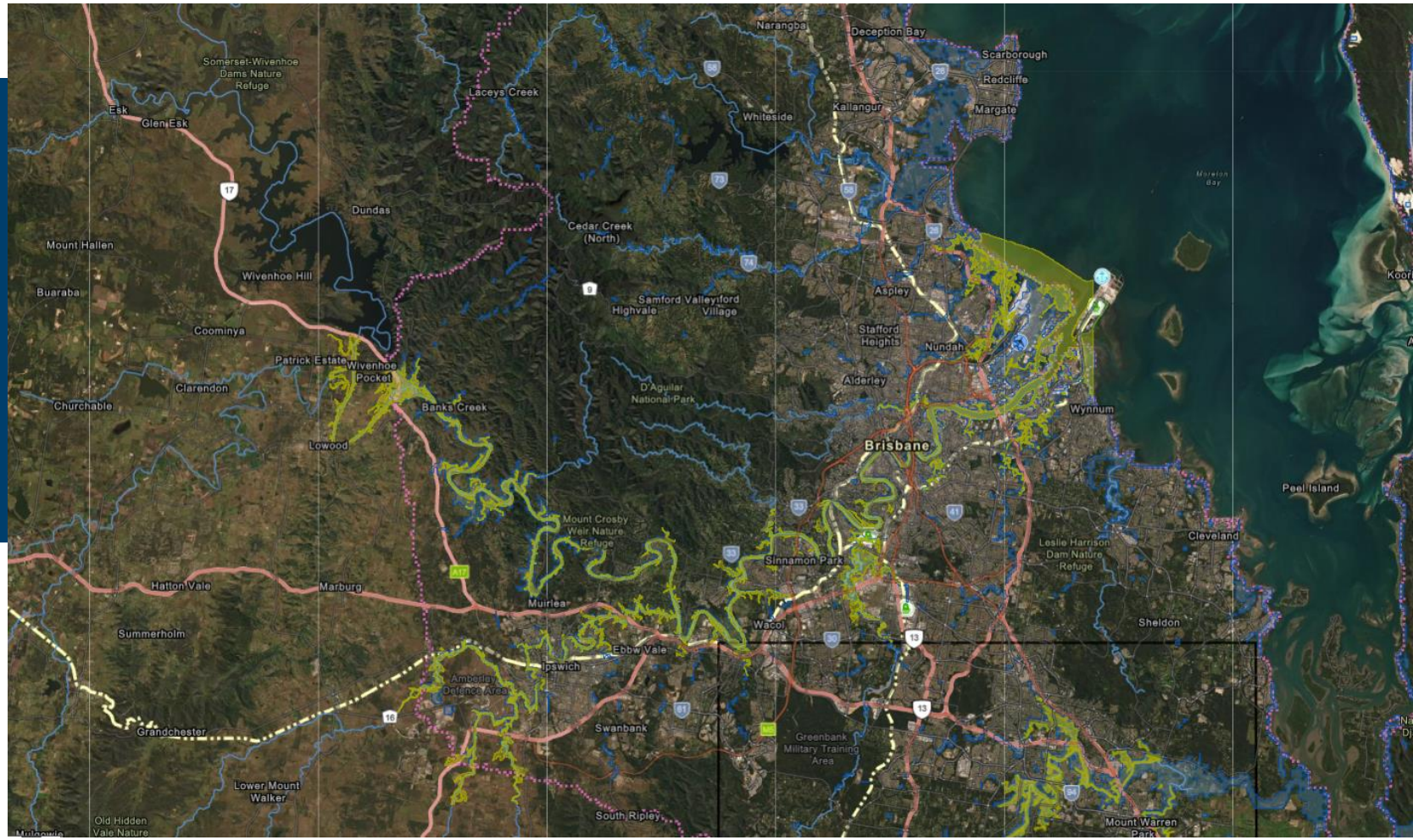
Australian Government

Australian Climate Service

ACS – Flood Intelligence

FEWs User Days

Shoni Maguire and Chris Leahy



Acknowledgements:
Simone De Kleermaeker (Deltares)
Luke Balasingham, Mark Dyall and Mark Menzel (ACS)

The service is a partnership of world leading science, information and expertise from the Bureau of Meteorology, Geoscience Australia, CSIRO and Australian Bureau of Statistics. It brings the Commonwealth's extensive climate and natural hazard information into a single national view.

Australian Government
Bureau of Meteorology

CSIRO

Australian Bureau of Statistics

Australian Government
Geoscience Australia

Customer Request

- Emergency Management Australia and the National Recovery and Resilience Agency provided an initial request for Flood Intelligence. This service was needed to allow the Australian Government to make informed decisions before, during and after the flood events.
- The National Situation Room (EMA) requires highly accurate flood inundation modelling with national coverage.
- NRRA require accurate inundation footprints to inform relief, short-term and longer-term recovery activities.
- The solution needed to be:
    - Able to be shared across governments and more widely
    - Linked to official forecasts/warnings where possible
    - Provide an open approach to the modelling

Western Sydney

Release v1.0

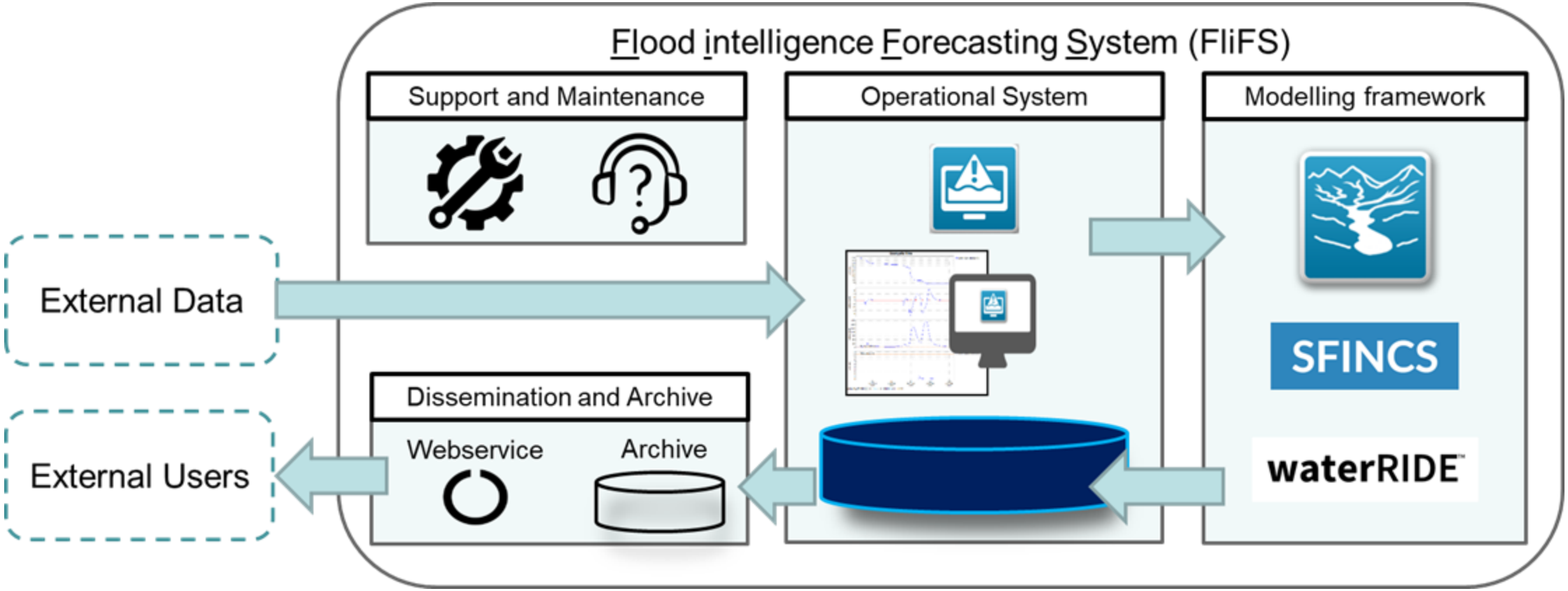
The Final Release included:

- Implementation of WFLOW (hydrology) models for all coastal catchments of QLD, NSW and NT.
- Implementation of a SFINCS (inundation) model for all coastal catchments of QLD, NSW and NT.
- 6 months of operational support for the FliFS PoC. Support provided by Deltares as needed.
- A post Implementation Report – detailing project outcomes based on original requirements.

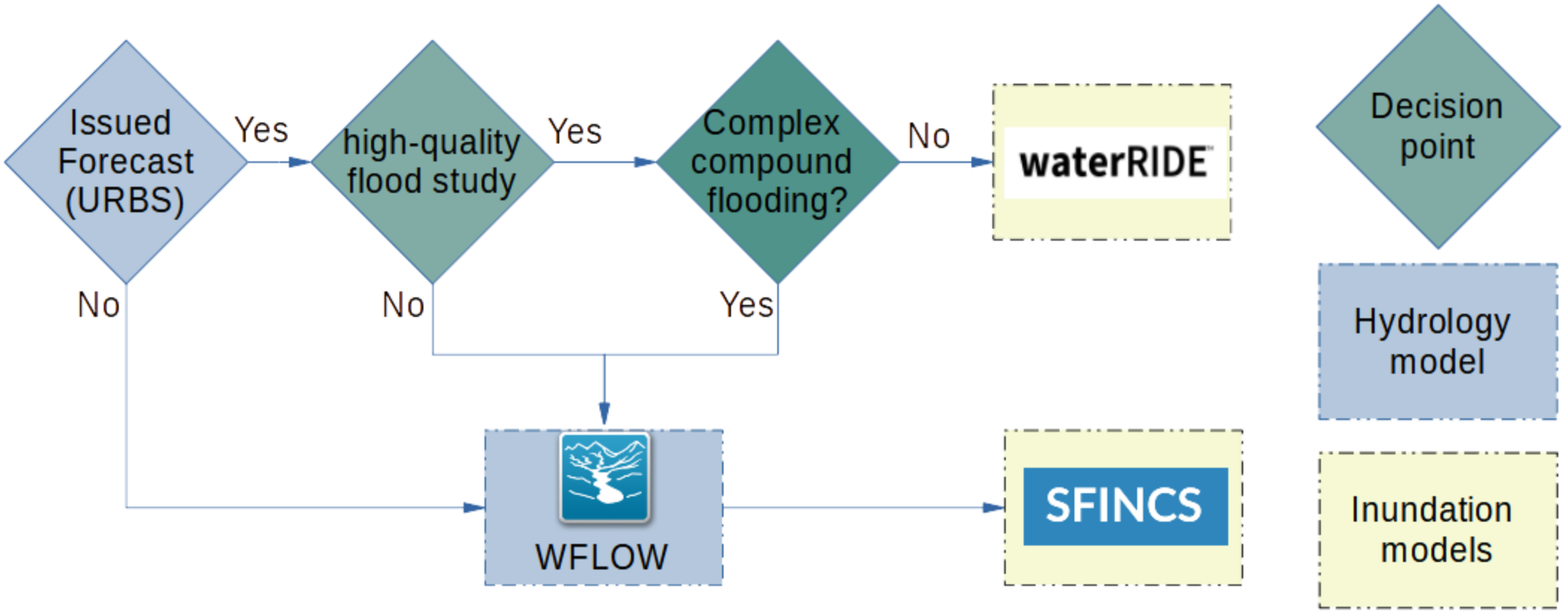
This included waterRIDE model for 6 locations:

- Brisbane River system (including Bremer) - a large, linear river system with flood gates and a large dam.
- Logan/Albert - a large, multi-tributary catchment.
- Fitzroy (Rockhampton) - a very large coastal catchment.
- Hastings (Port Macquarie) - a medium sized, faster responding catchment.
- Georges River (Sydney) - medium sized catchment, multi jurisdiction.
- Murrumbidgee (Wagga Wagga) - large inland river.
- Flood footprint shapefiles accessible through ACS ArcGIS online.
- OpenDAP server access to an archive of files (in NetCDF format)

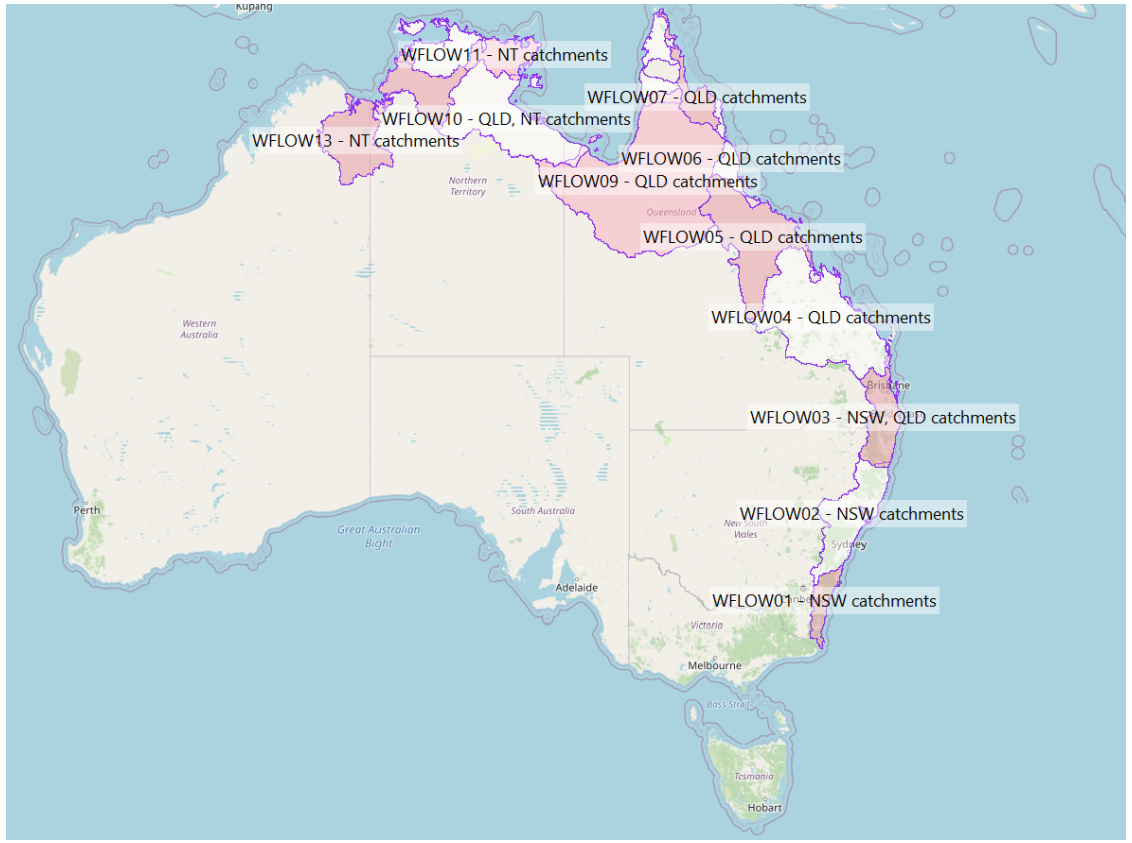
Modelling Framework – Components



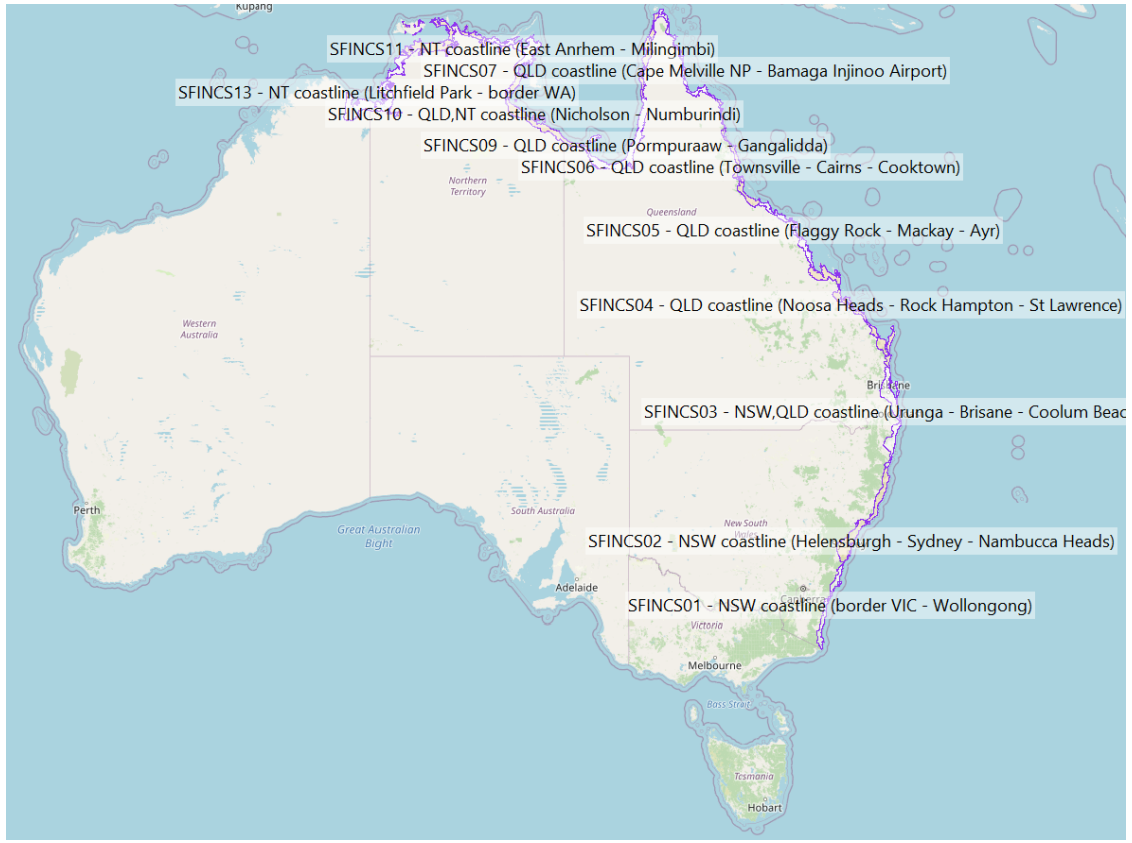
Modelling Framework – Work Flow



Proof of Concept – Model Coverage



WFLOW coverage



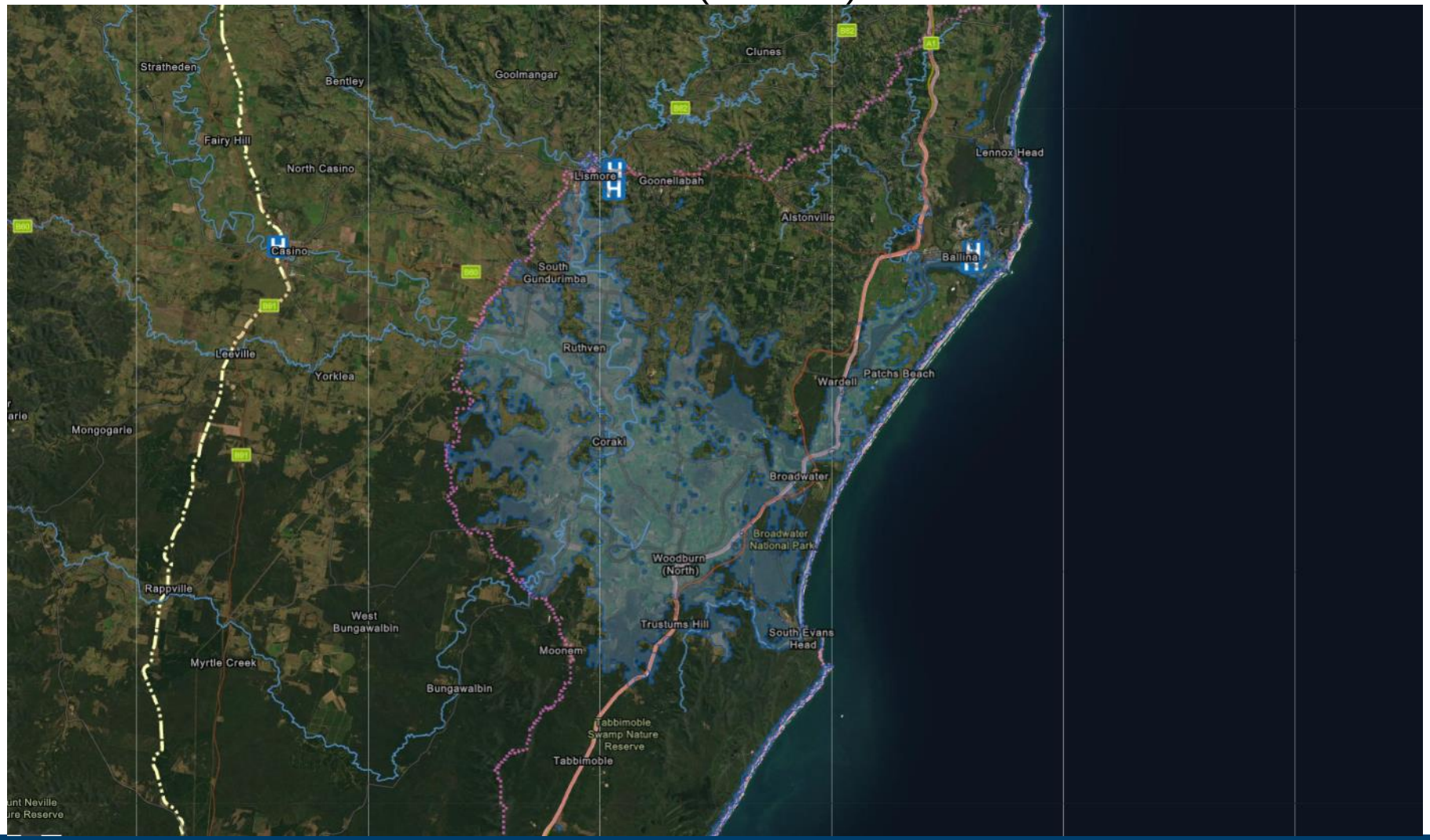
SFINCS coverage

Output Data Composition

Parameter	Model	Shapefiles (AGOL)	Image (Map webservice)	Netcdf (openDAP)	Geography
Discharge	WFLOW (13)	-	Yes (WMS)	Yes, gridded data	coastal catchments for NT/QLD/NSW
Depth (time series)	SFINCS (13)	-	Yes (WMS)	Yes, gridded data	coastal catchments for NT/QLD/NSW
Accumulated Inundation	SFINCS (13)	Yes	Yes (WMS)	Yes, gridded data	coastal catchments for NT/QLD/NSW
Accumulated Inundation	waterRIDE (6)	Yes	Yes (WMS)	Yes, gridded data	Brisbane River system (including Bremer); Logan/Albert; Fitzroy (Rockhampton); Hastings (Port Macquarie); Georges River (Sydney); Murrumbidgee (Wagga Wagga)
Precipitation	ACCESS-G processed to SFINCS model domains	-	Yes (WMS)	Yes, gridded data	coastal catchments for NT/QLD/NSW
Tidal water level	SFINCS	-	Yes (WMS)	Yes, gridded data	continental model for Australia

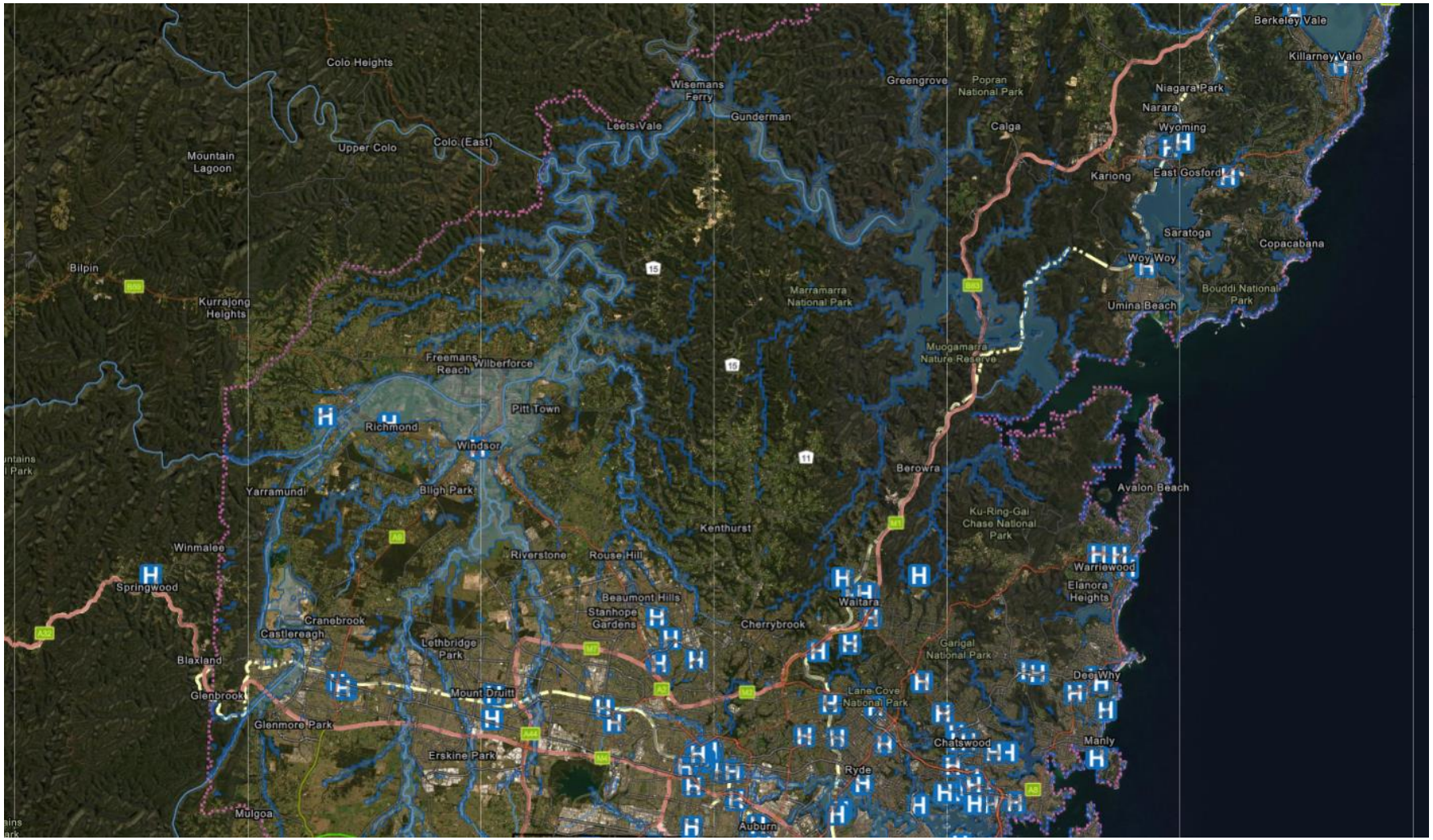
Output Screenshots

8 March Flood Inundation: Lismore NSW (SFINCS)



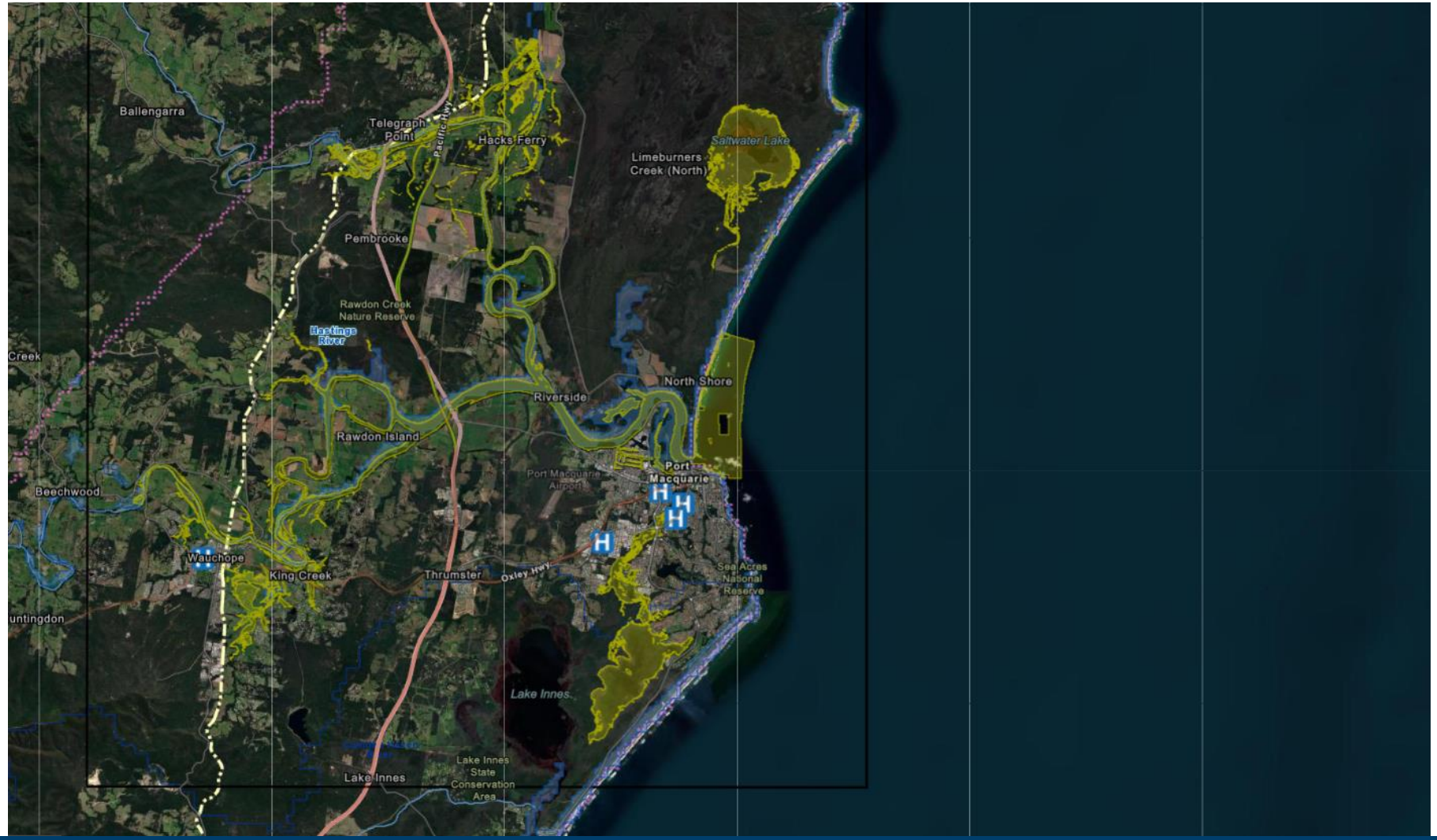
Output Screenshots

8 March Flood Inundation: Hawkesbury River NSW (SFINCS)



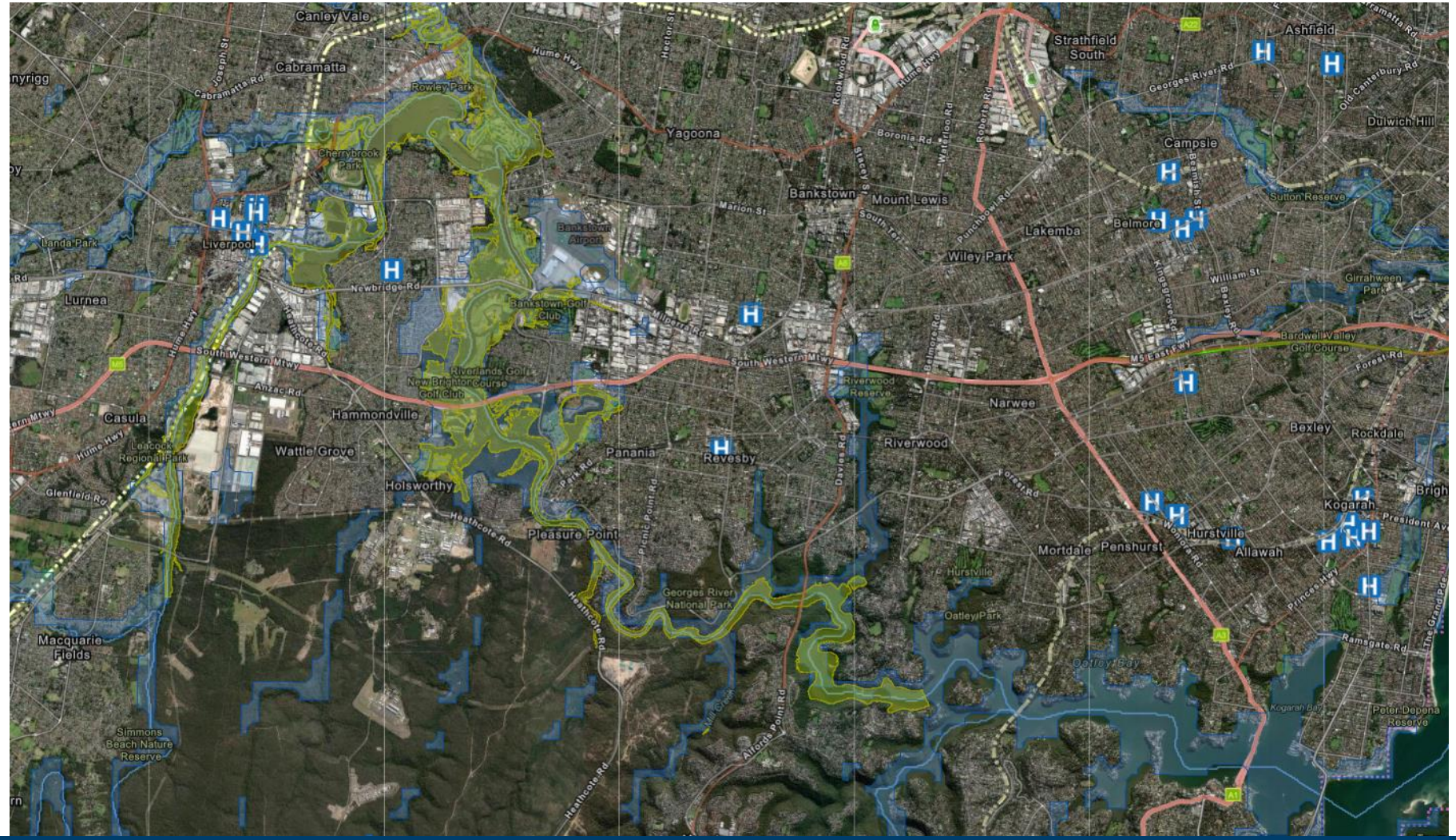
Output Screenshots

8 March Flood Inundation: Port Macquarie NSW (WaterRide and SFINCS)



Output Screenshots

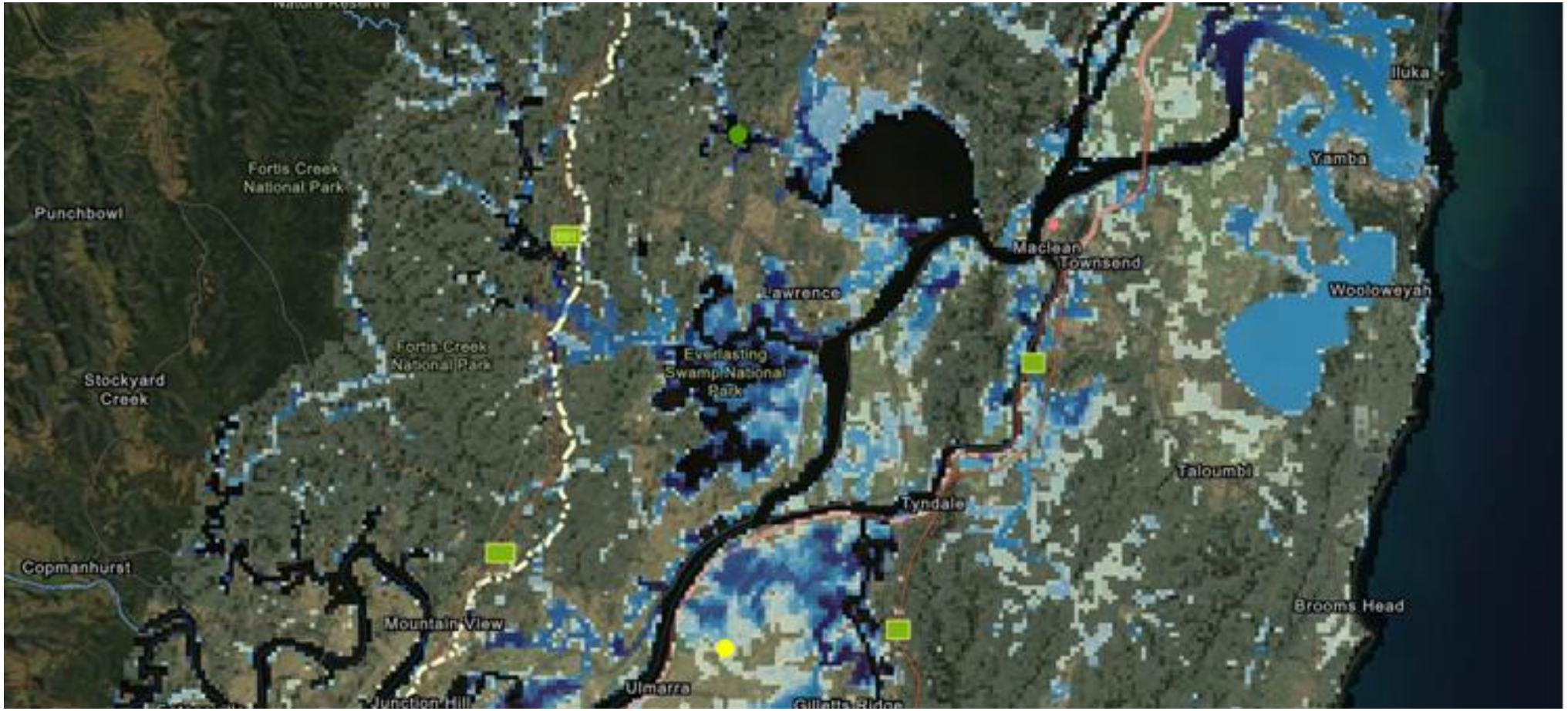
8 March Flood Inundation: Georges River NSW (WaterRide and SFINCS)



Output Screenshots

3 March Flood Inundation: Logan Albert QLD (WaterRide and SFINCS)

SFINCS – Clarence River, Flood depth forecasts



Initial learnings

- The POC has proved that a multi-model approach can be taken to deliver appropriate flood inundation information over large areas

- The calibrated WaterRide model currently outperforms the experimental uncalibrated SFINCS modelling approach – as expected

- Web Feature Service (WFS) or shapefile (vector) is the desirable output format of our customers, to enable integration and analysis with other key data sets
    - Population and business information
    - Roads and supply chain
    - Building information

- Lots of potential for improving the process across the value chain

Short-term planned improvements to the POC

- Integrating outputs of FliFS into HyFS and also viewing the FliFS client
- Inclusion of more WaterRide model locations
- Removal/identification of standing water
- Post processing output to enhance output resolution
- Further refinement of the output into GIS friendly formats (WFS layers)
- Verification/validation against flood footprints (Copernicus/QFES damage data/other remote sensed information)

Maitland

Longer term development options

PoC has shown viability of extent forecasts

Positive customer feedback received

Applying to whole country is a large job

- Model Development/Calibration
- Working with jurisdictions to define service

Bureau/ACS review to help guide future plans

Tuggerah Lake

Shoni Maguire and Chris Leahy

Australian Climate Service and Bureau of Meteorology

Camden, Western Sydney