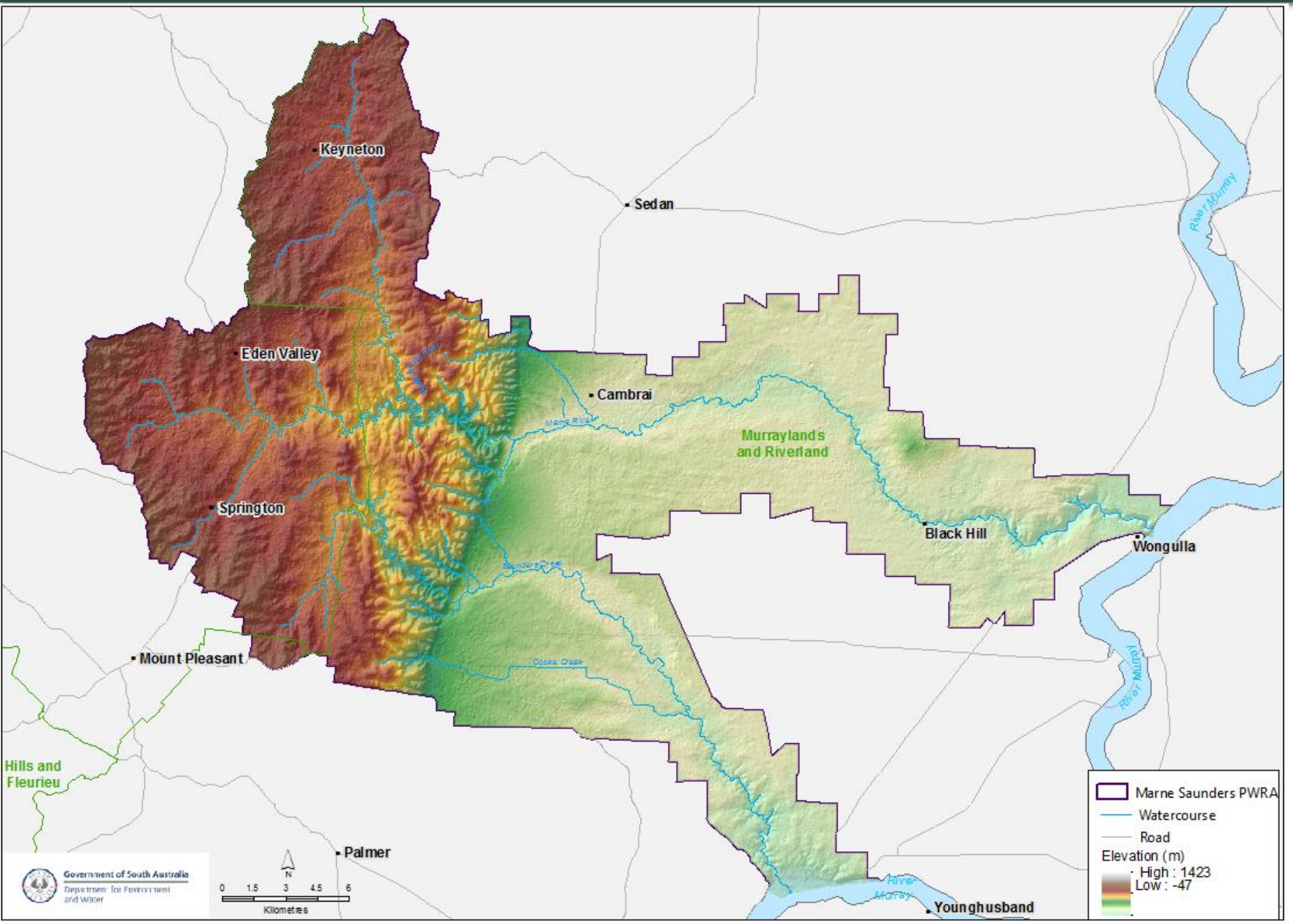
Marne Saunders Prescribed Water Resources Area

Surface water resources overview and trends

SOUTH AUSTRALIA
Government of South Australia
Department for Environment and Water

Kumar Savadamuthu, Daniel Penney

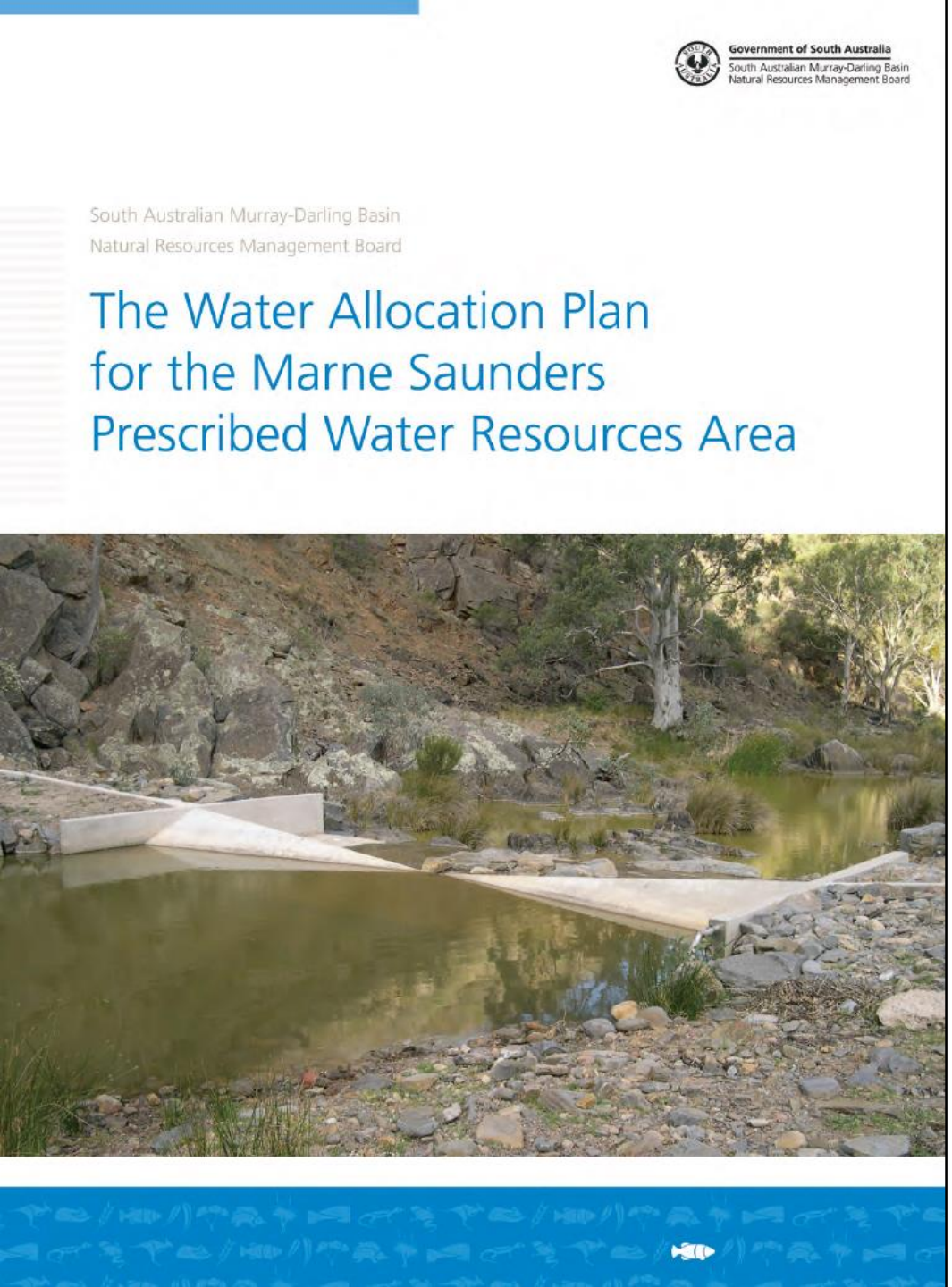
Marne Saunders PWRA – **Topography & Surface water features**



- Around 400m AHD on Western extent
- Higher rainfall 800mm/a

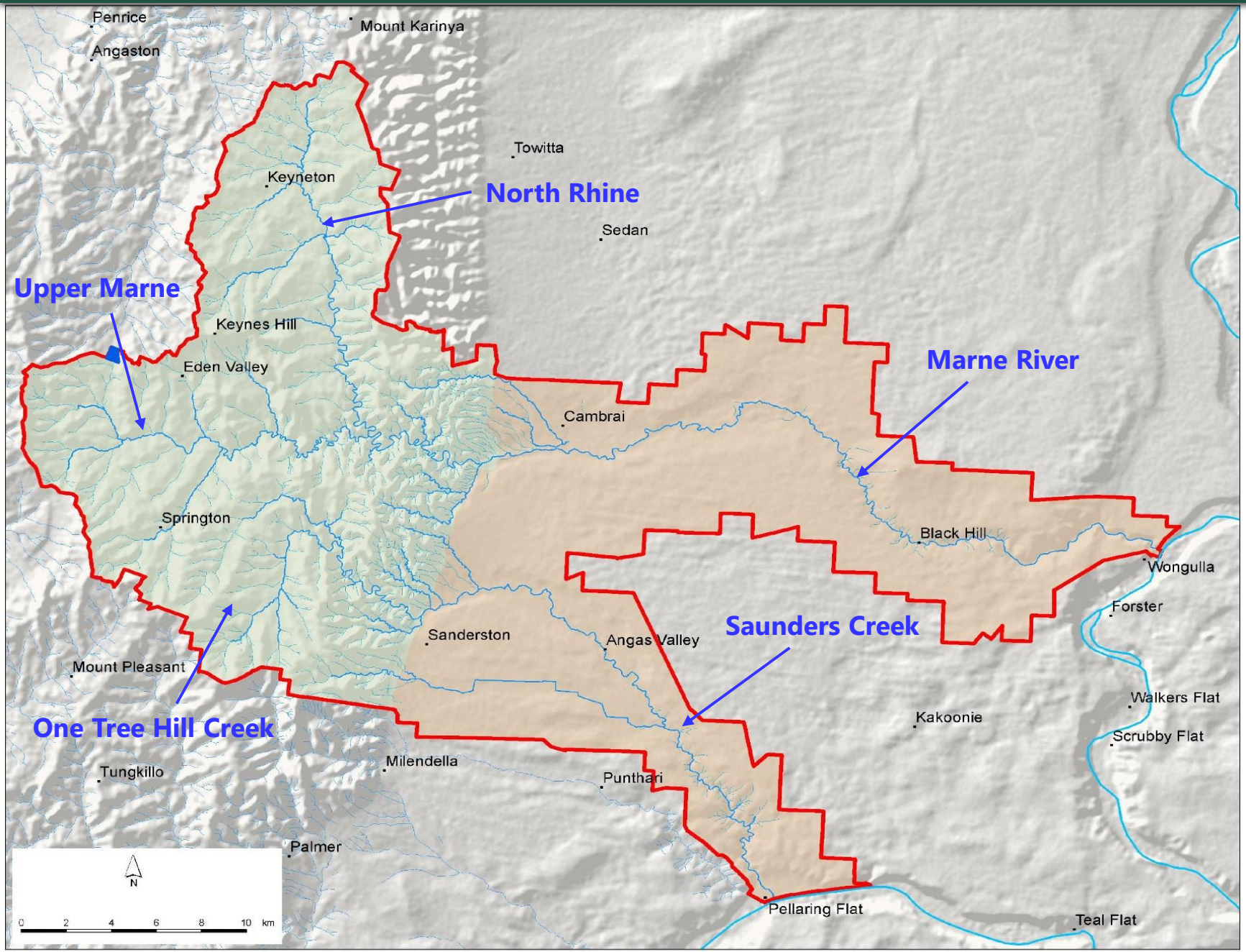
- Steep decline through the Gorge along the Palmer Fault line

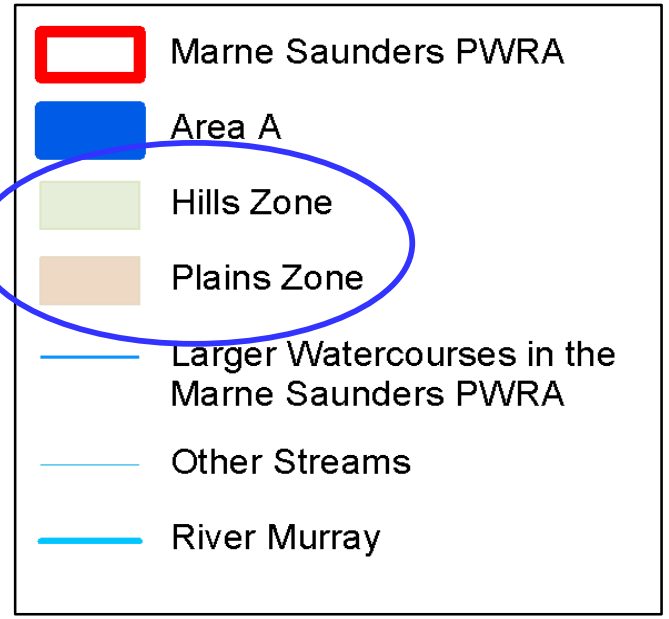
- Gently sloping floodplain d/s Palmer Fault
- Lower rainfall 250mm/a



- **This is among the first WAPs in the state to define and actually <u>quantify</u> EWRs and provisions**
- Describes the PWRA's surface water, groundwater resources and water dependant ecosystems in great detail
- Content of this presentation is taken largely from the WAP, except for the more recent analysis …

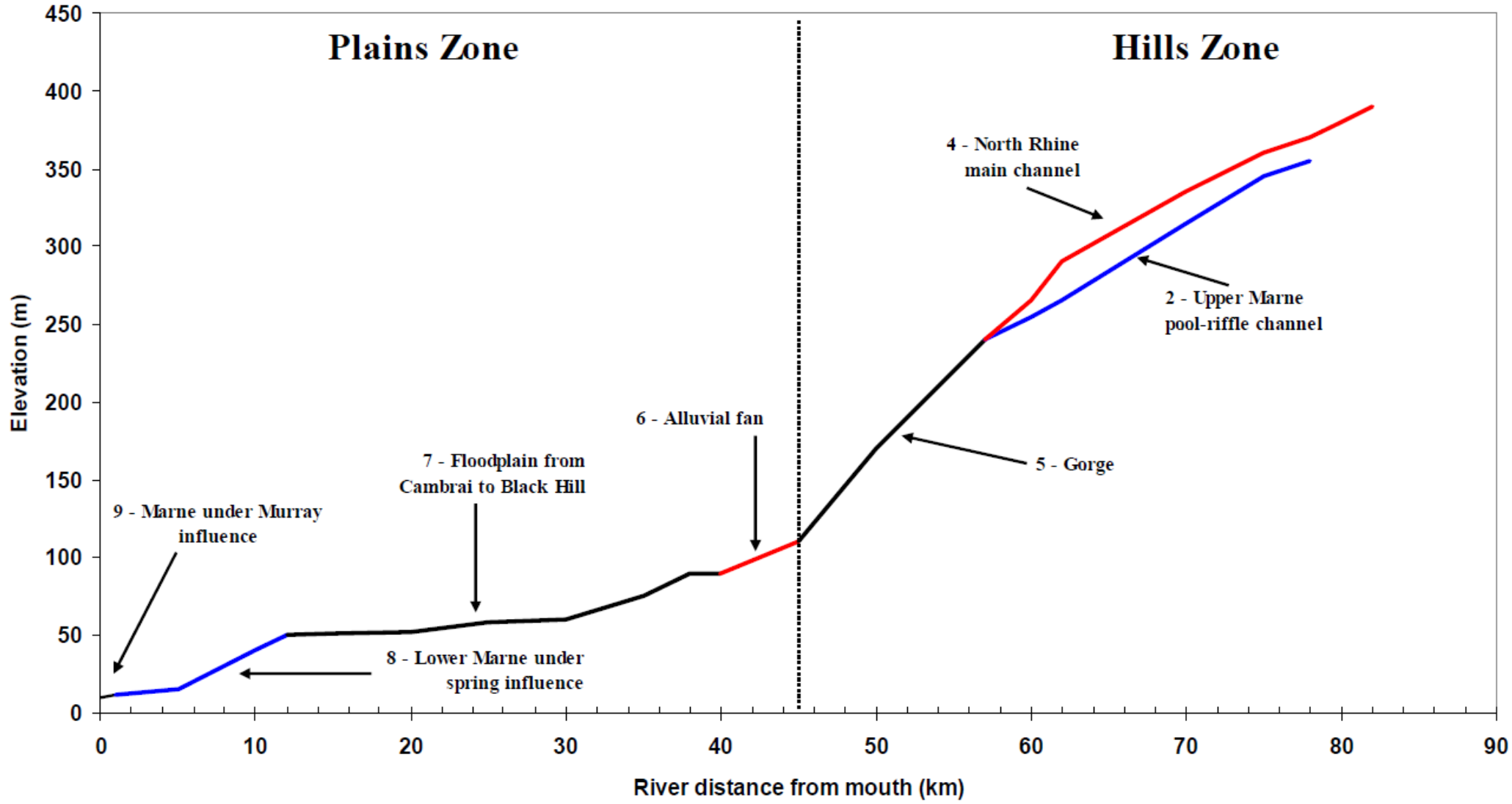
Marne Saunders PWRA – **Streams & Zones**





Marne Saunders PWRA – **Topography & Surface water features**

Figure 4 **Longitudinal profile of the Marne and North Rhine Rivers showing reach delineations. Elevations based on field survey of low flow control levels using differential GPS. River distances measured from 1:50,000 topographic maps.**

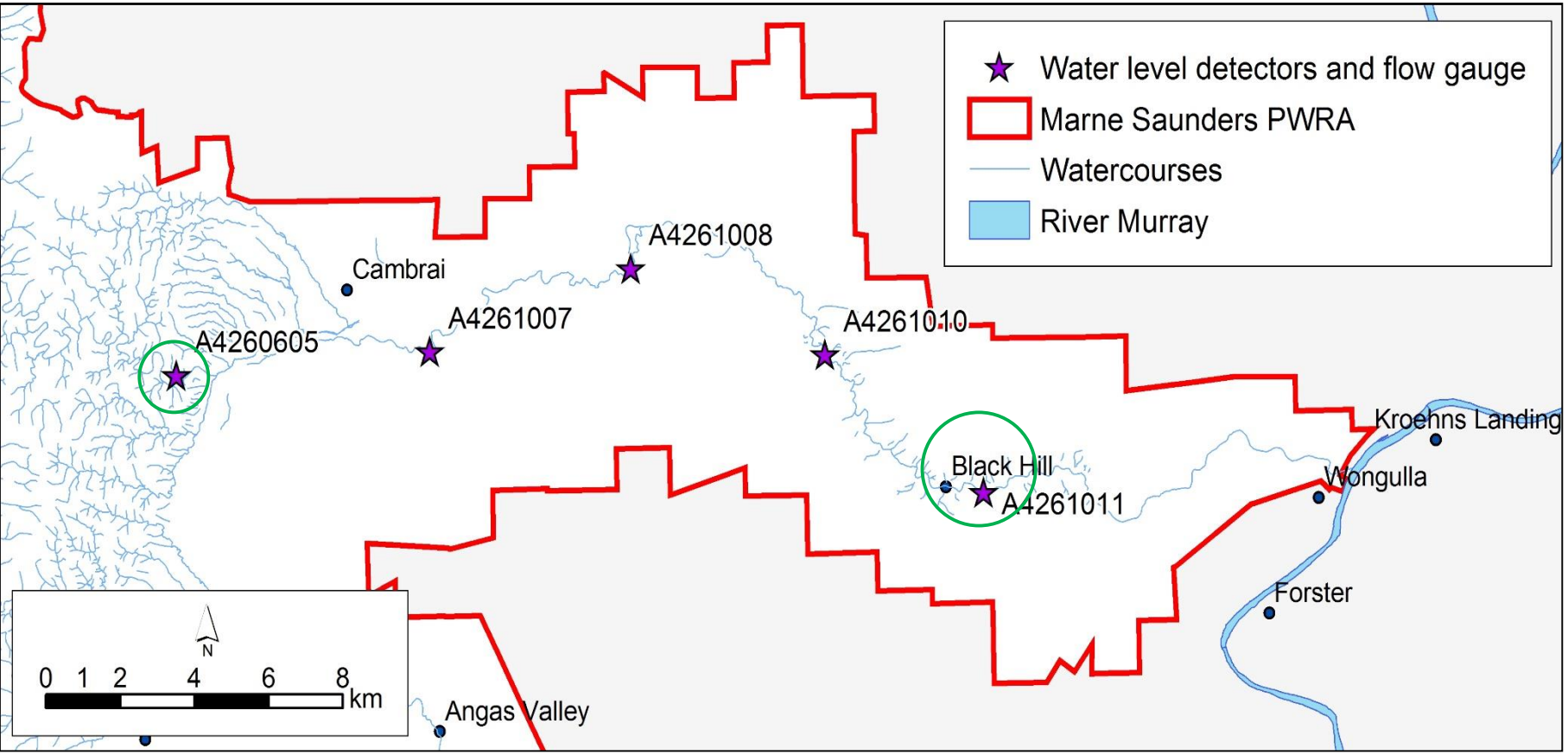


Marne Saunders PWRA – **Flow & Runoff in Lower catchments**

Marne Saunders WAP, pgs. 18 & 19

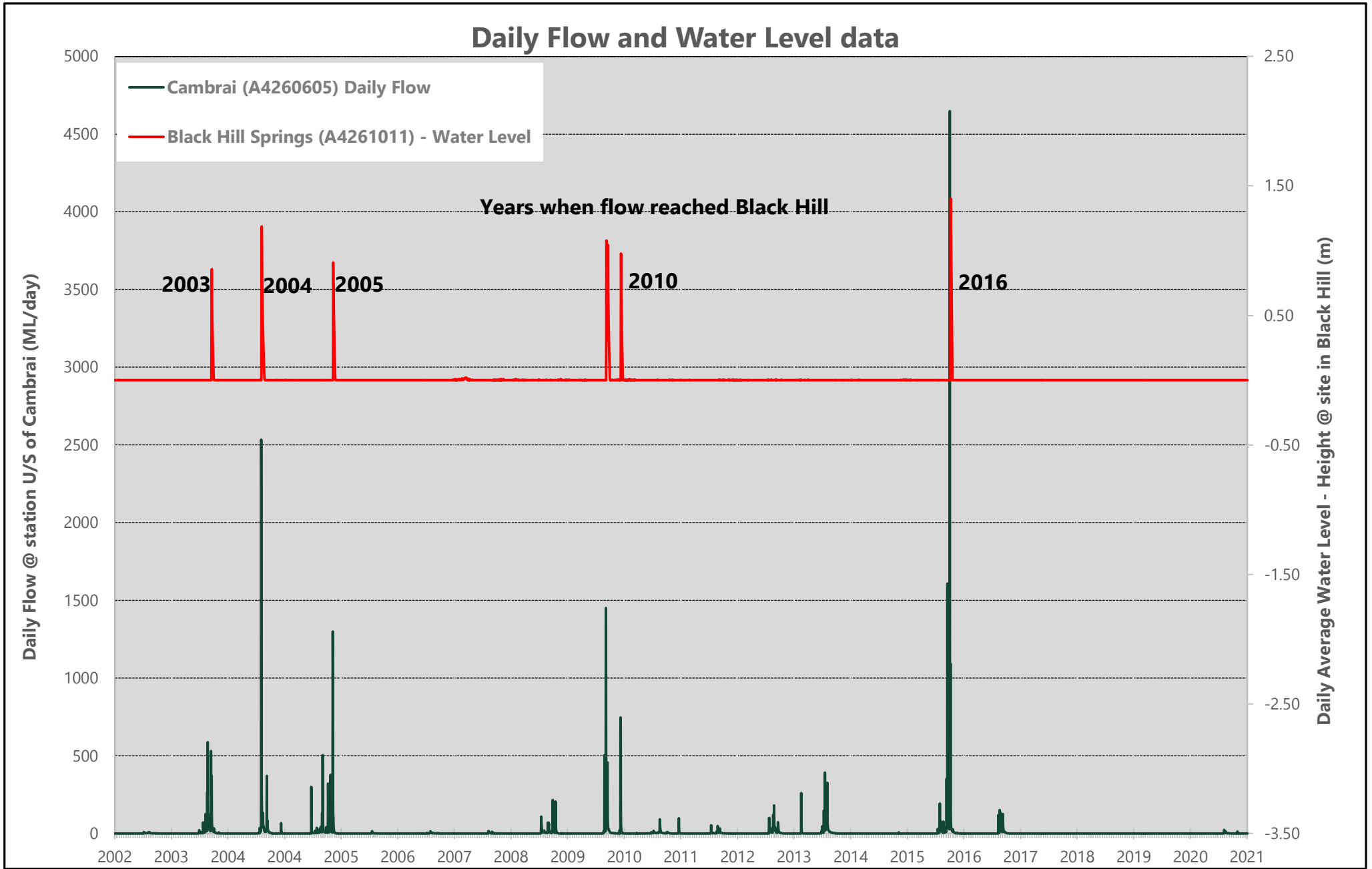
- The bulk of flow in the Lower Marne River and Lower Saunders Creek between the mouths of the gorges and Black Hill (Marne) or Lenger Reserve (Saunders) typically **originates in the hills zone**. These sections can be described as "losing" watercourses, as surface flows are lost from the watercourse as they percolate into the floodplain sediments, recharging the underground water below.
- There are few watercourses in the lower catchments besides the Marne River and Saunders Creek channels. A few minor tributaries are present, draining from the foothills and also in the incised lower reaches closer to the River Murray (e.g. around Black Hill in the Marne).
- Rainfall is low and there is little local generation of runoff.
- Water level detectors have been in place along the Lower Marne since 2001 to assess the loss of streamflow along the watercourse. Preliminary data analysis shows that **at least 4,000 ML of cumulative flow** is required at the Marne Gorge flow gauging station before flow will reach the downstream water level detector site near Black Hill.
- Flow from the Upper Marne to the mouth at the River Murray is now uncommon, having occurred in 1992, 1996 and 2004 in recent times (R. Laucke, personal communication). Flow from the Upper Saunders to the mouth is even more uncommon given the smaller discharge from this area, and it is not known when this last occurred.

Marne Saunders PWRA – **Flow & Water Level Monitoring sites**

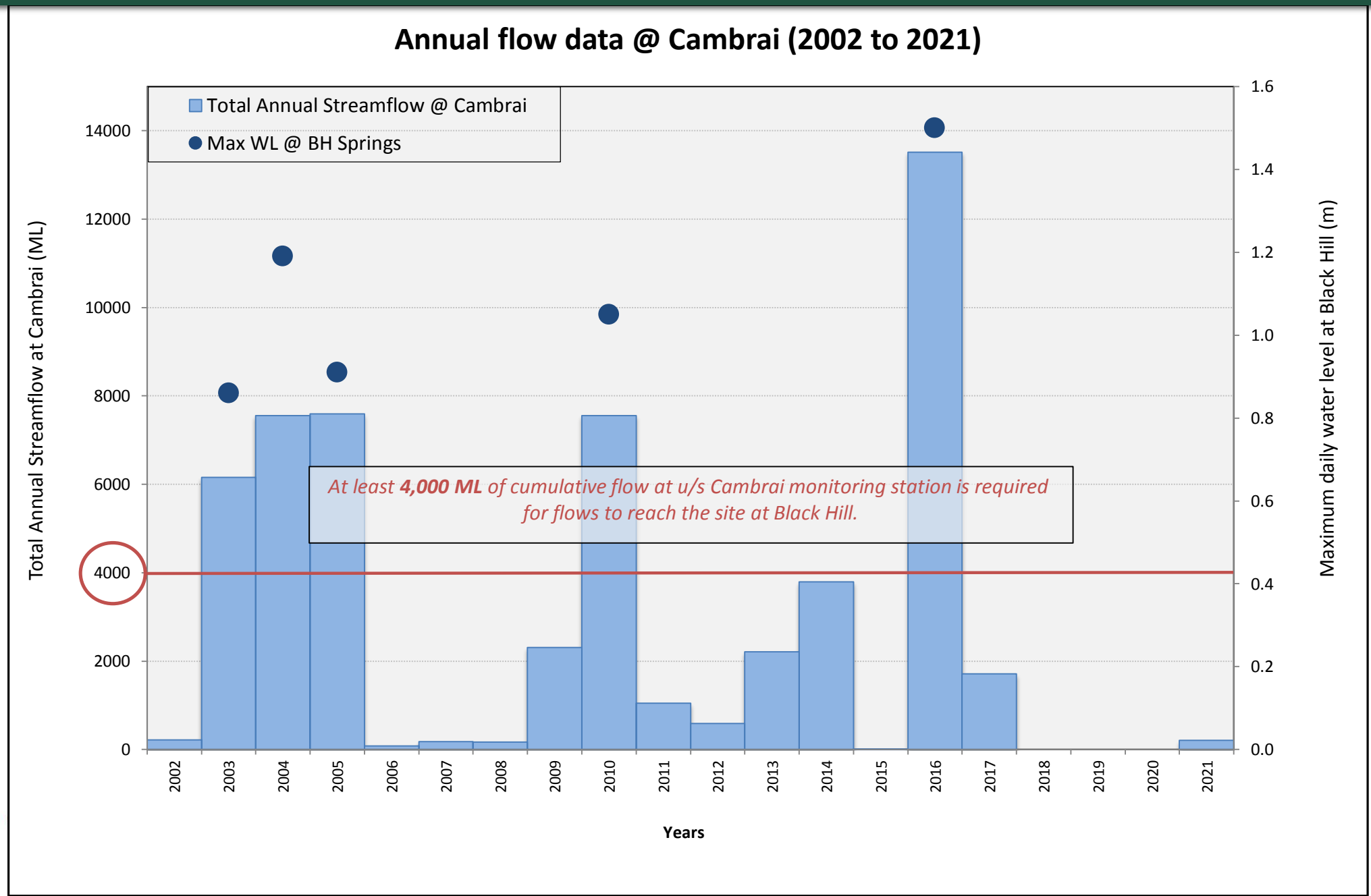


- A4260605 – long-term flow monitoring – u/s of Cambrai since early 1970s.
- A4261011 – most d/s site, water level data, established 2001.
- Other sites – water level data since 2002.
- Data in next slide…..

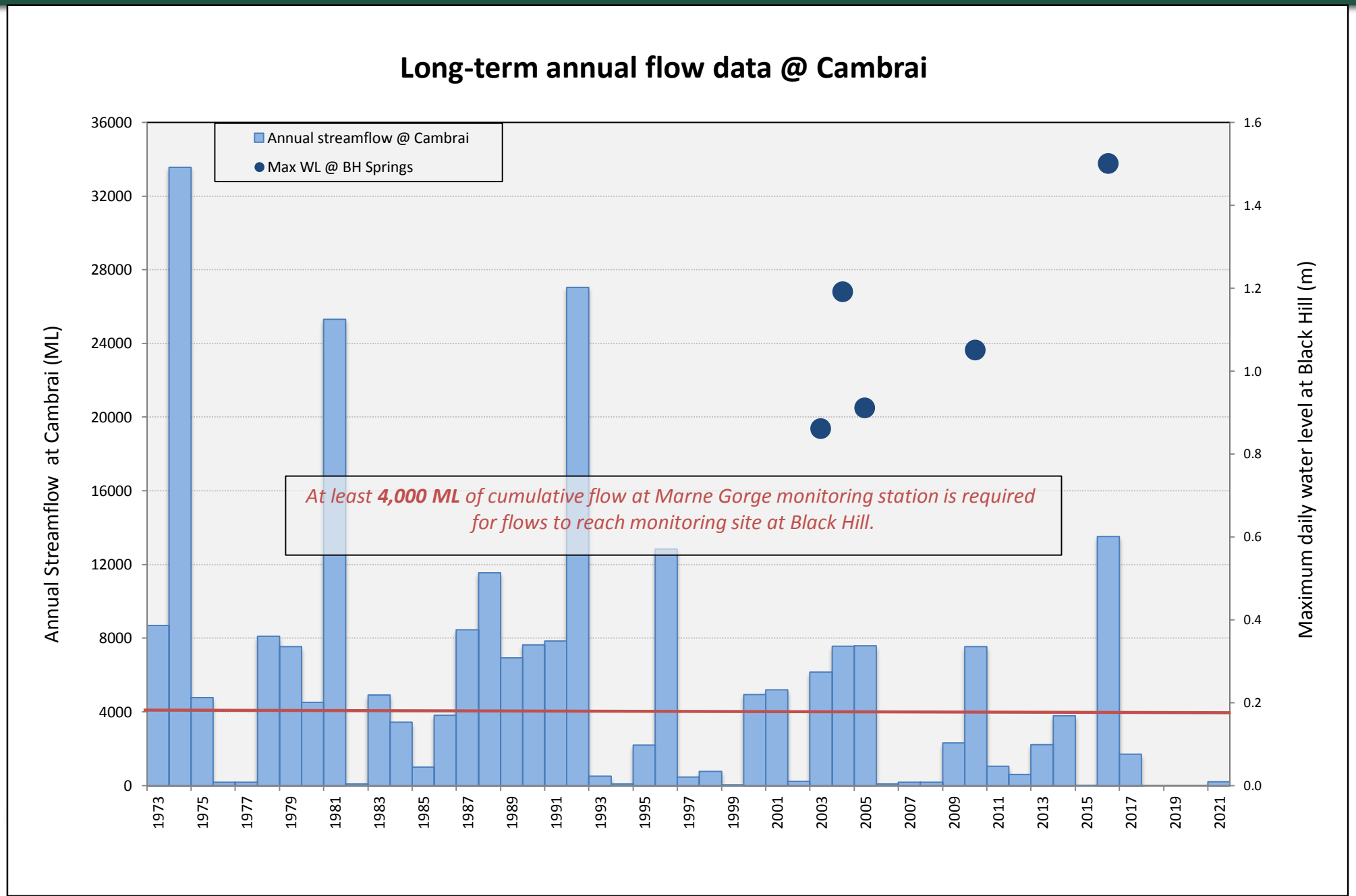
Years when flows reached Black Hill...



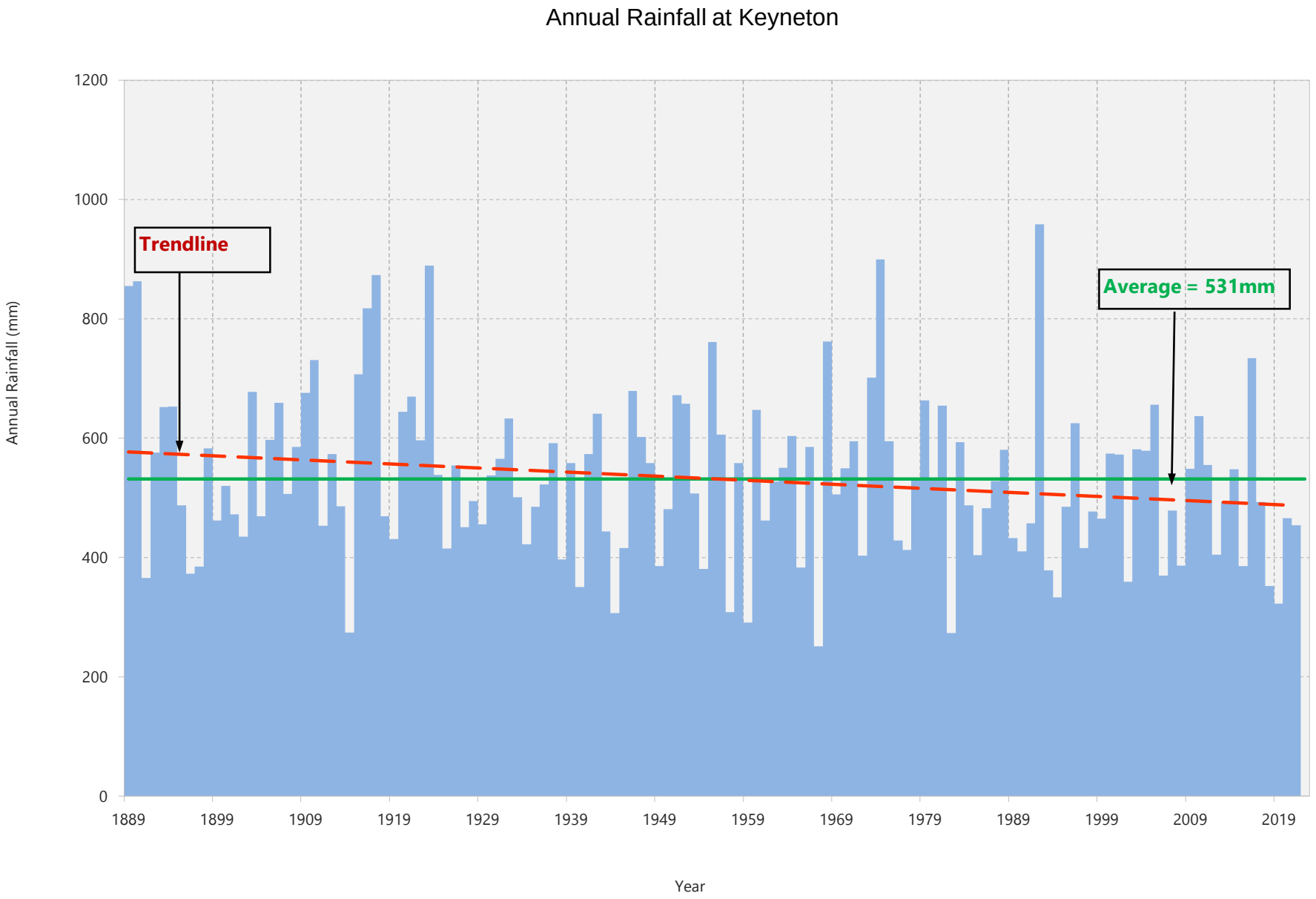
How much total flow needed … to reach Black Hill…



Long-term annual flow data at Cambrai..

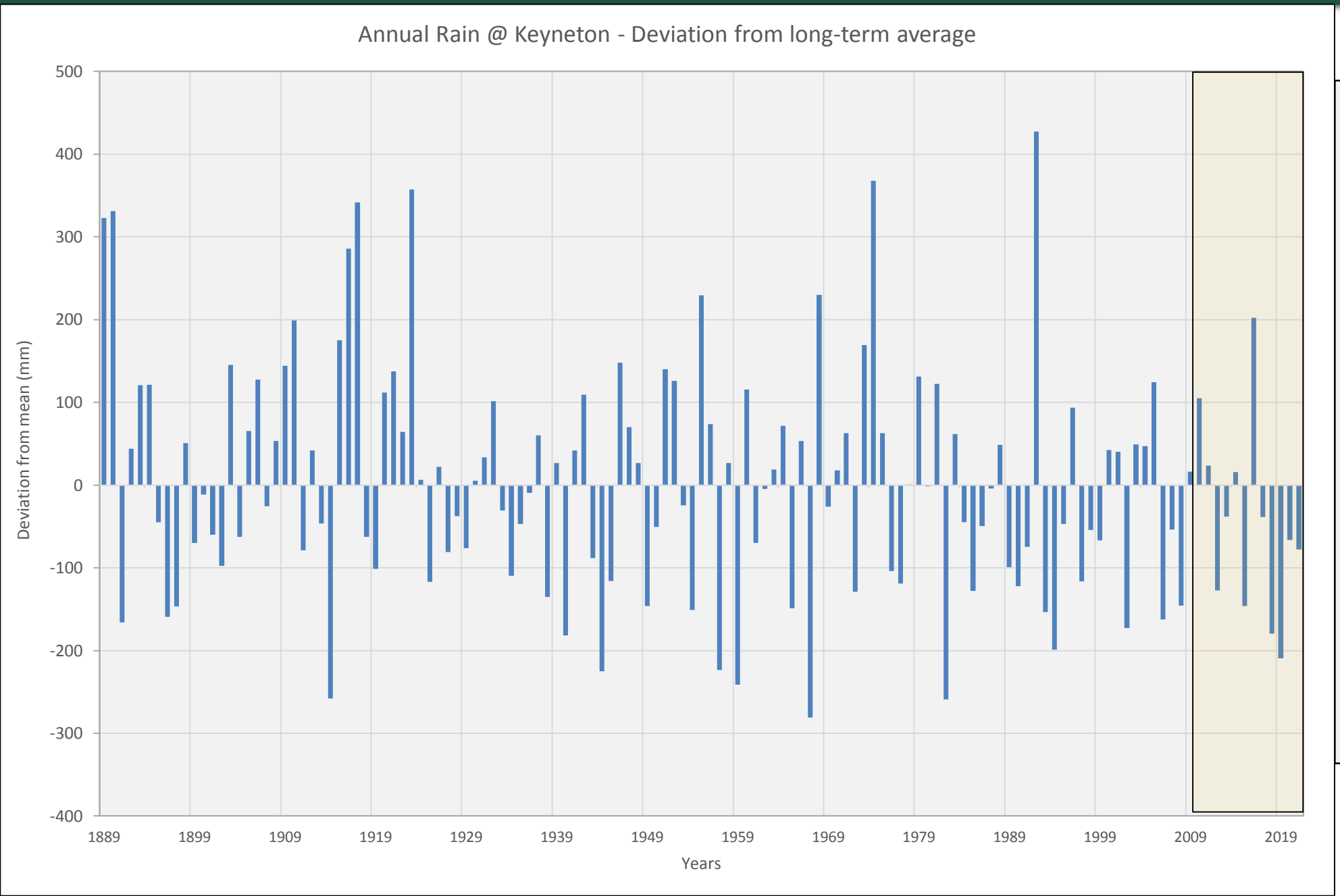


Long-term annual rainfall data, Keyneton..



- Long-term decreasing trend at Keyneton
- Since 2016, all years have been lower than average rainfall years.

Annual rain – Deviation from average..



- Last 5 years – long sequence of consecutive dry years..

Climate change

- Reduction in annual rain
- Increased Temp. & Evap
- Change in seasonality (rainfall pattern)
- Increased frequency of very DRY / WET years
- Reduction in Catchment Yield – runoff generated from hills
- Reduction and/or change in frequency of flow reaching Black Hill ??

Thanks….

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