



# TraNSIT - Unlocking options for efficient logistics infrastructure in Australia

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# Transport Network Strategic Investment Tool - TraNSIT

- Funded by the Australian Government
- Inform investment and regulatory changes in transport and supply chains
- A modular transport network analysis tool
  - Maps and optimises the route and cost of every vehicle and rail movement
  - Across the supply chain - farm – storage - processing – market
- Provides the most comprehensive mapping of Australia's agriculture and forestry freight ever achieved
  - 98% of Australian agriculture transport
  - Provided new insights into freight task, including bottlenecks and inefficiencies

# TraNSIT features

## Network

- Roads and features
- Rail lines and load points

## Vehicle and trains

- Costs model
- Optimal vehicle selection

## Commodities

- Enterprise locations
- Demands or supplies

## Calculation

- Vehicle route optimisation

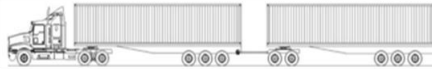
Semitrailer



B-Double



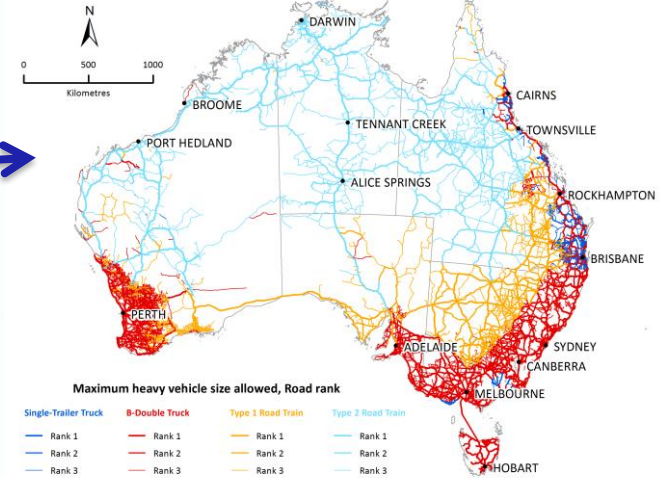
Type 1



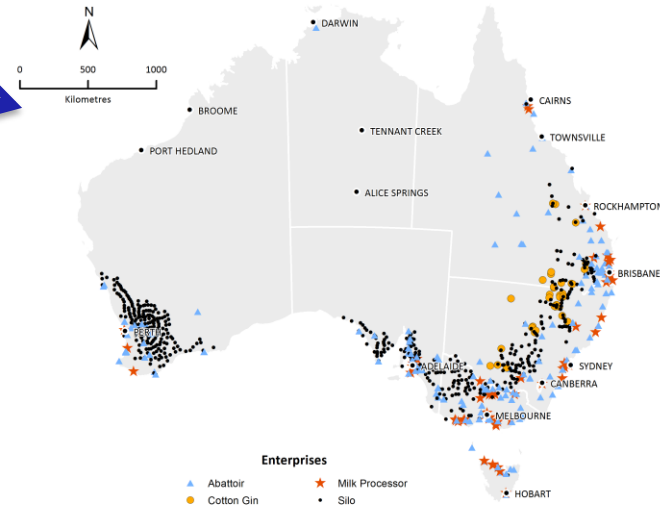
Type 2



## Road Network

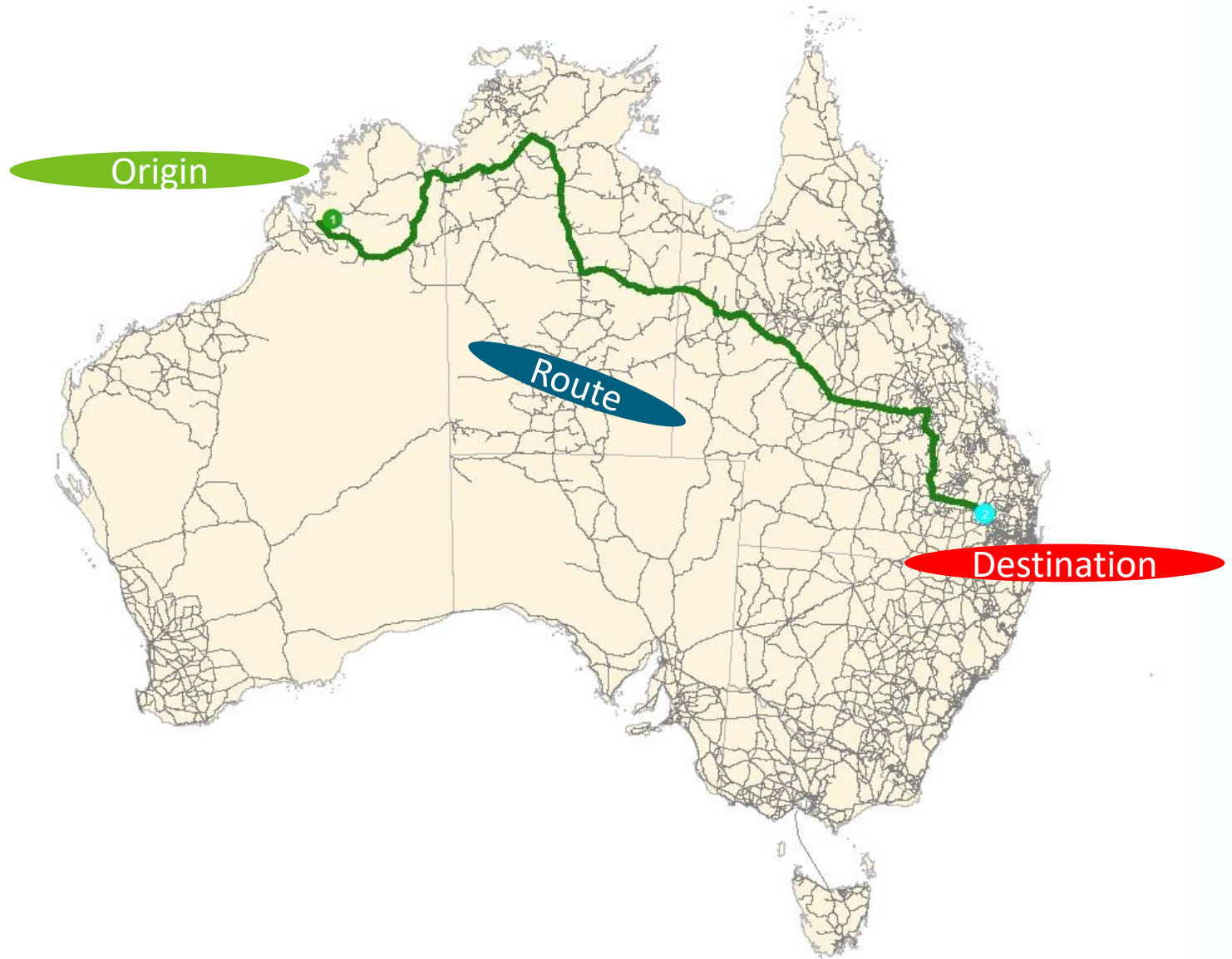


## Enterprises - Post Harvest



Type	Modelled cost (\$/km) per travel speed			Additional maintenance costs (\$/km)		Idle cost (\$/hr)
	100 km/h	60 km/h	20km/h	Good Unsealed	Poor Unsealed	
Semitrailer	1.91	2.58	6.11	0.09	0.26	119
B-Double	2.35	3.13	7.36	0.13	0.39	141
Type 1	2.71	3.54	6.81	0.16	0.49	169
Type 2	3.43	4.36	8.22	0.24	0.72	177

# TraNSIT route optimisation

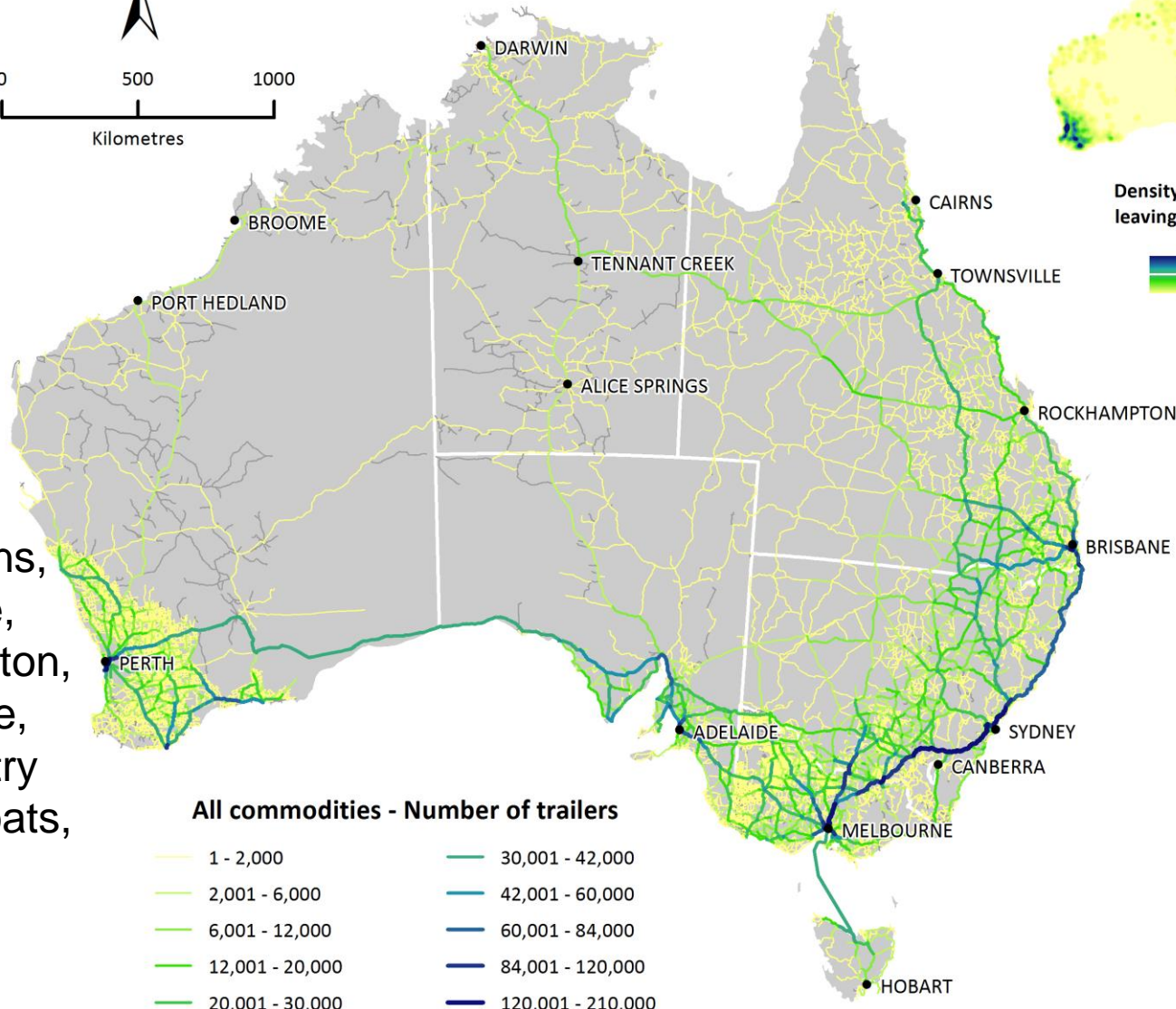
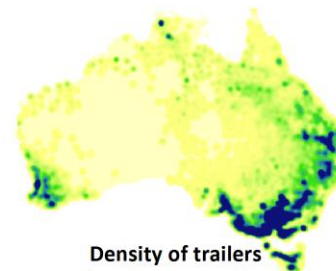
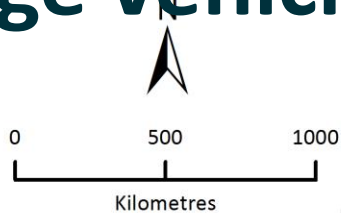




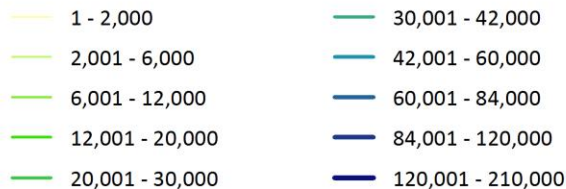
# Impacts and achievements

- Most extensive agricultural transport data set and modelling ever assembled
  - Over 80 government agencies, associations and industry groups involved
  - 235,000 enterprises from farming to processing and markets
    - Plus 180,000 for forestry and other commodities
  - Over 5 million vehicle trips and 10,000 rail trips routed
- Inform government investment in roads
  - \$100 million Northern Australia Beef Roads programme
    - Picked the best projects to fund and increased transport cost savings by 72%
- Changed regulation in transported related biosecurity
  - Reduced transport costs of cattle by \$1.5 million per year
- Improved access to processing and markets
  - Last mile, high productivity vehicles, inter-modal
- Identified and prioritised bottlenecks across Australia

# Average vehicles per year

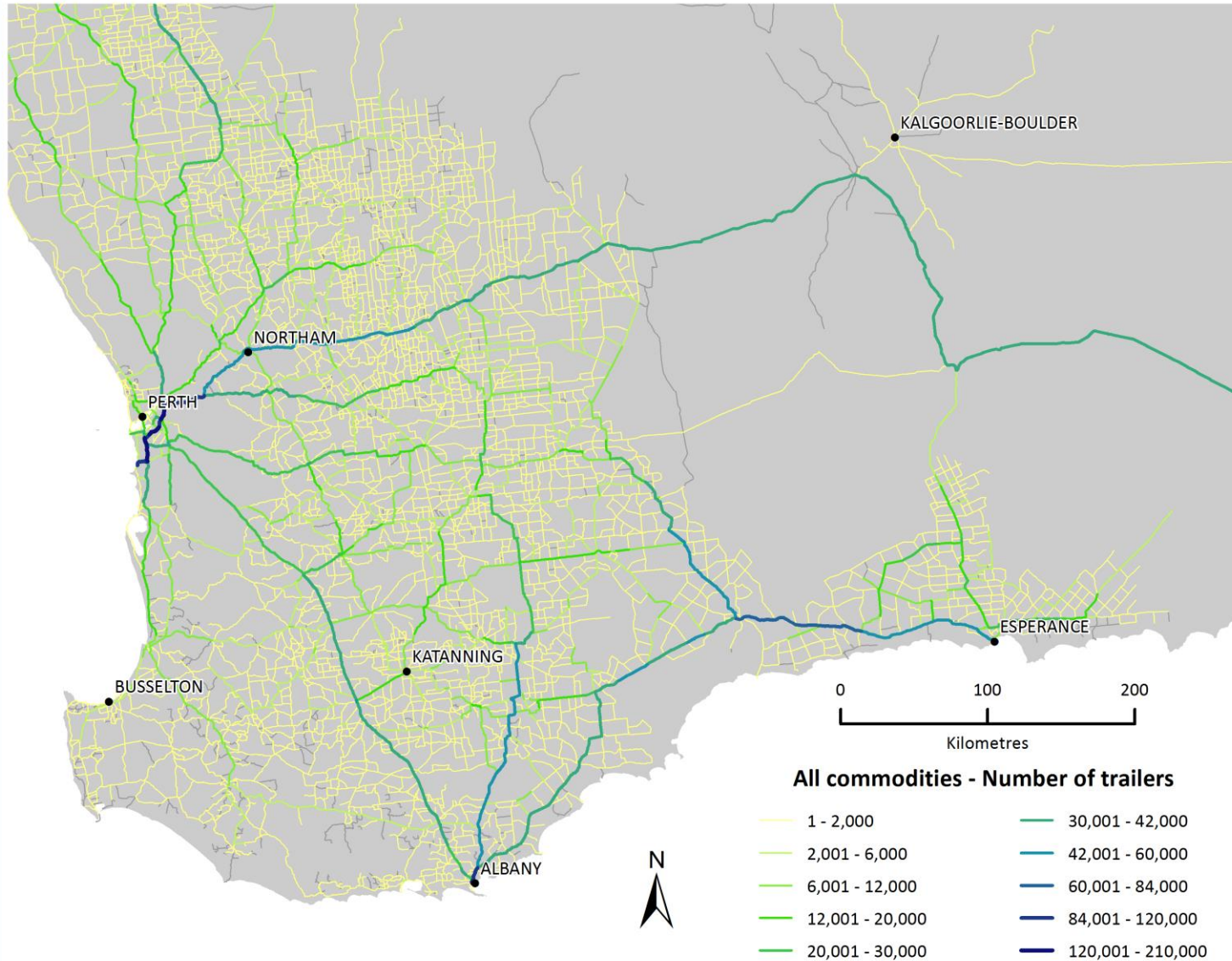


## All commodities - Number of trailers

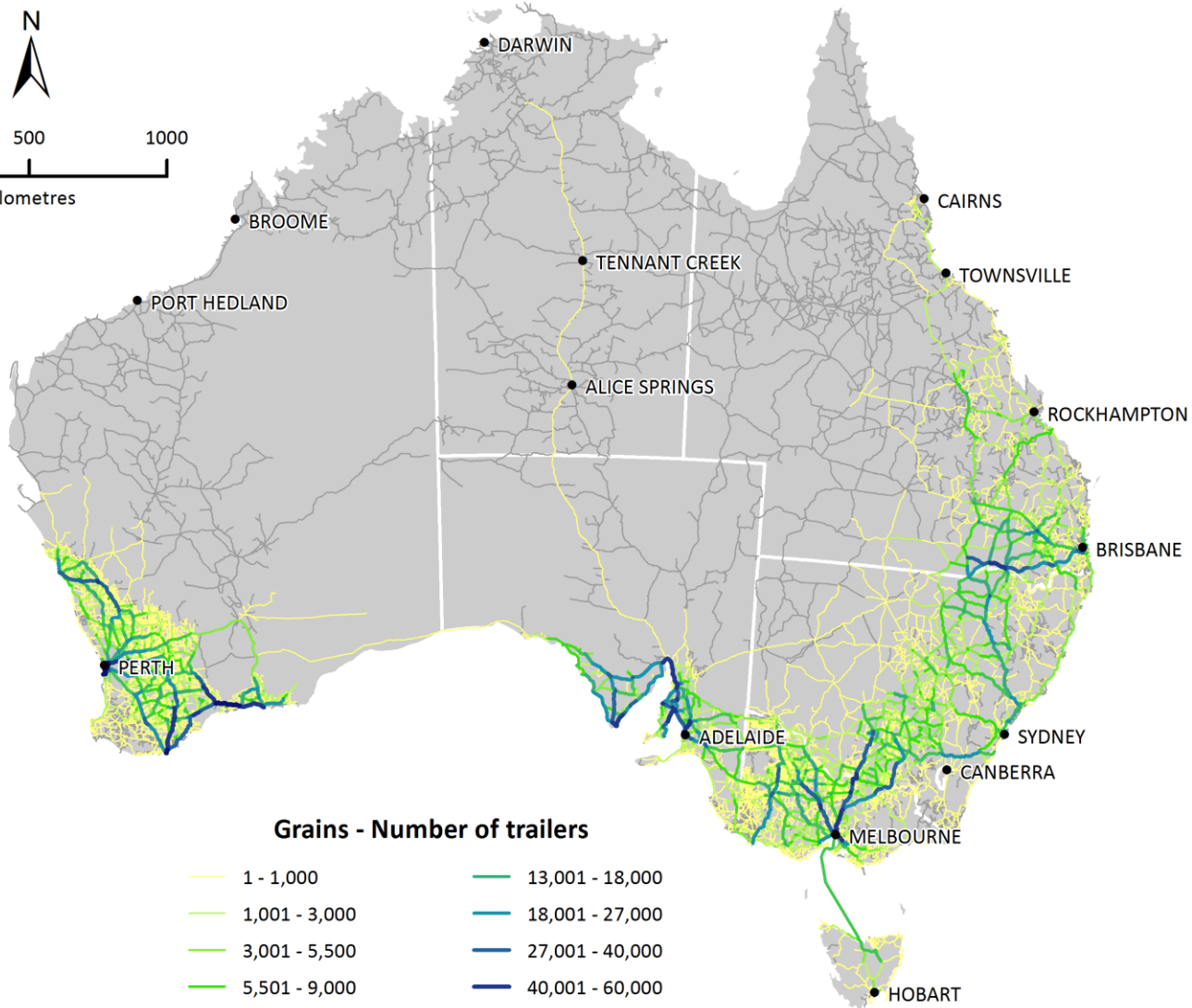
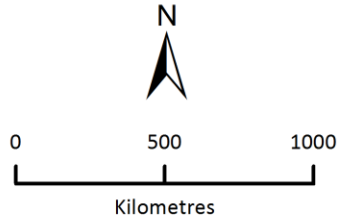


Beef, Grains,  
Dairy, Rice,  
Sugar, Cotton,  
Horticulture,  
Pigs, Poultry  
Sheep, Goats,  
Stock feed  
Buffalo

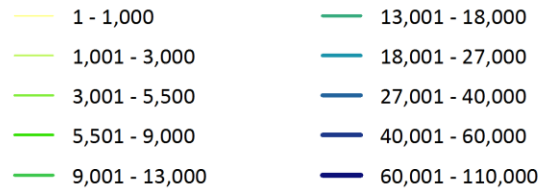
# Average vehicles per year – south west WA



# Average vehicles per year - Grains



## Grains - Number of trailers





# Modelled annual transport costs

	Road (\$m)	Rail (\$m)	Road CO <sub>2</sub> (tonnes)
Beef#	\$572.4	\$31.6	244,082
Grain	\$2,149.7	\$487.3	862,184
Pigs	\$29.0		11,156
Rice	\$134.2		55,437
Dairy	\$881.7		337,294
Sugar	\$52.2	\$9.9	16,174
Sheep/Goats	\$221.8		85,883
Cotton	\$76.9	\$13.2	36,385
Horticulture	\$617.8		256,295
Post Processing*	\$249.7		98,080
Mixed (DC to Market)^	\$284.5		109,157
Poultry	\$28.2		8,766
<b>Total</b>	<b>\$5,298.3</b>	<b>\$542.1</b>	<b>2,120,893</b>

#including a small number (20,000 head) of Buffalo

\*includes boxed beef, chicken, lamb, pork to domestic markets and port

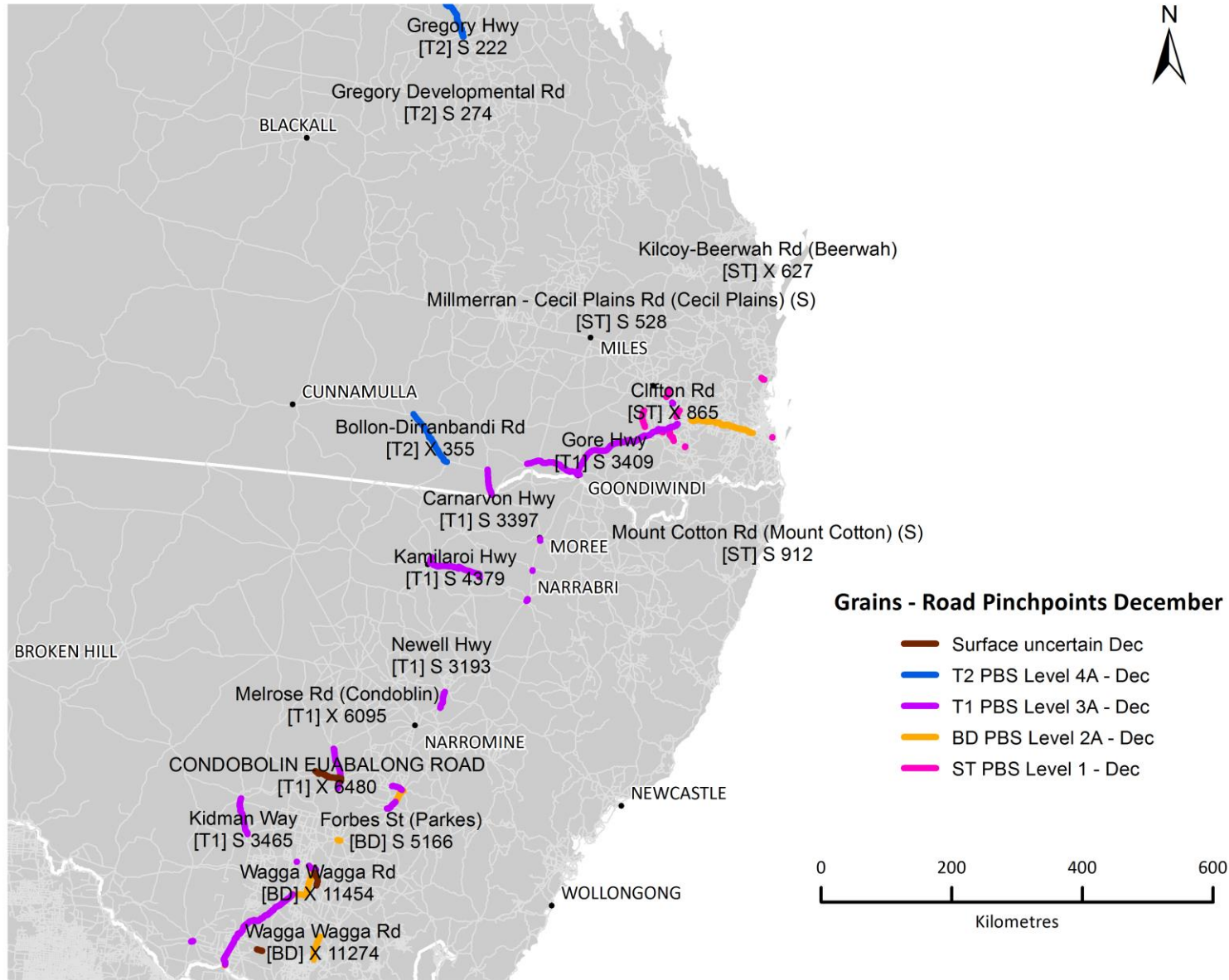
^mixture of horticulture and post processed commodities between DC's and supermarkets

These represent the total transport costs across the supply chain from paddock to domestic market (except grain) or port.

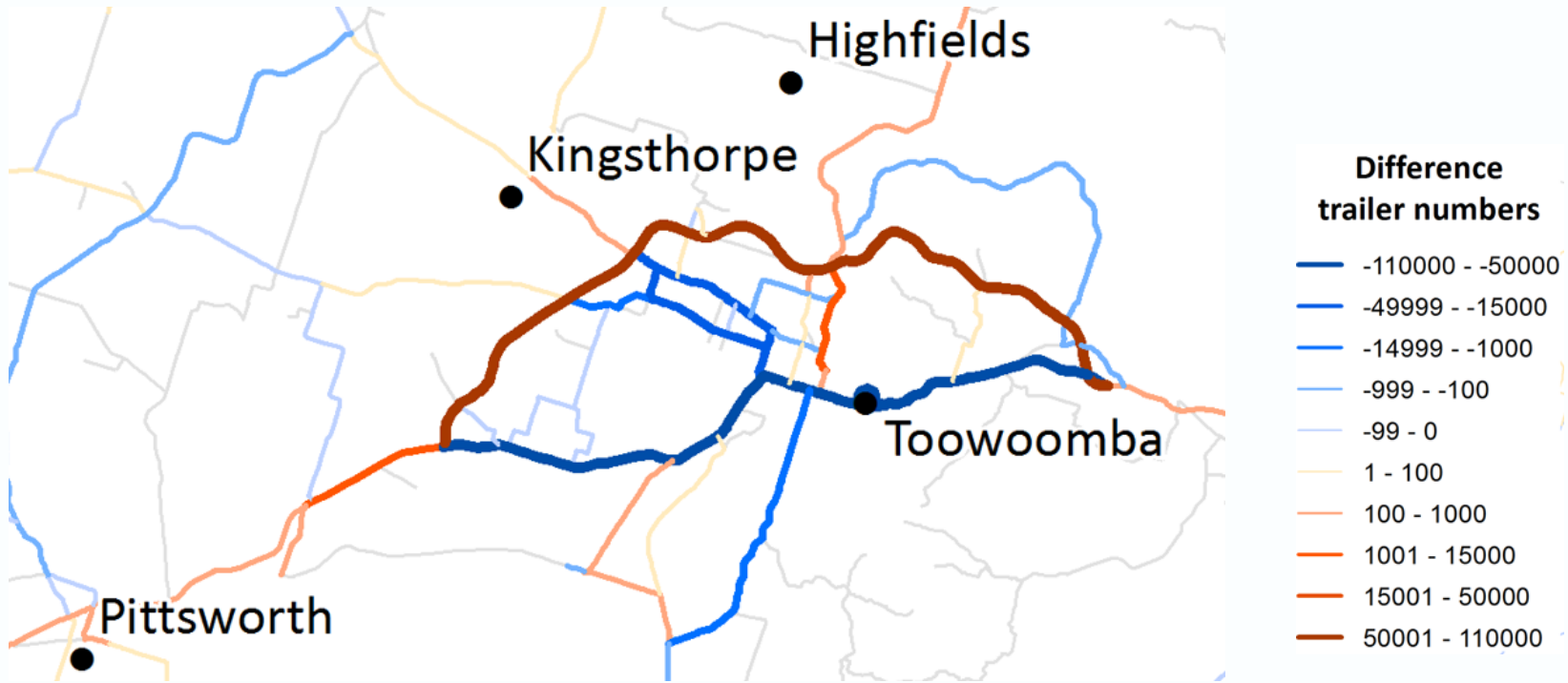
# Applications over last 18 months

- Northern Australia Beef Roads Programme
- Various road upgrade and last mile bottlenecks
  - Road sealing, volumetric loading, road flood proofing, HPV
- Impact of processor disruption – Kingaroy pork abattoir
- Providing baseline to state and local government
- Local government applications
  - Temora, Hall Creek, Flinders and Toowoomba councils
- MLA – bottlenecks and inefficiencies of livestock export
- ARTC - freight hubs – with several local governments

# Pinch points for Grain Movements - December



# Case study: Toowoomba Second Range Crossing - Change in freight volumes after construction



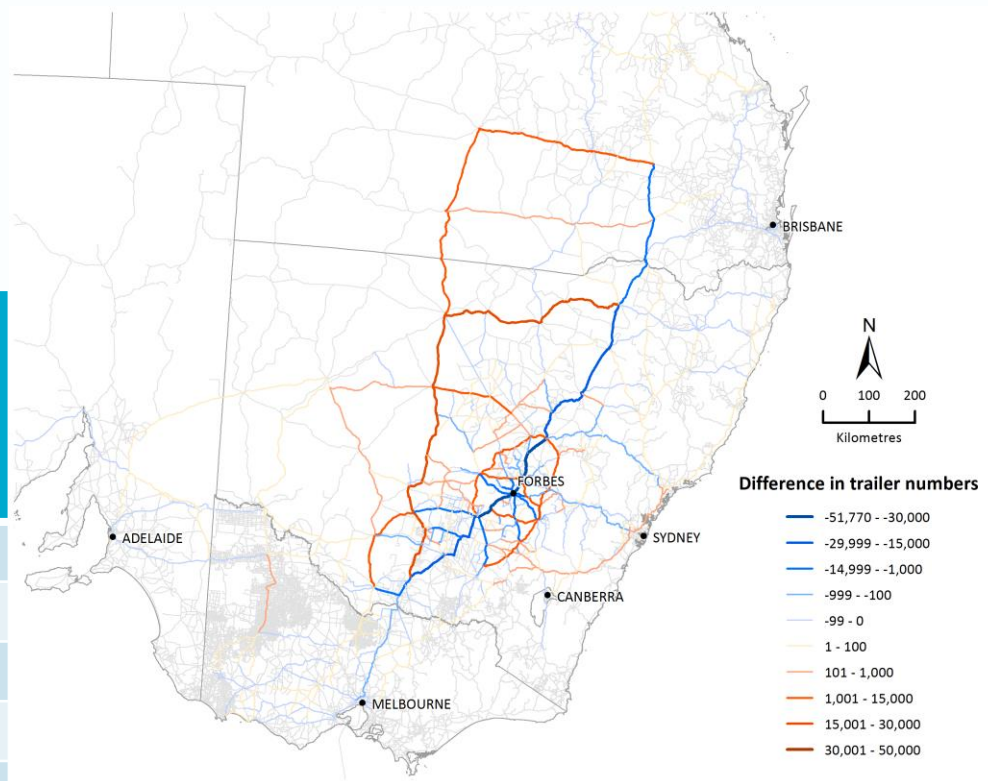
	Total Savings	Semi-Trailer Equivalents (full loads)	Savings per Trailer (one way)
<b>Total</b>	<b>\$5,402,976</b>	<b>130,645</b>	<b>\$20.68</b>



# NSW floods – Impact on transport

## Forbes Shire

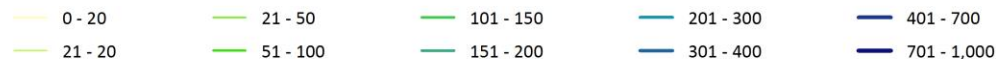
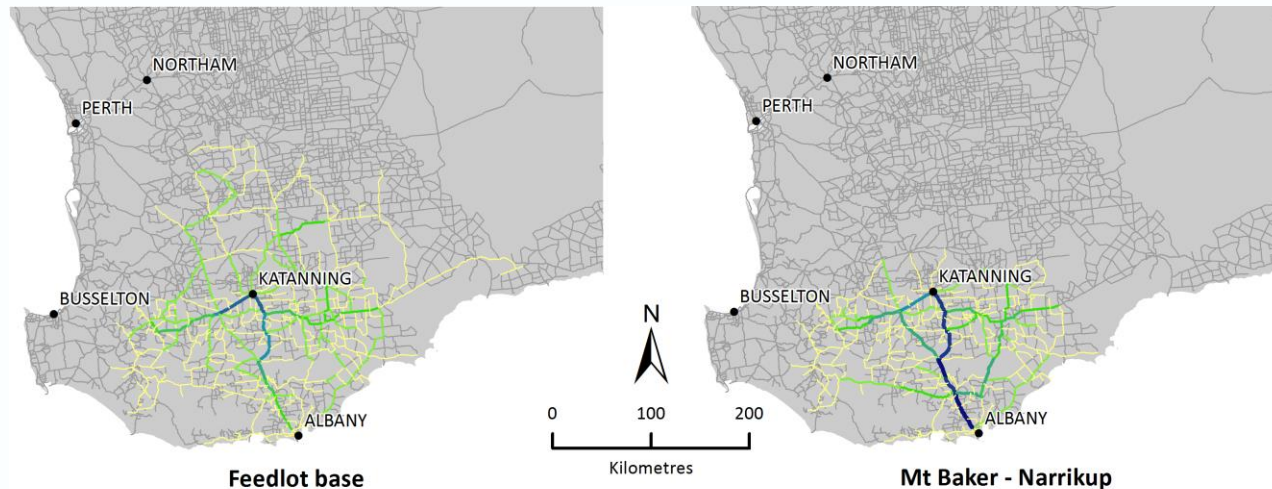
Commodity	Trailers Sept- Oct	Additional transport costs	Additional cost per tonne or head
Beef	612	\$0.2 m	\$6.90
Grains	331	\$0.1 m	\$12.81
Horticulture	2,420	\$0.4 m	\$6.33
Processed	3,852	\$0.8 m	\$9.20
Rice	2	\$0.0002m	\$4.48
Sheep & Goat	1,542	\$0.4 m	\$1.43
<b>Total</b>	<b>8,147</b>	<b>\$2 m</b>	



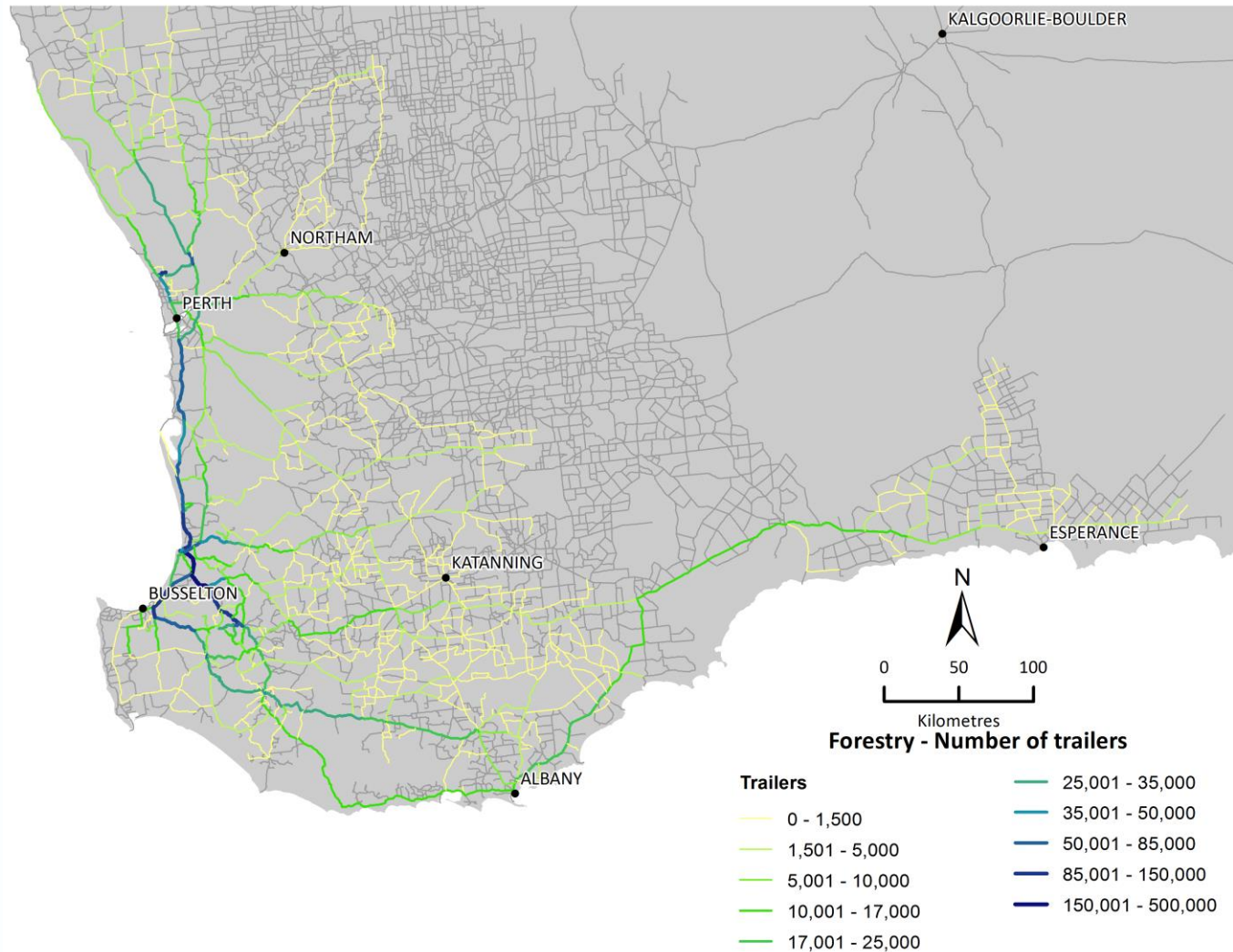
# Case study – two sheep feedlots – 70,000 head/yr

## Selecting sites to minimise transport costs

			Scenario		
<b>Supply chain segment</b>	Baseline – no feedlots	Jerramungup, Mayanup	Mt Barker, Cranbrook	Mt Barker, Kojonup	Mt Barker, Narrikup
<b>Grain</b>					
Property to Feedlot		\$265,239	\$228,398	\$272,346	\$226,810
Property to Silo	\$235,716				
<b>Sheep</b>					
Property to Abattoir	\$345,309				
Property to Feedlot		\$478,526	\$309,521	\$384,550	\$336,457
Feedlot to Abattoir		\$420,195	\$301,035	\$430,392	\$189,056
<b>Total</b>	<b>\$581,026</b>	<b>\$1,163,961</b>	<b>\$838,956</b>	<b>\$1,087,289</b>	<b>\$752,324</b>



# Forestry supply chain – WA case study

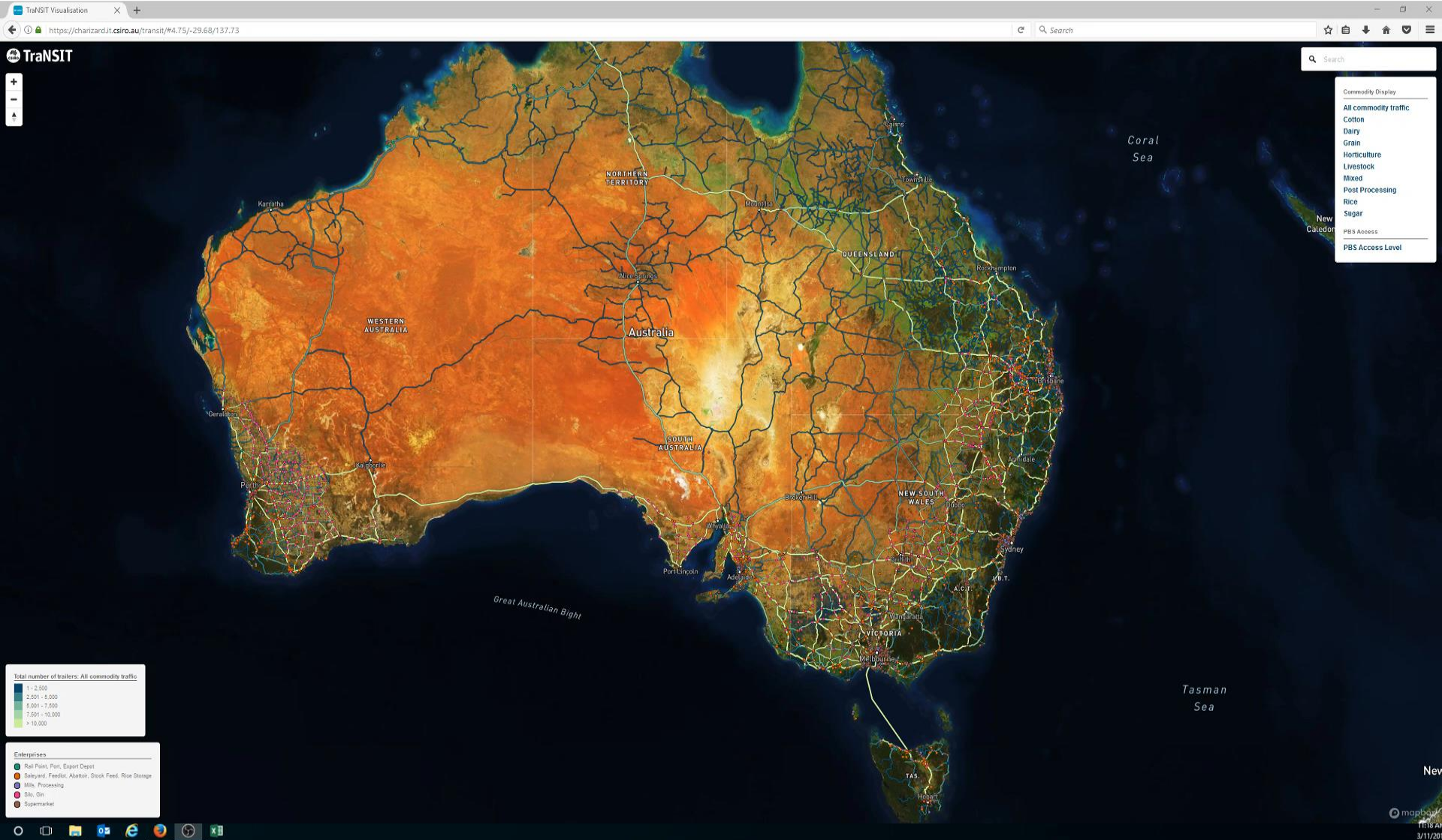


# Current/Future developments of TraNSIT

- Adding sea and air transport
  - Supply chains from point of production in country A to markets in country B
  - Facilitate logistics around trade and planning
- TraNSIT Web
  - Enable agencies to produce and test scenarios
- Link with rainfall and flood hazards
- Add a predictive capability
  - e.g. Freight task for future grain and livestock forecasts
- Extension to broader freight transport
- South East Asia – ACIAR, DFAT
  - Indonesia, Vietnam, Laos



# Visualisation Tool



# For further information contact

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