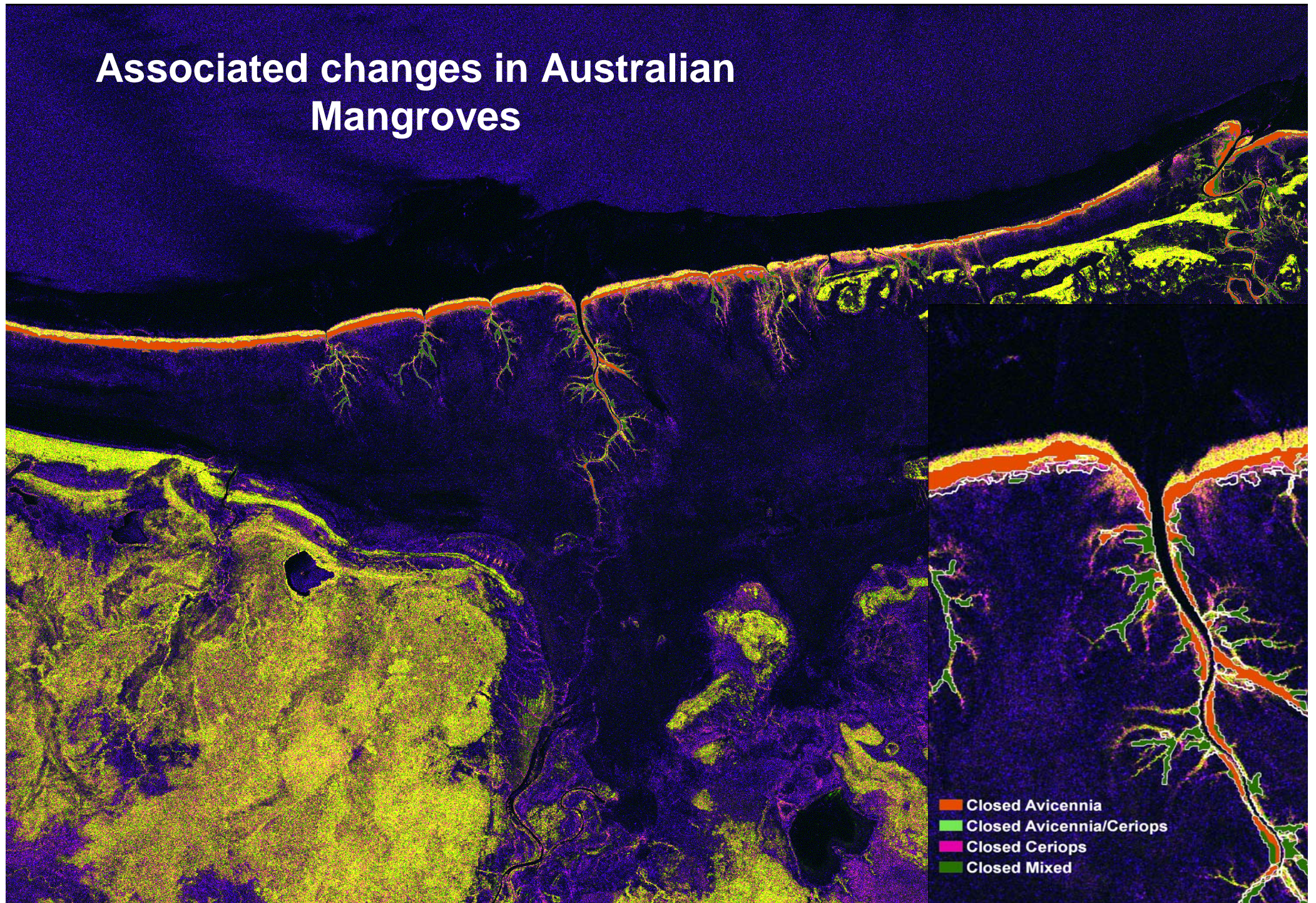
Overview

- **ALOS PALSAR in conjunction with SPOT-5, Landsat FPC and SRTM data contributes to more detailed classification of wetlands.**

- **Limited by lack of temporal data and also by the resolution**

- **Requirement for consistency in classes mapped**
  - ⬇ **Classification being revised in conjunction with Queensland Herbarium**

- **Object-based approach couples knowledge of ecology with that of remote sensing scientists.**
  - ⬇ **Allows mapping to fit with existing coverages**

- **ScanSAR data are likely to provide more detailed information on seasonal variation in wetlands**

- **Wetland classifications are being linked to that of mangroves in northern Australia**
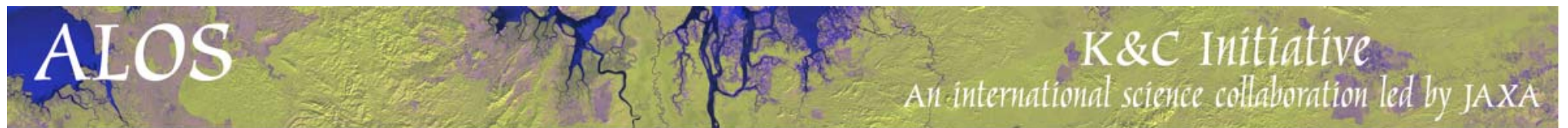
Many thanks to:

- Japanese Space Exploration Agency (JAXA) and the Kyoto and Carbon Initiative

- Queensland Herbarium

- Queensland Department of Natural Resources and Water