
MUSGRAVE PWA

POLDA LENS

Groundwater Level and Salinity Status Report

2013



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Department of Environment,
Water and Natural Resources

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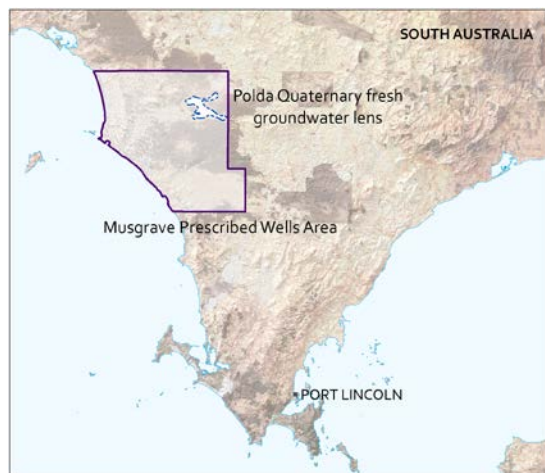
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2013 SUMMARY



The Musgrave Prescribed Wells Area (PWA) is situated in central Eyre Peninsula, approximately 120 km north-west of Port Lincoln. It is prescribed under South Australia's *Natural Resources Management Act 2004* and a Water Allocation Plan provides for the sustainable use of the groundwater resources. The Poldo lens is situated in the north-east of the Musgrave PWA.

Within the Musgrave PWA there are two main sedimentary sequences containing groundwater that overlie basement rocks: the Quaternary limestone aquifer and the underlying Tertiary sands aquifer. The Quaternary limestone aquifer comprises a generally thin veneer of aeolianite sediments of the Bridgewater Formation and is continuous across the PWA. Areas within the Quaternary limestone aquifer defined by salinity of less than 1000 mg/L, such as the Poldo lens, are described as a fresh groundwater

lens in the current Water Allocation Plan. The main source of recharge to the Quaternary limestone aquifer is the direct infiltration of rainfall and groundwater flow is predominantly in a westerly to south-westerly direction towards the Southern Ocean.

Licensed groundwater extractions occur predominantly from the fresh groundwater lenses within the Quaternary limestone aquifer and the Poldo lens has provided groundwater for the Eyre Peninsula reticulated water supply system since 1963. Prior to 2000, this contribution averaged about 15 % of the total supply. Due to continued, low effective recharge, increasing groundwater salinity and the design characteristics of the pumping infrastructure, SA Water has not utilised water from Poldo since voluntarily ceasing pumping in May 2008. The current Notice of Prohibition for the Poldo lens does not allow SA Water to extract water from this resource and restricts extractions by other licence holders. Metered extractions from the Poldo lens in 2012-13 totalled 613 kL, a 68 % decrease from the previous water-use year (Fig. 1). This volume of extraction equates to 32 % of the allocation volume allowed under the Notice of Prohibition and accounts for less than 1 % of the total licensed extractions within the Musgrave PWA for 2012-13.

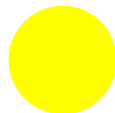
The sustainability of the groundwater resources in the Musgrave PWA is highly dependent on recharge from rainfall. The historical data has indicated that trends of above or below-average rainfall can last for up to 25 years, and that greater recharge responses have been observed when rainfall occurs in high-intensity events. The Terre Winds rainfall station (number 18165) is located south of the Poldo lens and recorded 424 mm of rain in 2013. This is 50 mm greater than the long-term average annual rainfall for that station. The winter months received rainfall above respective long-term monthly averages, with other seasons experiencing below-average to average monthly rainfall (Fig. 2).

A long-term decline in groundwater levels of up to 3 m from 1980 to 2009 has been recorded in the Poldo lens. This decline has a very close correlation with below-average rainfall recorded in the area. Higher rainfall in 2009 and 2010 corresponds with a rise in groundwater levels throughout most of the lens. These levels however, are still lower than those recorded prior to the early 1990s. In 2011, water levels recovered in response to six months of above-average rainfall then declined in 2012 due to a period of below-average rainfall. In 2013, this trend continued particularly in the north of the lens (Fig. 3). Declines in the maximum recovered groundwater level were recorded in 24 of 36 wells (65 %) when compared to 2012 water level data. Twelve of these wells recorded a decline of between 0.1 and 0.2 m and are predominantly located in the northern part of the lens where the saturated thickness of the lens is up to 10 m. A recovery of groundwater levels of up to 0.16 m was recorded in 8 wells (22 %) and a further 4 wells (11 %) of wells recorded no overall change in water level. The median trend across the whole monitoring network was a decline of 0.02 m.

The majority of observation wells show a rise in salinity from 2005 when compared to the previous measurements taken in the mid to late 1990s. This widespread increase in groundwater salinity coincided with a prolonged period of below-average rainfall, reduced recharge and declining groundwater levels. After June 2009, observation wells within the Polda lens reveal signs of freshening occurring, which may be in response to the increased recharge caused by above-average rainfall received from 2009 to 2011. From 2012 salinity levels start to increase in the majority of the wells, possibly in response to below-average winter rainfall. In 2013, this trend has not continued as 80% of monitoring wells recorded a decrease in salinity concentration when compared to 2012 data. All wells located within the lens recorded a decrease in salinity of up to 75 mg/L with significant changes noted in more than half of the wells (<5% change in concentration). Although there was a notable freshening within the Polda lens, several wells outside the lens have recorded salinity increases.

The Polda lens of the Musgrave PWA has been assigned a yellow status for 2013:

2013 STATUS



"Gradual adverse trends, indicating low risk to the resource in the medium term"

This means that gradual adverse trends in resource status have been observed over the reporting period. Continuation of these trends is unlikely to negatively impact the beneficial use of the resource for at least 15 years. The 2013 status for the Polda lens is supported by:

- a slight decline in the groundwater levels when compared to 2012 water level data, which was more marked in the northern part of the lens.
- an overall decrease in salinity concentration within the lens.

To view the *Musgrave PWA groundwater level and salinity status report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, and to view the descriptions of all status symbols, please visit the *Water Resources* page on [WaterConnect](#).

For further details about the Polda lens, please see the *Water Allocation Plan for the Musgrave Prescribed Wells Area* on the Eyre Peninsula Natural Resource Management [website](#).

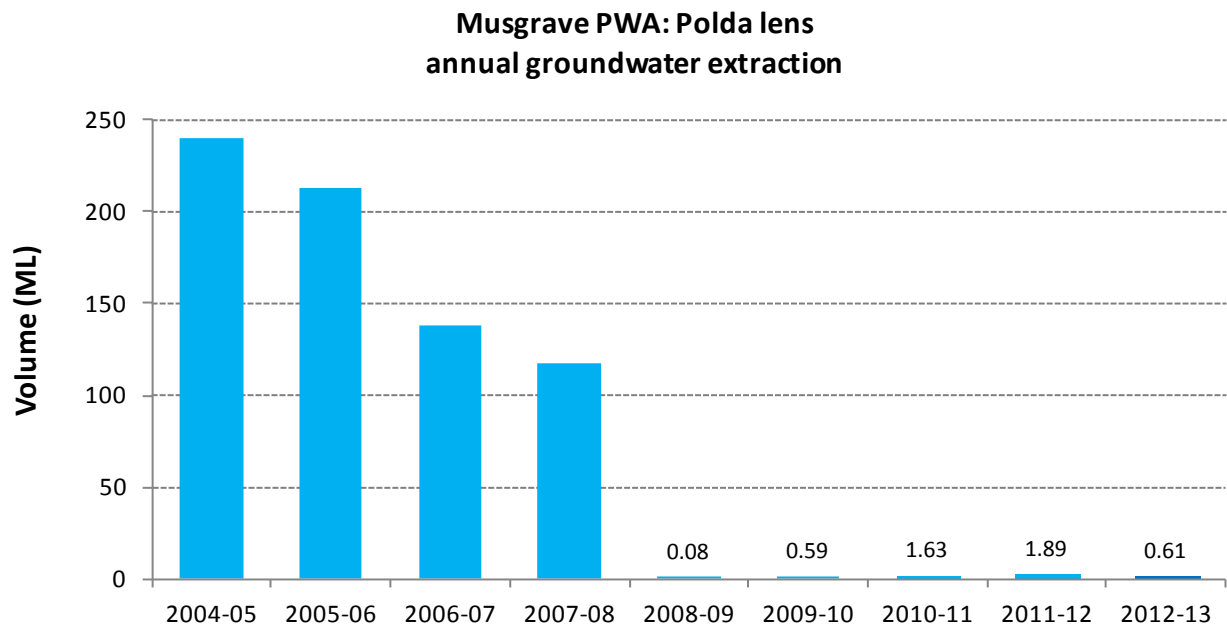


Figure 1. Historical licensed groundwater use for the Polda lens of the Musgrave Prescribed Wells Area

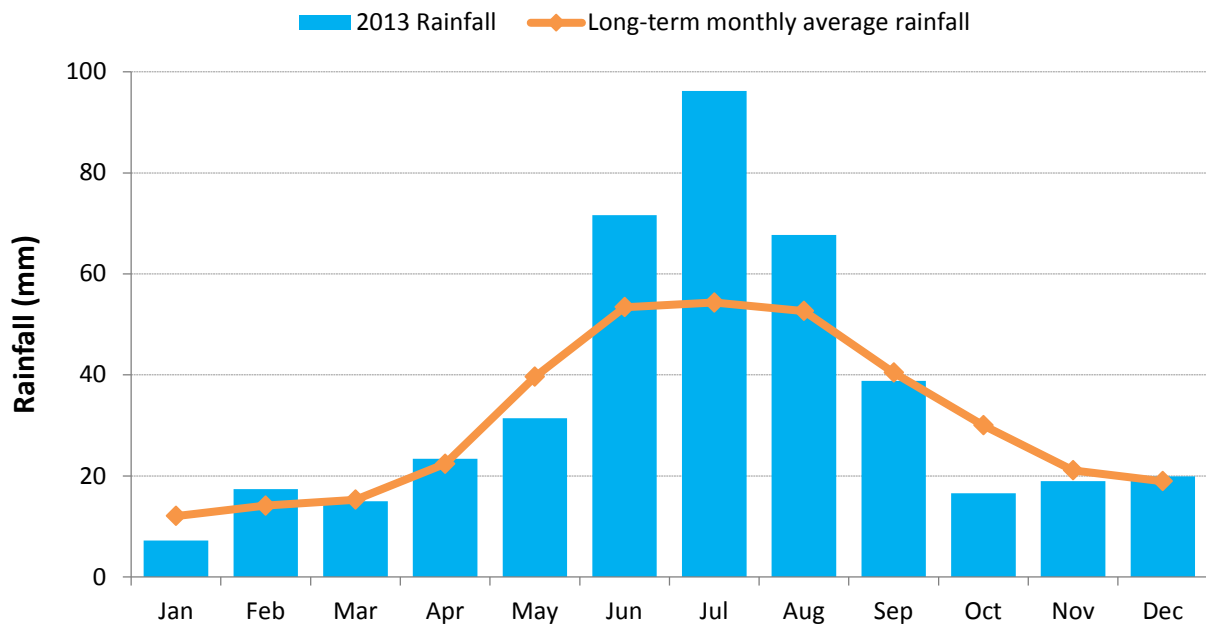


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Terre Winds rainfall station (number 18165) in the Musgrave Prescribed Wells Area

Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at www.longpaddock.qld.gov.au/silo.

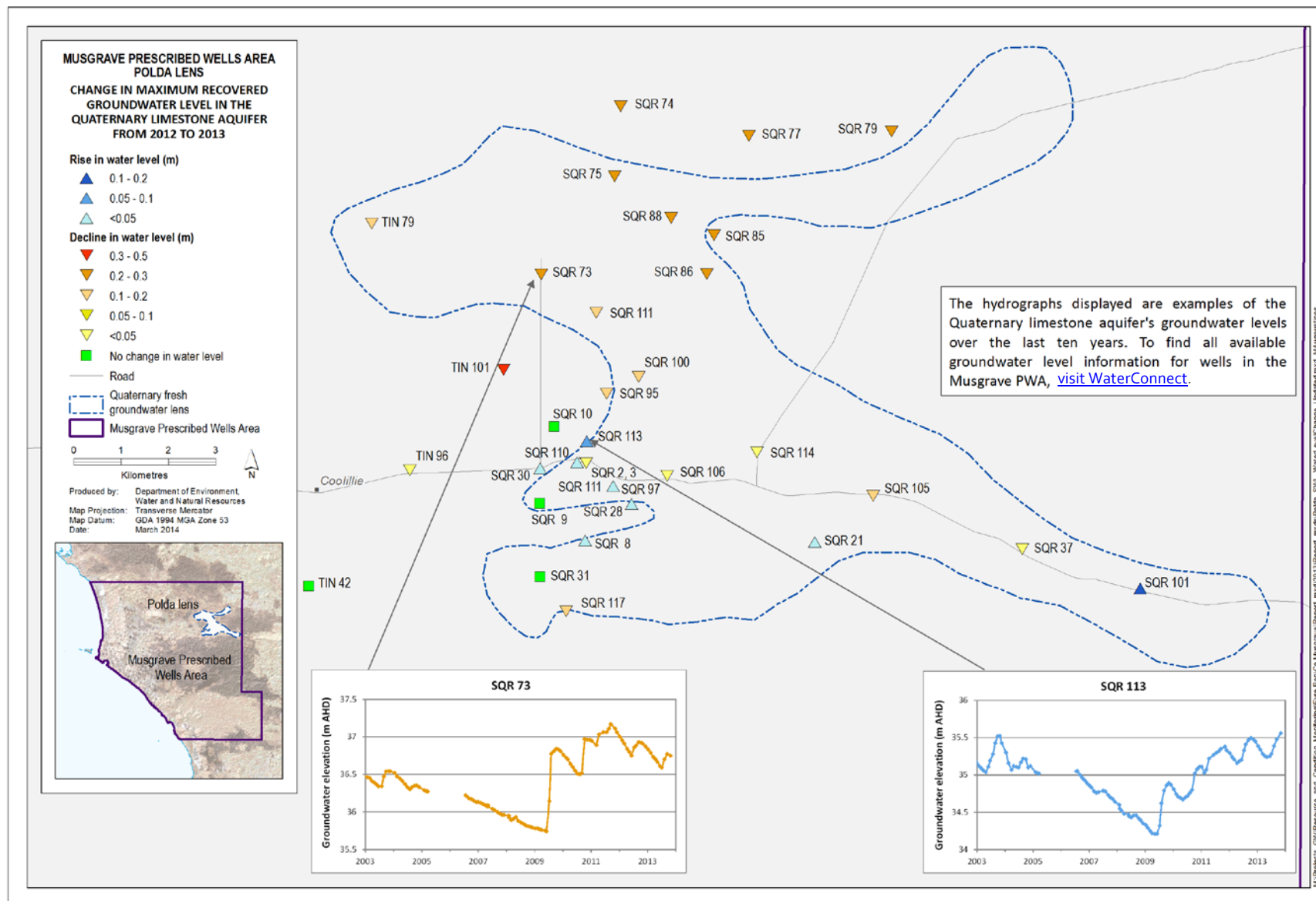


Figure 3. Overall changes in maximum recovered groundwater levels in the Polda lens of the Musgrave Prescribed Wells Area from 2012 to 2013

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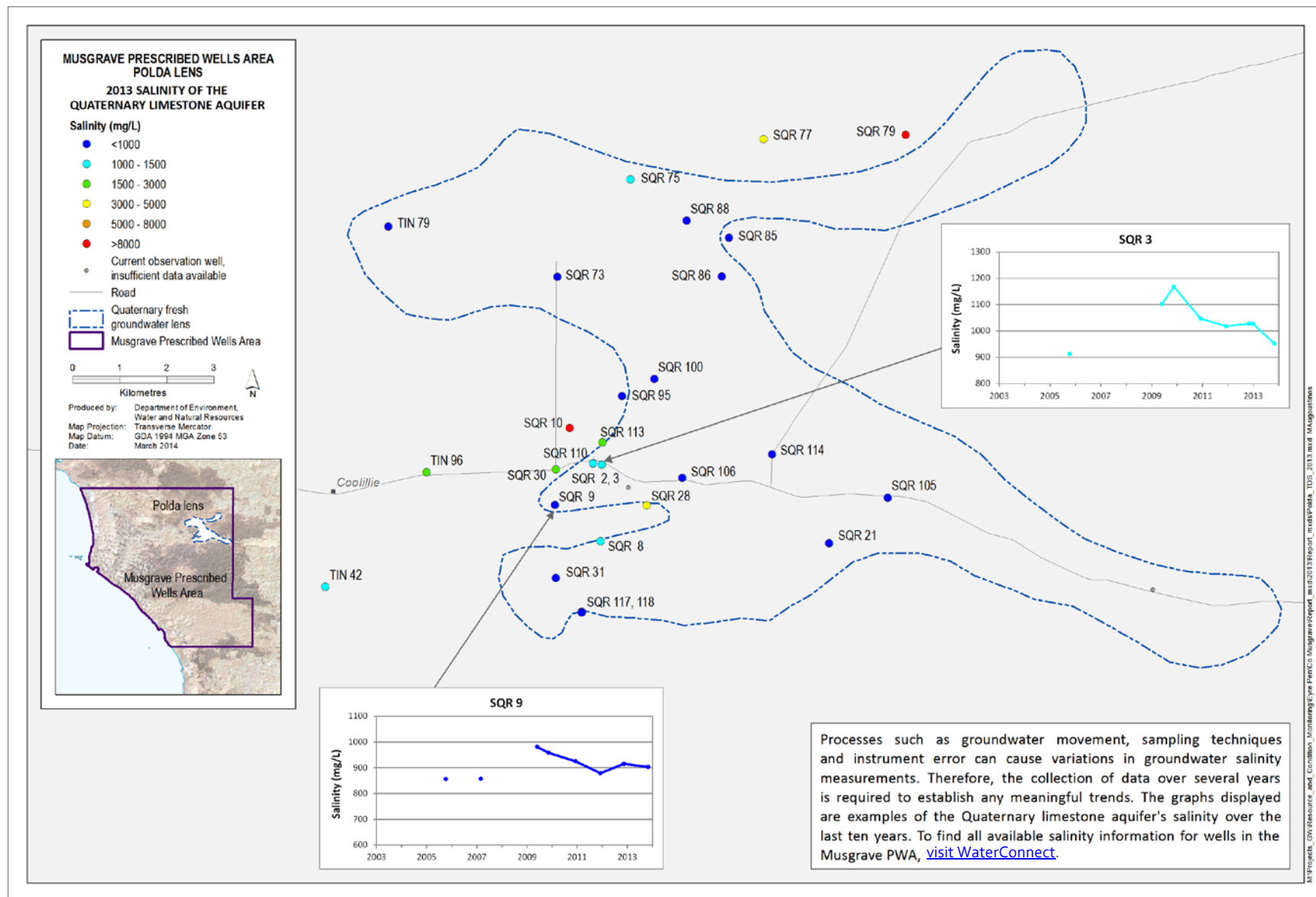


Figure 4. Groundwater salinity of the Poldalens in the Musgrave Prescribed Wells Area in 2013

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