

Figure 1: Alluvial Monitoring Well Levels in Cheyenne County Fringe

There are three alluvial monitoring wells in Cheyenne County. CN29 has the longest period of record with measurements from 1947, while CN03 and CN09 have measurements from 1948 and 1967 respectively. CN03 has had the largest net decline of about 4 feet since 1948, while CN09 and CN29 have experienced net declines of 0.69 feet and 2.5 feet respectively (Figure 1). From 2009 to 2010 CN03, CN09 and CN29 experienced increases of 2.61 feet, 0.2 feet, and 0.97 feet respectively. The five-year rolling average has declined 3.20 feet since 2000.

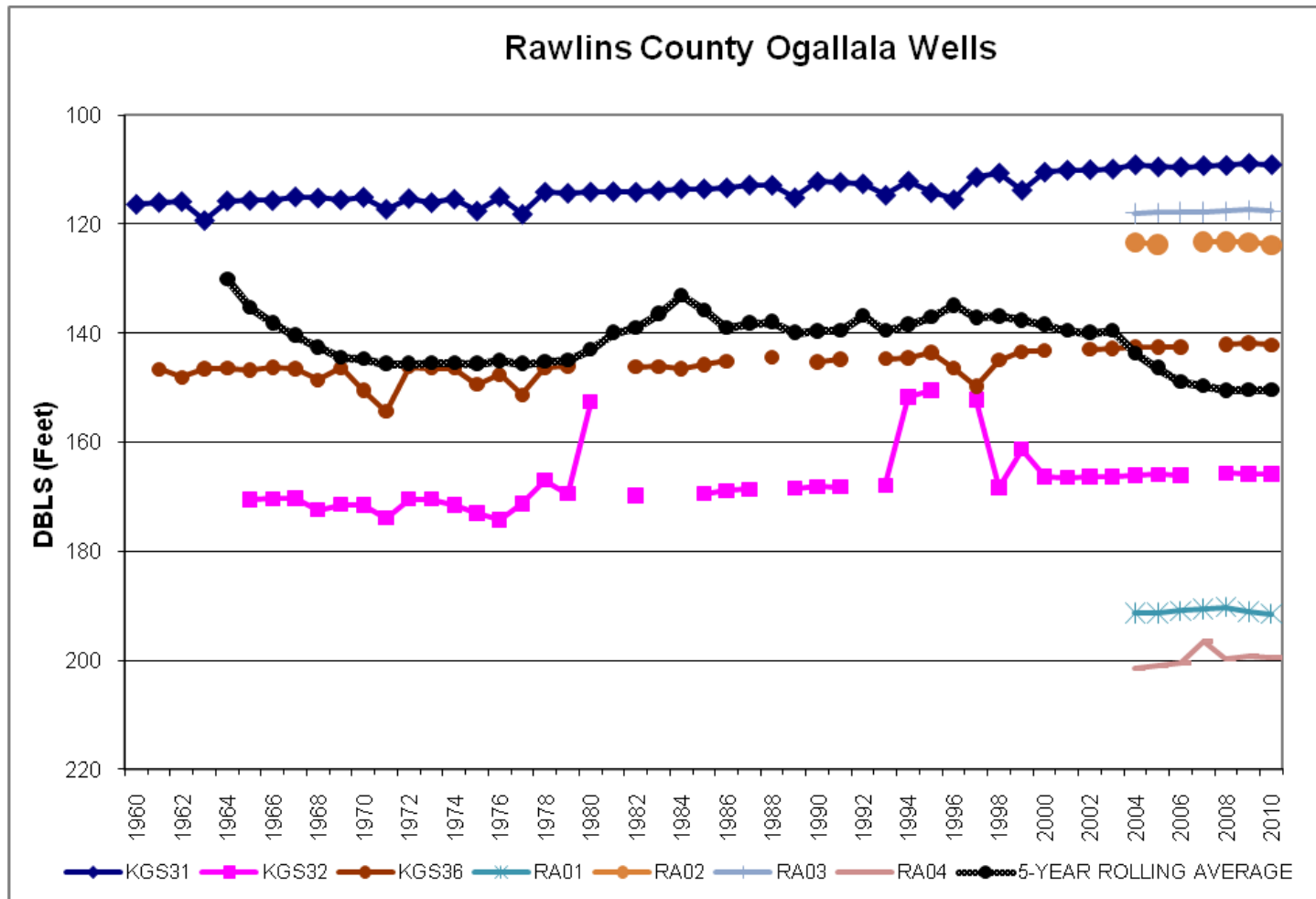


Figure 2: Ogallala-High Plains Monitoring Well Levels in Rawlins County Fringe

Rawlins County has both alluvial and Ogallala-High Plains monitoring wells. There are seven monitoring wells in the Ogallala-High Plains. Three of these wells have data beginning in the 1960s. KDA-DWR added monitoring wells RA01, RA02, RA03 and RA04 to the data analysis in 2008 and these wells have measurements since 2004. From 2009 to 2010, the wells had an average overall decline of 0.26 feet. However, over the period of record, the water levels exhibit an average net increase of 2.57 feet (Figure 2). Since 1960, KGS31 has a net increase of 7.18 feet. The five-year rolling average has remained relatively stable with a declining trend starting in 2004 that is likely attributed to the addition of the deeper wells RA01 and RA04.

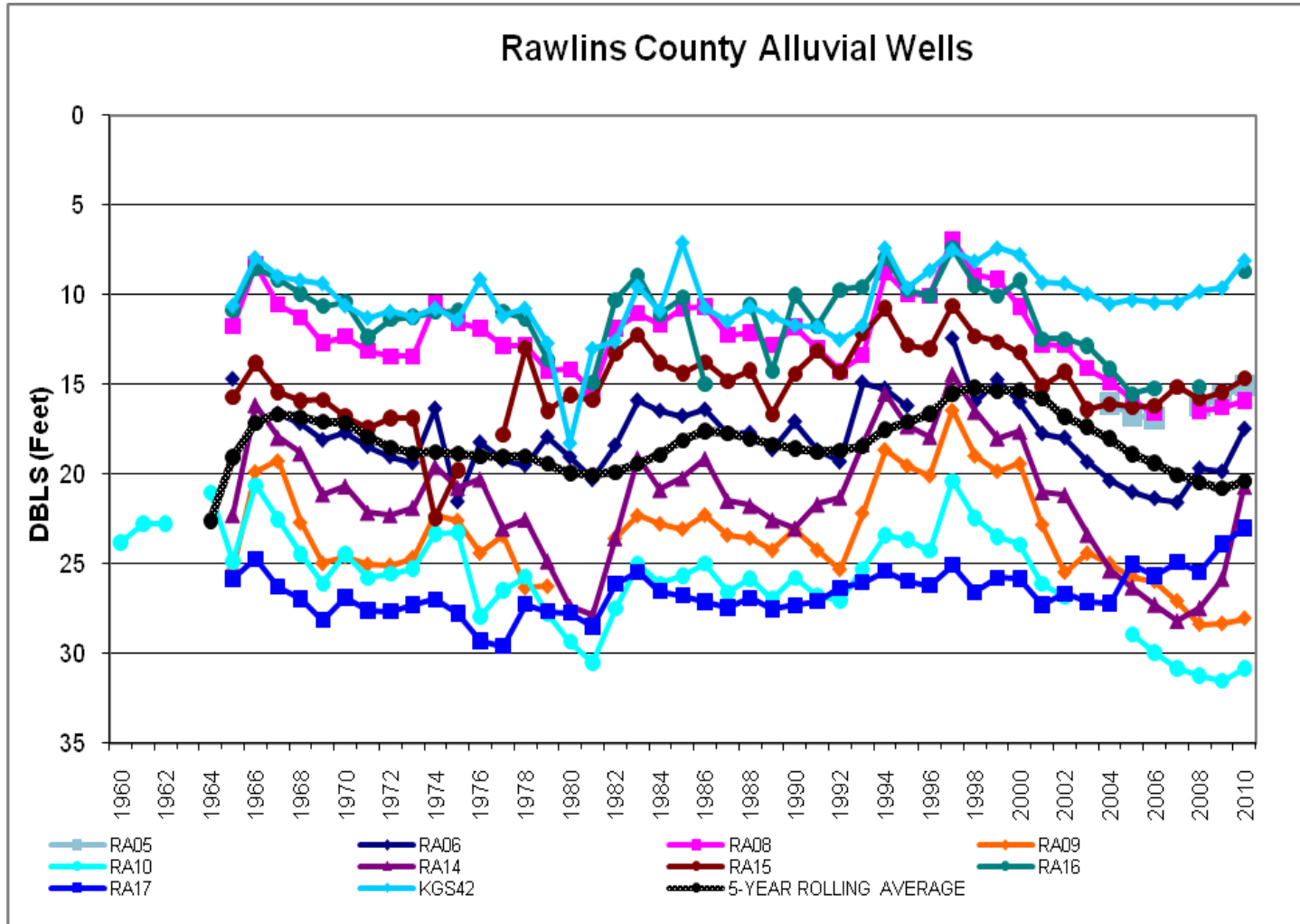


Figure 3: Alluvial Monitoring Well Levels in Rawlins County Fringe

Rawlins County has ten alluvial wells measured annually along Beaver and Sappa Creeks. Wells located in the alluvium along Beaver and Sappa Creek fluctuate over time and do not typically have a pronounced long term rising or declining trend (Figure 3). The five-year rolling average has steadily declined about 5 feet since 2000. RA10 has the longest record dating back to 1960. The water levels have increased and declined in that time period. RA10 exhibited a net decline of 7.03 feet since 1960.

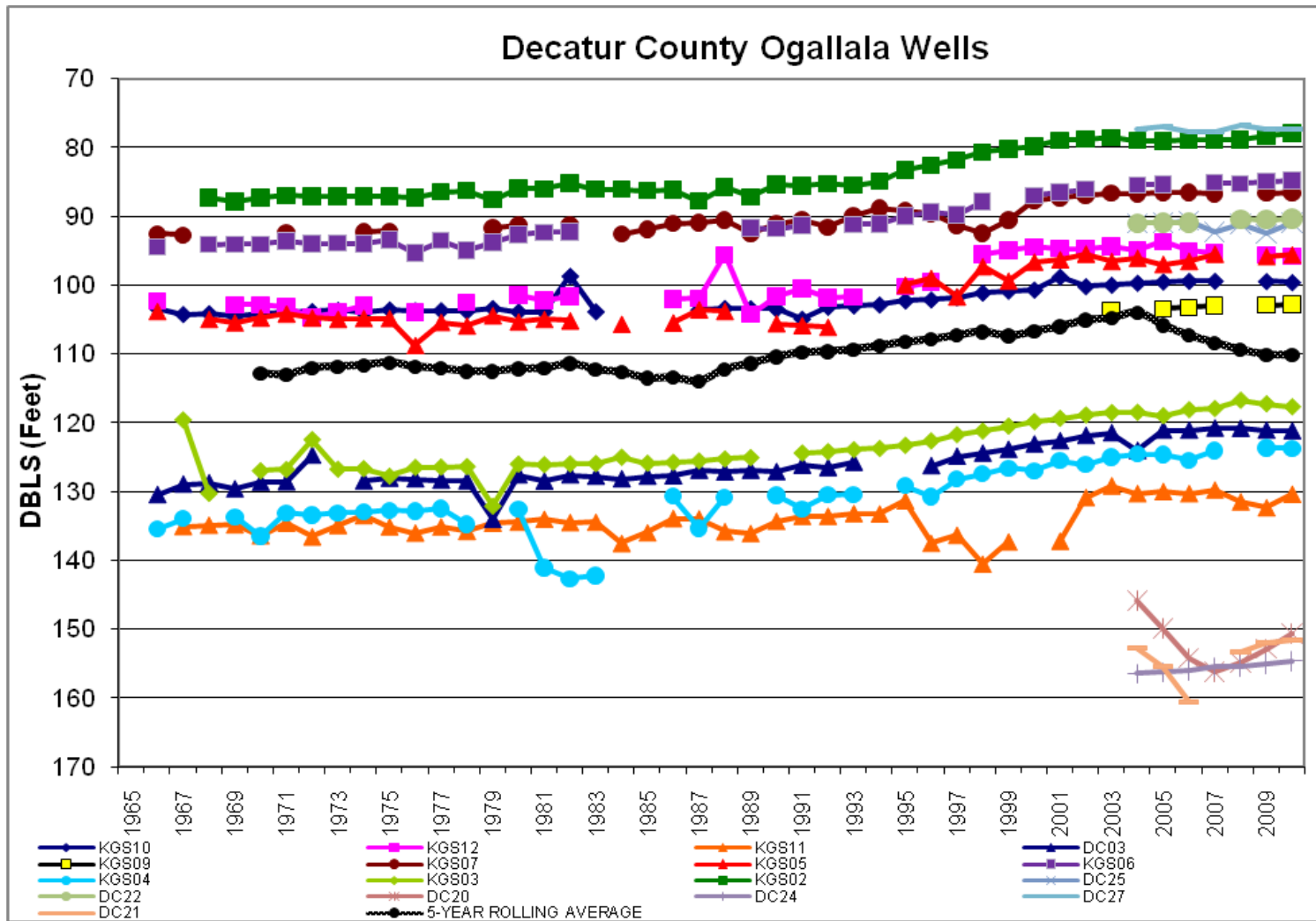


Figure 4: Ogallala-High Plains Monitoring Well Levels in Decatur County Fringe

Decatur County has a number of wells where measurements begin in 1965. Seventeen monitoring wells have been charted in Figure 4. KDA-DWR added monitoring wells DC20, DC21, DC22, DC24, DC25 and DC27 to the 2008 data analysis and these wells have measurements since 2004. Ogallala wells in Decatur County show an average 4.27 feet net increase. The addition of the deeper wells in 2004 may be pulling the five-year average down slightly.

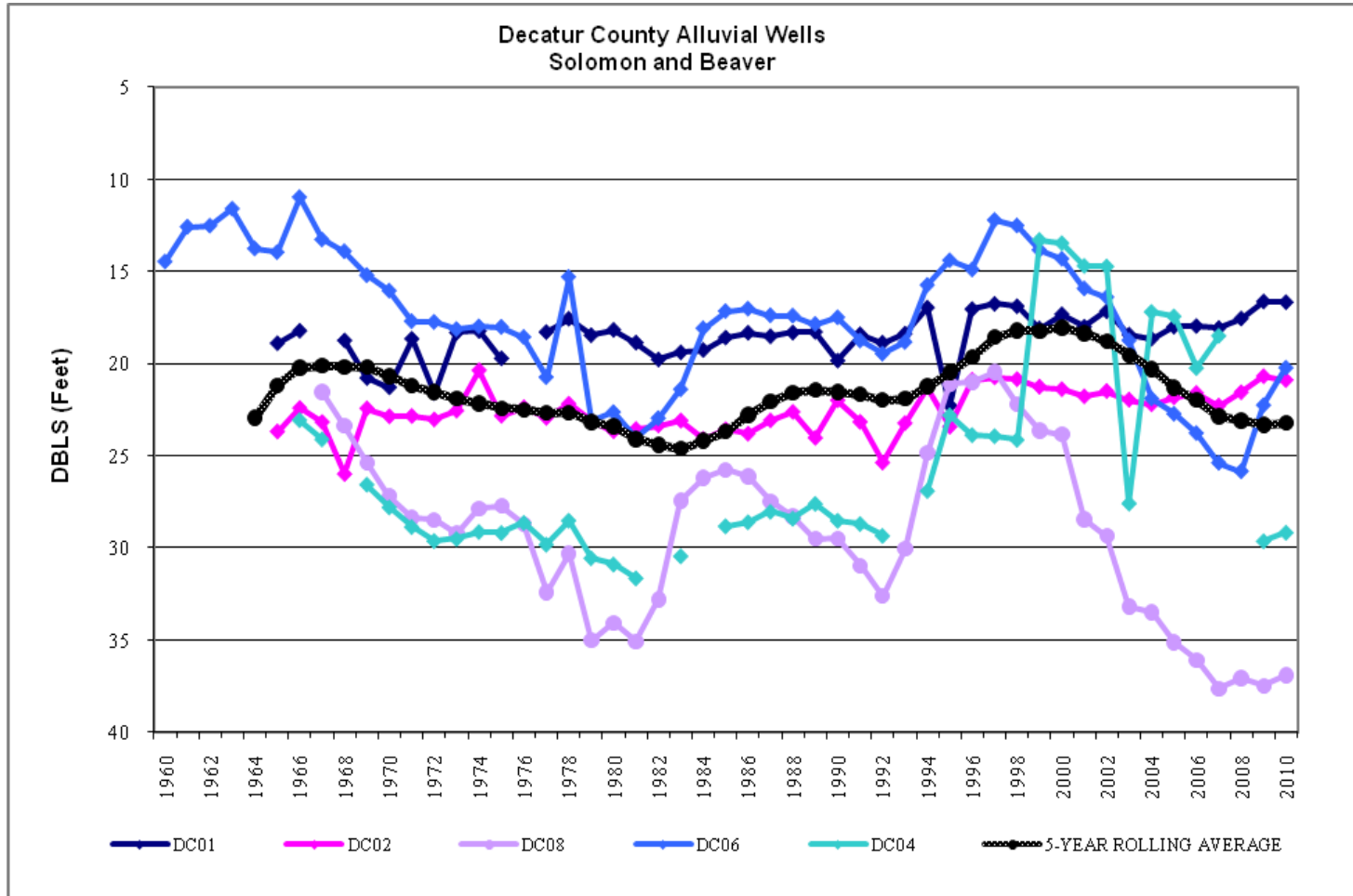


Figure 5: Alluvial Monitoring Well Levels in Decatur County, Upper North Solomon and Beaver Creek Fringe

NOTE: The 5-year rolling average is for all the alluvial wells in Decatur County

Decatur County has five alluvial monitoring wells. DC01 and DC02 are in the upper Solomon alluvium and have increased by a net of 2.24 feet and 2.78 feet respectively since 1965. The other three wells are in the Beaver Creek alluvium. Both DC06 and DC08 have net declines of 5.77 feet and 15.38 feet respectively; however DC06 has risen 5.62 feet since 2008. DC04 had periods of increase in the late 1990s to early 2000s, but has an overall net decline of about 6 feet (Figure 5).

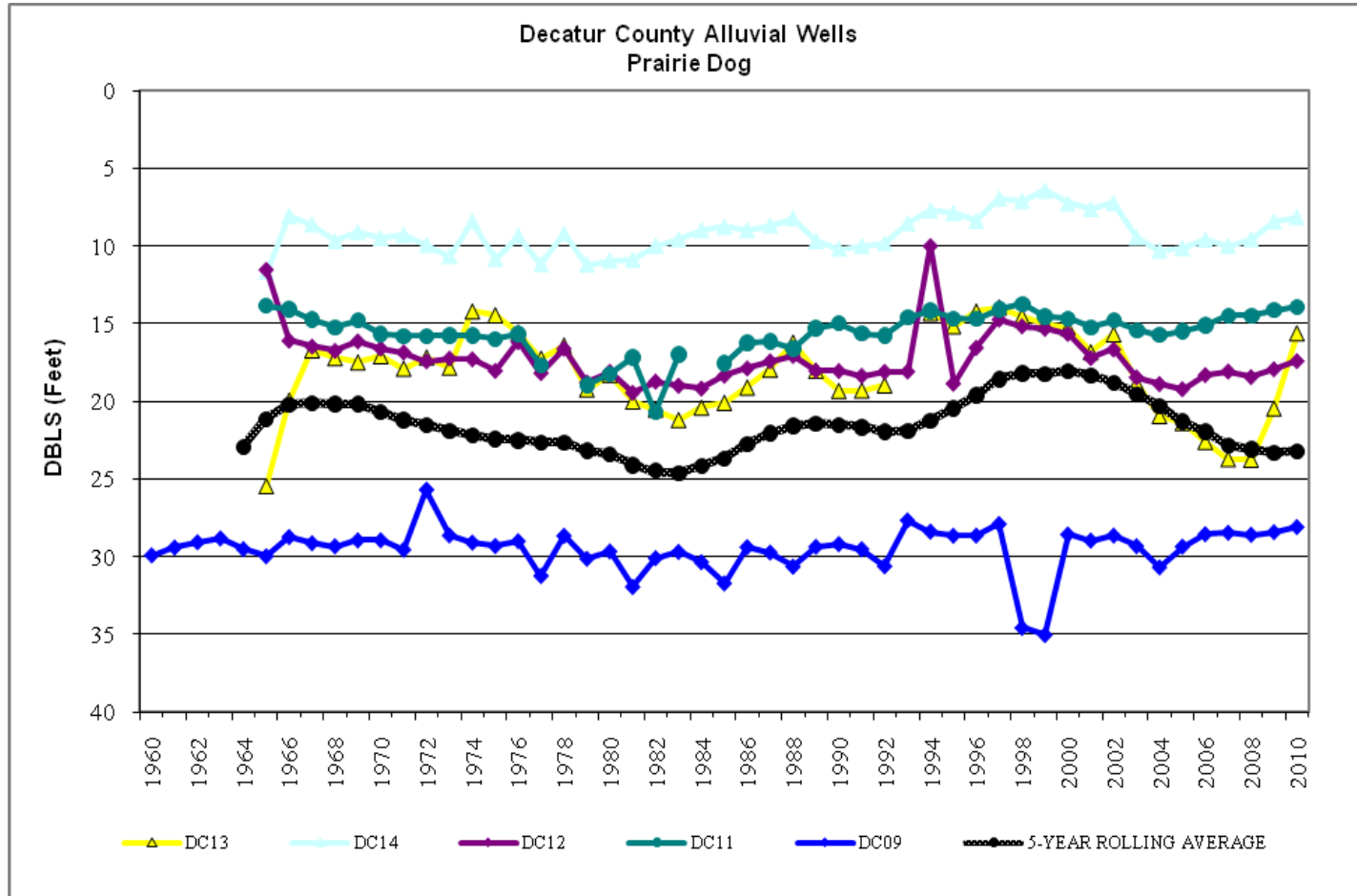


Figure 6: Alluvial Monitoring Well Levels in Decatur County, Prairie Dog Creek Fringe

NOTE: The 5-year rolling average is for all the alluvial wells in Decatur County

Decatur County has five alluvial monitoring wells in Prairie Dog Creek alluvium. Only DC12 has had a net decline (6 feet) since its inception. Even with a declining trend from 2002 to 2008, DC13 has increased nearly 10 feet since 1965. The other three wells have maintained relatively stable water levels over time with short-term increases and decreases (Figure 6). The five-year rolling average was on a downward trend from 2001 to 2009, but overall remained relatively stable.

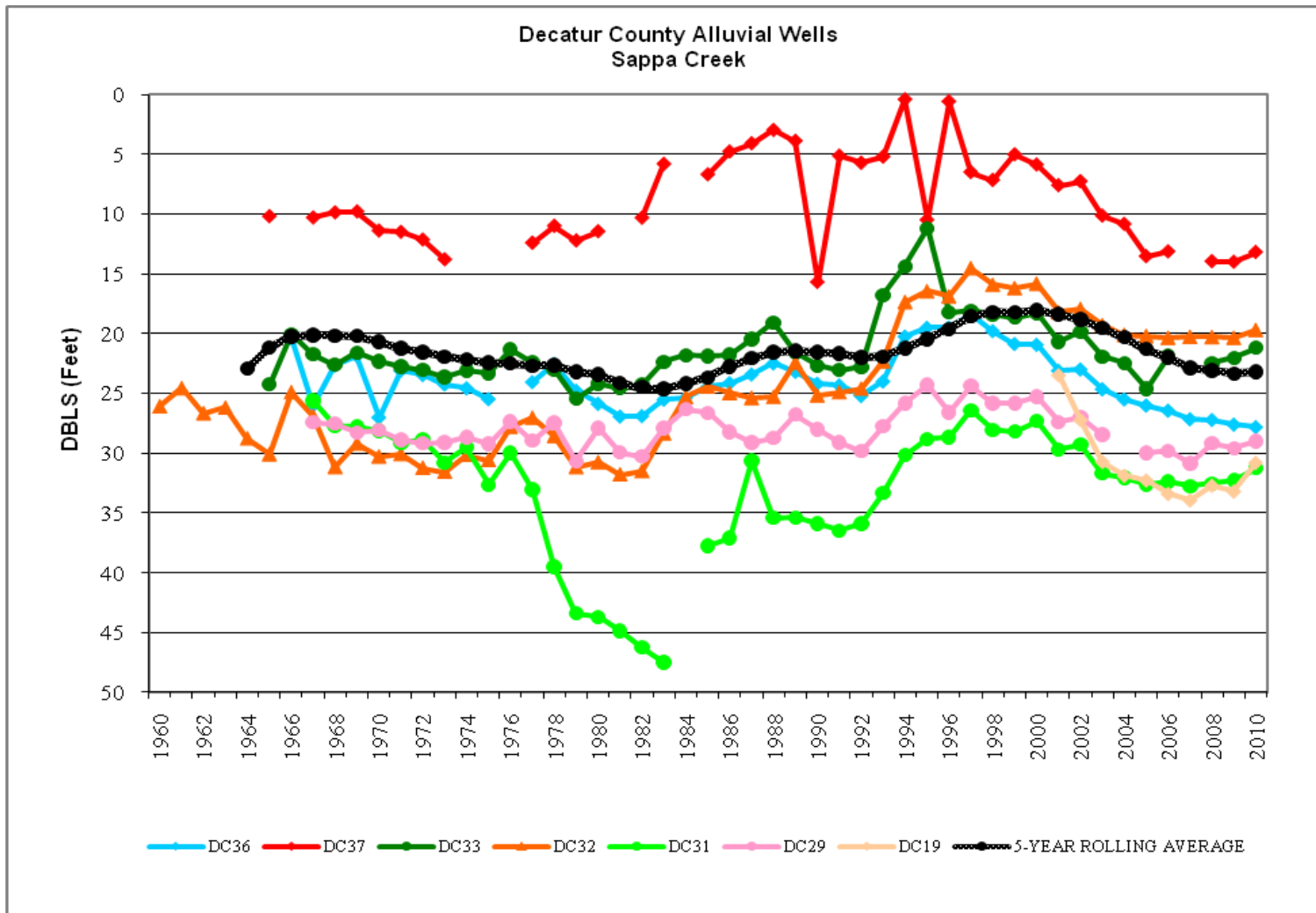


Figure 7: Alluvial Monitoring Well Levels in Decatur County, Sappa Creek Fringe

NOTE: The 5-year rolling average is for all the alluvial wells in Decatur County

Sappa Creek has seven monitoring wells in Decatur County. Five of the seven monitoring wells have had net declines over the period of record, with DC31 declining 5.65 feet and DC19 declining 7.32 feet. DC32 and DC33 had net increases of 6.4 feet and 3.06 feet respectively (Figure 7).

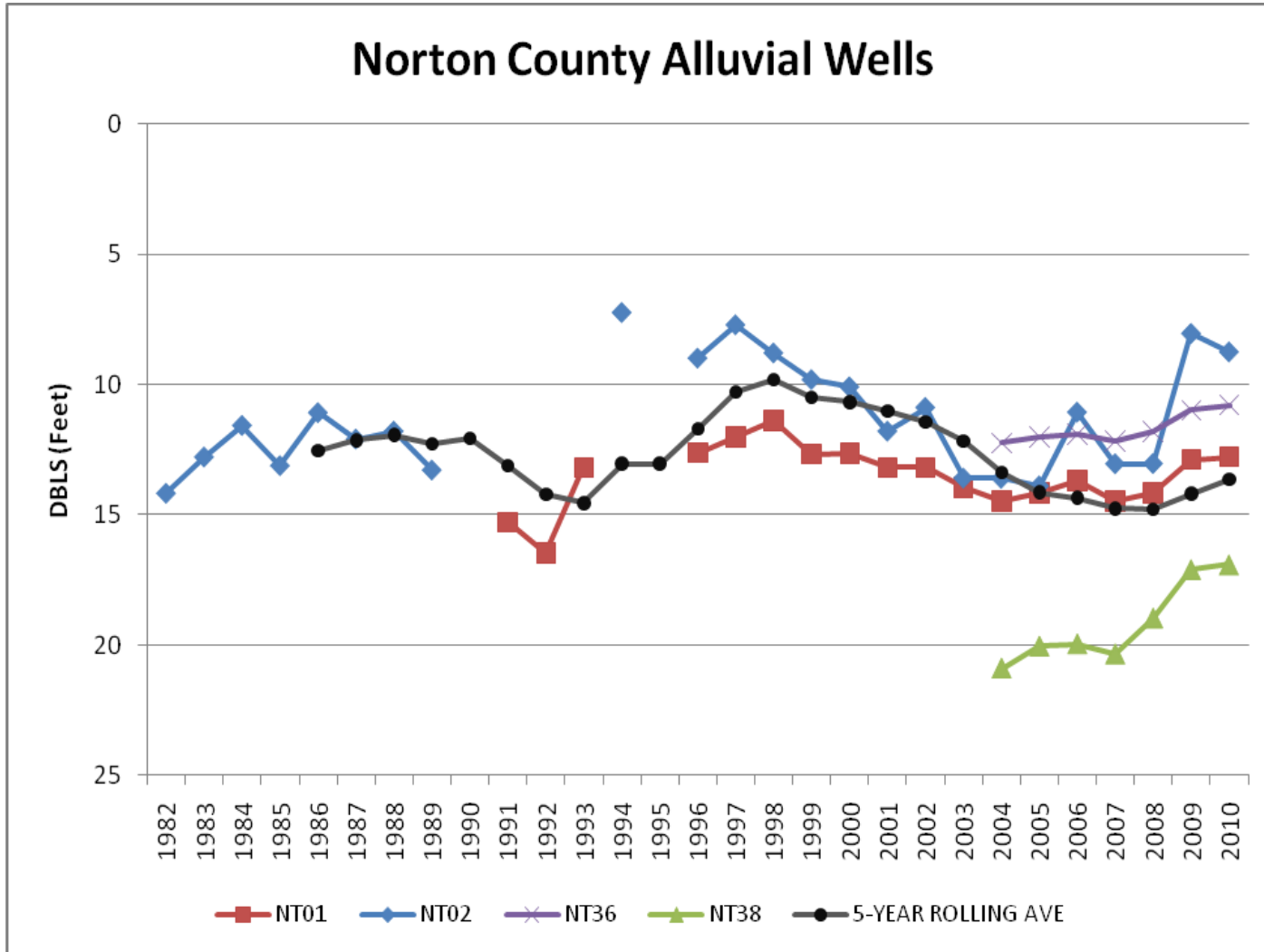


Figure 8: Alluvial Monitoring Well Levels in Norton County Fringe

Norton County has four alluvial monitoring wells. NT02 has the longest record beginning in 1982. NT01 has records from 1991, while NT36 and NT38 were added to the analysis in 2008 with records from 2004. All wells show net increases over the period of record with the average net increase for the monitoring wells at 3.3 feet (Figure 8).

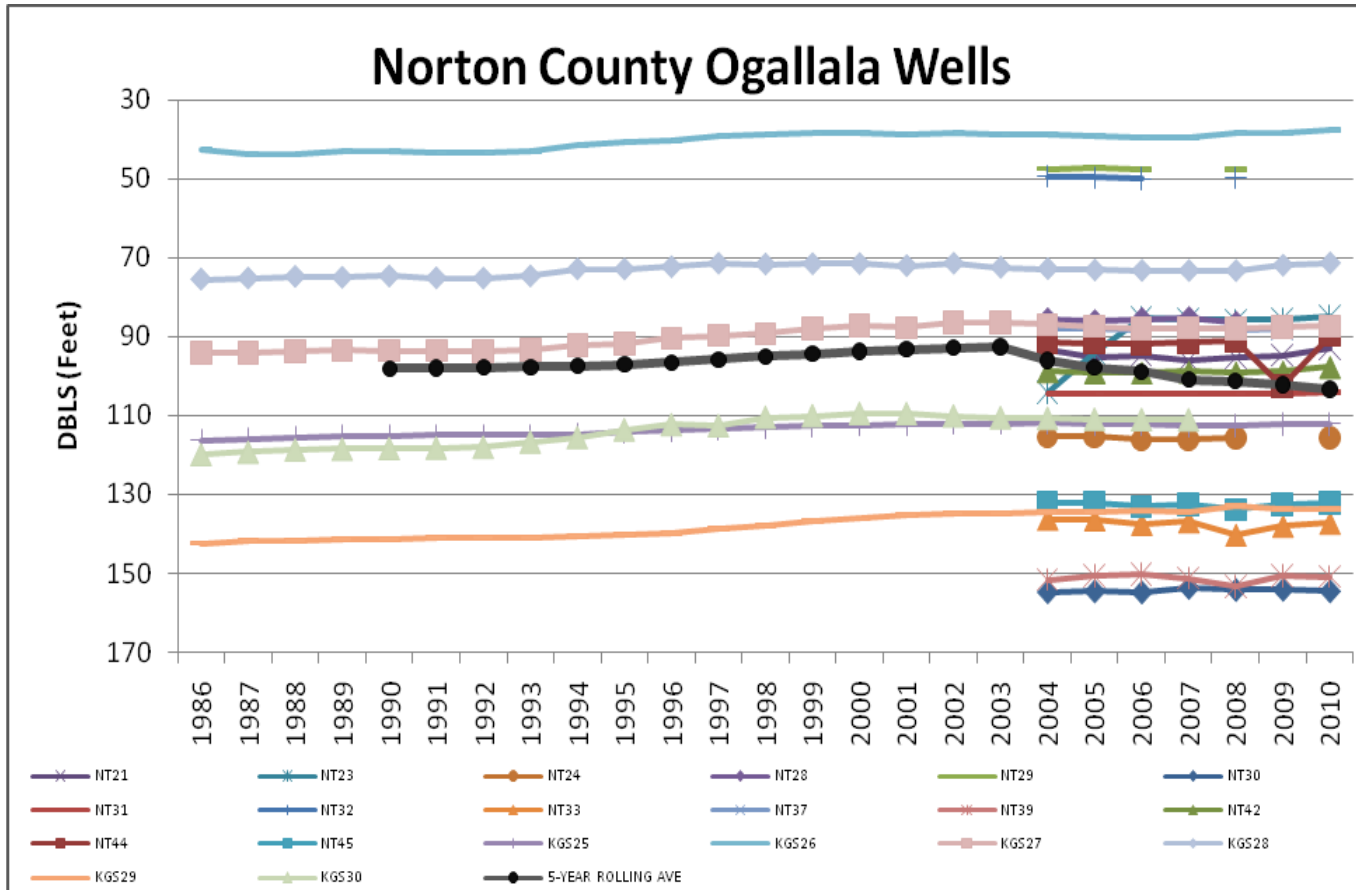


Figure 9: Ogallala-High Plains Monitoring Well Levels in Norton County Fringe

Norton County has twenty Ogallala monitoring wells. KDA-DWR added fourteen of these wells to the analysis in 2008 that have measurements since 2004. The water levels have remained relatively stable with an average increase of 1.3 feet from 2009 to 2010. The water levels ranged from an increase of 12.82 feet in NT44 to a 0.36 feet decrease in NT44. The five-year rolling average has remained relatively stable with a declining trend starting around 2004, which is likely attributed to the deeper wells added to the analysis at that time.

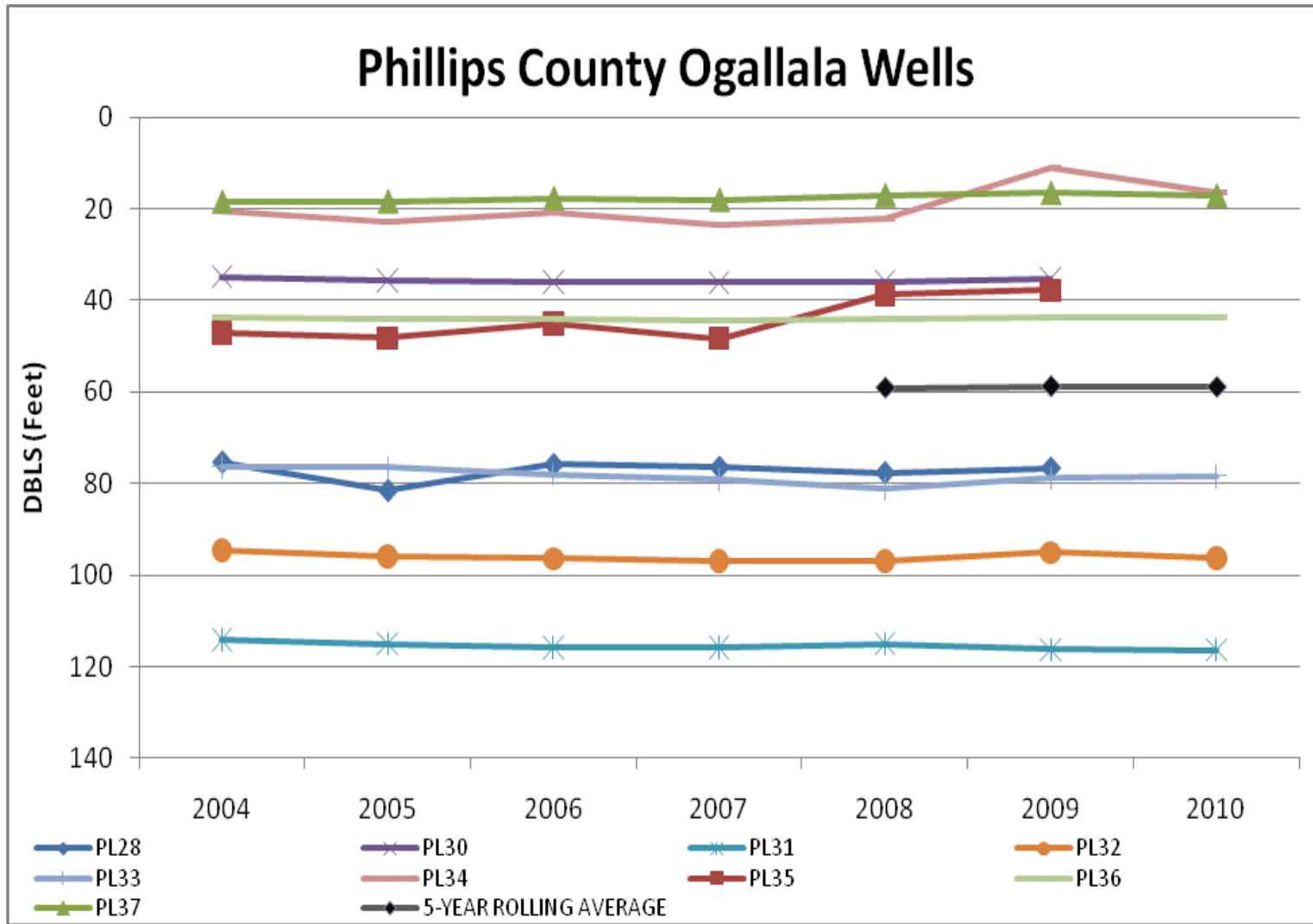


Figure 10: Ogallala-High Plains Monitoring Well Levels in Phillips County Fringe

There are nine total monitoring wells in the fringe area of Phillips County with measurements from 2004. Over the period of record, all wells experienced an average net increase of 0.79 feet. From 2009 to 2010, wells ranged from a decrease of 5.43 feet in PL34 to an increase of 0.35 feet in PL33.

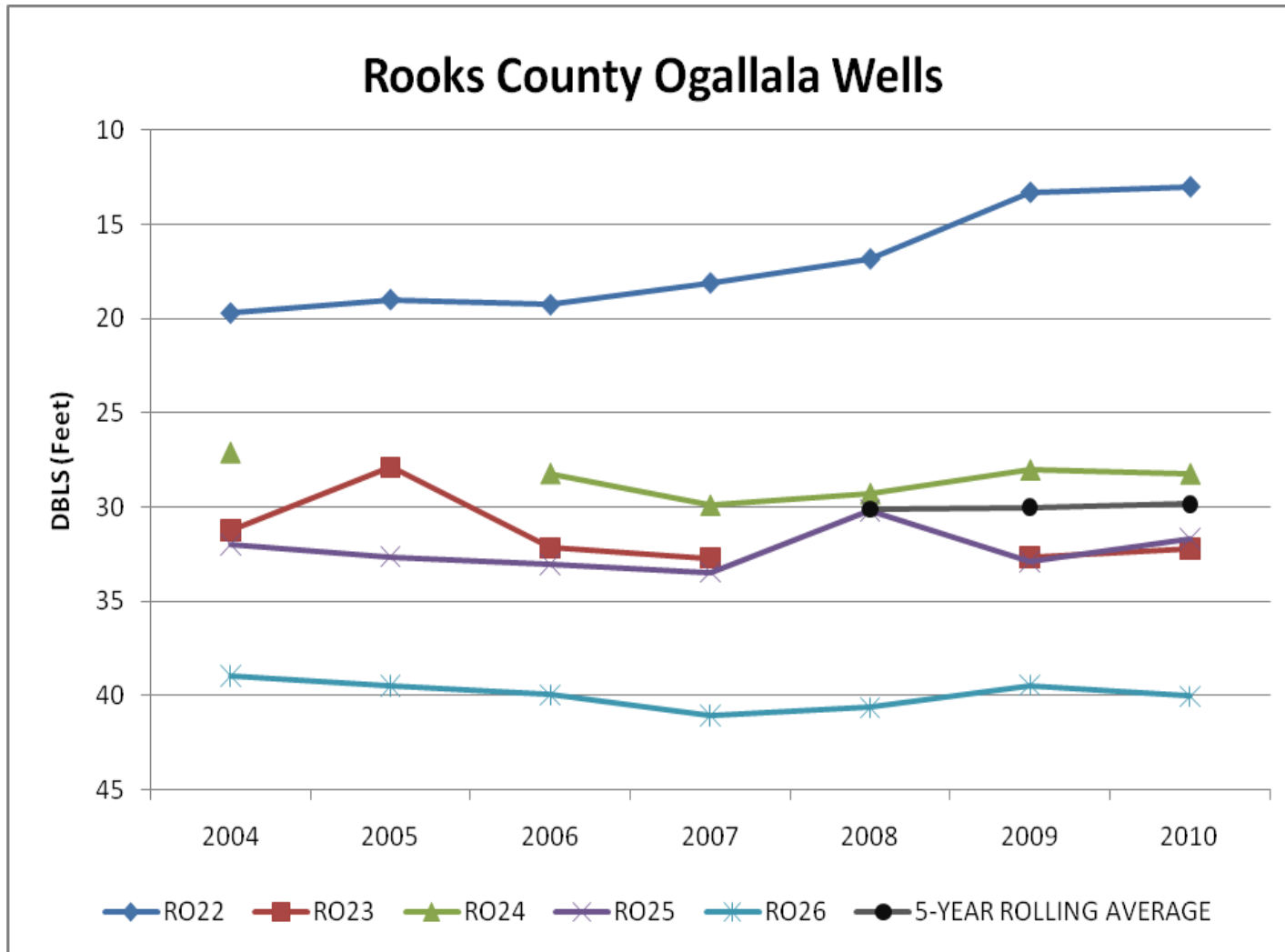


Figure 11: Ogallala-High Plains Monitoring Well Levels in Rooks County Fringe

There are five monitoring wells in Rooks County with measurements since 2004. Over the period of record, the wells had a net average increase of 0.76 feet. From 2009 to 2010, the wells increased an overall average of 0.22 feet ranging from an increase of 1.21 feet for RO25 to a decrease of 0.58 feet in RO26.

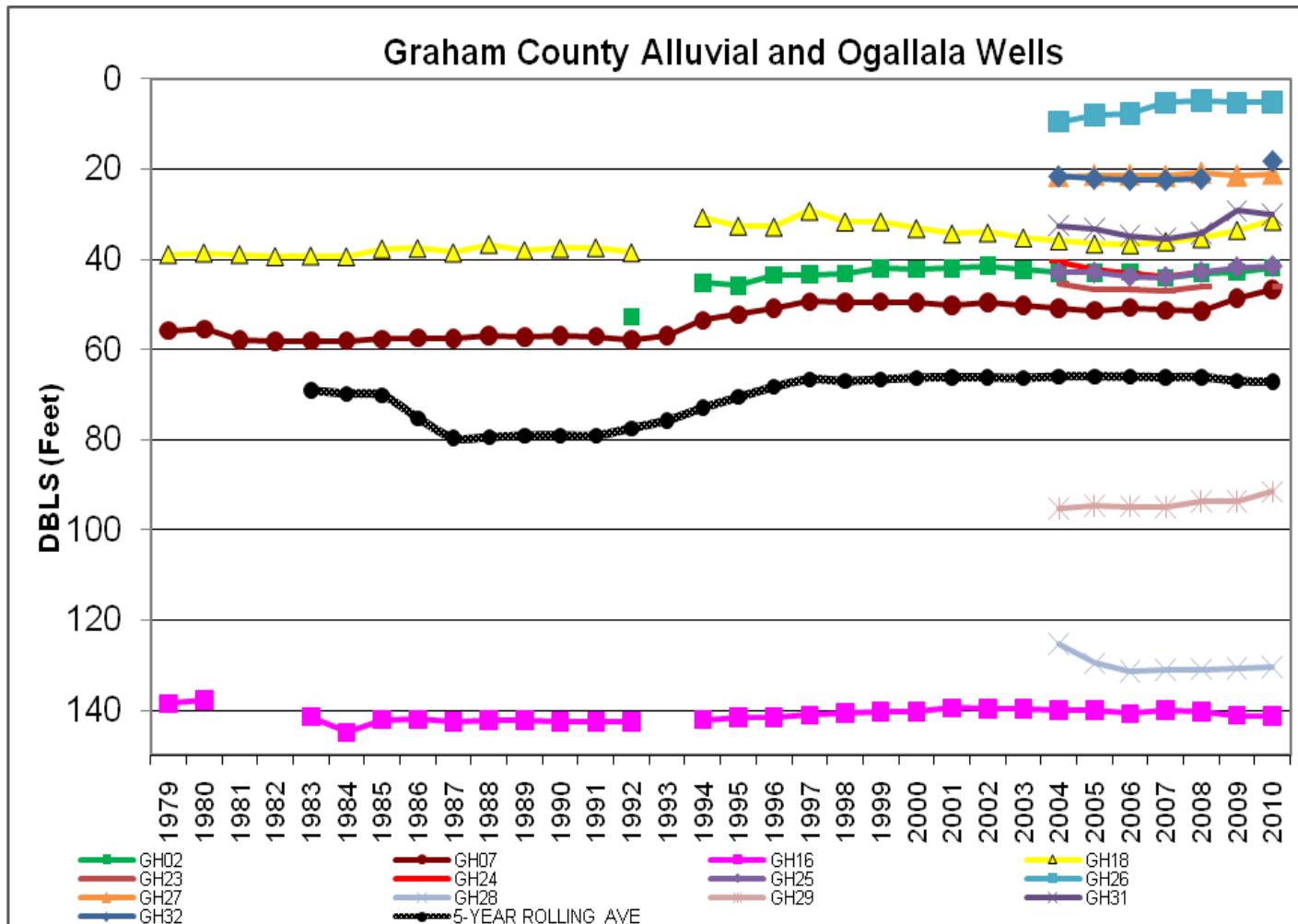


Figure 12: Monitoring Well Levels in Graham County Fringe

Graham County has thirteen Ogallala and alluvial monitoring wells. Measurements begin for three of the wells in 1979. GH02 was added to the network in 1992, while the remaining wells were added in the 2008 data analysis with measurements from 2004. GH16 has had a net decline of 2.78 feet since 1979. Overall, the water levels increased an average of 0.72 feet from 2009 to 2010, ranging from a 0.87 feet decrease in GH31 to an increase of 2.06 feet in GH18. The five-year rolling average for Ogallala wells has remained fairly consistent since 1996.

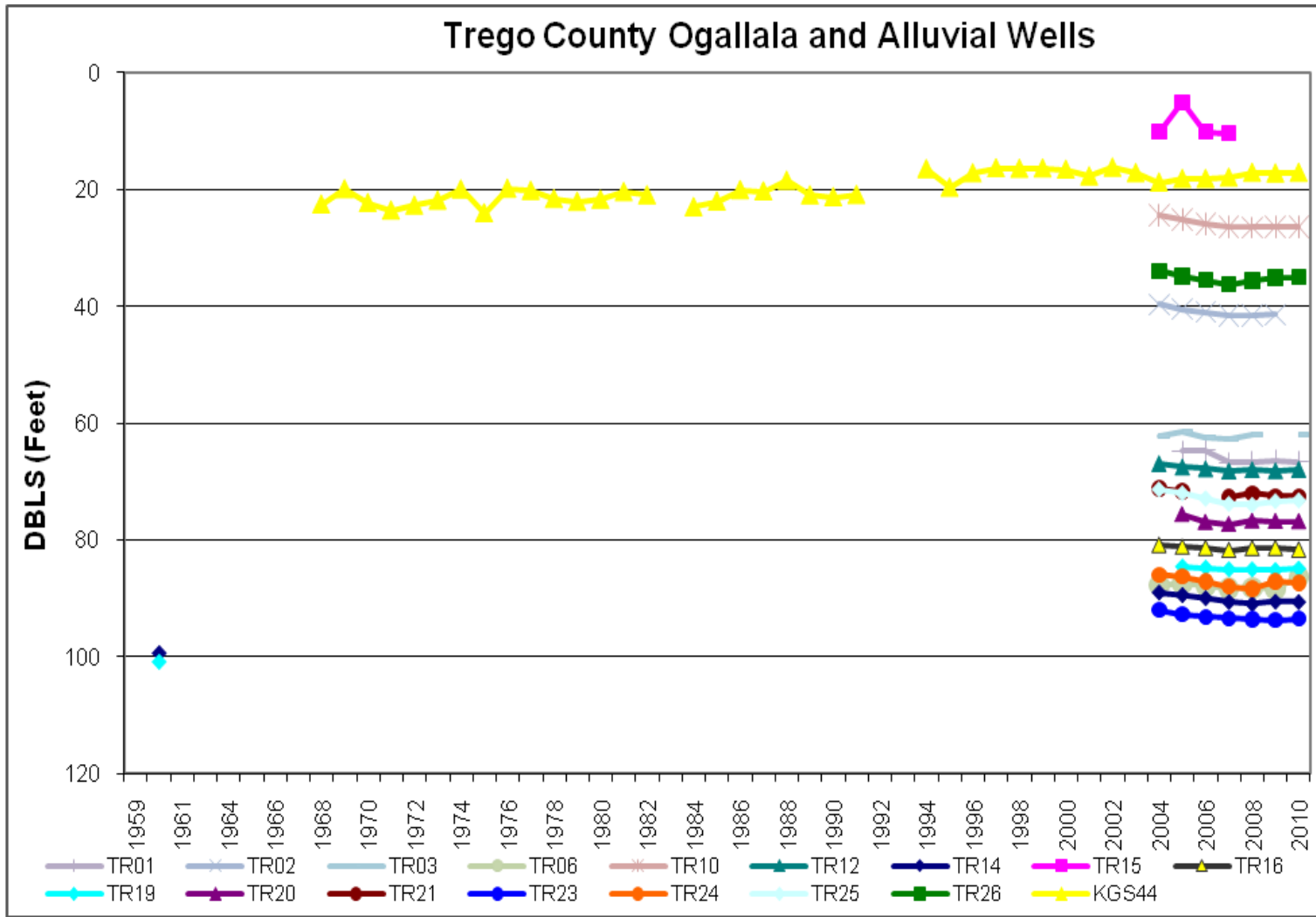


Figure 13: Monitoring Well Levels in Trego County Fringe

Trego County has seventeen monitoring wells. KGS44 has a record dating back to 1968 and is located in the alluvium of Big Creek. TR14 and TR19, Ogallala wells, were first measured in 1960, but were not measured again until 2004 and 2005, and have a net increase of 8.86 feet and 16.01 feet, respectively. The rest of the wells were not added to the network until 2004. KGS44 showed a net increase of 5.41 feet while the remaining wells show a net average decrease of 0.84 feet since 2004 (Figure 13).

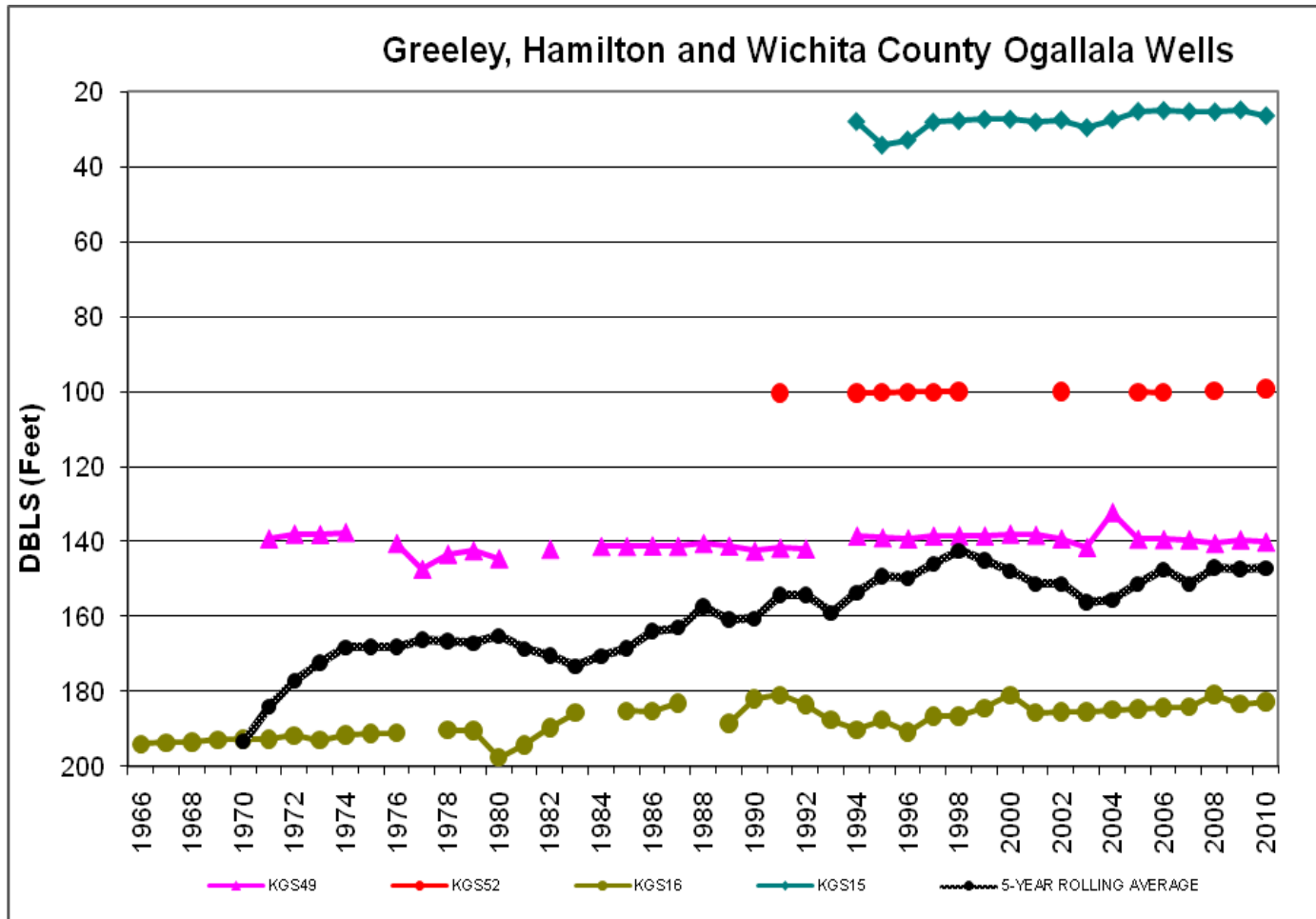


Figure 14: Monitoring Well Levels in the Fringe Area of Greeley, Hamilton and Wichita Counties

Hamilton County has one monitoring well, Greeley County has one monitoring well and Wichita County has two monitoring wells. KGS52 showed a net increase of 1.01 feet since 1991 (Figure 14). The Hamilton County well KGS16 is located outside GMD #3 and had a net increase of 11.29 feet for 1966-2010, with an increase of 0.57 feet from 2009-2010. The Greeley County well KGS15 located outside GMD #1 had a net increase of 1.53 feet for 1994-2010 (Figure 14). The five-year rolling average has fluctuated some with an overall net increase.

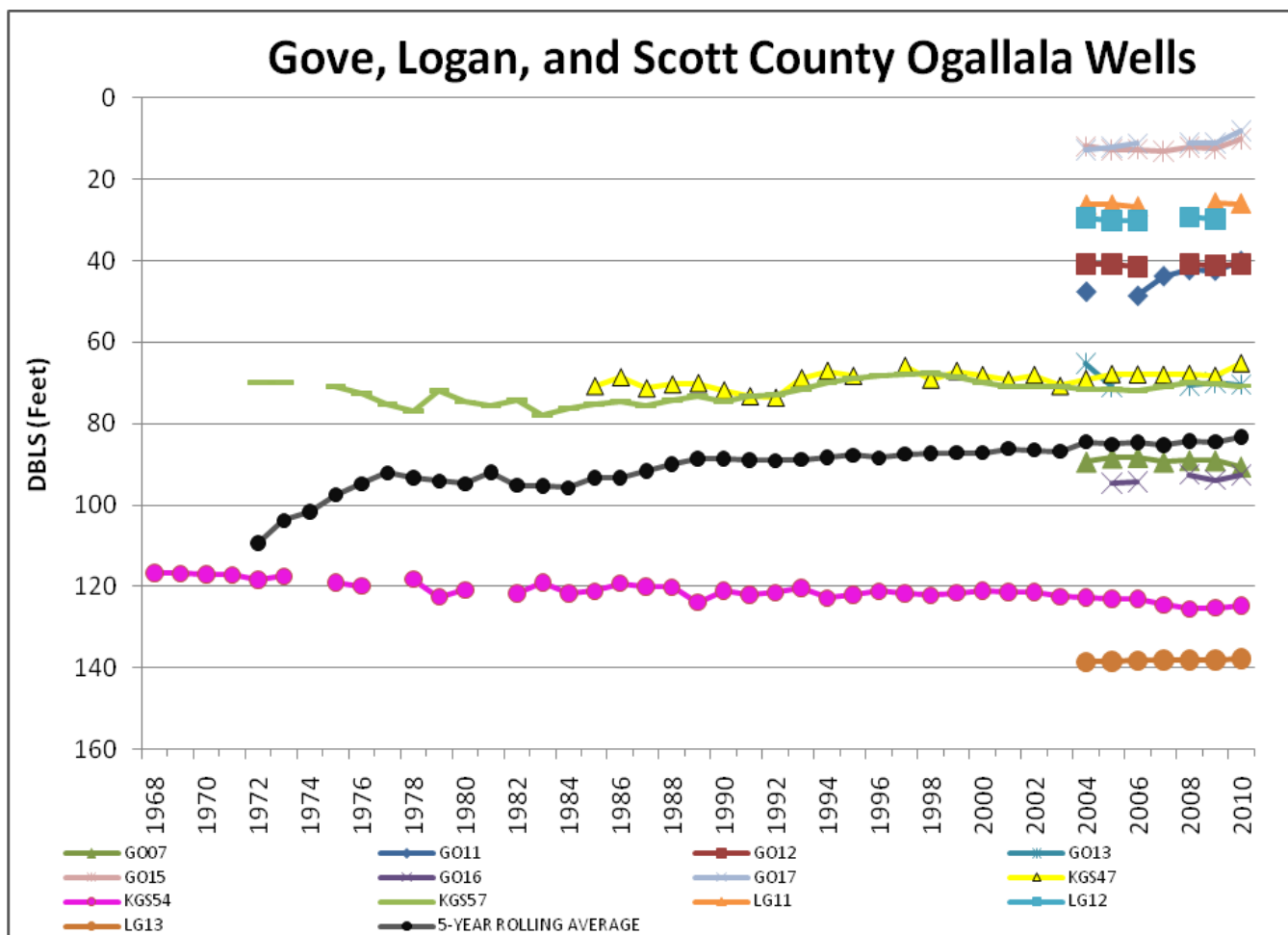


Figure 15: Monitoring Well Levels in the Fringe Area of Logan and Scott Counties

Gove, Logan, and Scott counties have thirteen monitoring wells located outside of the GMD #1. Water level measurements date back to 1968 for KGS54, 1972 for KGS57 and 1984 for KGS47. KGS54 (Scott County) has had a net decline of 7.96 feet since 1968. KGS 47 has had a net increase of 5.49 feet since 1985. From 2009 to 2010, the wells increased an average of 0.87 feet. Overall, the wells have remained relatively stable with an average net increase of 0.54 feet (Figure 15).

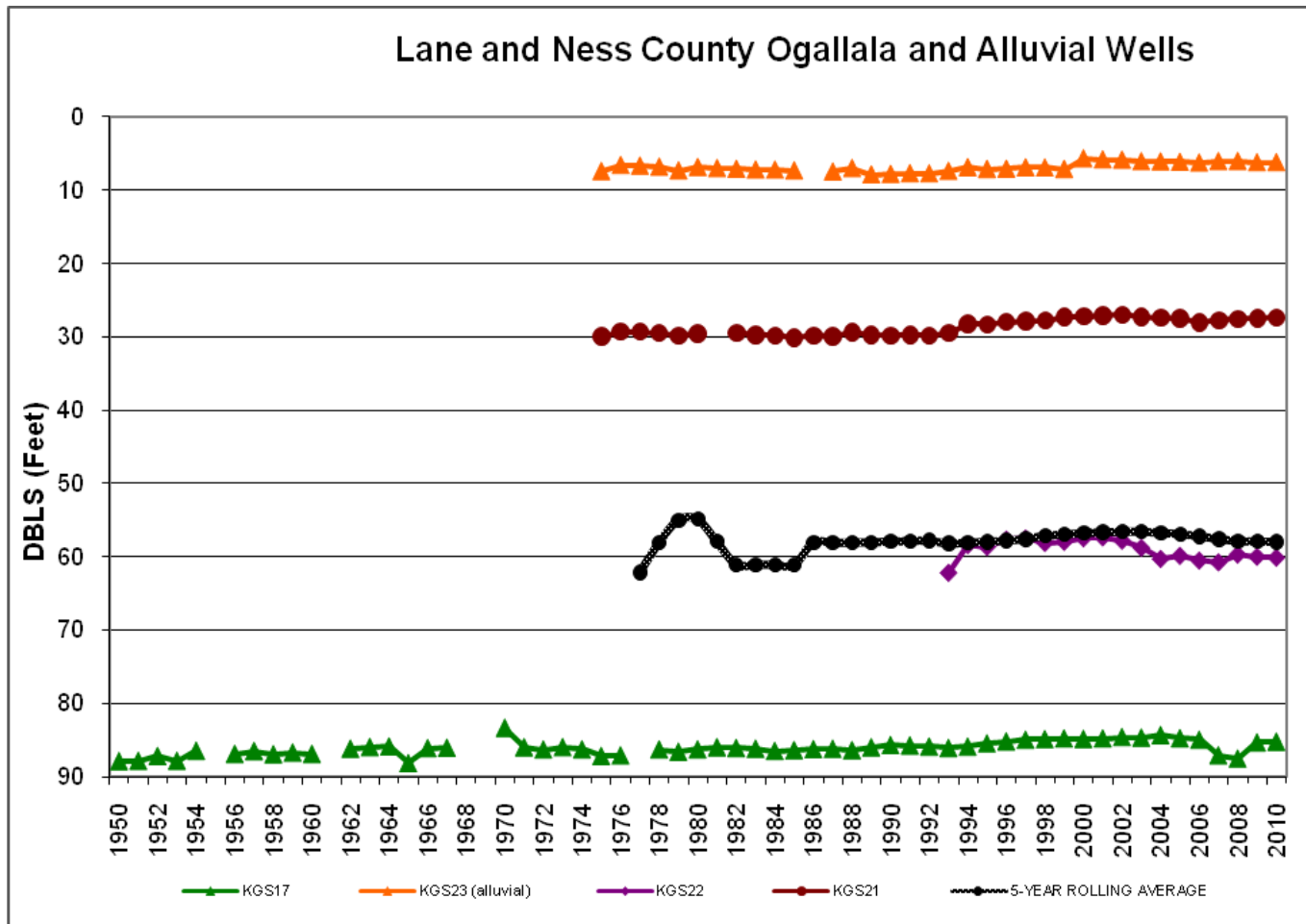


Figure 16: Monitoring Well Levels in the Fringe Area of Wallace, Lane and Ness Counties

Lane County has one monitoring well, KGS17, outside GMD #1 in the Ogallala. Ness County has three monitoring wells, one in the alluvial aquifer and two in the Ogallala (Figure 16). KGS17 has measurements dating back to 1950, and has a net increase of 2.64 feet. The three wells in Ness County, two dating back to 1974 (KGS23 and KGS21) had net increases of 1.22 feet and 2.55 feet, respectively. KGS22 had a net increase of 2.06 feet. Overall from 2009 to 2010, the wells remained relatively stable with an average increase of 0.03 feet. The five-year rolling average for Ogallala wells is showing a slight decline (0.20 feet) in water levels since 2004.

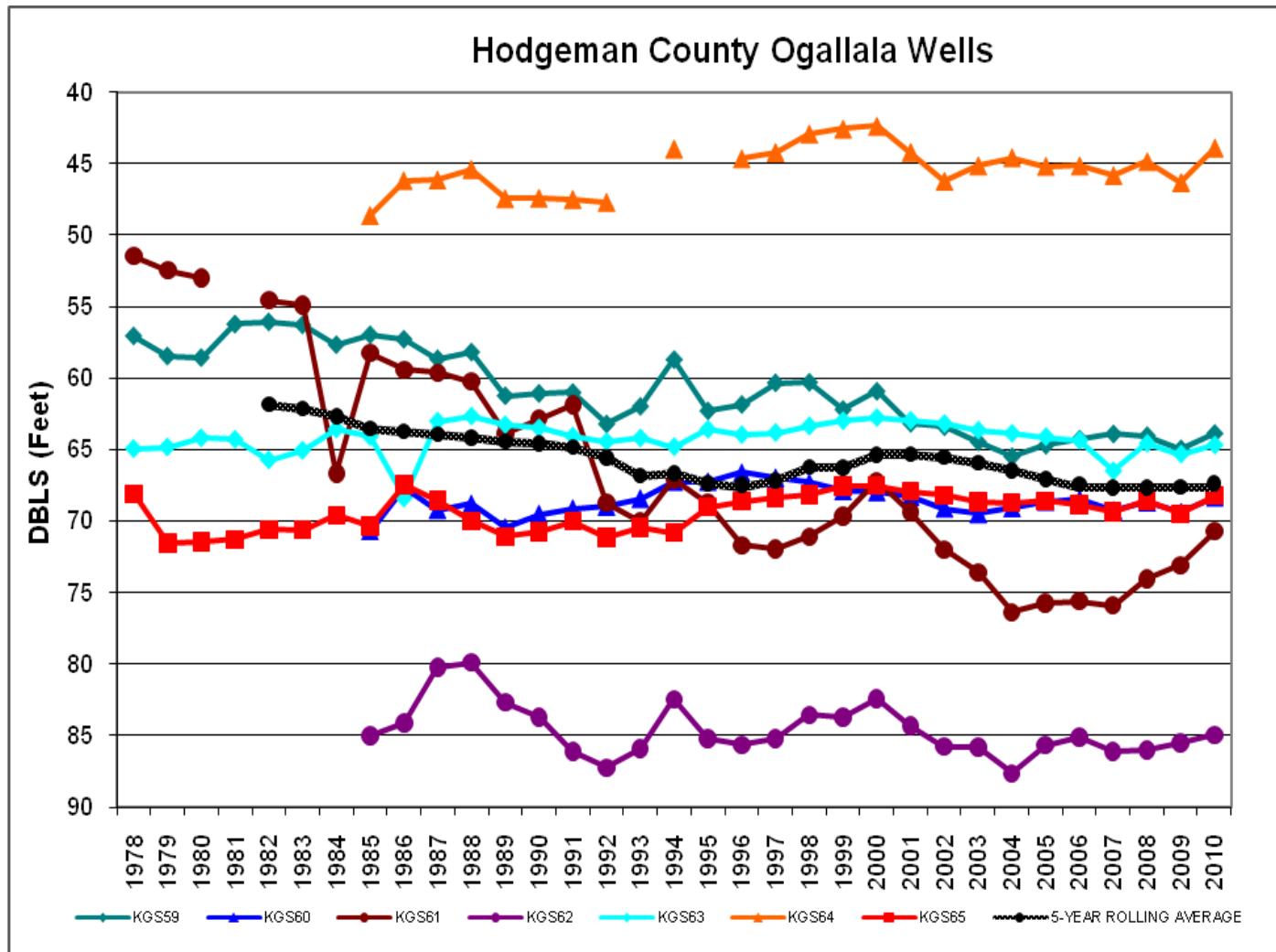


Figure 17: Monitoring Well Levels in Hodgeman County Fringe

In Hodgeman County, there are seven monitoring wells in the fringe area outside GMD #3. From 1954 to 2009, the wells have shown an overall net decline of 2.67 feet. KGS61 has a net decline 19.24 ft since 1978. From 2009 to 2010, all wells showed an increase with an average of 1.35 feet. Increases ranged from 0.59 feet in KGS62 to 2.43 feet in KGS64 (Figure 17). The five-year rolling average has a net decline of 5.54 feet.

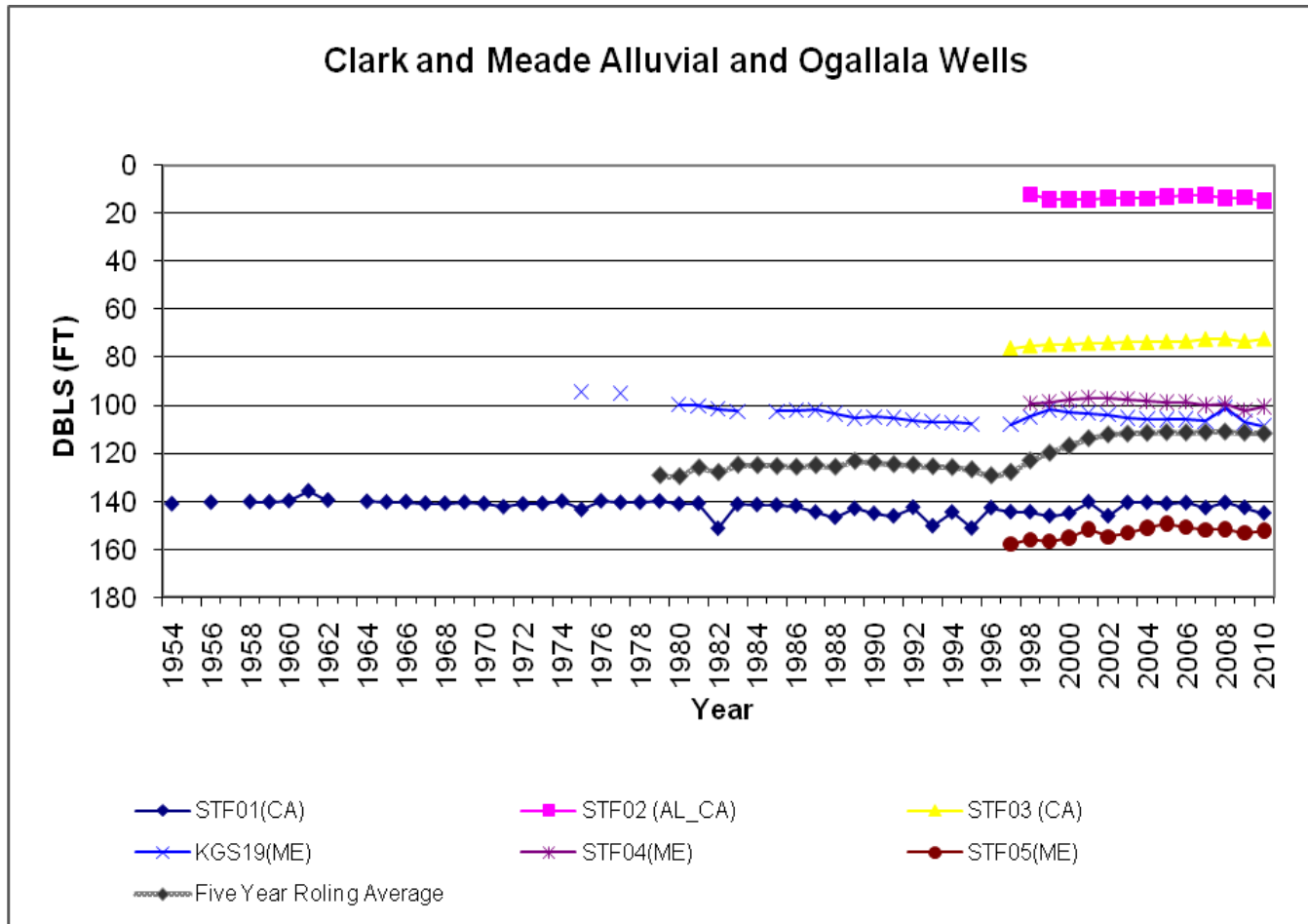


Figure 18: Monitoring Well Levels in the Fringe Area of Clark and Meade Counties

Clark County has three monitoring wells located in the fringe area of GMD #3. STF02 is an alluvial well where as STF01 and STF03 are Ogallala wells. STF02 has had a net decline of 2.74 feet for the period of record, with a decrease of 1.47 feet from 2009 to 2010. STF01 decreased by 2.28 feet from 2009 to 2010. STF03 increased from 2009 to 2010 by 0.93 feet (Figure 18). Meade County has three monitoring wells that are all Ogallala wells. KGS19 had a net decline of 14.14 feet since 1975, with a 1.58 feet decline from 2009 to 2010. The other two wells, STF04 and STF05, had a net decrease of 1.27 feet and net increase of 5.76 feet, respectively. The increase in the five-year rolling average for the Ogallala wells in Meade and Clark counties seen in 1997 is likely due to the addition of STF03 to the network.