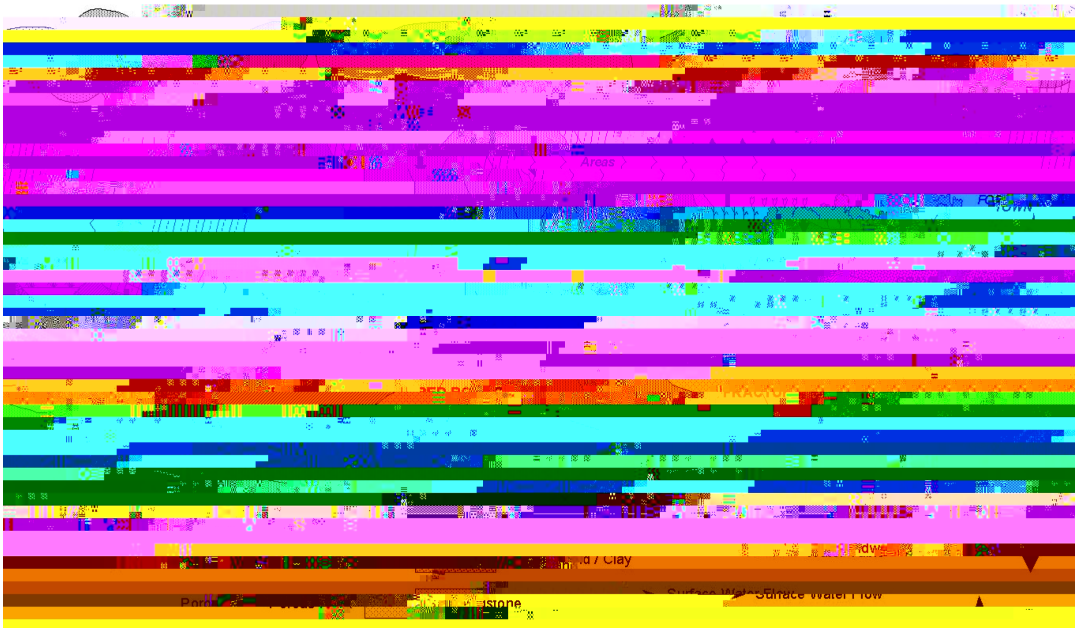
Coastal Groundwater

Water Research Laboratory

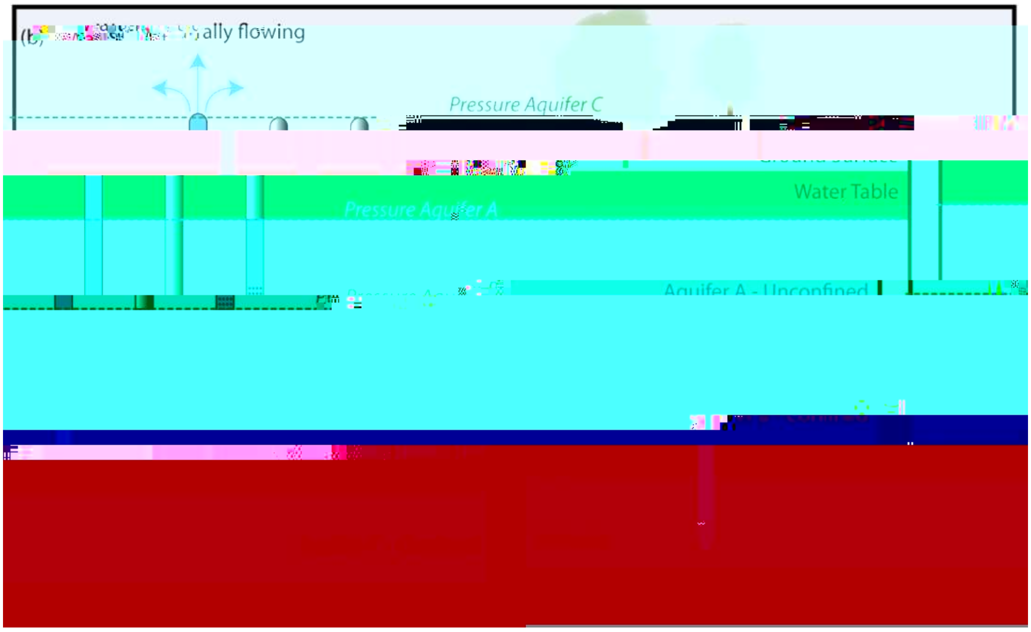
Groundwater and Climate Change

2. Groundwater

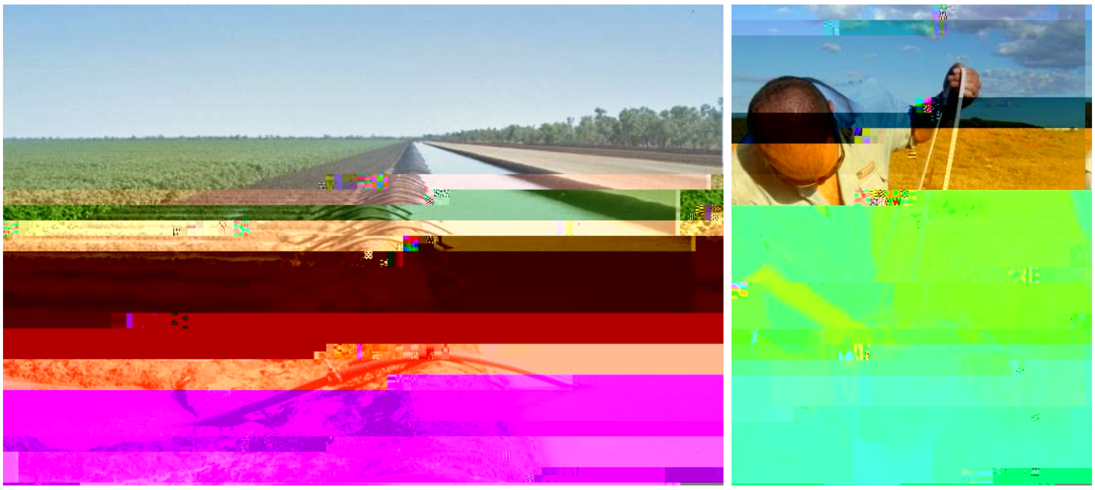
2.1 What is groundwater?

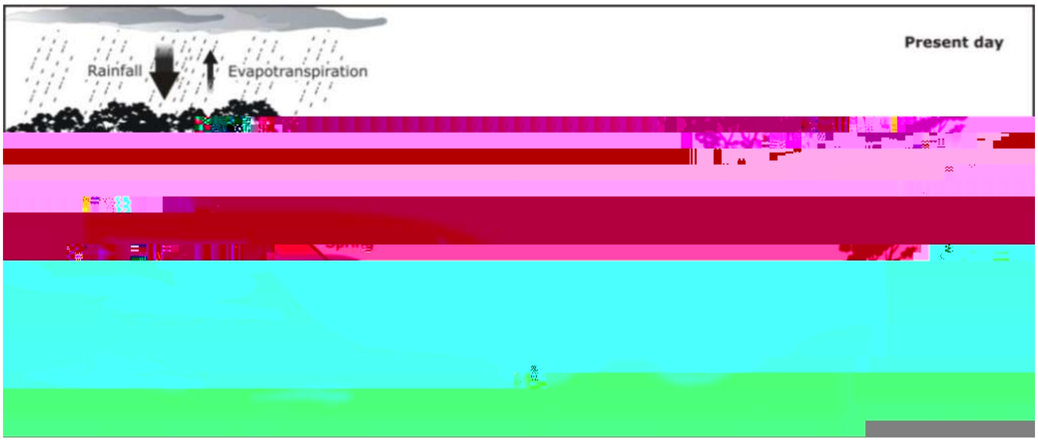


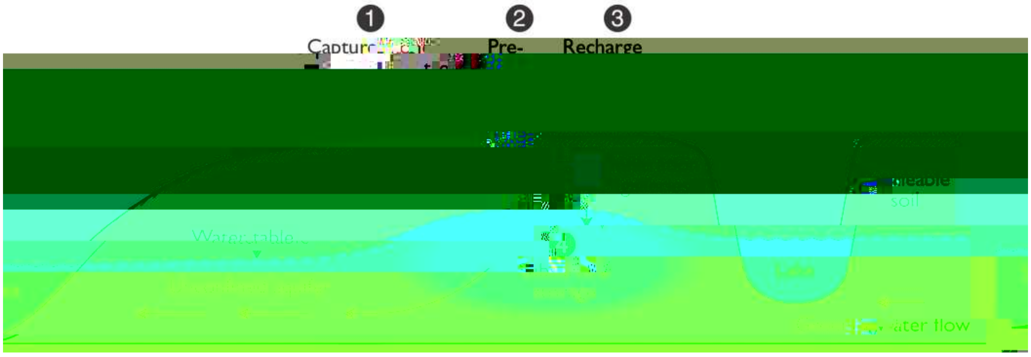
2.2 Components of a groundwater system

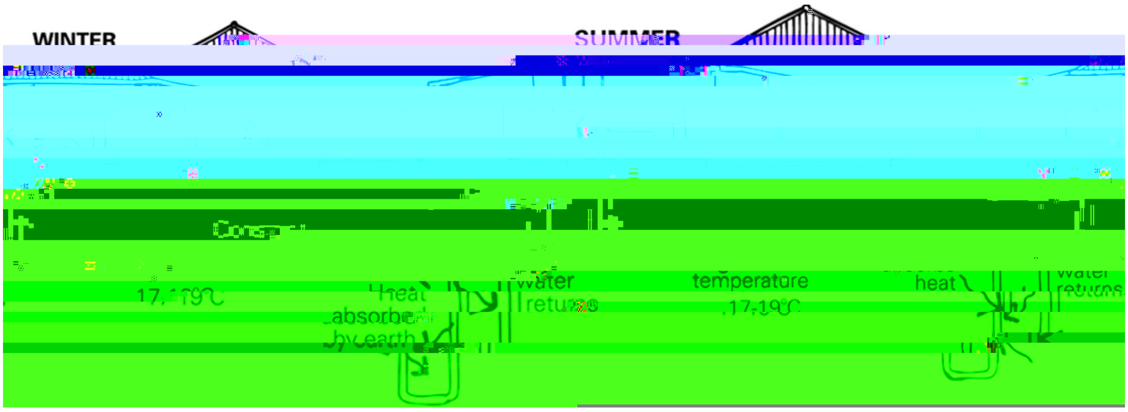


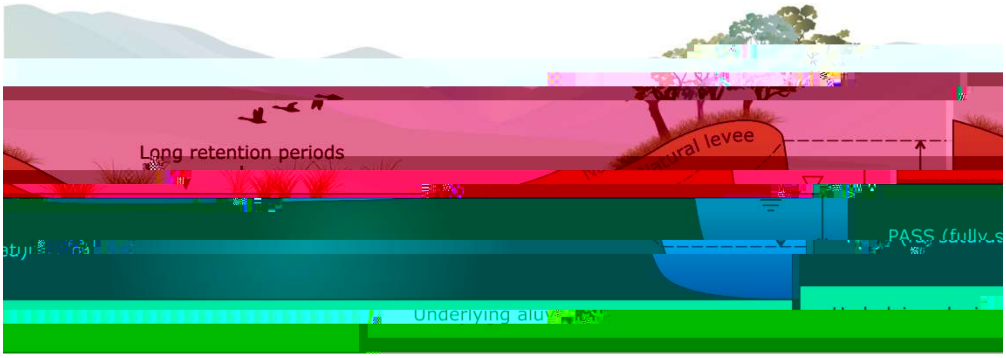
2.4 Surface water ï groundwater interactions




Present day
Rainfall
Evapotranspiration
Spring


❶
❷
❸
Pre-
Recharge
Water table
soil
water flow


WINTER
SUMMER
17-19°C
Heat absorbed by earth
Water returns
temperature 17-19°C
heat
water returns


Long retention periods
Natural levee
PASS (fully s
Underlying aluv


Drain & floodgate
AASS (exposed to ox
(fully saturated)
PA

3.3 Expected impacts on groundwater

x

x ³&XUUHQW NQRZOHGJH RI JURXQGZDWHU V\VWHPV ERWK P
FRQFHSWXDOLVDWLRQ LV LQDGHTXDWH WR DOORZ LQIRUPHG FO
PDQDJHPHQW GHFLVLRQV LQ PRVW RI $XVWUDOLD 0RGHOV FXUUH
VKRXOG XQGHUJR DQ DXGLW WR HVWDEOLVK LI WKH\ DUH ILW IRU SXU
DGDSWLRQ VWUDWHJLHV´

x ³1RW DOO JURXQGZDWHU V\VWHPV DUH HTXDOO\ VHQVLWLYH WR FO

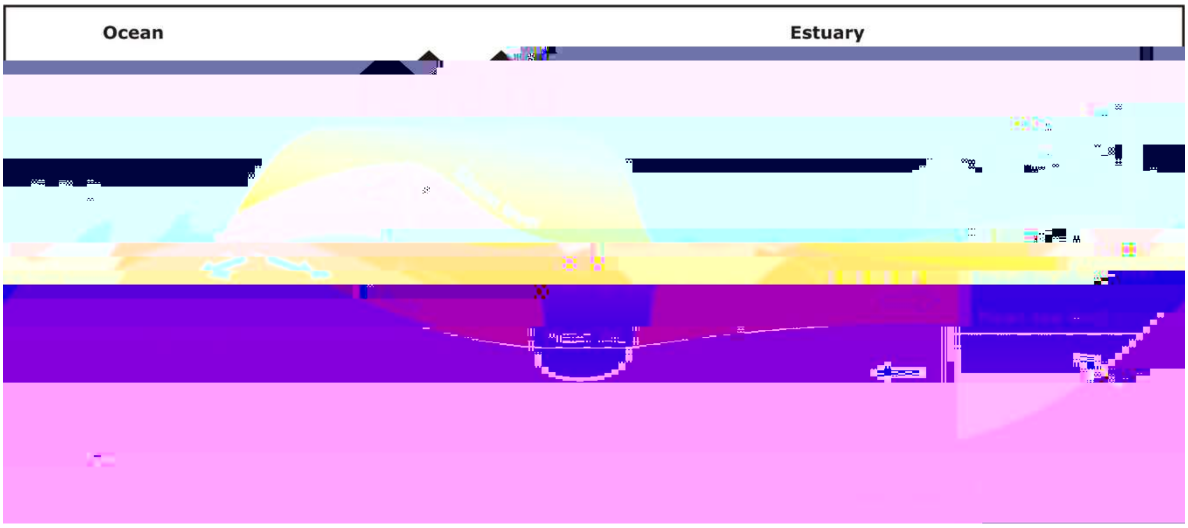
x ³*URXQGZDWHU VXUIDFH ZDWHU LQWHUDFWLRQV ZLWK ULYHUV DUH K
DQG FRXOG KDYH D SURIRXQG HIIHFW RQ ZDWHU DYDLODELOLW\´

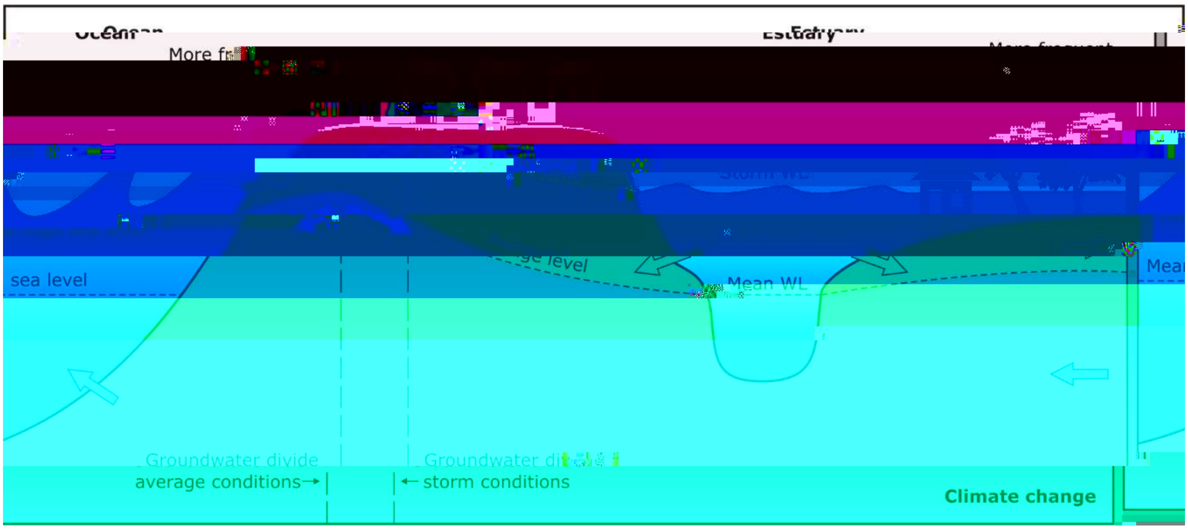
x ³9DULRXV FOLPDWH PRGHOV \LHOG GLIIHUHQW UHVXOWV IURP VLPSL
SURMHFWLRQV DUH FRQVLVWHQW IRU VRXWK ZHVW :HVWHUQ $XVWU

5LVLQJ JURXQGZDWHU OHYHOV

,QFUHDVHG VHDVRQDOLW\ LQ JURXQGZDWHU UHFKDUJH OHYHOV DQ

0R


Ocean
Estuary


Ocean
Estuary
More fr
More frequent
Storm WL
sea level
ge level
Mean WL
Mea
Groundwater divide
average conditions→
Groundwater di
← storm conditions
Climate change


120°
130°
140°
150°
-10°
Milikapiti (Melville Island)
Warruwi
Milingimbi
Lambert's Lagoon
Rottnest Island
Bunbury
Woolnorth
Smithton

x

x

x

x

x
x
x

,QFUHDVHV LQ JURXQGZDWHU WHPSHUDWXUH

6RLO ZDWHU FRQWHQW DQG WHPSHUDWXUH DUH LPSRUWDQW IDFWRUV L
ODQG DWPRVSKHUH LQWHUDFWLRQV DQG D FULWLFDO GHWHUPLQDQW
YDGRVH]RQH K\GURORJ\ VKDOORZ ZDWHU WDEOHV WKDW VXSSRUW 6:&
IHHGV DTXLIHUV DUH DOVR DIIHFWHG E\ 6:& DQG WHPSHUDWXUH«7KH F
HIIHFW IURP XUEDQLVDWLRQ DQG JOREDO ZDUPLQJ RQ VXEVXUIDFH WK
JURXQGZDWHU TXDOLW\ EHFDXVH RI FKDQJHV WR VXEVXUIDFH ELRJHRF
UHVHDUFK LV QHHGHG WR XQGHUVWDQG DQG SUHGLFW WKH IXOO UDQJH
FKDQJHV LQ WK R™˜„ R •VXHGLFDWHUQLF I G HGDQHRVRQ

:DWHU TXDOLW\

QXWULHQW

WUDQVSRUW UDWHV EHQHDWK DJULFXOWXUDO ODQGV PD\ DOVR EH VHQ
UHODWLYHO\ IHZ VWXGLHV KDYH H[SORUHG FOLPDWH FKDQJH HIIHFWV RQ
VXEVXUIDFH

3.4 Groundwater m] Ʈ

:DWHU VXSSO\ VHFXULW\

4. Summary

x

x

x

x

5. Further reading