An Empirically-based sediment budget for the Normanby Basin: Key Findings & Implications

Australian Rivers Institute, Griffith University

Andrew Brooks, John Spencer, Jon Olley, Tim Pietsch, Daniel Borombovits, Graeme Curwen, Leila Eslami-Endargoli, Anne Bourgeault, Jeff Shellberg, Christina Howley

Sediment Sinks Sources & Drivers in the Normanby Basin

CAPE YORK WATER QUALITY

Summary (upper catchment sources) i.e. Excl. Coastal plain

	GU 2012 SS I/Ps (t)	%	Previous SedNet*	%
colluvial gully	411800	13%	173000	10%
alluvial gully	736400	24%	0	0%
hillslope delivered	15900	1%	1576000	89%
Mainstem bank erosion	249900	8%	17500	1%
2ndry alluvial channel erosion	1672000	54%	0	0
total	**3086000**	**100%**	**1766500**	**100%**
storage	**1697300**	**55%**	**664000**	**37%**
Net (=18% of terrestrial input to PCB)	**1,390,000**		**1,102,000**	

Coastal plain/delta contrbt'n extra ~4 MT

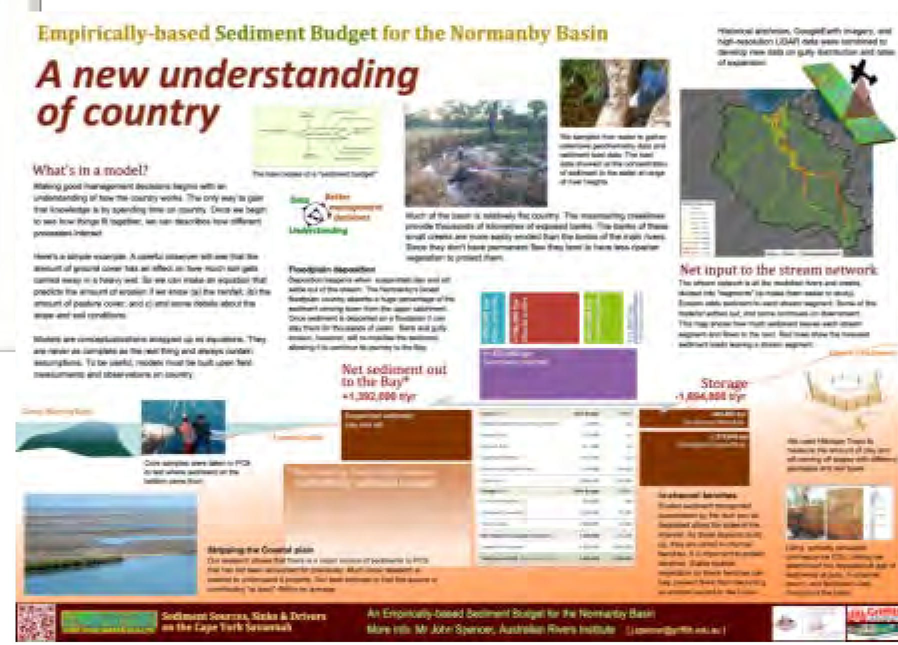
Sediment Sinks Sources & Drivers in the Normanby Basin

CAPE YORK WATER QUALITY

For more details - see

www.capeyorkwaterquality.info

See also POSTER Displays in Foyer



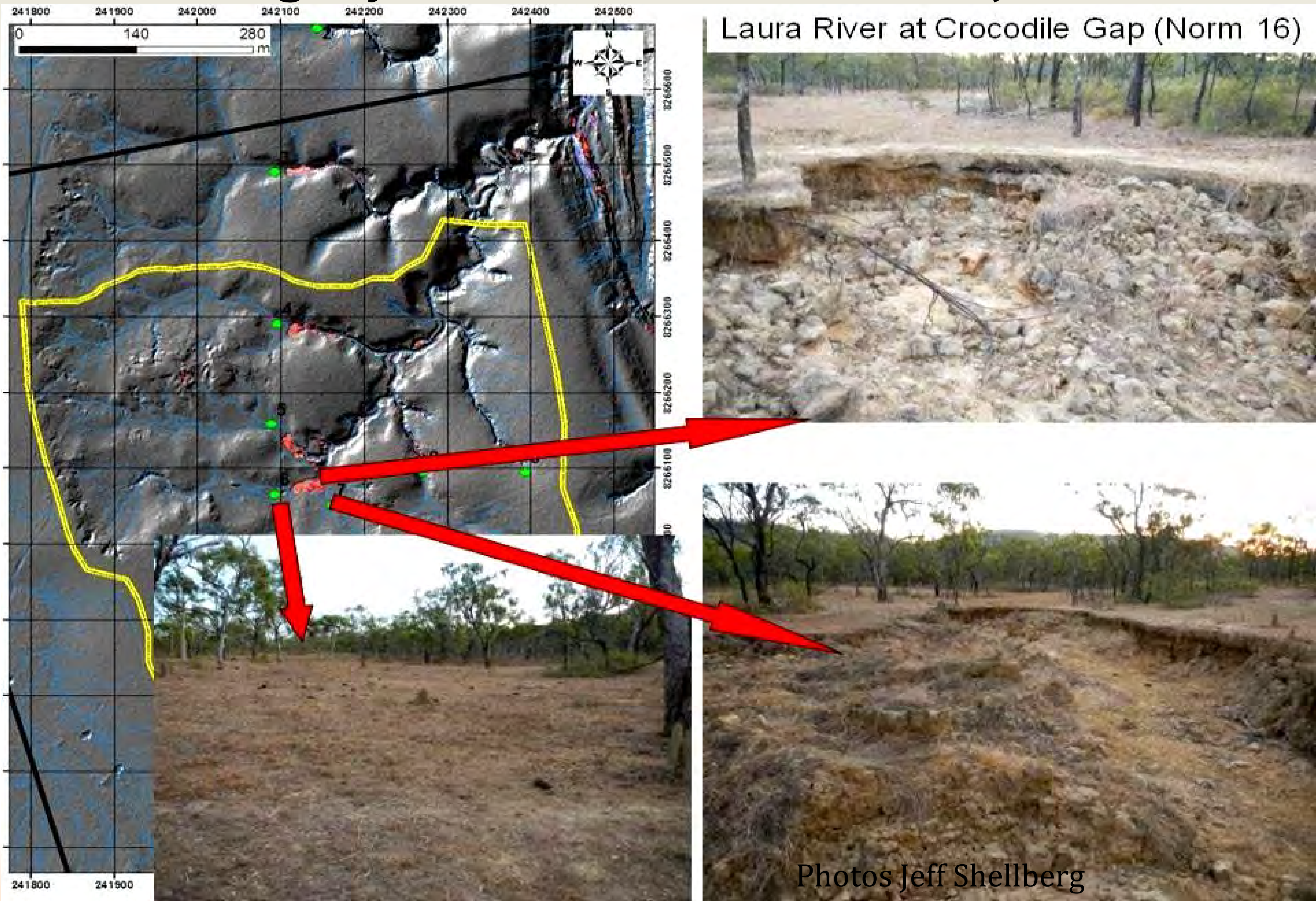
Sediment Sinks Sources & Drivers in the Normanby Basin

CAPE YORK WATER QUALITY

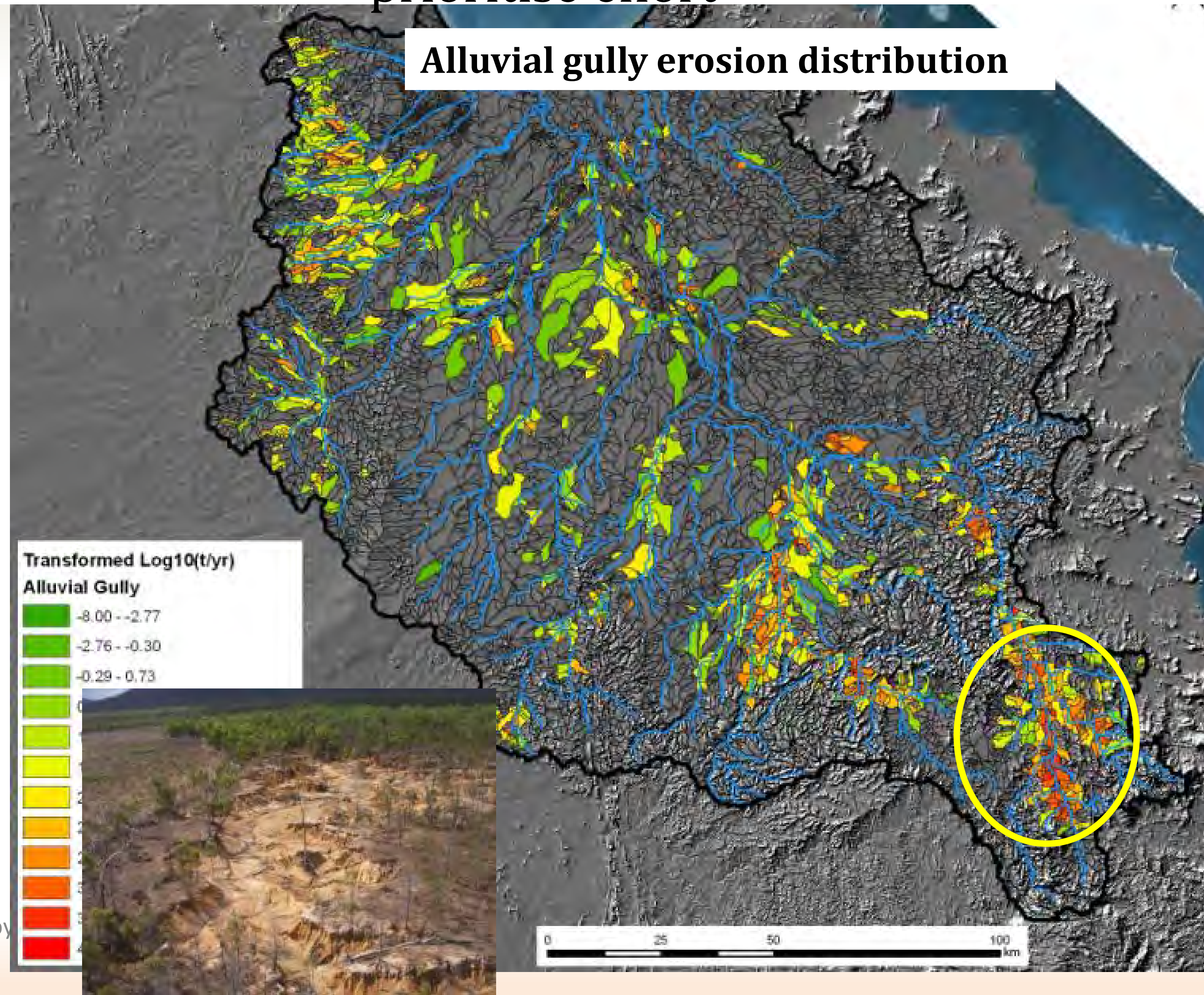
So what are the implications of these findings?

Hillslopes like this not the major sediment source area (1-10% - not 90%)

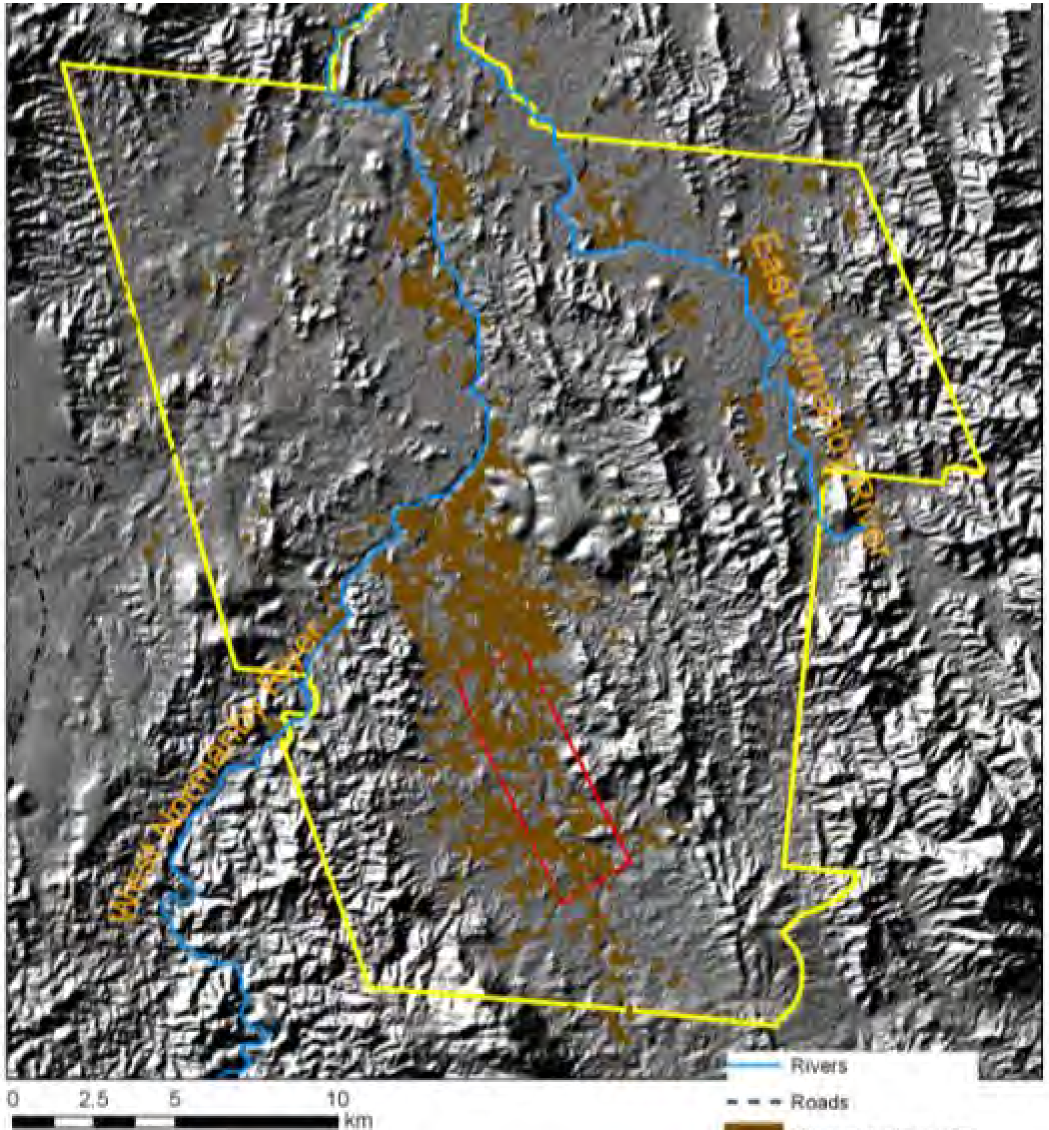
Alluvial gully erosion like this is a major source



Can now identify accelerated erosion hotspots and better prioritise effort

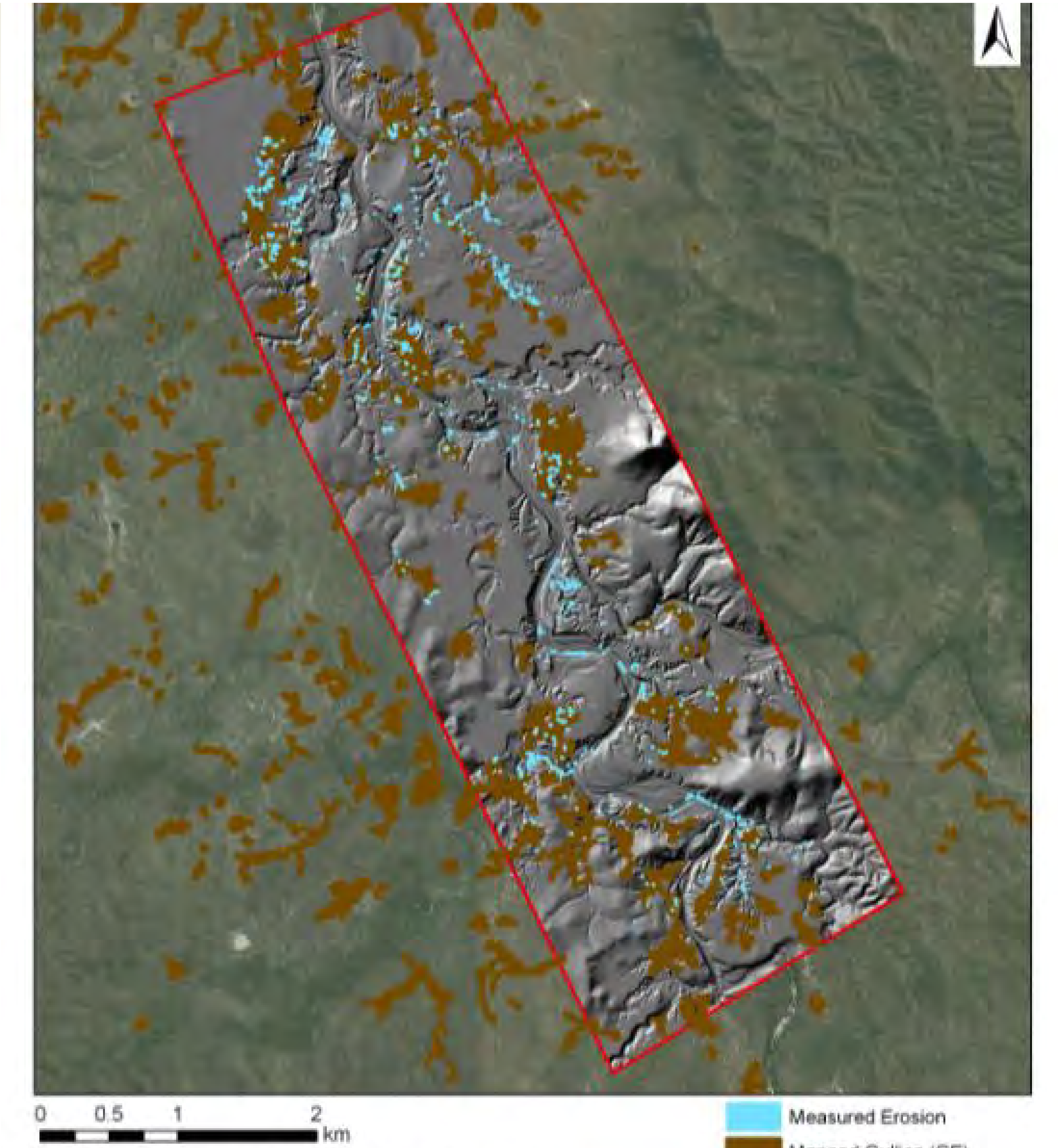


At a property scale we can identify areas of major erosion and use this as a basis for planning new management approaches



Distribution of gullies as mapped on Google Earth imagery

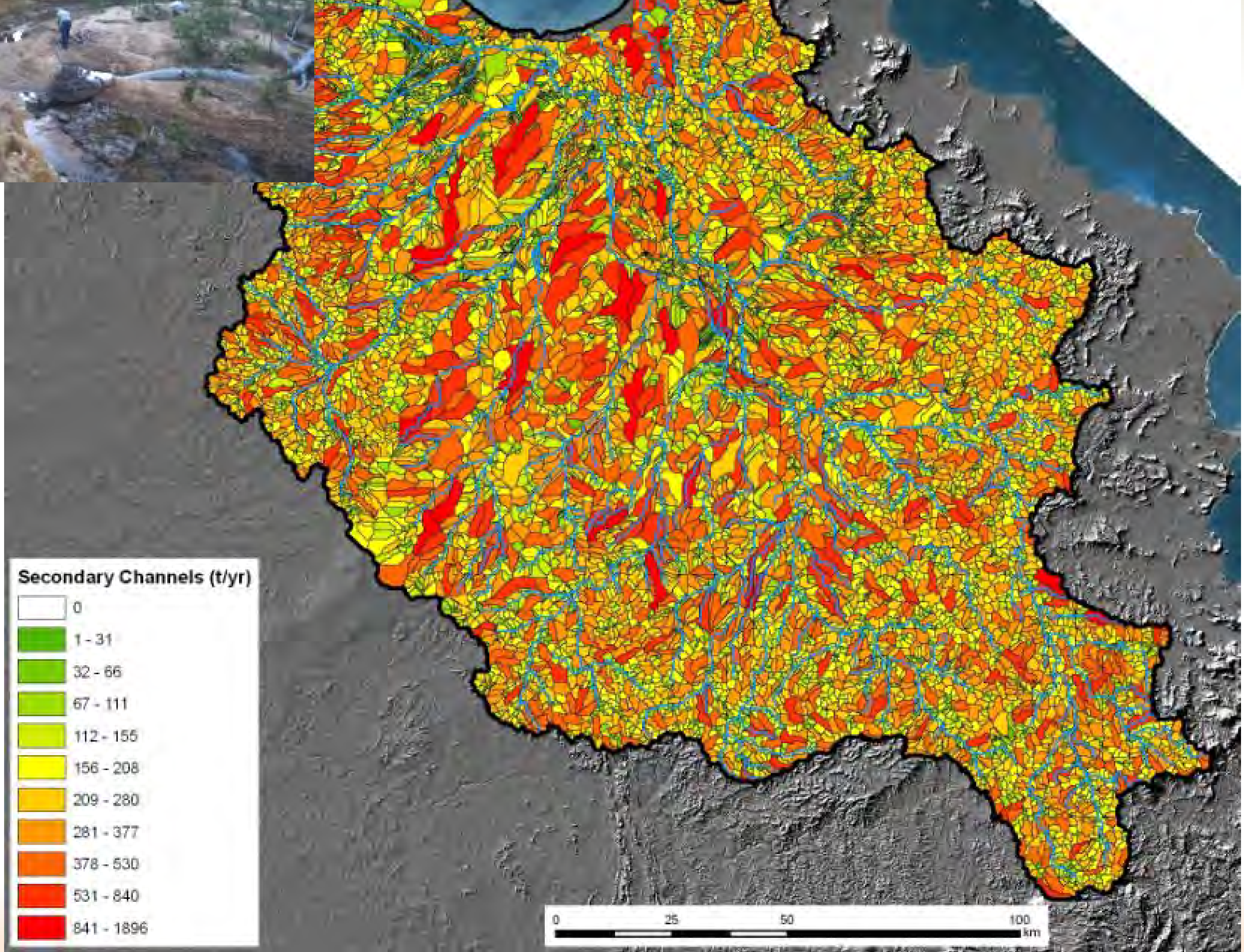
In areas where we have repeat LiDAR – we can potential target individual “problem gullies” or gully clusters.



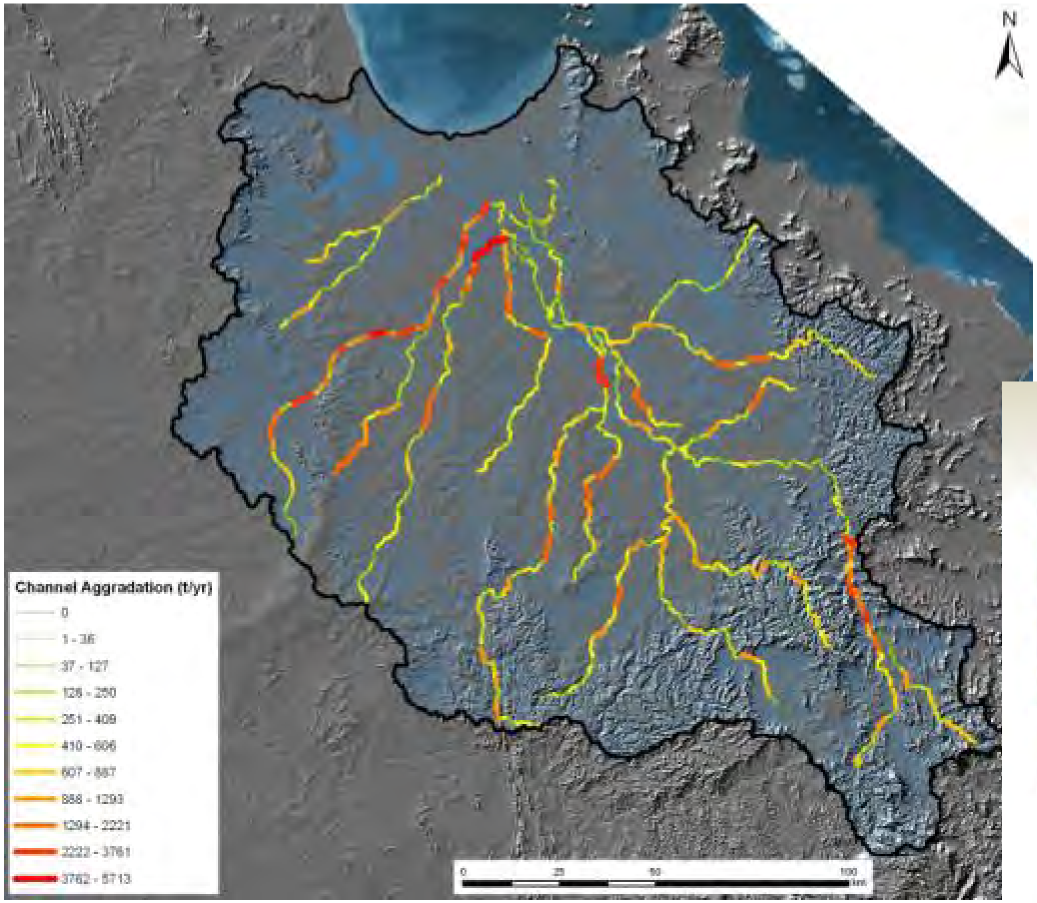
This map shows polygons of material eroded between lidar acquistion in 2009 and 2011 overlain on distribution of gullies as mapped on Google Earth imagery.

Channel erosion from ubiquitous small channels also a major source

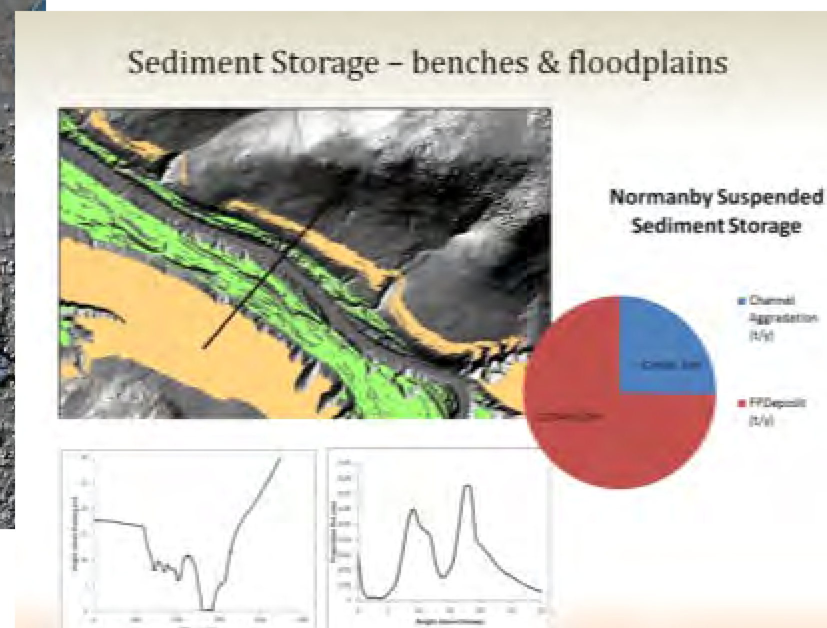
Minor alluvial channel bank erosion



Need to factor in-channel storage into modelling and management strategies



How important is bench storage in other GBR catchments?



Management approach quite different under the two scenarios (i.e. Old & New model)

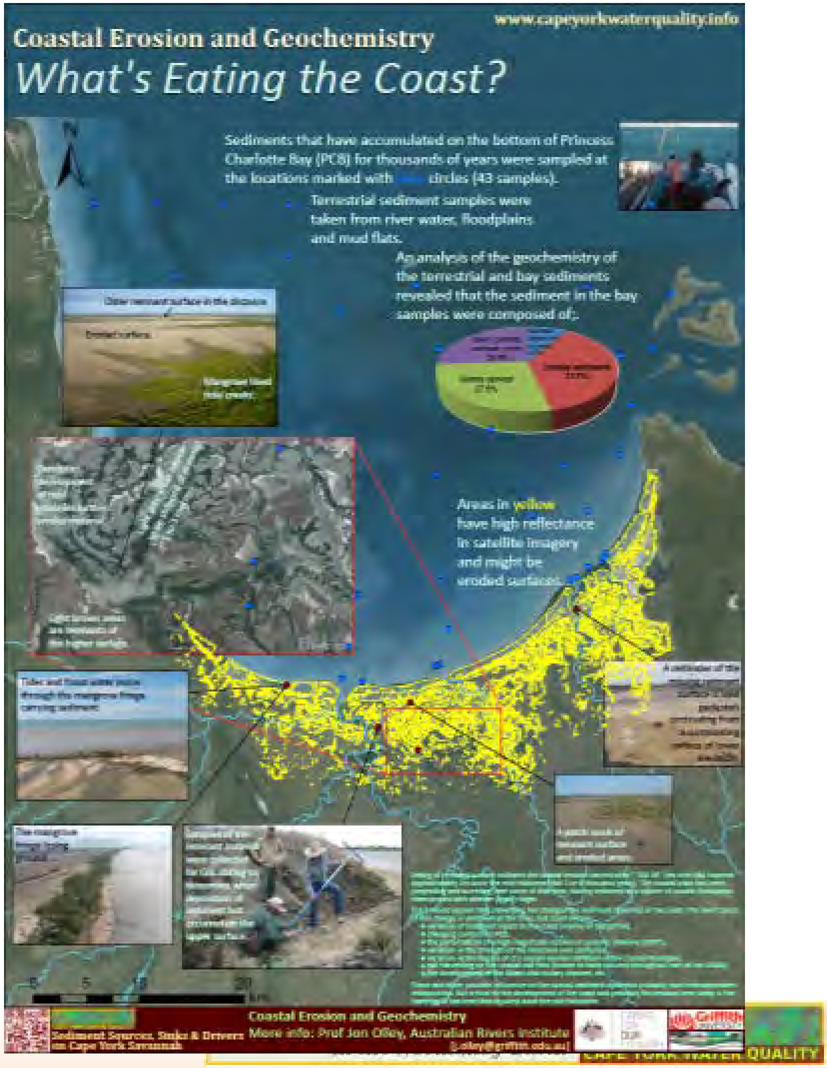
- Catchment cover management (e.g. GLM) only part of the solution..(hydrologic link to channel/gully erosion)
- Need a range of other measures
  - Riparian zone management is key
    - Reducing the potential for initiating new alluvial gullies
    - Reducing bank erosion due to direct disturbance by cattle (particularly)
    - Increasing vegetation in gullies & on banks
    - Maximising storage within channels
    - Reducing potential for remobilising sediment deposited within the channel zone (benches)

Need to focus management efforts & R&D on gullies & river banks

See poster display

What is driving coastal erosion in PCB?

- What threat – if any - does an additional ~4Mt/yr that we didn't know about pose to the reef?
- Climate change?
- Do other catchments have coastal erosion sources such as this?



See poster display

To what extent has RUSLE-based modelling over-predicted hillslope erosion in other GBR catchments?

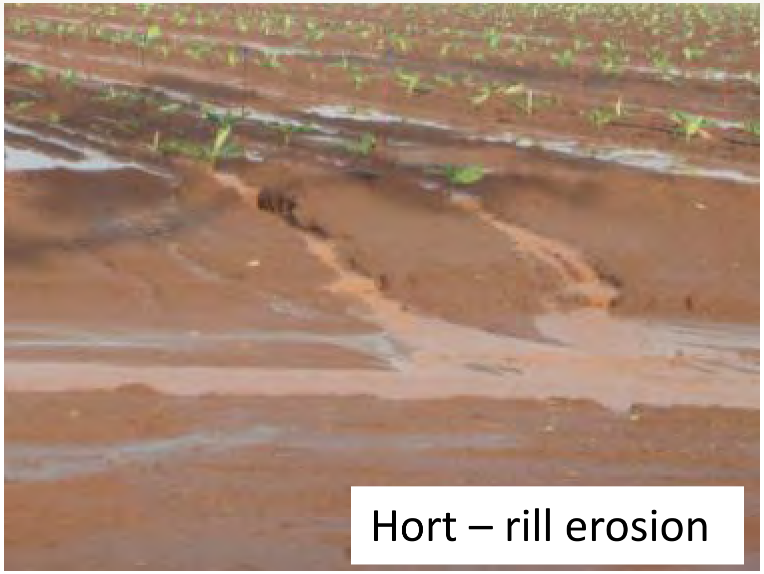
- Are rivers like the O'Connell really dominated by hillslope erosion?
- Or are other processes like bank erosion more significant?

Need to revisit models & critically review all model assumptions

Need a major investment in measuring soil erodibility (K factors)

How significant are roads as human induced sediment sources in other GBR catchments?

Still a number of unquantified inputs



There are a range of more specific implications for how we measure and/or model these large savannah catchments... this is just a start.

Thankyou

- Acknowledgements:

This project is funded through the Federal Govt Reef Rescue Program in partnership with Cape York Sustainable Futures (CYSF) & Cape York Marine Advisory Group (CYMAG) , Rainforest Reef Research Centre (RRRC)

Thanks to Isha Segboer & Trish Butler (CYSF), Ian & Malcolm McCollum (CYMAG), Sheriden Morries (RRRC), Jane Waterhouse (C20), Ron Harrigan (Normanby Station), Darryl Paradise (Kings Plains Station), Damian & Bridget Curr (Springvale Station); Jason Carroll (Sthrn CY Catchments), Amanda Hogbin (OLKLA Corp), The Laura Rangers, Ted & Sue Lee, Bungie Scott, & many others....

Reef Rescue Research & Development

Griffith UNIVERSITY

CARING FOR OUR COUNTRY

Sediment Sinks Sources & Drivers in the Normanby Basin

CAPE YORK WATER QUALITY