Shackleford Creek – Scott River Confluence Water Surface Elevation Monitoring
Scott River Watershed Council
September 24, 2025

Fourteen (14) water surface elevation (WSE) stations were installed in the Shackleford Creek – Scott River confluence to document the elevation of shallow groundwater – Map 1. Onset Computer Corporation pressure transducers were installed in the vented steel casing documenting continuous (15 minute) water depth and temperature. A RTK GNSS survey system was utilized to document the horizontal coordinates (NAD83) and the elevation (NAVD88) of the ground and reference point of each station – Table 1.

Pressure transducers were deployed in WSE station SHSRMW1 to SHSRMW7 and SHSRMW16 on August 4th and 5th, 2025 and in WSE stations SHSRMW8 to SHSRMW14 on September 3, 2025 – Table 2.

Periodic measurements of the distance from the reference point to the water surface are performed at each station. The reference point elevation, periodic depth to water measurements and continuous water depth data are utilized to calculate the continuous water surface elevation (ft) for each station – Figure 1.

SHSCMW2 on river left bar of Scott River downstream of Shackleford Creek Confluence

Well ID	Northing (ft)	Easting (ft)	Ground Elevation (ft)	RP Elevation (ft)
SHSRMW1	2480037.2	6298799.8	2659.10	2663.01
SHSRMW2	2480617.6	6297880.5	2658.93	2661.30
SHSRMW3	2480565.3	6297422.4	2660.50	2663.44
SHSRMW4	2480482.3	6297836.8	2661.78	2664.05
SHSRMW5	2480198.0	6298082.9	2662.34	2665.24
SHSRMW6	2480126.3	6298293.7	2663.90	2666.40
SHSRMW7	2479984.7	6298484.4	2665.02	2667.40
SHSRMW8	2479821.5	6298622.2	2665.94	2669.12
SHSRMW9	2479805.7	6298758.7	2664.77	2667.91
SHSRMW11	2480426.2	6297240.9	2661.20	2664.39
SHSRMW12	2480432.4	6297525.4	2661.38	2664.56
SHSRMW13	2479972.2	6298163.5	2664.10	2667.26
SHSRMW14	2479746.1	6298190.0	2665.72	2668.84
SHSRMW16	2479412.0	6298533.5	2667.37	2670.71

Table 1 - Location (SPC CA01) and elevation of WSE stations

Station ID	Date Logger Installed
SHSRMW1	8/4/2025
SHSRMW2	8/4/2025
SHSRMW3	8/5/2025
SHSRMW4	8/4/2025
SHSRMW5	8/4/2025
SHSRMW6	8/4/2025
SHSRMW7	8/4/2025
SHSRMW8	9/3/2025
SHSRMW9	9/3/2025
SHSRMW11	9/3/2025
SHSRMW12	9/3/2025
SHSRMW13	9/3/2025
SHSRMW14	9/3/2025
SHSRMW16	8/5/2025

Table 2 – Data of pressure transducer deployment

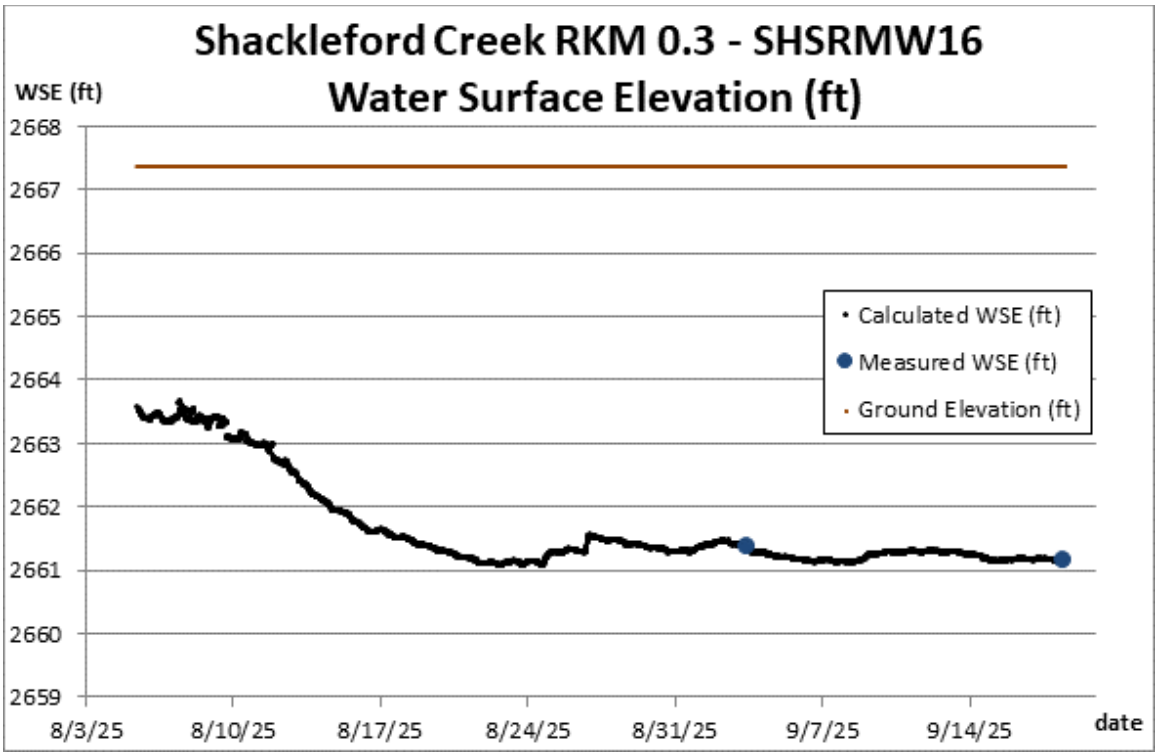


Figure 1 – Calculated and measured WSE - SHSRMW16 – Shackleford Creek RKM 0.3

Water surface elevation (WSE) of the Scott River upstream and downstream of the Shackleford Creek confluence were documented during the summer base flow period on September 3, 2025 when the WSE in each station was documented. Shackleford Creek was disconnected through the project reach during the September 3rd survey.

The WSE in the Scott River surface water and the shallow groundwater at the fourteen (14) WSE stations on September 3rd was utilized to generate a surface model of the WSE through the project area – Map 2.

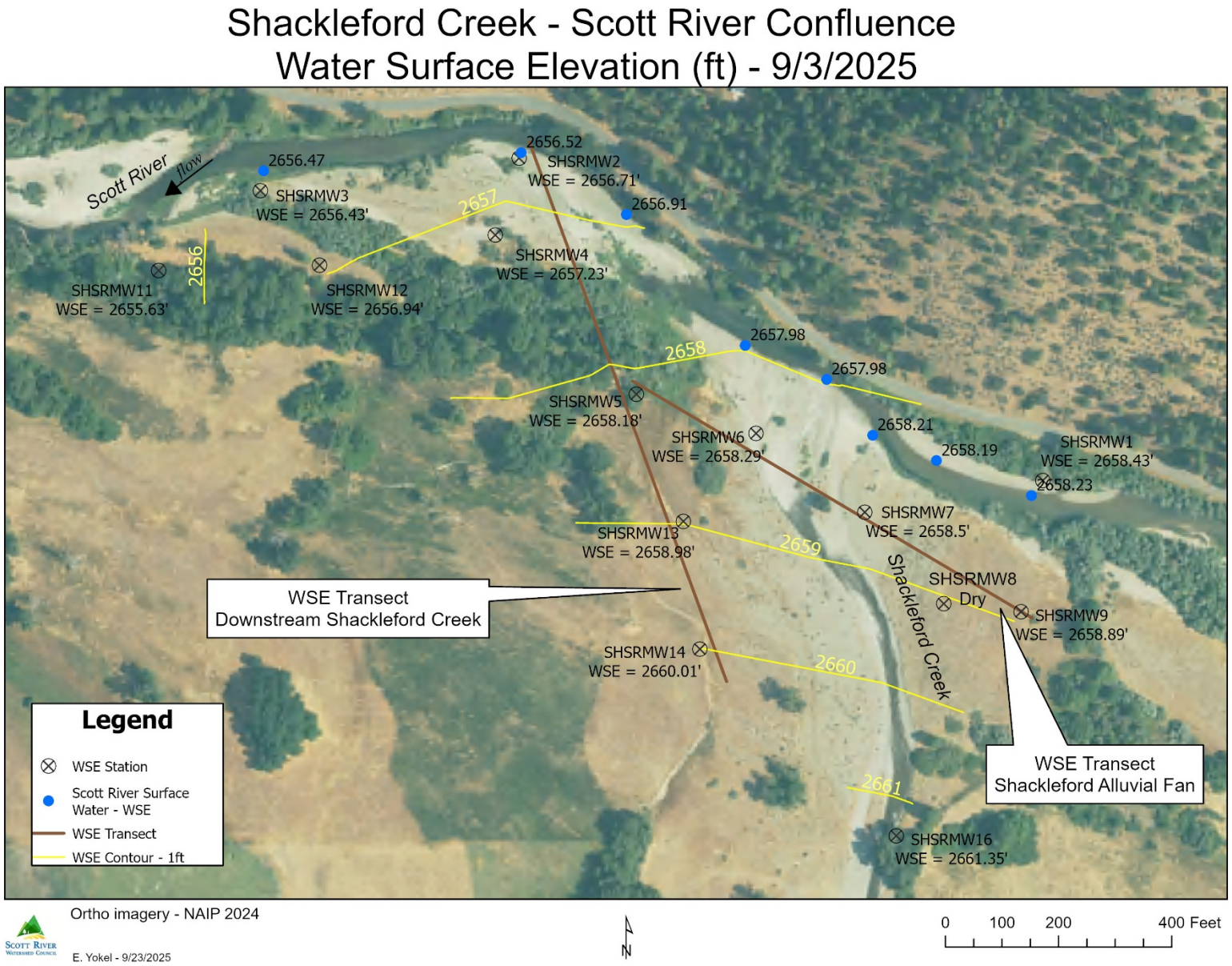
The daily average WSE in several monitoring station transects was analyzed – Map 2. A transect downstream of the Shackleford Creek confluence consisting of four WSE stations (SHSRMW14, SHSRMW13, SHSRMW5 and SHSRMW2) illustrates the lower WSE elevations moving downslope along the alignment of Shackleford Creek – Figure 2. Analysis of the daily average temperature (°C) at the four stations along the transect illustrates warmer water temperatures in the station adjacent to the Scott River (SHSRMW2) compared to the upslope station (SHSRMW5) indicative of a surface water component at the MW2 station – Figure 3.

Analysis of the SHSRMW2 station adjacent to the Scott River and the SHSRMW4 station on a bar approximately 150 ft from the surface water illustrates that the Scott River is lower elevation than the adjacent shallow groundwater indicative of a gaining reach – Figure 4.

The water temperature in the shallow groundwater adjacent to the Scott River (MW2) is warmer than the temperature observed in the MW4 – Figure 5.
A transect of four WSE stations (SHSRMW9, SHSRMW7, SHSRMW6 and SHSRMW5) at the alluvial fan of Shackleford Creek was analyzed. WSE decreases from the upstream end of the Scott River (SHSRMW9) to the downstream end of the Scott River (SHSRMW5) – Figure 6.
Shallow groundwater temperatures are warmer at the WSE stations located in the alluvial fan of Shackleford Creek (SHSRMW7 and SHSRMW6) then the stations located on the river right and river left terraces (SHSRMW9 and SHSRMW5, respectively) – Figure 7.
It is believed that the warmer temperatures observed in the alluvial fan are due to the infiltration of Scott River water into the coarse alluvial deposits.

Shackleford Creek - Scott River Confluence
Water Surface Elevation Monitoring Network

Map 1 – Location of water surface elevation stations – Shackleford Creek – Scott River Confluence



Map 2 - Water surface elevation (ft) of Scott River surface water and shallow groundwater – September 3, 2025

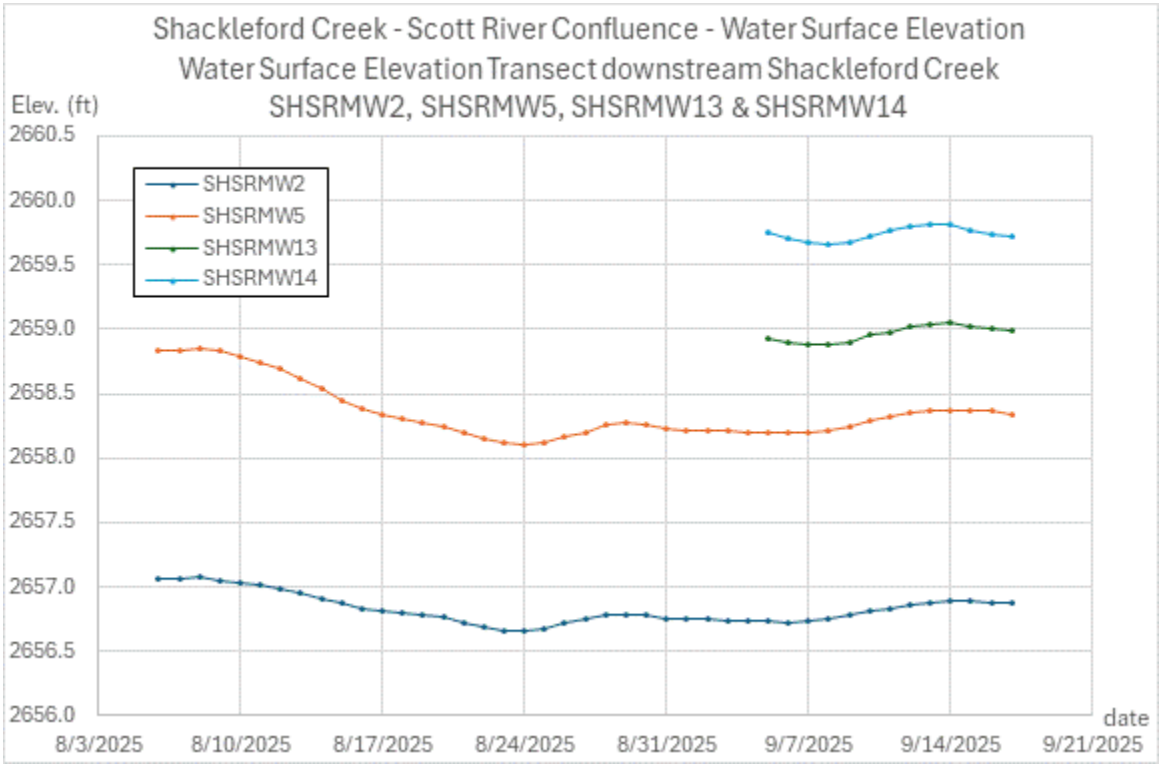


Figure 2 – Daily average WSE (ft) – WSE Transect downstream of Shackleford Creek

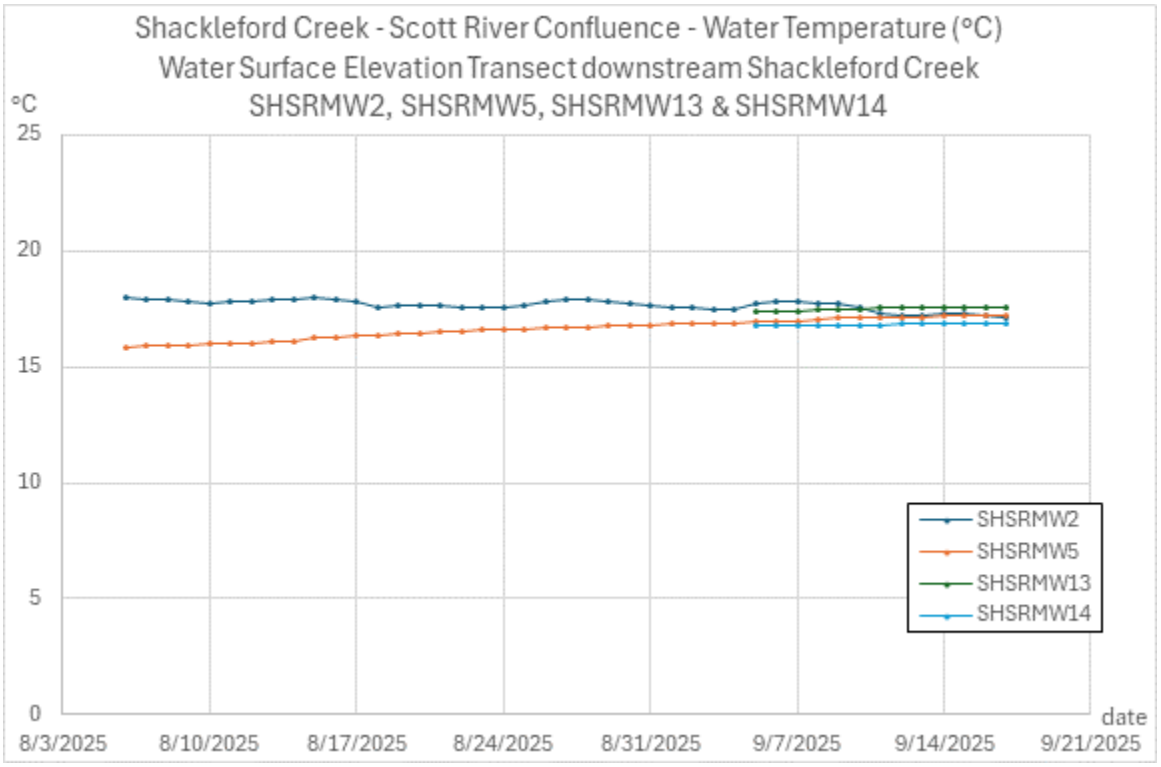


Figure 3 - Daily average temperature (°C) – WSE Transect downstream of Shackleford Creek

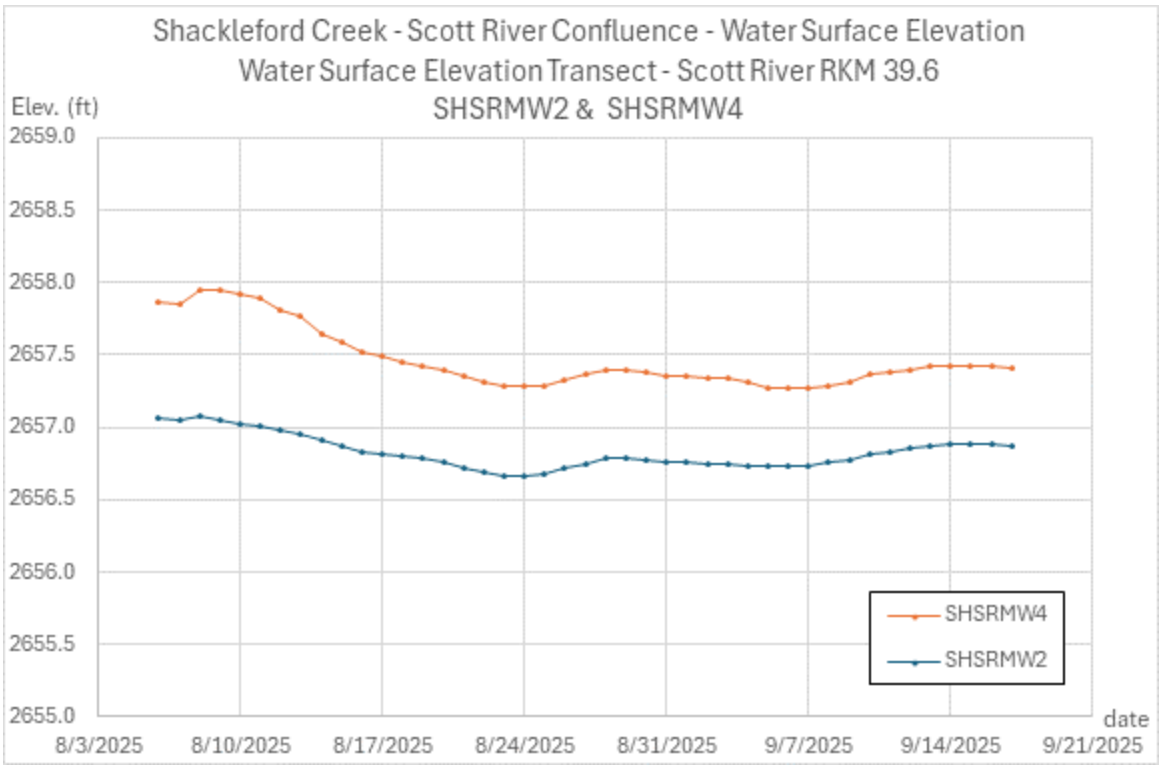


Figure 4 - Daily average WSE (ft) – Scott River (SHSRMW2) and bar (SHSRMW4)

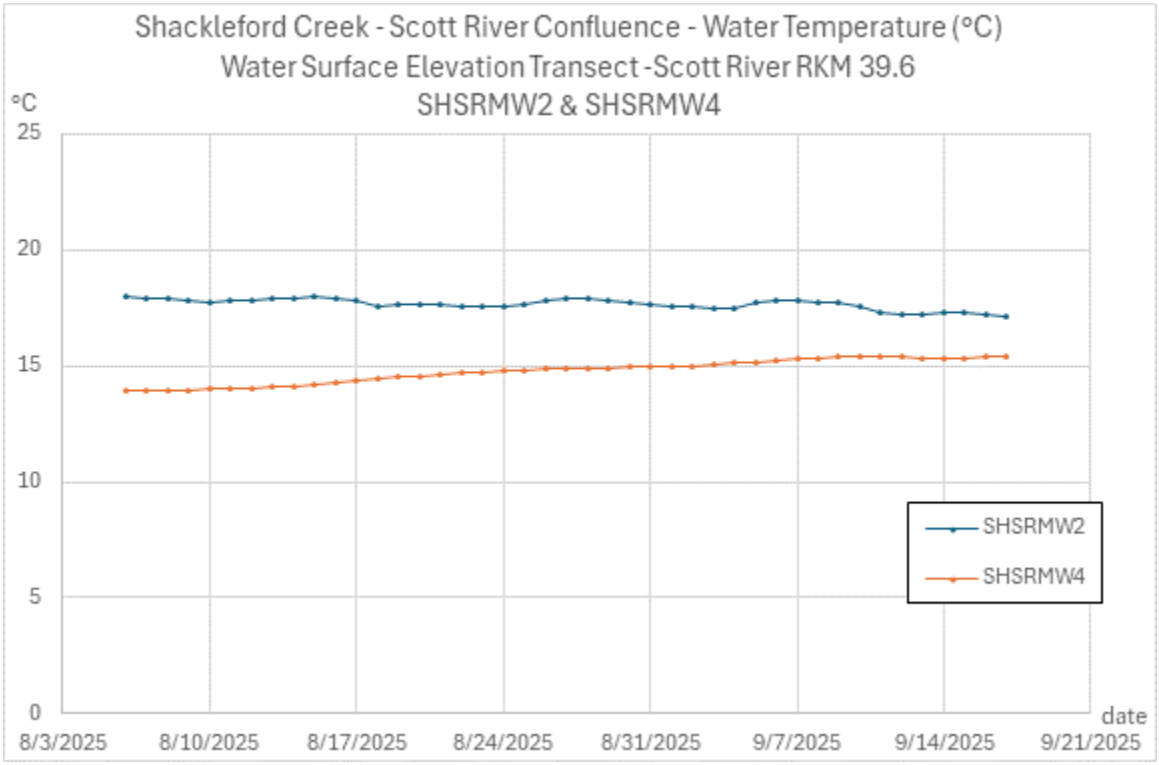


Figure 5 - Daily average WSE (ft) – Scott River (SHSRMW2) and bar (SHSRMW4)

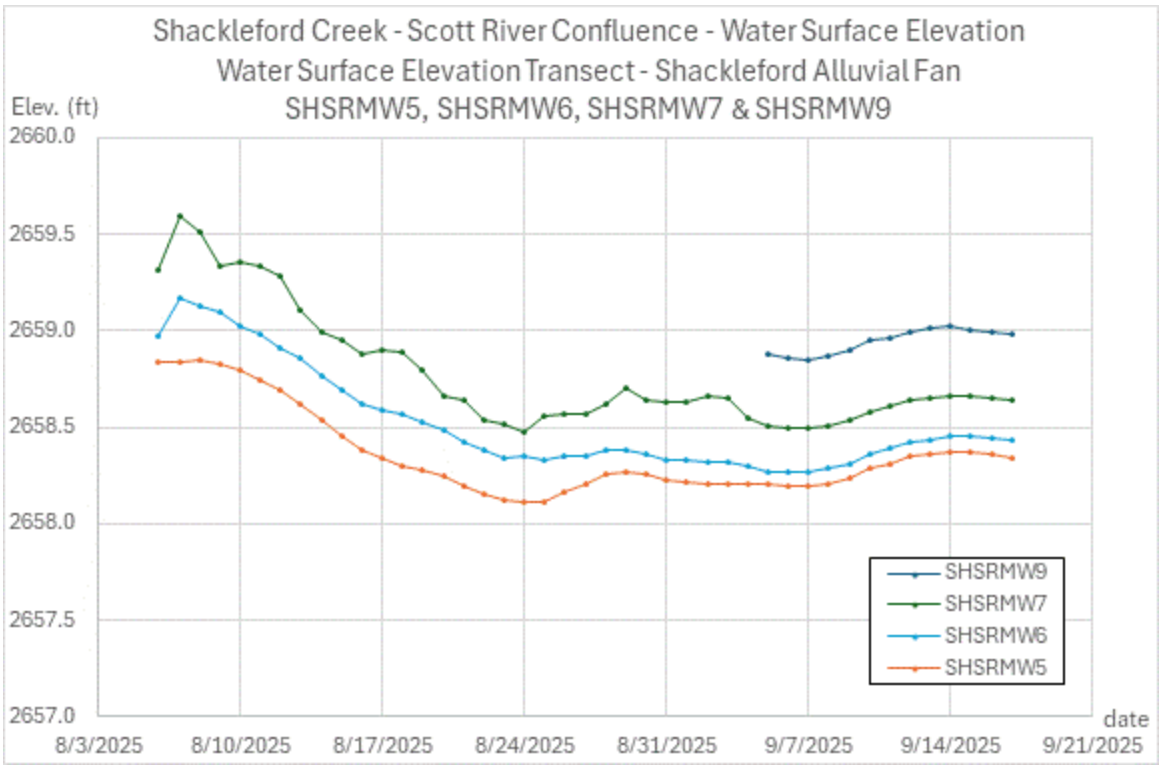


Figure 6 – Daily average WSE (ft) – WSE Transect Shackleford Alluvial Fan

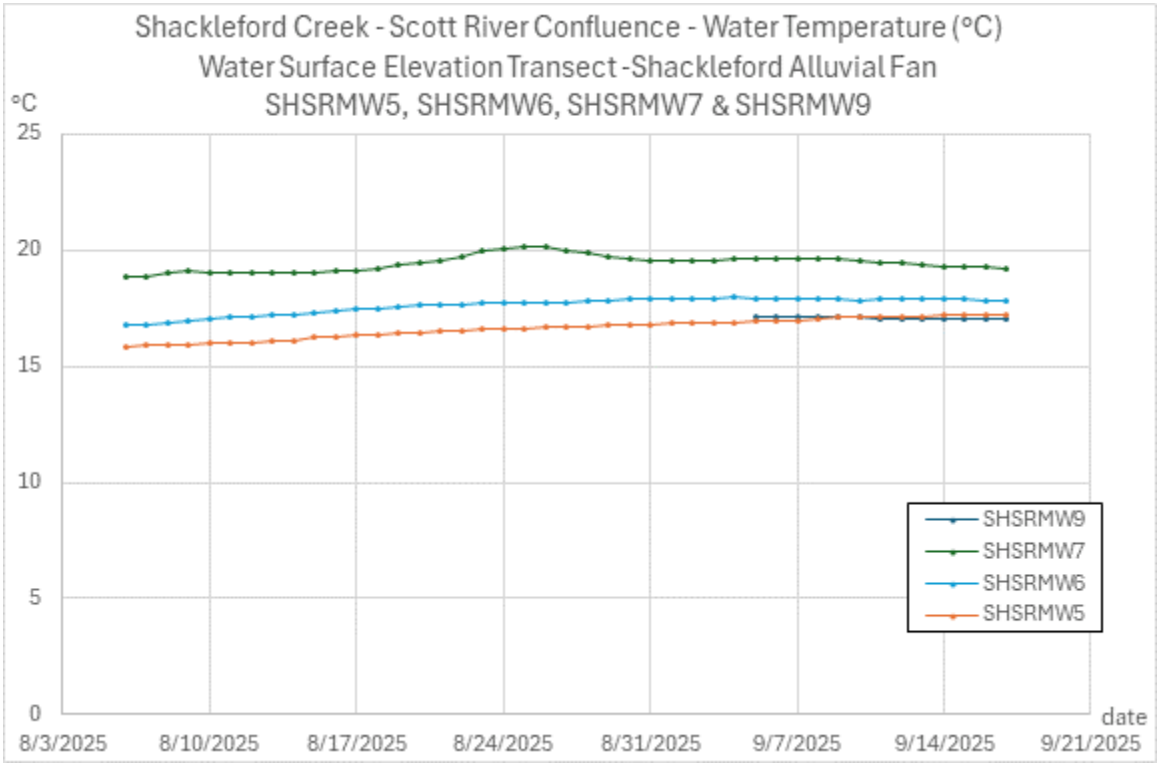


Figure 7 - Daily average temperature (°C) – WSE Transect Shackleford Alluvial Fan