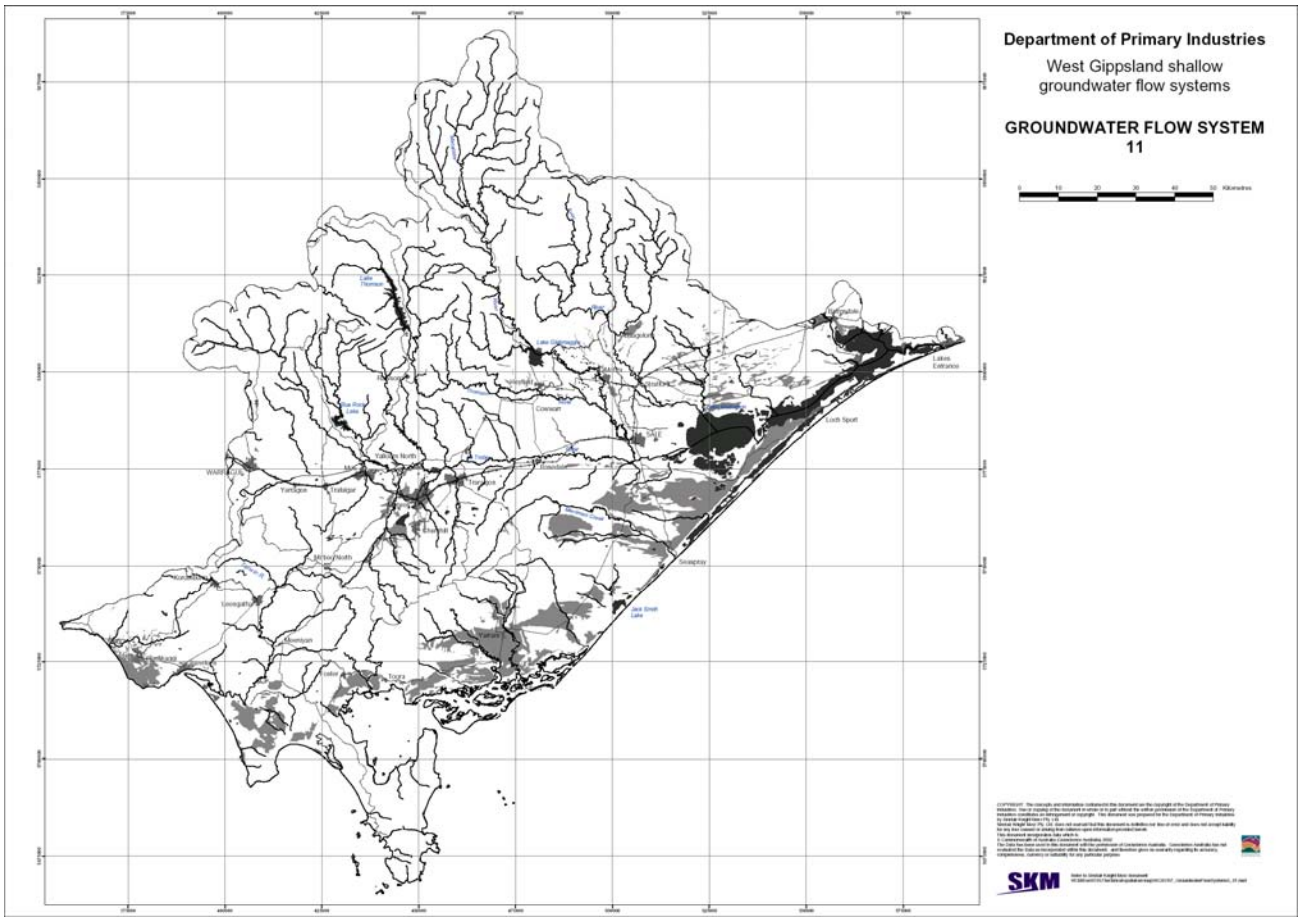
GFS 11: Quaternary sediments – general (low-mid slope)

1. GFS definition



Geology constraint:	All Quaternary sediments except for Qrd, Qrm, Qra and Qpd. (Qpa only for south of Gippsland Lakes and Latrobe River), moderate - high permeability soils
Slope constraint:	None
Area constraint:	South of Latrobe River and south of Gippsland Lakes for Qpa, otherwise no restrictions
Rationale for choice of GFS:	Alluvial Quaternary deposits forming gently undulating plains are likely to be dominated by intermediate to local flow systems
GFS priority:	High

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2. The salinity problem

Salinity occurrence: Agricultural land, potential urban salinity (Source: DNRE (2000) and WGCMA (2005))

Assets being affected: Agricultural land around Newry, Yarram, Lake Reeve and Merrimans Creek area. Predominance of primary salinity close to the coast (especially Lake Reeve area) (Source: DNRE (2000) and WGCMA (2005))

Area of mapped land salinity: 299ha Class 1, 268ha Class 2, 154ha Class 3, 1042ha undifferentiated (Source: West Gippsland Land Salinity GIS layer, DNRE (2000) and WGCMA (2005))

Area of primary and secondary land salinity: 820ha primary salinity, 752ha secondary salinity, 190ha unknown (Source: West Gippsland Land Salinity GIS layer, DNRE (2000) and WGCMA (2005))

Area of wetland salinity: Lake Reeve (primary salinity)

Surface water salinity: Not significant except lower reaches of rivers affected by sea water intrusion (eg Merriman's Creek) (Source: WGCMA (2005))

Salinity process: Influx of ocean water; discharge of intermediate groundwater flow systems (Source: DNRE (2000) and WGCMA (2005))

Current area of less than 2m depth to water table: 4859ha <2m, 2203ha coastal plain (<2m AHD) = total 7062ha (Source: West Gippsland DTWT GIS layer, SKM (2004b) and WGCMA (2005))

Groundwater salinity: 500 to 1,000mg/L TDS (Source: Warragul/Sale hydrogeological map (1995))

Land salinity trend: Expected to vary year to year depending on rainfall, proximity to the coast and land management (Source: SKM (2004b))

Groundwater level trend: Rising. (Source: SKM (2004b))

- **Figure 27: Looking south towards the coast and Wilson's Promontory from Foster**

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3. Landscape attributes

Area: Plains and dunes

Geology: Quaternary sediments

Topography: >0.3° slope

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

Annual Rainfall: Variable. 800-1000mm in wonthaggi-foster area, 600-700mm in Gippsland Lakes area, 700-800mm in Yarram area. (Source: West Gippsland Annual Rainfall GIS layer)

Annual Evaporation: Varies between <900 and >1000mm.
(Source: West Gippsland Annual Evaporation GIS layer)

Landuse: Predominantly farming with large areas of forestry and native vegetation.
(Source: West Gippsland Landuse GIS layer)

4. Hydrogeology

Geology: Sands, gravels, clays

Aquifer type: Unconsolidated sediments

Hydraulic conductivity: Unknown

Aquifer transmissivity: Unknown

Aquifer storage coefficient: Unknown

Hydraulic gradient: Unknown

Yield Variable

Temporal recharge distribution: Unknown

Spatial recharge distribution: Unknown

Recharge estimate: Unknown

Aquifer uses: Stock and domestic, irrigation

Scale of groundwater flow path: Intermediate

Responsiveness to land management: High

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

Groundwater flow between GFSs: Flow between GFSs 10 and GFS11.

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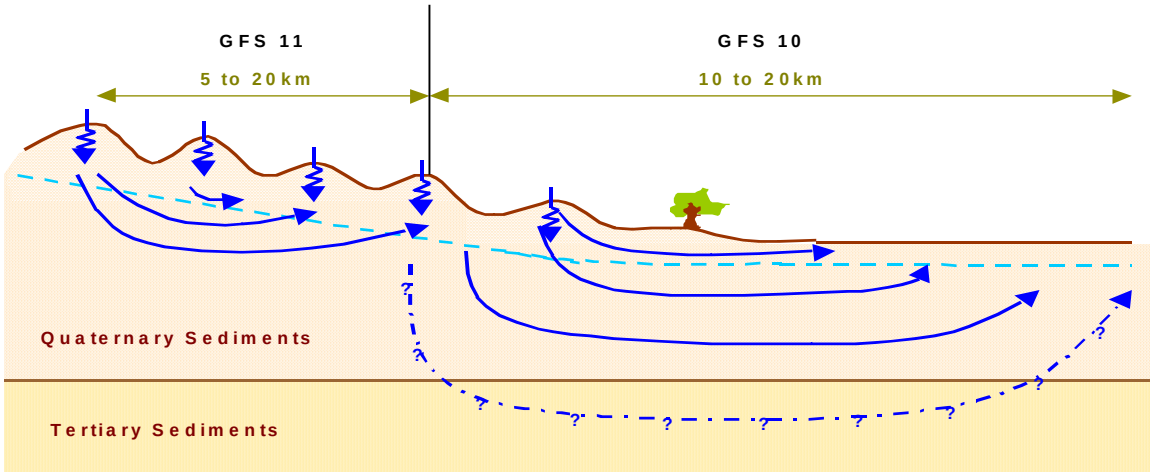
5. Conceptual model of recharge discharge relationship



6. Salinity Management Options

Current salinity management: Private groundwater pumping is having salinity benefits, some perennial pasture, drainage enhancement (Source: DNRE (2000) and WGCMA (2005))

Recharge control options: Perennial pastures where rainfall is <600mm/year, farm forestry where rainfall is >600mm/year. Perennial pasture may be useful for limiting recharge from small rainfall events during the year, but not the large events that happen about once every 3 years. Lucerne may be suitable due to higher permeability soils. Trees will have the most effect due to the high rainfall. 650mm suits pine, 700mm suits Eucalypts. (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	Strong	Weak	Strong

Groundwater discharge enhancement options: Increase in private pumping in areas with viable yields. Groundwater pumping for salinity control only may not be economically viable due to low gross margin of agricultural land and lack of suitable shallow aquifer (Source: DNRE (2000) and WGCMA (2005))

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

Living with salt options: Salt tolerant crop and pasture species. Potentially Tall Wheat Grass (Source: DNRE (2000), WGCMA (2005) and GFS workshop)

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Conflicts with other NRM programs: Pumping can have conflicts with resource sustainability, Potential conflict with weed and wetland program if salt tolerant crops and pastures infest areas outside intended saline areas (eg wetland reserves). Irrigation efficient developments may conflict with trees. (Source: WGCMA (2005) and GFS workshop)

Synergies with other NRM programs: Strong synergy with the Farm Forestry and Biodiversity programs, Native Vegetation Plan, Landcare works relating to erosion and streambank rehabilitation, Environmental Management Systems, Productivity from farm management perspectives. (Source: WGCMA (2005) and GFS workshop)