3. Location of high probability GDEs on the coastal plains within the study area

Groundwater dependent vegetation and wetlands can include paperbark swamp forests and woodlands distributed across coastal dunes and floodplains, swamp heaths and swamp sclerophyll forests and woodlands, swamp scrubs and heaths that occur on coastal dunes and swampy areas and swamp shrublands. It can include:

- Heathlands (e.g. *Banksia ericifolia)* that occur on nutrient poor, sandy soils where drainage is impeded. Where they occur on headlands or where the soils are shallow they are unlikely to depend on groundwater.
- Woodlands that occur on sandy soils {e.g. Scribbly Gum (*Eucalyptus haemastoma),* Sydney Red Gum (*Angophora costata,)* Old Man Banksia (*Banksia serrata*), Red Bloodwood (*Eucalyptus gummifera*)}
- Open forests that occur along drainage lines or in places with deeper sandy soils {e.g. Smooth-barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*) Grey Gum (*Eucalyptus punctata*), Bangalay (*Eucalyptus botryoides)}*
- Littoral rainforest and sub tropical rainforests that occur in moister coastal areas and in moist protected gullies.
- Dunal communities that occur on the sand dune and sand sheets {e.g. She-Oak (*Casuarina glauca*), Red Bloodwood (*Eucalyptus gummifera*), Scribbly Gum (*Eucalyptus haemastoma),* Smooth- barked Apple (*Angophora costata*) Coastal Banksia (*Banksia integrifolia)}*
- Aquatic habitats such as sandy beaches; estuarine areas that include mangroves, mudflats, seagrass and saltmarsh; freshwater habitats that include freshwater streams and rivers; and wetlands include coastal lagoons and floodplains, lakes, swamps and bogs.

3.1. The Northern Rivers Region

Appendix 1 and 2 presents the type of communities including groundwater dependent vegetation and wetland communities that occur on the coastal sands and coastal floodplain alluvials within the Northern Rivers Region.

The amount (percentage) of high probability GDEs (includes vegetation and wetland communities) within each groundwater source is presented in Table 4.

Table 4: Percent of high probability (HP) GDEs within each groundwater source.

Groundwater Source Name	% of HP GDEs within GWS
Bellinger - Nambucca Coastal Sands	50.56
Brunswick River Alluvial	16.74
Clarence and Coffs Harbour Alluvial	22.42
Clarence Coastal Sands	61.37
Coffs Harbour Coastal Sands	65
Hastings Coastal Sands	74.89
Hastings River Alluvial	48.95
Hydes Creek Water Source	0.88
Macleay Coastal Sands	72.53
Macleay River Alluvial	22.62
Nambucca Alluvial	38.67
Richmond Coastal Sands	41.00
Richmond River Alluvium	21.14
Stuarts Point	76.76
Tweed - Brunswick Coastal Sands	40.90
Tweed River Alluvium	1.93
Coastal Bellinger Water Source	29

3.1.1 Groundwater dependent vegetation

The location of groundwater dependent vegetation within the Northern Rivers Region is shown in Figure 7. The location of high probability groundwater dependent vegetation for each groundwater source is presented in Appendix 3.

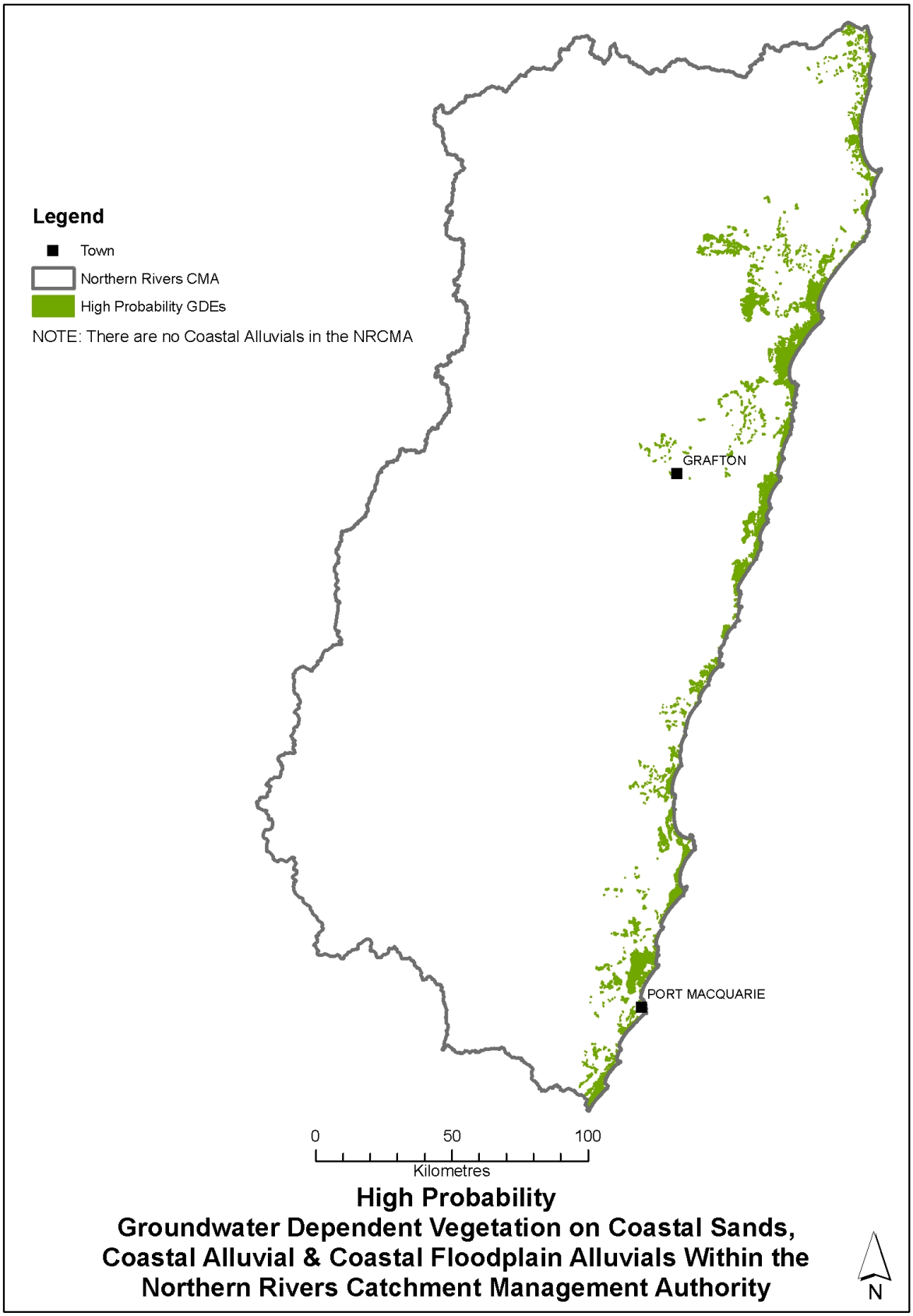

Figure 7: *Location of groundwater dependent vegetation within the Northern Rivers CMA.*

3.1.2. Groundwater dependent wetlands

The location of groundwater dependent wetlands within the Northern Rivers Region is shown in Figure 8.

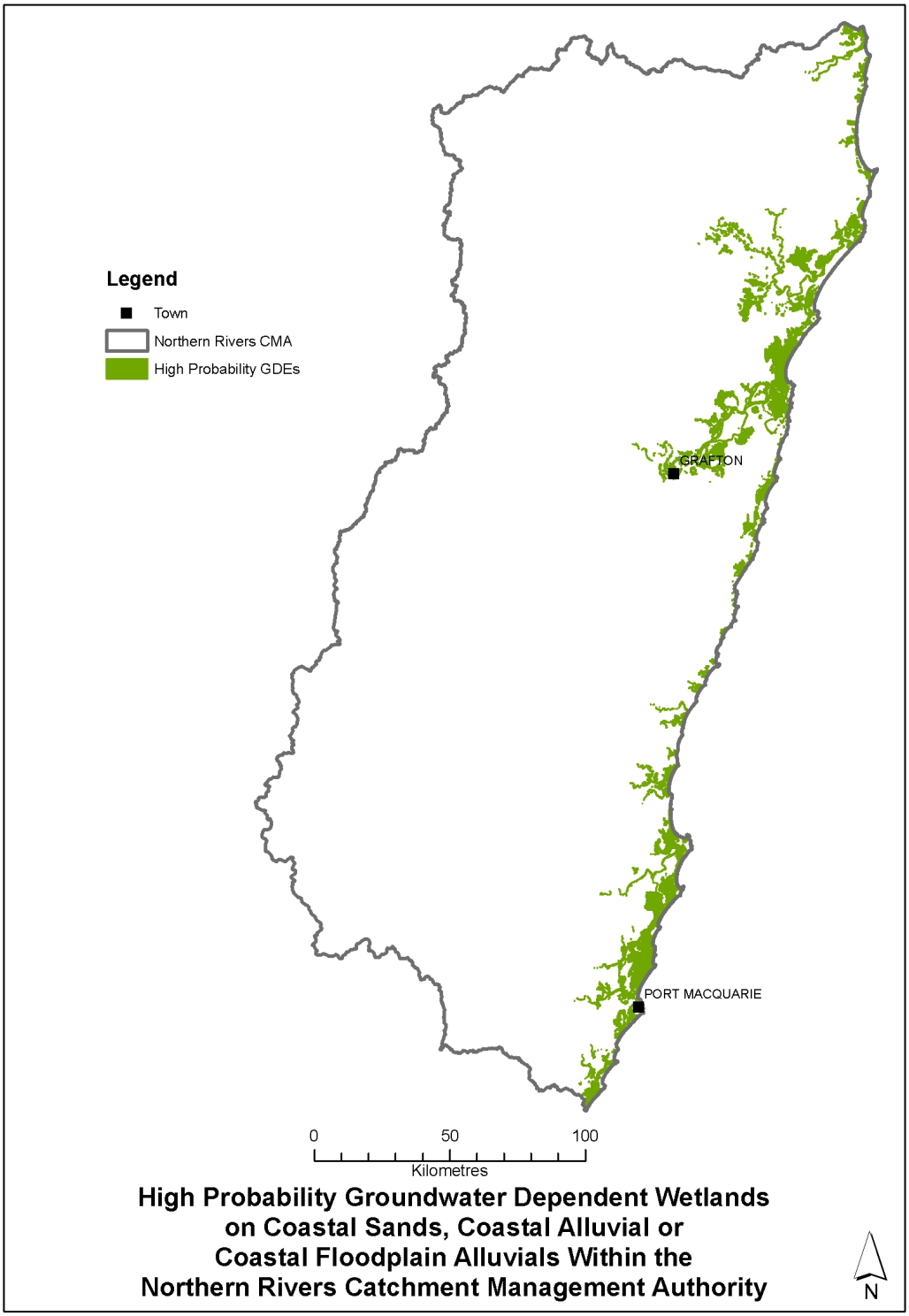

Figure 8: *Location of high probability groundwater dependent wetlands within the Northern Rivers CMA.*

Groundwater dependent wetlands were identified by type and where possible wetland community. The location of groundwater dependent wetlands by type and community for each groundwater source is presented in Appendix 4.Although many of these communities depend on groundwater the nature of dependency is largely unknown. Appendix 5 outlines the potential relationship between groundwater and wetland types that can occur on the coastal plains and details the types of groundwater dependent wetland communities that occur on the coastal sands and coastal floodplain alluvials within the Northern Rivers Region.

3.2. Hunter-Central Catchment Management Authority Area

The location of groundwater dependent vegetation, selected freshwater and estuarine wetlands is presented in Figure 9.

The amount (percentage) of high probability (HP) GDEs (includes vegetation and wetland communities) within each groundwater source is presented in Table 5.

Table 5: The percentage of high probability groundwater dependent ecosystems within each water source within Hunter- Central Rivers CMA.

Groundwater Source Name	% of HP GDE within GWS
Great Lakes Coastals Sands	74.30
Hawkesbury to Hunter Coastal Sands	40.26
Hunter Regulated River Alluvium	6.49
Karuah Alluvial	93.36
Manning - Camden Haven Coastal Sands	66.81
Manning River Alluvial	14.16
Newcastle	21.29
Paterson/Allyn Rivers	7.45
Sydney Basin - Lower Hunter/Central Coast	58.76
Tomago Tomaree Stockton Coastal Sands (Stockton)	47.24
Tomago Tomaree Stockton Coastal Sands (Tomago)	63.26
Tomago Tomaree Stockton Coastal Sands (Tomaree)	67.45
Wallis Creek	0.30
Williams River	5.64

The location of groundwater dependent vegetation, selected freshwater and estuarine wetland communities for each groundwater source is presented in Appendix 6.

Appendix 7 lists the types of groundwater dependent vegetation, freshwater and estuarine wetlands that occur on the coastal sands, coastal alluvial and coastal floodplain alluvials within the Hunter-Central Rivers Catchment Management Authority area.

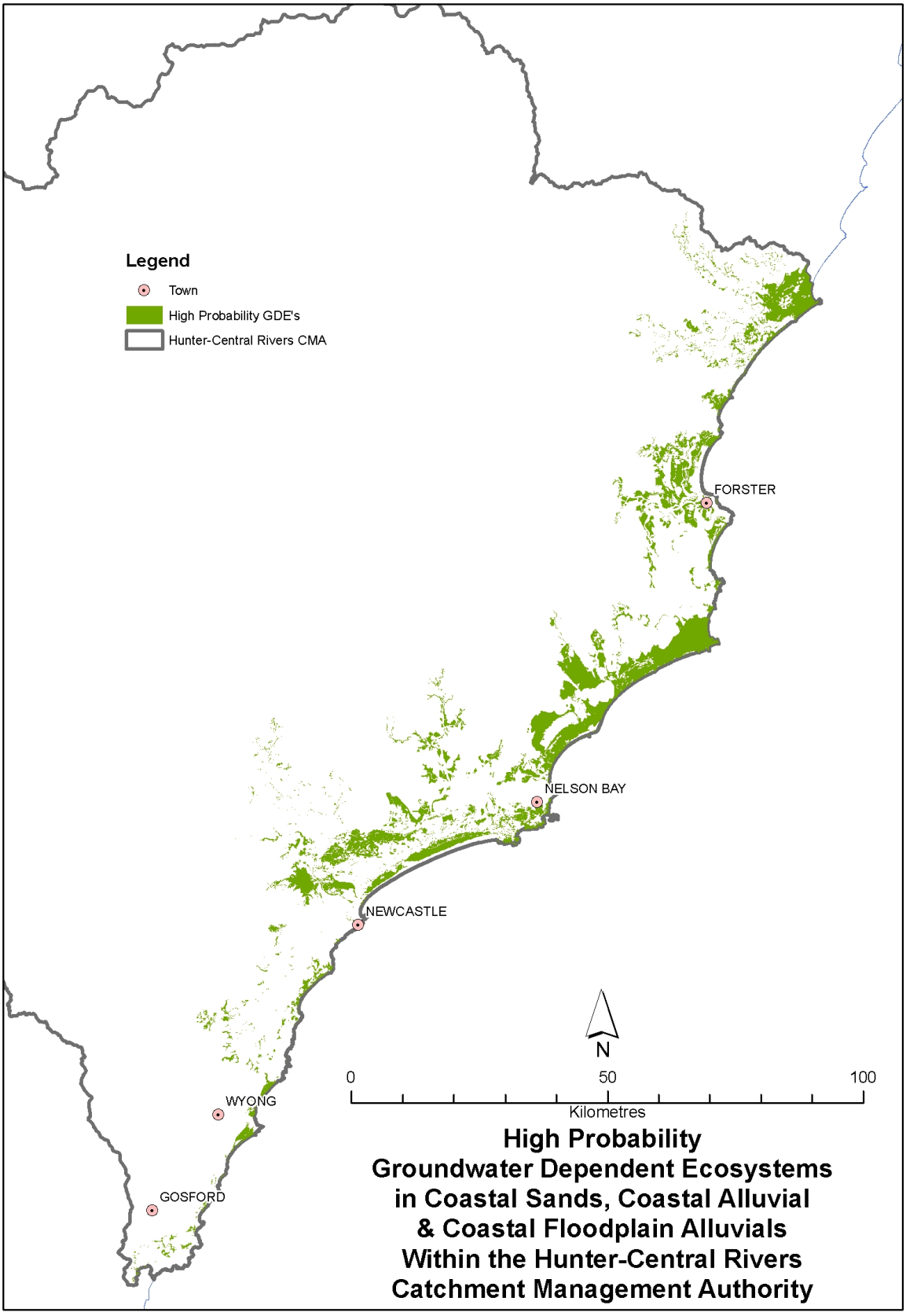

Figure 9: *Location of groundwater dependent ecosystems in the coastal plains of the Hunter – Central Rivers CMA.*

3.3. Hawkesbury Nepean, Sydney Metro and Southern Rivers CMA areas

The location of groundwater dependent vegetation, selected freshwater and estuarine wetlands within the Hawkesbury Nepean, Sydney Metro and Southern Rivers CMA areas is presented in Figure 10.

The amount (percentage) of high probability GDEs (includes vegetation and wetland communities) within each groundwater source is presented in Table 6.

Table 6: The percentage of high probability groundwater dependent ecosystems within each water wource in the Hawkesbury – Nepean, Sydney Metro and Southern Rivers CMA areas.

Groundwater Source Name	% of HP GDE within GWS	WSP identified GDE	% of WSP identified within GWS	Total % for WSP GDEs
Barragoot Lake Tributaries Alluvium	34.55			
Bega River Alluvium	46.34			
Bermagui River Alluvium	54.43			
Bobundra Creek Alluvium	96.99			
Botany Sands	6.65	Identified	5.35	12
Cuttagee Lake Tributaries Alluvium	79.01			
Dignams Creek Alluvium	52.45			
Hawkesbury Alluvial	14.87	Identified	0.41	15.28
Maroota Tertiary Sands	18.89			
Metropolitan Coastal Sands	18.08	Identified	6.83	24.91
Middle Lagoon Tributaries Alluvium	38.70			
Murrah Estuary Tributaries Alluvium	52.85			
Murrah River Alluvium	22.48			
Narira Creek Alluvium	42.39			
Nelson Lagoon Tributaries Alluvium	82.51			
South Coast Alluvium	48.73	Identified	0.78	49.51
South East Coastal Sands	61.44	Identified	0.18	61.62
Towamba River Alluvial	41.11			
Tuross River Alluvial	18.94			
Wallaga Lake Tributaries Alluvium	21.56			
Wapengo Lagoon Tributaries Alluvium	62.26			

The location of groundwater dependent vegetation, selected freshwater and estuarine wetland communities for each groundwater source is presented in Appendix 8.

Appendix 9 lists the types of groundwater dependent vegetation, freshwater and estuarine wetlands that occur on the coastal sands, coastal alluvial and coastal floodplain alluvials within the Hawkesbury Nepean, Sydney Metro and Southern Rivers Catchment Management Authority areas.

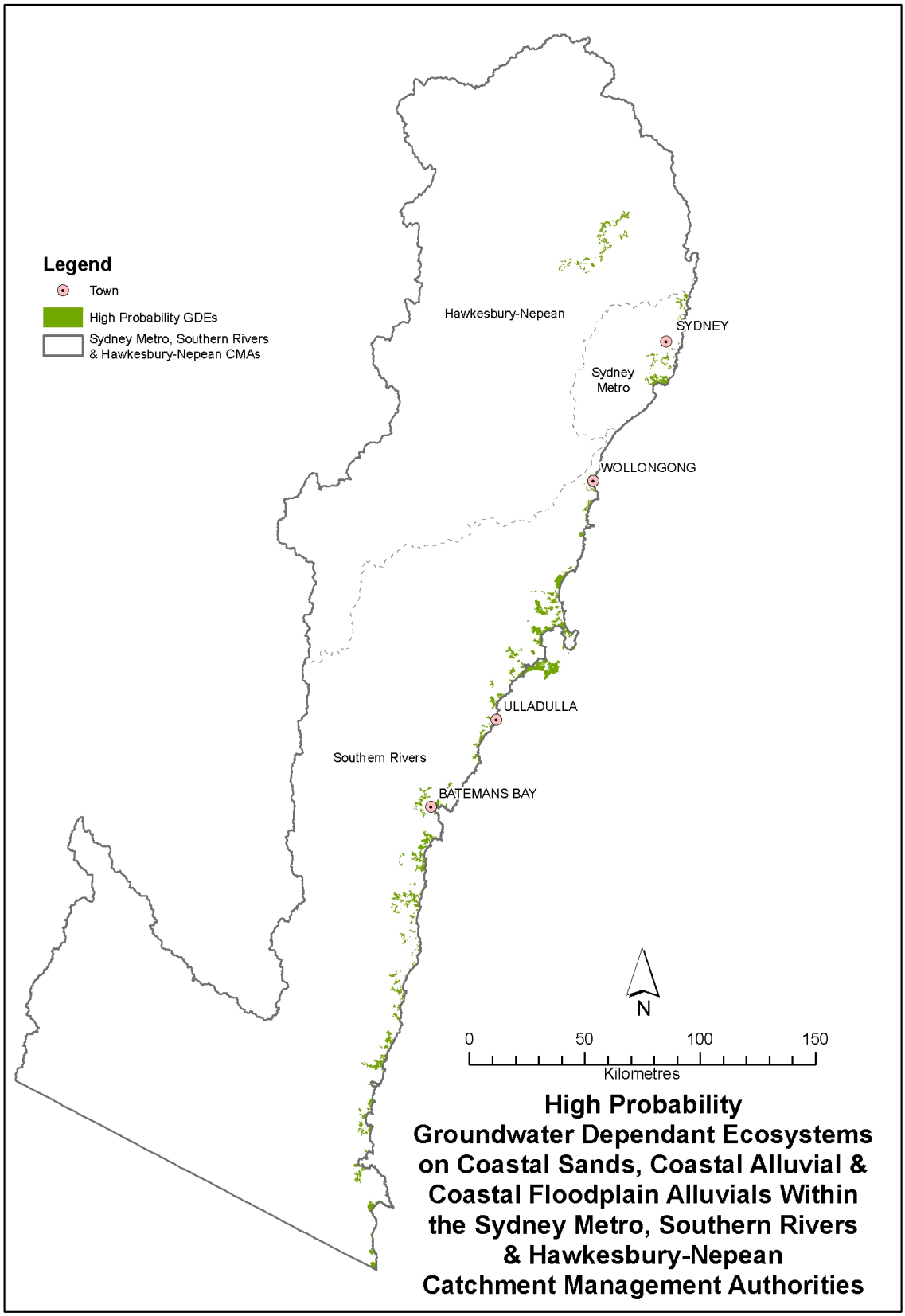

Figure 10: Location of groundwater dependent ecosystems on the coastal plains of Hawkesbury – Nepean, Sydney Metro and Southern Rivers CMA areas.