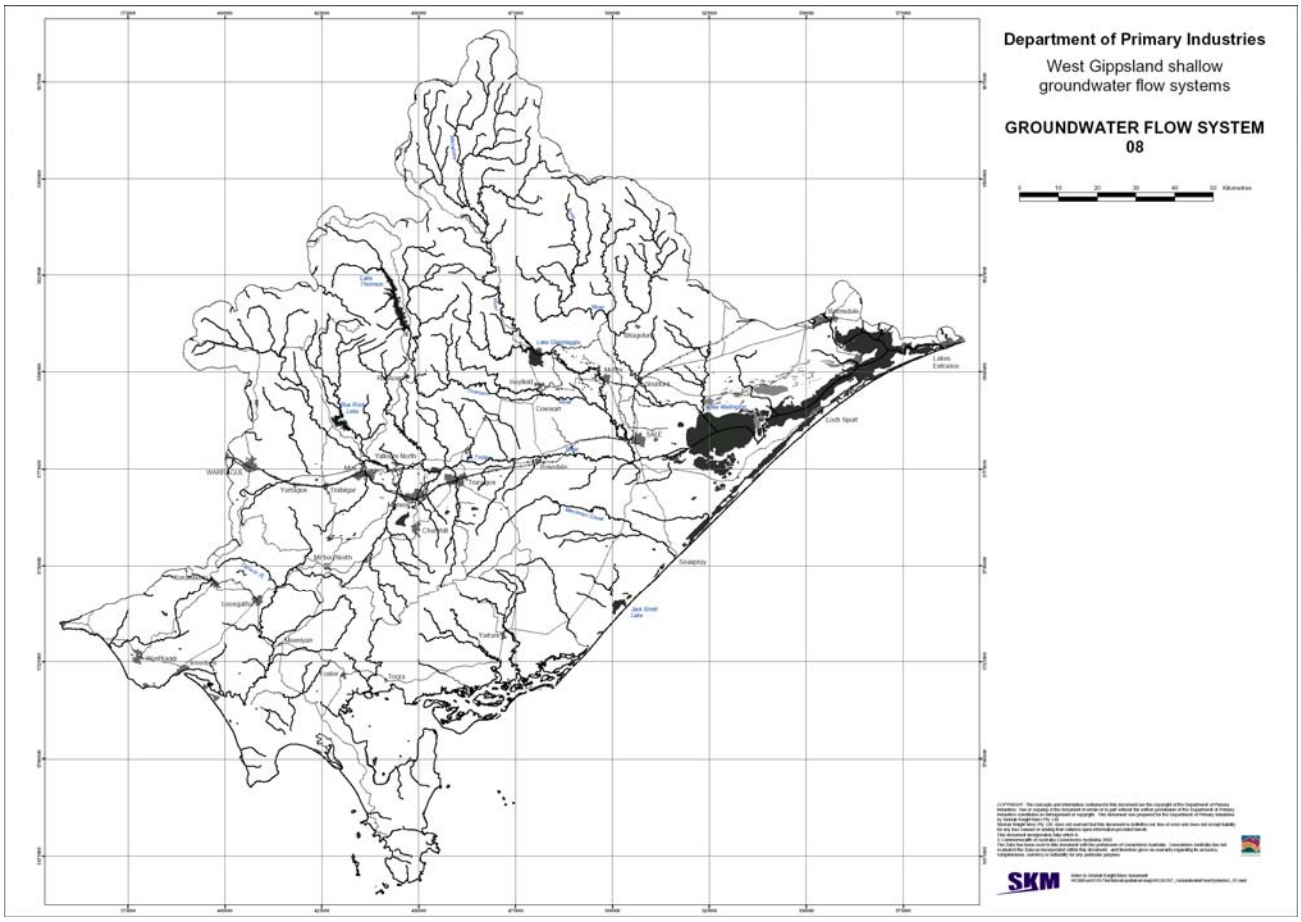
GFS 8: Quaternary sediments – Lower Bengworden region

1. GFS definition



Geology constraint: Qpd

Slope Constraint: None

Area constraint: South of Paynesville – Perry Bridge line and east of Avon River

Rationale for choice of GFS: SKM (2002) showed that the dunes in the Lower Bengworden area do not have clay cores and are likely to be connected to the intermediate scale Quartermary Sands aquifer. These dunes are likely to exhibit intermediate flow systems

GFS priority: High

2. The salinity problem

Salinity occurrence: In low lying interdunal areas and plains increasing in occurrence and severity with proximity to Lake Wellington. (Source: West Gippsland Land Salinity GIS layer, SKM (2002))

Assets being affected: Agricultural land (sheep and cattle), roads and wetlands

(Source: SKM (2002), WGCMA (2005))

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Area of mapped land salinity: 6ha Class 1, 95ha Class 2, 105ha Class 3, 42ha undifferentiated (Source: West Gippsland Land Salinity GIS layer, SKM (2002))

Area of primary and secondary land salinity: 248ha secondary salinity (Source: West Gippsland Land Salinity GIS layer, SKM (2002))

Area of wetland salinity: Salinity is affecting key wetlands fringing Lake Wellington

Surface water salinity: Surface water monitoring stations with <100% attainment of 90 percentile salinity SEPP: Perry River at Perry Bridge (35%)

Salinity process: Recharge on the highly permeable sandy soils (especially dunes) causing discharge in the interdunal swales and plains (Source: SKM (2002))

Current area of less than 2m depth to water table: 516ha <2m (Source: West Gippsland DTWT GIS layer, SKM (2002))

Groundwater salinity: In areas immediately north of Lake Wellington and Lake Victoria generally 5,000 to >10,000µS/cm. (Source: SKM (2002))

Land salinity trend: Possibly stabilised or getting slightly worse (Source: SKM (2002) and WGCMA (2005))

Groundwater level trend: Current trend: stable or falling due to below average rainfall over last 7 years. Analysis of hydrographs show that groundwater not yet in equilibrium with expected future rising trend of 24mm/yr assuming return to average rainfall. (Source: SKM (2002))

3. Landscape attributes

Area: Quaternary dunes overlying Tertiary sediments

Geology: Quaternary dunes

Topography: Low dunal systems

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

Annual Rainfall: 500-700mm on average. (Source: West Gippsland Annual Rainfall GIS layer)

Annual Evaporation: 975-1000mm on average. (Source: West Gippsland Annual Evaporation GIS layer)

Landuse: Predominantly sheep, some beef and dairy. (Source: West Gippsland Landuse GIS layer)

4. Hydrogeology

Geology: Sands, gravels, clays

Aquifer type: Unconsolidated sediments

Hydraulic conductivity: Unknown

Aquifer transmissivity: Low to moderate (~39m^2/day measured in coastal lowlands) (Source: SKM (2002))

Aquifer storage coefficient: Unknown

Hydraulic gradient: Unknown

Yield Variable

Temporal recharge distribution: During large rainfall events (Source: SKM (2002))

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Spatial recharge distribution: Highest recharge on sandy rises and lowest in interdunal swales. Potential recharge has been mapped (Source: SKM (2002))

Recharge estimate: Unknown

Aquifer uses: Stock and domestic

Scale of groundwater flow path: Intermediate to local flow systems (Source: SKM (2002)

Responsiveness to land management: Moderate

National GFS type most like (ref Coram et al., 1998): Intermediate 4 – Discharge across topographic divides controlled by large, transmissive, linear structures (GFS workshop)

Groundwater flow between GFSs: Groundwater flow from GFS 8 (dunes) to GFS10 (interdunal swales) in the Bengworden region

- **Figure 20: Quaternary dunes between Meerlieu and Perry Bridge**

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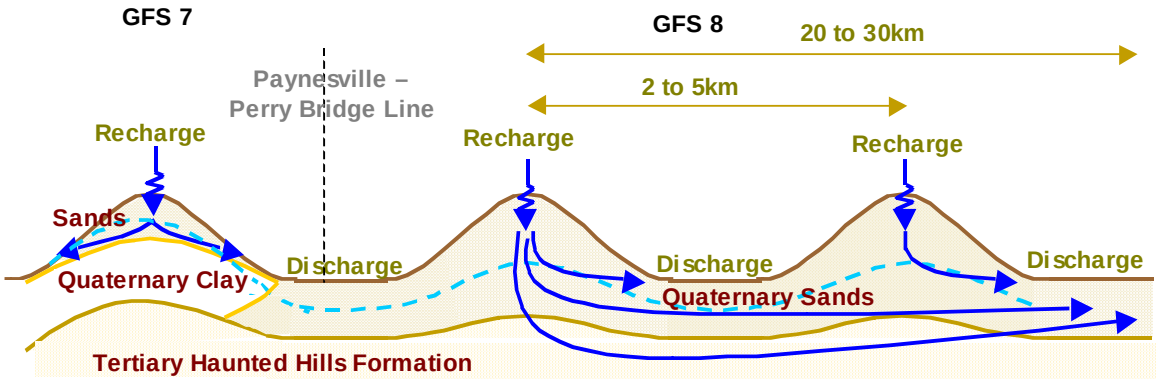
5. Conceptual model of recharge discharge relationship



6. Salinity Management Options

Current salinity management: Salt tolerant crops and pastures (Source: SKM (2002) and WGCMA (2005))

Recharge control options: Trees and perennial pastures planted on tops of the dunes are an option, potentially lucerne, low rainfall farm forestry (Source: SKM (2002), WGCMA (2005) and GFS workshop)

Pasture or crop potential	*Trees for biodiversity potential*	*Trees for forestry potential*	*Surface drainage potential*	*Irrigation management potential*
Strong	Strong	Strong	Weak	Weak

Groundwater discharge enhancement options: Groundwater pumping not likely to be a viable option due to low gross margin of agricultural land and lack of suitable shallow aquifer (Source: SKM (2002) and WGCMA (2005))

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

Living with salt options: Salt tolerant crops and pastures suitable (Salt Bush, Tall Wheat Grass), shrubs such as Tagasaste (Source: SKM (2002), WGCMA (2005) and GFS workshop)

Conflicts with other NRM programs: Potential conflict with weed and wetland programs if salt tolerant crops and pastures infest areas outside intended saline areas (eg wetland reserves) (Source: SKM (2002) and WGCMA (2005))

Synergies with other NRM programs: Strong synergy with farm forestry and biodiversity programs (Source: SKM (2002) and WGCMA (2005))