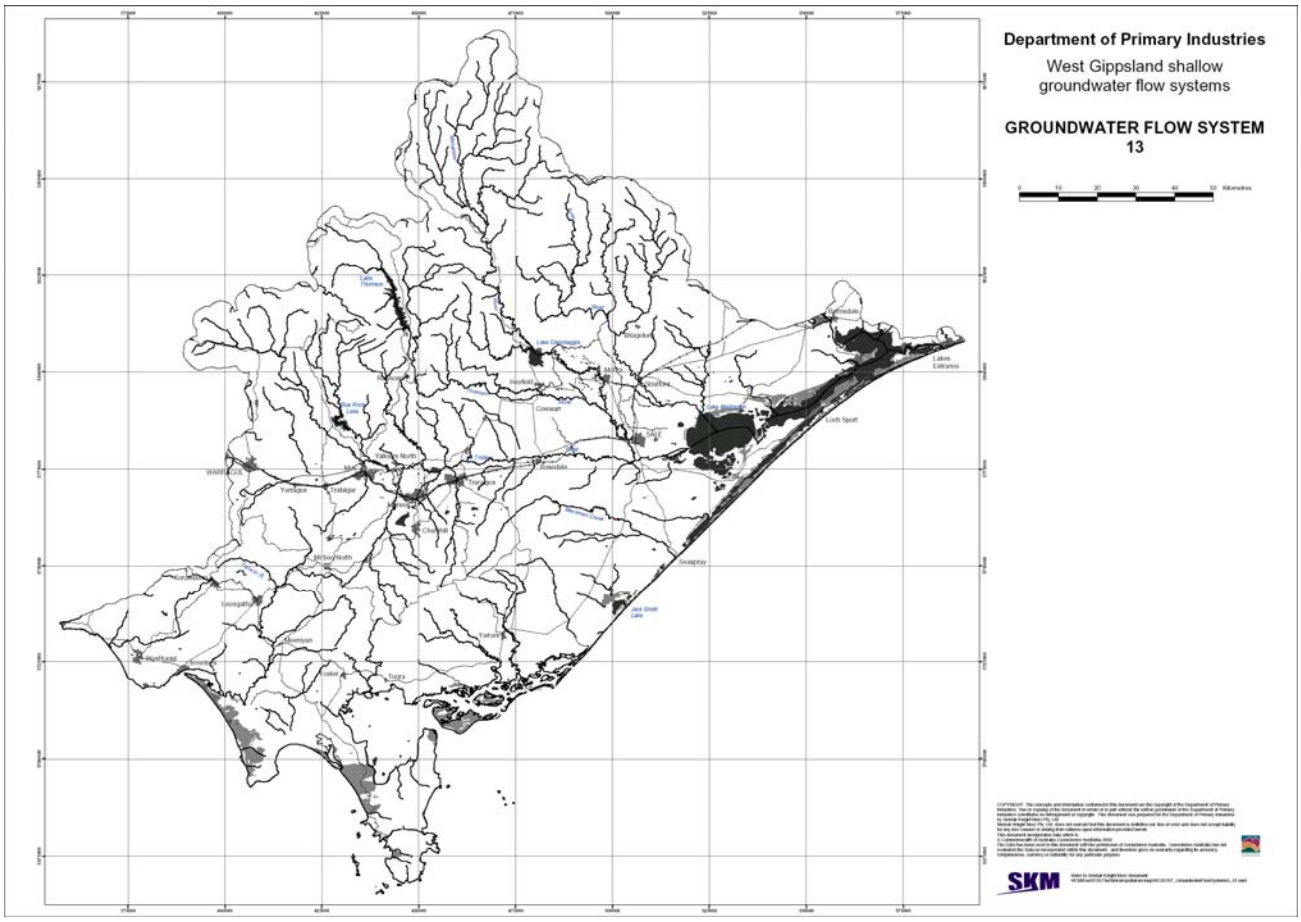
GFS 13: Quaternary sediments – coastal dunes

1. GFS definition



Geology constraint:	Qrd
Slope constraint:	None
Area constraint:	None
Rationale for choice of GFS:	Coastal dune systems are likely to discharge directly to the sea via local flow systems and, therefore, are distinguished from other Quaternary deposits
GFS priority:	Low

2. The salinity problem

Salinity occurrence: Low lying coastal areas (generally affected by primary salinity) (Source: DNRE (2000) and WGCMA (2005))

Assets being affected: Agricultural land, parks/reserves, wetlands (Source: DNRE (2000) and WGCMA (2005))

Area of mapped land salinity: 144ha Class 1, 833ha Class 2, 853ha Class 3, 201ha undifferentiated (Source: West Gippsland Land Salinity GIS layer, DNRE (2000) and WGCMA (2005))

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Area of primary and secondary land salinity: 254ha primary salinity, 1767ha secondary salinity, 9ha unknown (Source: West Gippsland Land Salinity GIS layer, DNRE (2000) and WGCMA (2005))

Area of wetland salinity: Key wetland affected by salinity (primary): Lake Reeve

Surface water salinity: No significant surface water salinity

Salinity process: Primary salinity resulting from ocean influxes (Source: DNRE (2000) and WGCMA (2005))

Current area of less than 2m depth to water table: 3104ha <2m, 1652ha coastal plain (<2m AHD) = total 4756ha (Source: West Gippsland DTWT GIS layer and WGCMA (2005))

Groundwater salinity: Variable (500 to 3,000mg/L TDS). (Source: Warragul/Sale hydrogeological map (1995))

Land salinity trend: Unknown

Groundwater level trend: Stable.

3. Landscape attributes

Area: Coastal dunes

Geology: Quaternary coastal dune deposits

Topography: Slightly undulating dunes

Soil permeability: Predominantly very high with areas of moderate, very very low and high permeability. (Source: West Gippsland Soil Permeability GIS layer)

Annual Rainfall: 800-1000mm in South Gippsland coastal areas, 600-700mm in Gippsland Lakes area. (Source: West Gippsland Annual Rainfall GIS layer)

Annual Evaporation: 925 to >1000mm. (Source: West Gippsland Annual Evaporation GIS layer)

Landuse: Predominantly native vegetation and dryland beef production with limited dairy. (Source: West Gippsland Landuse GIS layer)

4. Hydrogeology

Geology: Sands, gravels, clays

Aquifer type: Unconsolidated sediments

Hydraulic conductivity: Unknown (5-10m/day?)

Aquifer transmissivity: Moderate-high (Source: GFS workshop)

Aquifer storage coefficient: 0.05-0.1 (Source: GFS workshop)

Hydraulic gradient: Highly variable. Huge range. 0.001 to 0.01 (Source: GFS workshop)

Yield Variable but generally pretty low (<0.5-5L/sec) (Source: Warragul/Sale hydrogeological map (1995))

Temporal recharge distribution: Spring (Source: GFS workshop)

Spatial recharge distribution: Uniform (Source: GFS workshop)

Recharge estimate: 10-20% of rainfall (Source: GFS workshop)

Aquifer uses: Stock and domestic

Scale of groundwater flow path: Local

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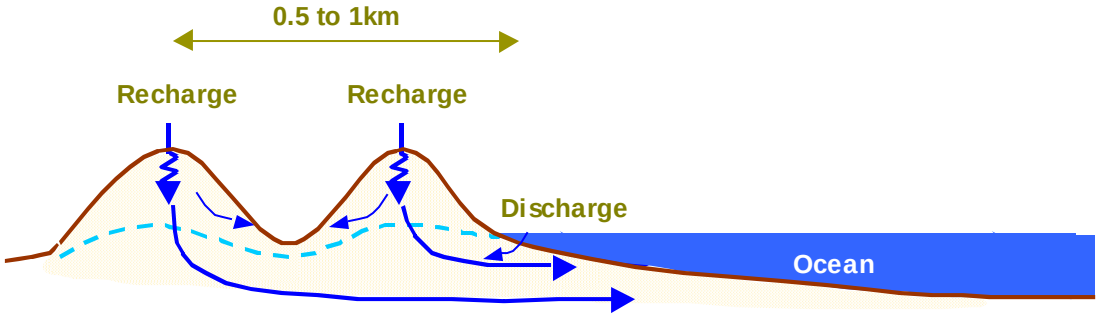
Responsiveness to land management: Salinity generally primary from ocean influx but secondary salinity would respond quickly. (Source: GFS workshop)

National GFS type most like: None (Source: GFS workshop)

Groundwater flow between GFSs: Likely to receive flow from GFSs 10 and 11.

5. Conceptual model of recharge discharge relationship



6. Salinity Management Options

Current salinity management: Seawalls, salt tolerant pasture, gated structures in wetlands.
(Source: DNRE (2000) and WGCMA (2005))

Recharge control options: Perennial pasture, enhancement of native vegetation.
(Source: DNRE (2000), WGCMA (2005) and GFS workshop)

Pasture or crop potential	*Trees for biodiversity potential*	*Trees for forestry potential*	*Surface drainage potential*	*Irrigation management potential*
Moderate	Strong	None	Weak	None

Groundwater discharge enhancement options: Groundwater pumping really not viable in these areas due to low gross margins and proximity to coast (and the risk of salt water intrusion) (Source: DNRE (2000) and WGCMA (2005))

Public groundwater control pumping	*Private groundwater pumping potential*	*Tile and mole drain potential*	*Break of slope tree planting*
None	Weak	None	Weak

Living with salt options: Salt tolerant pasture, crops and trees (Melaleuca, Leptospermum).
(Source: DNRE (2000), WGCMA (2005) and GFS workshop)

Conflicts with other NRM programs: Potential conflict with weed and wetland program if salt tolerant crops and pastures infest areas outside intended saline areas (eg wetland reserves).
(Source: WGCMA (2005) and GFS workshop)

Synergies with other NRM programs: Synergy with the biodiversity program.
(Source: WGCMA (2005) and GFS workshop)