

7.0 NATURAL RESOURCES

Natural resources are an important element of the Eureka County economy and the quality of life enjoyed by local residence. Natural resources support many critical economic sectors, provide for community development, enhance the quality of life by supporting recreational activities enjoyed by residents and visitors. One of the most important natural resources in the County is water. In the arid west, water is precious and limited.

Water Resources

Throughout the region, precipitation varies widely between seasons and years as well as within elevation. Annual precipitation ranges from 11 to 13 inches and results mostly from winter storms although summer thunderstorms can produce large amounts of precipitation as rain but contribute little to annual precipitation. Higher amounts of precipitation generally occur as elevation increases. Above 6,000 feet it is not uncommon for areas in central Nevada to receive 14 inches of precipitation or more. Precipitation supports groundwater recharge. Table 7-1 shows major groundwater hydrographic basins in Eureka County including the active duty groundwater rights and perennial yield of each basin.

Figure 7-1 provides a comparison of active duty water rights, perennial yield and pending actions by the State Engineer. A distinctive feature is the condition where active duty groundwater rights exceed the perennial yield. Diamond Valley is the more extreme case in Eureka County. Table 7-2 shows groundwater rights by type of use in Eureka County hydrographic basins. As shown in Figure 7-2, agriculture followed by mining and milling account for about 93.4 percent of groundwater right usage in Eureka County.

Table 7-1 Eureka County Groundwater Rights-2018 (In Acre-Feet)				
Basin	Active Duty	Pending	Perennial Yield	Balance
Maggie Creek-51	13,539	21,000	4,000.00	(9,539)
Pine Valley-53	16,527	3,720	20,000.00	(-3,473)
Crescent Valley-54	16,980	807	16,000.00	(980)
Boulder Flat-61	73,256.33	8,491.57	30,000.00	(43,256.33)
Diamond Valley-153	130,536	11,538	30,000.00	(100,536)
Kobeh Valley-139	18,089.25	11,949.52	16,000.00	2,089.25
Steven's Basin-152	100	-	100.00	0
Total	269,027.58	57,430.46	116,100.00	(155,694.75)

Source: Nevada Division of Water Resources.



Figure 7-1 Groundwater Rights: Active, Pending Action, and Perennial Yield 2018

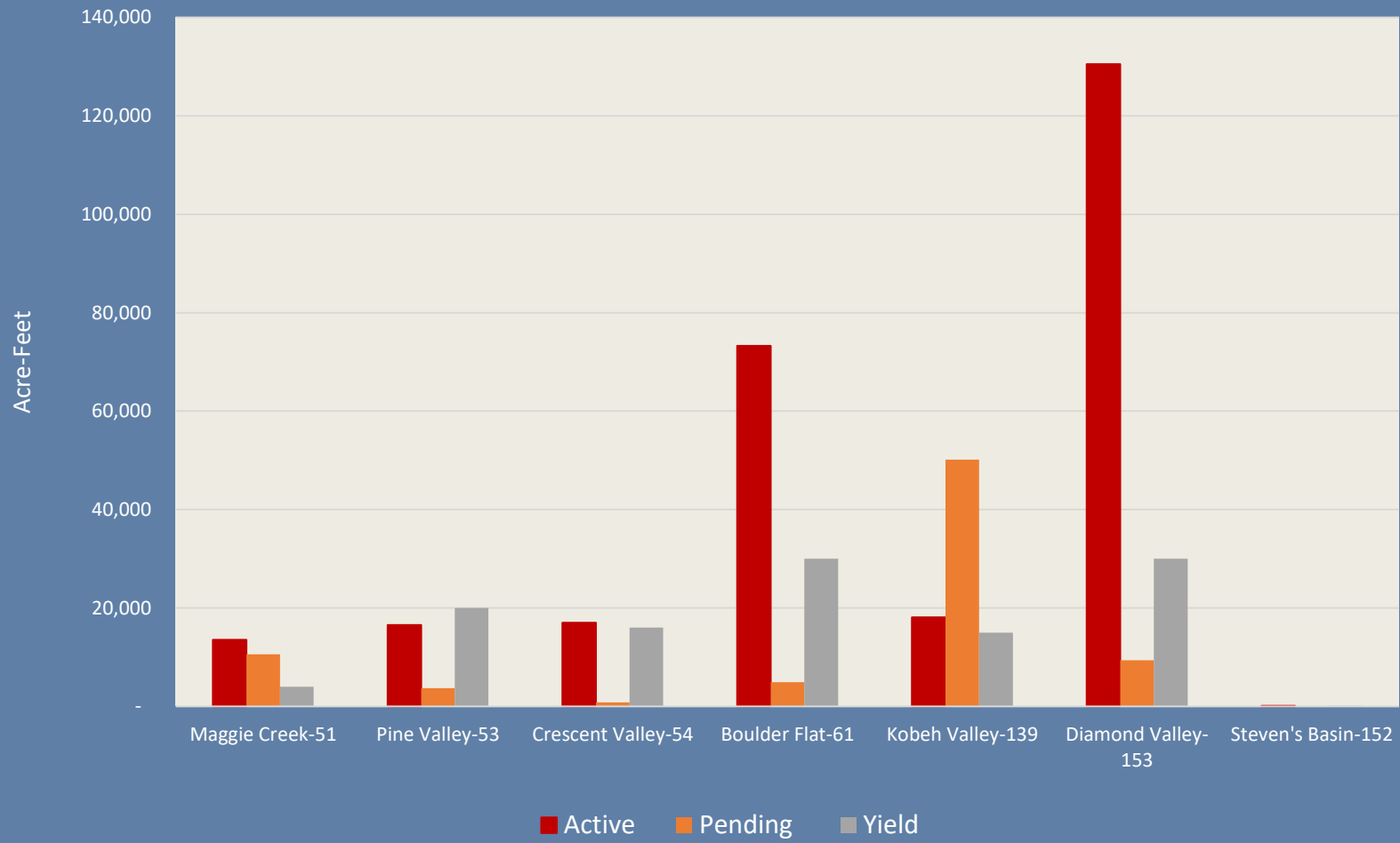
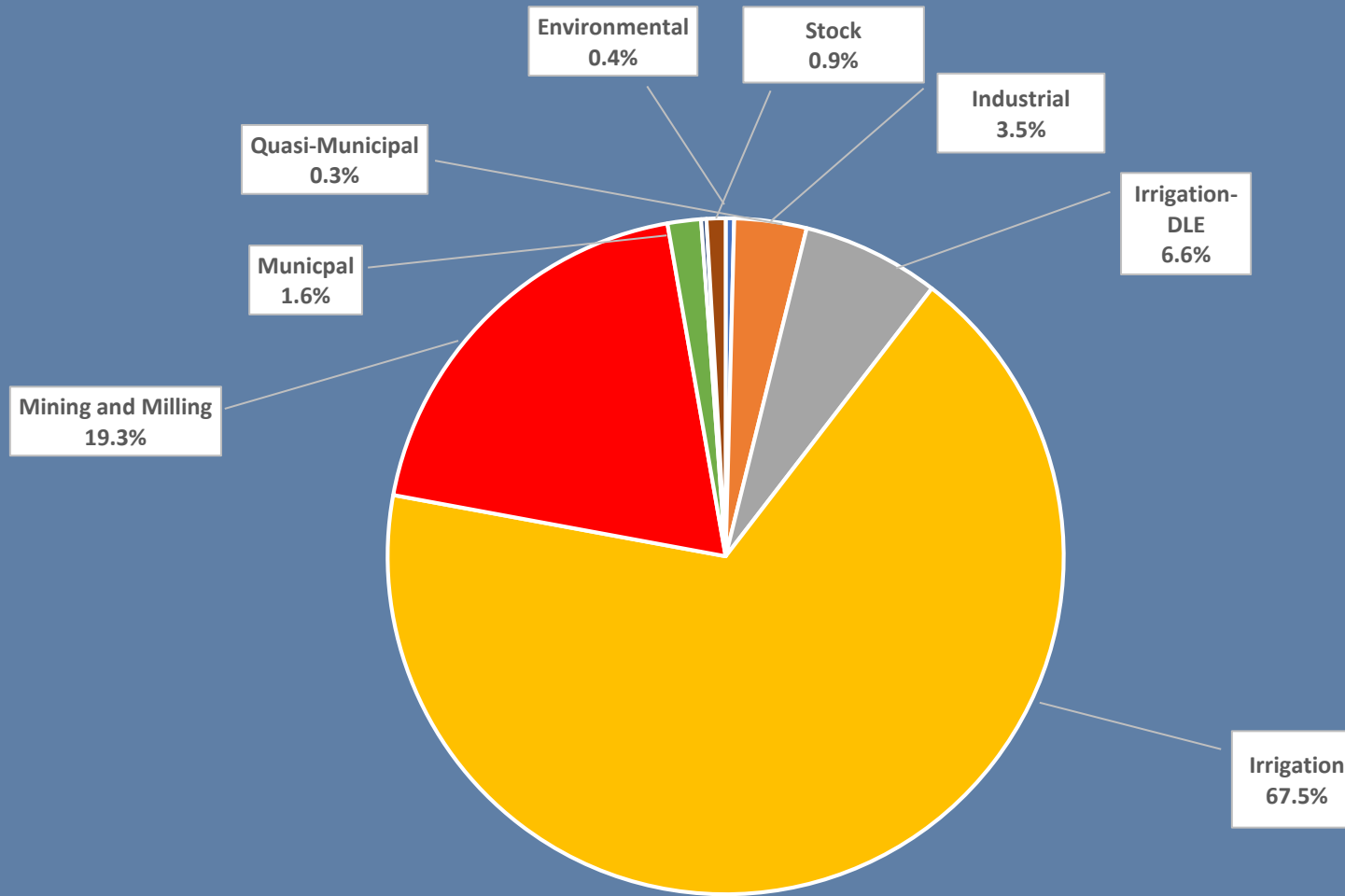


Figure 7-2 Groundwater Use 2018
Basins 51,52,54, 61, 152, 153



Source: Nevada Division of Water Resources, DLE-Desert Land Entry



Table 7-2 Groundwater Use in Eureka County: Selected Basins: 2018		
Use	Active Duty	Pending
Commercial	38.16	-
Domestic	33.6	
Environmental	1,123.22	-
Industrial	9,286.22	-
Irrigation-DLE	17,707.84	
Irrigation	181,437.50	7,746
Mining & Milling	52,020.20	71,059.24
Municipal	4,296.49	361.98
Quasi-Muni	681.09	300.78
Stock	2,438.24	8.68
Total	269,028.90	44,063.77

Source: Nevada Division of Water Resources

Groundwater Wells and Groundwater Depth

Table 7-3 shows the number of estimated groundwater wells by type of well in each basin. There are nearly 2,300 wells in the Eureka County. The largest category of wells is irrigation and mining. The total number of domestic wells has increased from 220 in 2012 to 251 in 2018.

Groundwater in Eureka County also supports municipal and domestic water demands. There are three municipal systems operated by Eureka County. One is in the Town of Eureka, another in Devil's Gate, and a third in the Town of Crescent Valley. The water systems in Eureka County currently meet all drinking water standards. Arsenic treatment was recently added to the Town of Crescent Valley water system. Overall, the systems in Eureka County are in excellent condition meeting all municipal operating standards. Figure 7-3 shows the number of water customers in each system. Since 2010, there has been limited growth in the number of municipal customers served by the systems, although the Town of Eureka is trending higher.



**Table 7-3
Groundwater Wells By Basin in Eureka County 2018**

Groundwater Basin	Public water supply (1)		Domestic		Irrigation		Stock		Mining (2)	
	Entire basin	Eureka County	Entire Basin	Eureka County	Entire basin	Eureka County	Entire basin	Eureka County	Entire basin	Eureka County
49-Elko Segment	66	0	1218	0	23	0	34	1	0	0
51-Maggie Creek	0	0	12	1	4	0	10	8	98	50
52-Mary's Creek	1	0	18	18	2	0	1	0	4	4
53-Pine Valley	4	4	21	21	30	30	14	14	23	3
54-Crescent Valley	4	2	83	62	42	19	18	14	75	2
59-Lower Reese River Valley	8	0	338	1	35	0	5	0	28	1
60-Whirlwind Valley	0	0	3	1	3	3	3	3	5	1
61-Boulder Flat	1	1	18	18	31	31	27	23	237	234
62-Rock Creek	0	0	2	2	0	0	4	1	8	0
138-Grass Valley	1	0	4	1	8	3	7	1	5	0
139-Kobeh Valley	0	0	8	7	26	13	8	8	3	3
140A-Monitor Valley (North)	0	0	4	4	2	1	4	0	0	0
151-Antelope Valley	0	0	1	1	5	4	10	10	0	0
152-Stevens Basin	0	0	0	0	0	0	1	1	0	0
153-Diamond Valley	11	11	114	114	332	332	22	19	22	22
155-L. Smoky Valley (North)	1	0	4	1	5	1	5	5	0	0
Total (by use)	97	18	1848	251	548	437	173	108	508	320

Source: Data from the Nevada Division of Water Resources



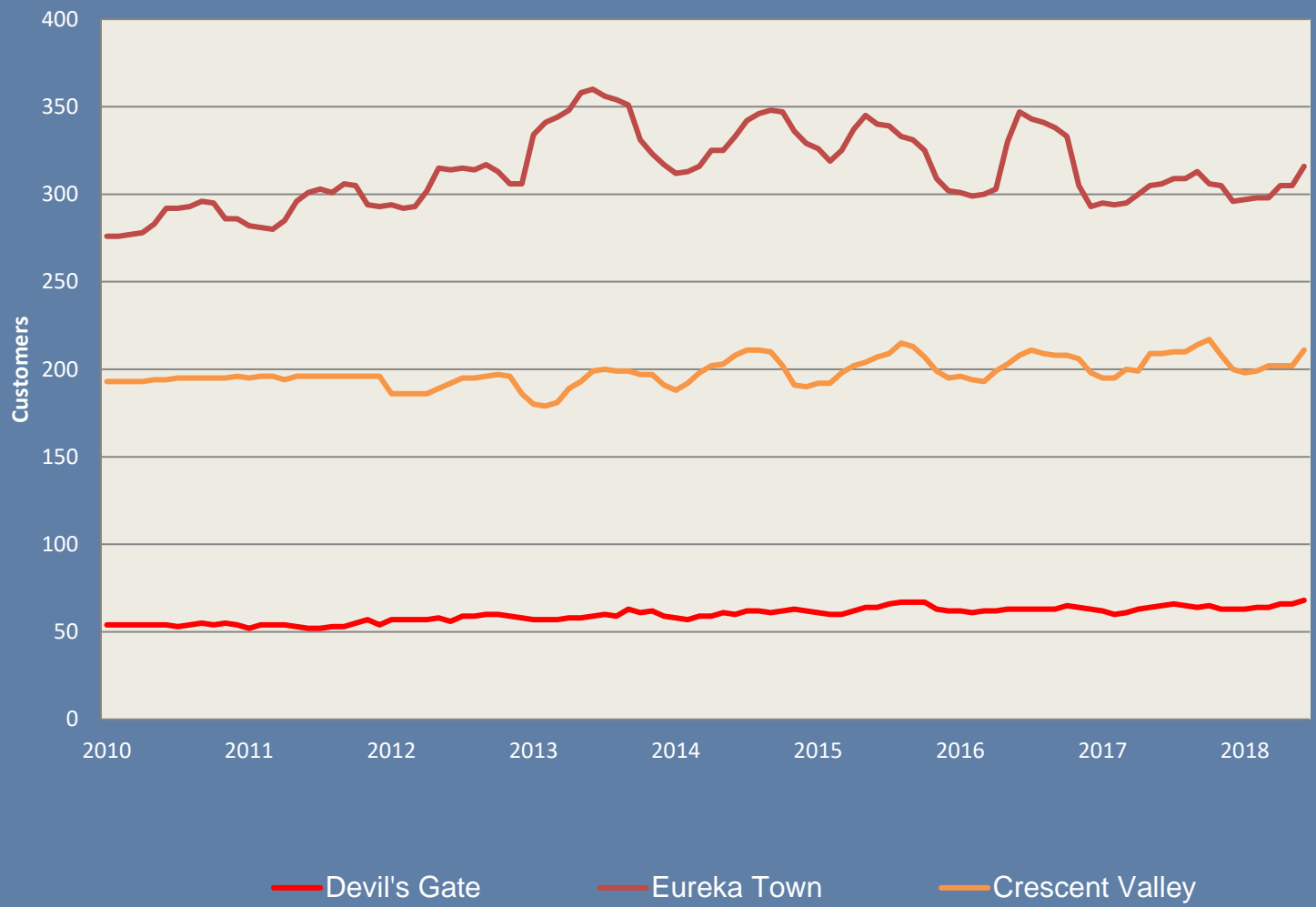
**Table 7-3
Groundwater Wells By Basin in Eureka County, 2018**

Groundwater Basin	Industrial (3)		Monitoring		Other (4)		Total (by basin)	
	Entire basin	Eureka County	Entire basin	Eureka County	Entire basin	Eureka County	Study Area	Eureka County
49-Elko Segment	25	0	199	0	34	0	1599	1
51-Maggie Creek	35	35	223	212	19	16	401	322
52-Mary's Creek	2	2	17	9	2	1	47	34
53-Pine Valley	20	20	113	107	3	2	228	201
54-Crescent Valley	95	4	578	72	7	3	902	178
59-Lower Reese River Valley	12	0	211	1	3	0	640	3
60-Whirlwind Valley	0	0	42	7	4	1	60	16
61-Boulder Flat	73	64	458	417	12	5	857	793
62-Rock Creek	5	1	73	5	2	1	94	10
138-Grass Valley	3	0	36	10	1	1	65	16
139-Kobeh Valley	6	6	36	36	0	0	87	73
140A-Monitor Valley (North)	0	0	0	0	0	0	10	5
151-Antelope Valley	1	1	2	1	0	0	19	17
152-Stevens Basin	0	0	0	0	0	0	1	1
153-Diamond Valley	3	3	71	71	9	9	584	581
155-L. Smoky Valley (North)	0	0	19	19	0	0	34	26
Total (by use)	280	136	2078	967	96	39	5628	2277

Source: Data from the Nevada Division of Water Resources



Figure 7-3 Municipal Water Customers



Historic Water-Level Changes

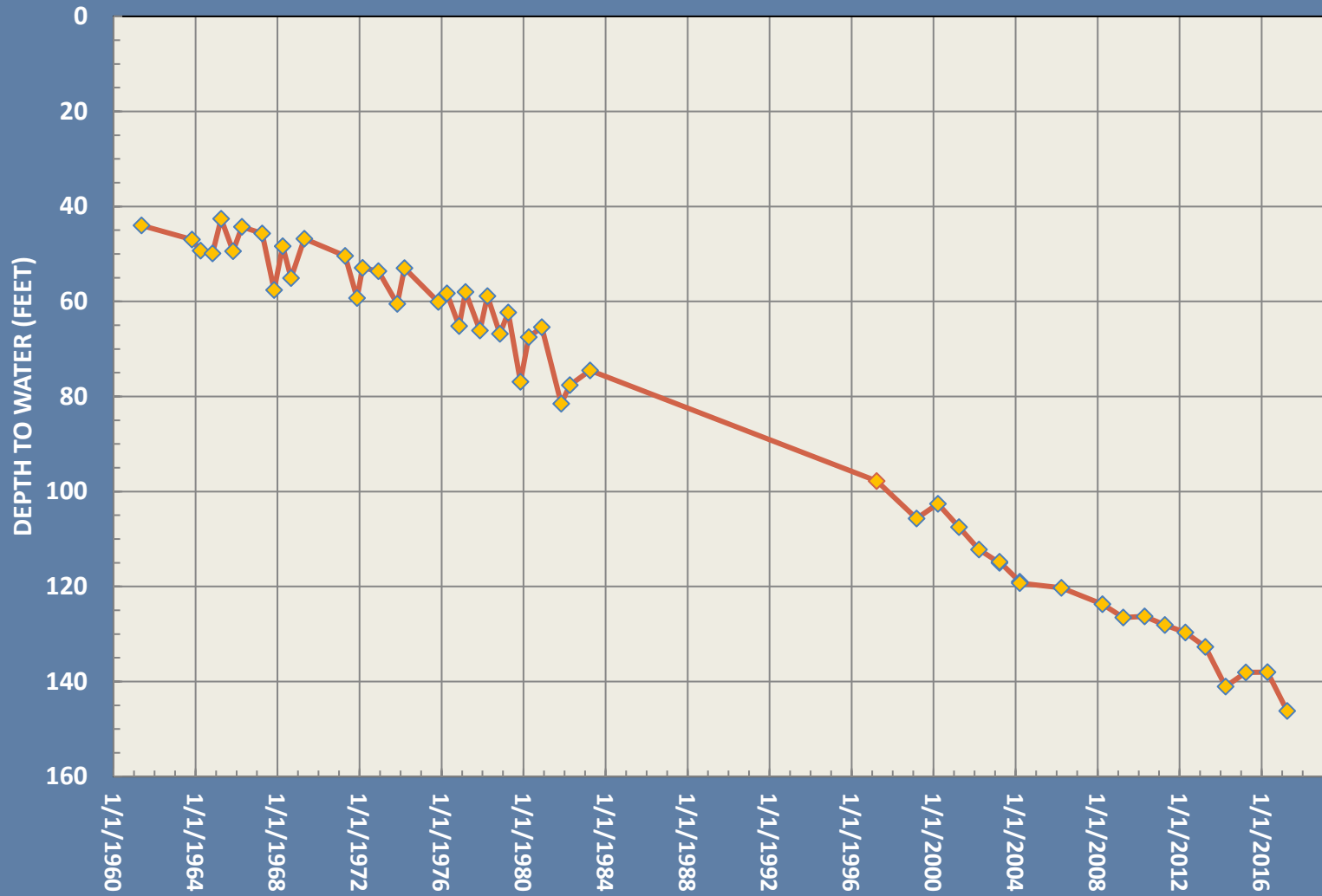
Water levels in the Diamond Valley Flow system have changed over time as a result of withdrawals for irrigation, municipal, domestic, and mining uses and as a result of annual long-term variations in precipitation. Most withdrawals have been for irrigation in southern Diamond Valley where the irrigated area expanded from 3,200 acres in 1961 to 22,200 acres in 1990. Water level declines from the 1960s to 2005 in southern Diamond Valley ranged from 26 to 90 feet at 67 wells. The large area of water-level decline that has been developed in the basin-fill aquifer of southern Diamond Valley underlies an area about 10 miles wide and 20 miles long.

Long-term water level records are available for only a few wells in Kobeh, Monitor, and Antelope Valleys. Kobeh Valley water levels ranged from 35-46 feet below the land surface with minor annual fluctuations generally 2-4 feet. In Monitor Valley water levels ranged from 48 to 56 feet below the land surface with limited annual fluctuations and response to short-term changes in precipitation. In northern Antelope Valley water levels ranged from 94 to 98 feet below the land surface with annual fluctuations of less than 1 foot (USGS Scientific Investigations Report 2006-5249).

Figure 7-4 shows changes in depth of groundwater since 1960 for a USGS monitoring well in Diamond Valley. Overall declines of about 100 feet have occurred since 1960. This trend is consistent with several wells in the area. Figures 7-5 and 7-6 show recent trends in wells being measured by Eureka County.



Figure 7-4 Water Depth to Surface, Diamond Valley, N21 E53 12CCBC



Source: Nevada Division of Water Resources, Water Level Data



Figure 7-5 Burnham Monitoring Well

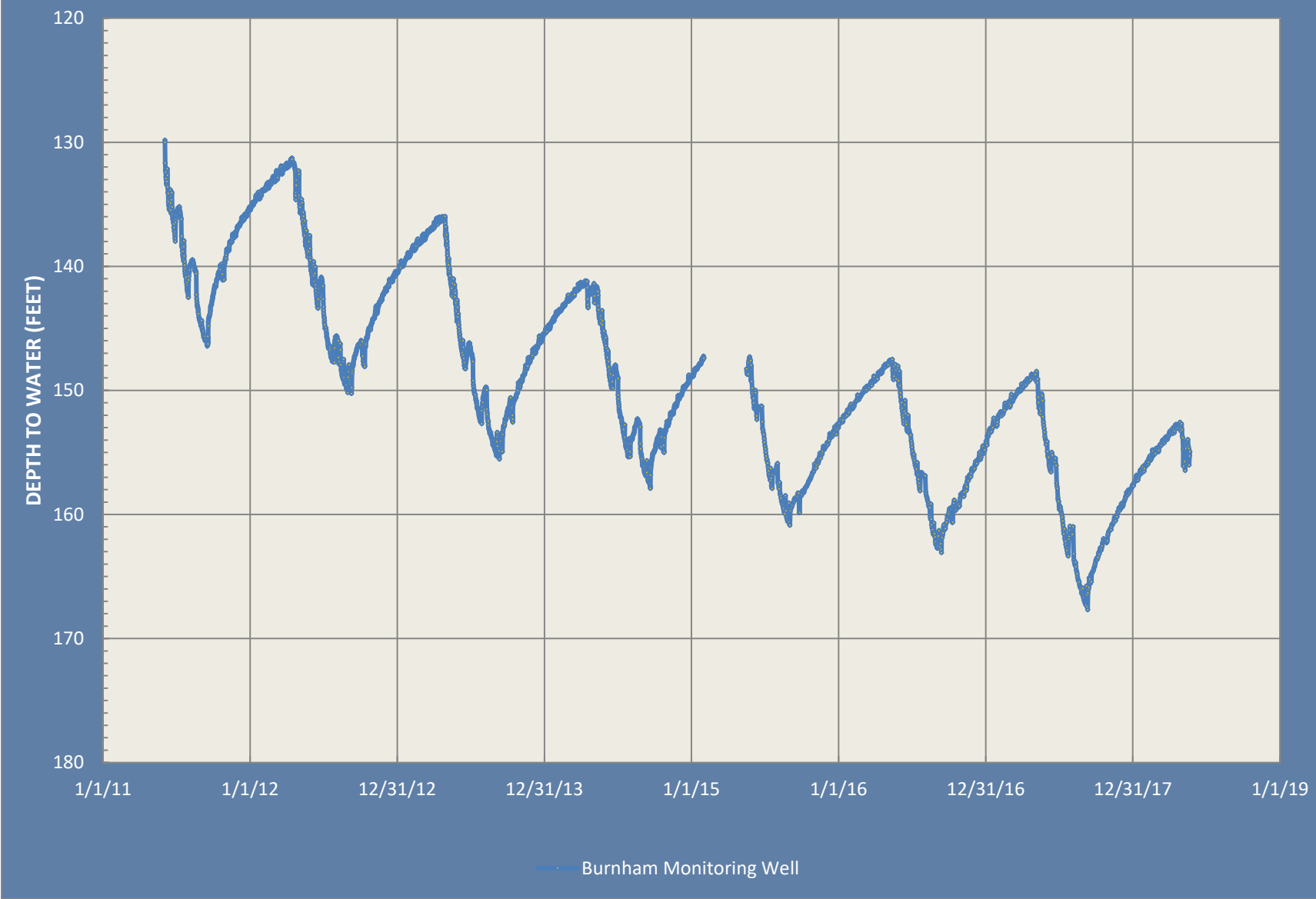
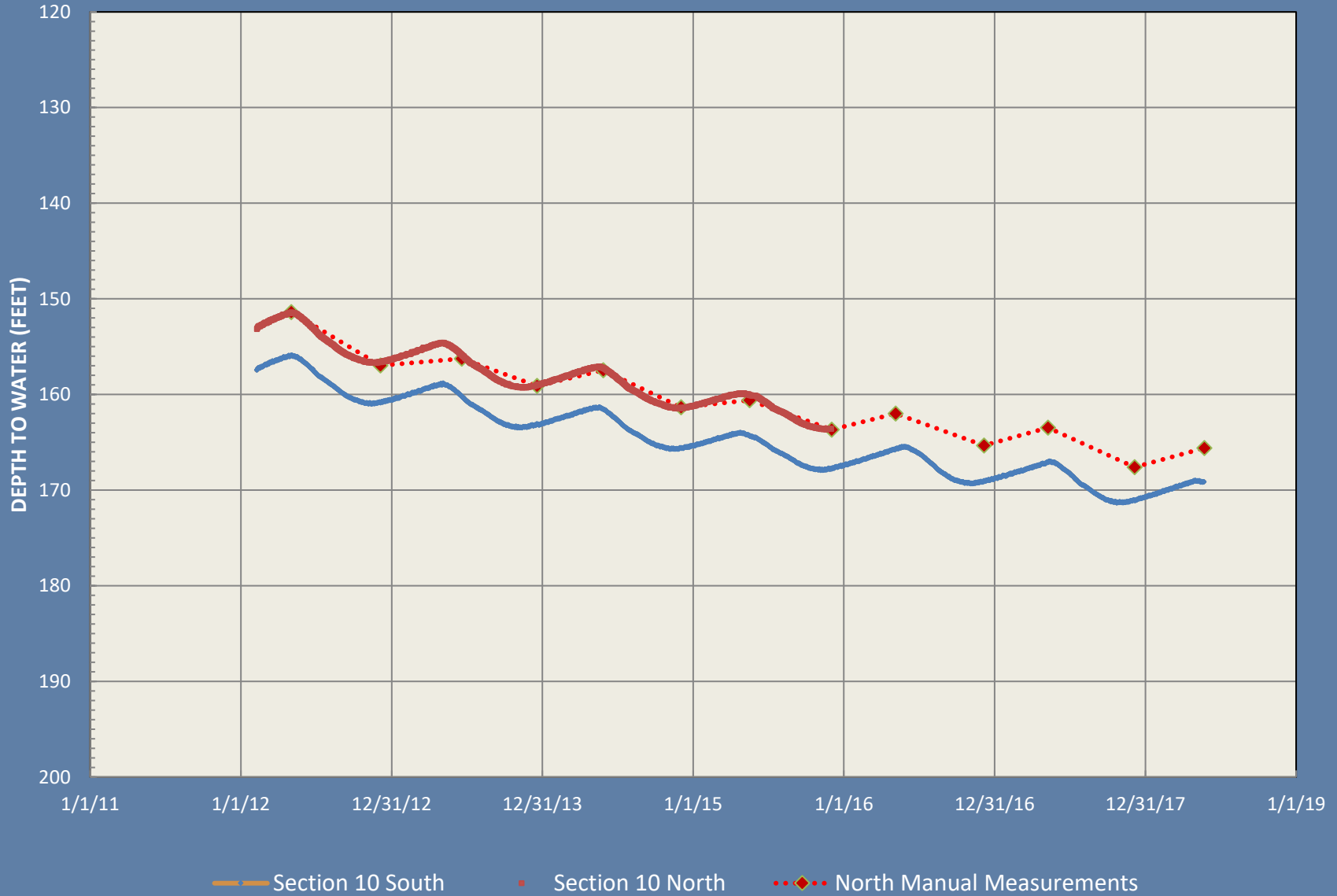
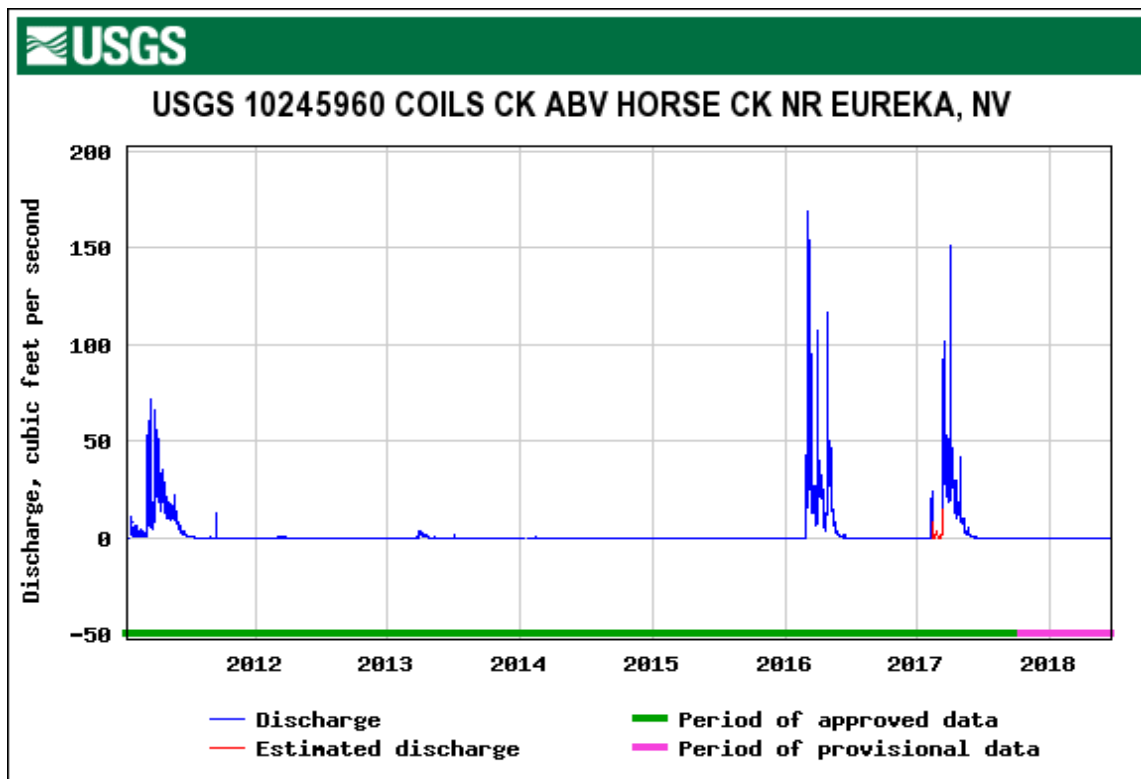


Figure 7-6 Eureka County Section 10 Monitoring Wells



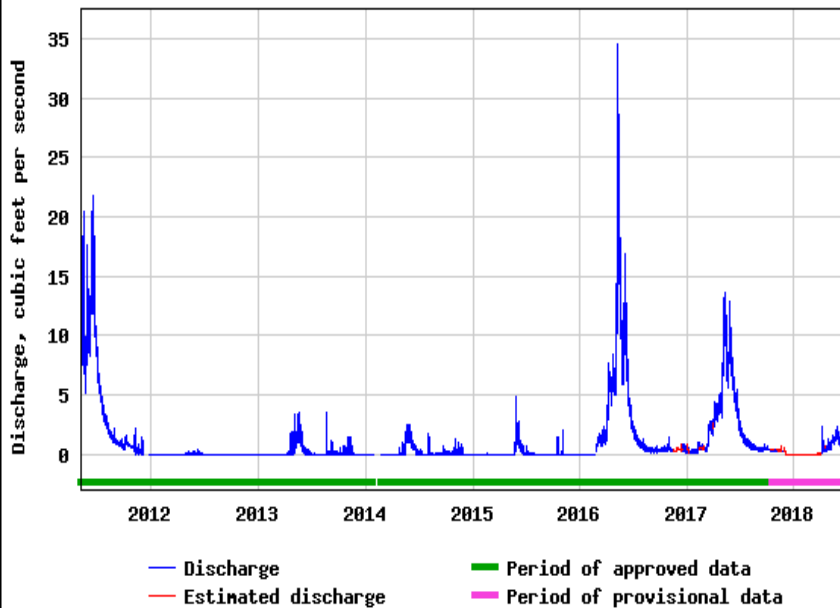
Surface Water

The major surface water feature in Eureka County is the Humboldt River which has an average annual discharge of approximately 218,000 acre-feet. Other major surface water features include Pine Creek and a series of smaller perennial streams originating in the Roberts Mountains, the Diamond Mountains, Cortez Range, and Monitor Range. Stream flow readings are limited in Eureka County. In recent years the United States Geologic Survey installed gauging stations at streams in the Roberts Mountains. The following graphs show real-time daily readings for Roberts Creek, Henderson Creek, Pete Hanson Creek, Tonkin Springs and Colis Creek through June 2018. Drought conditions from 2012 to 2016 reduced stream flows.

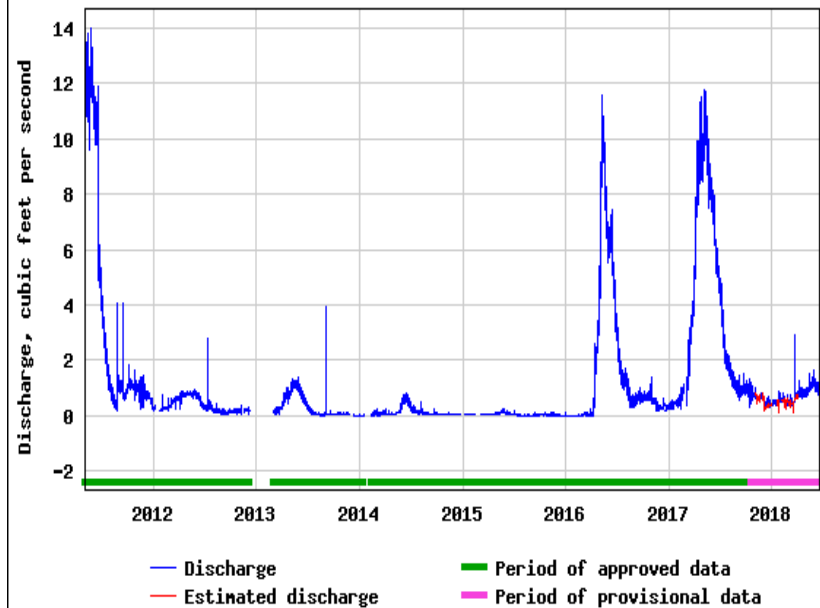


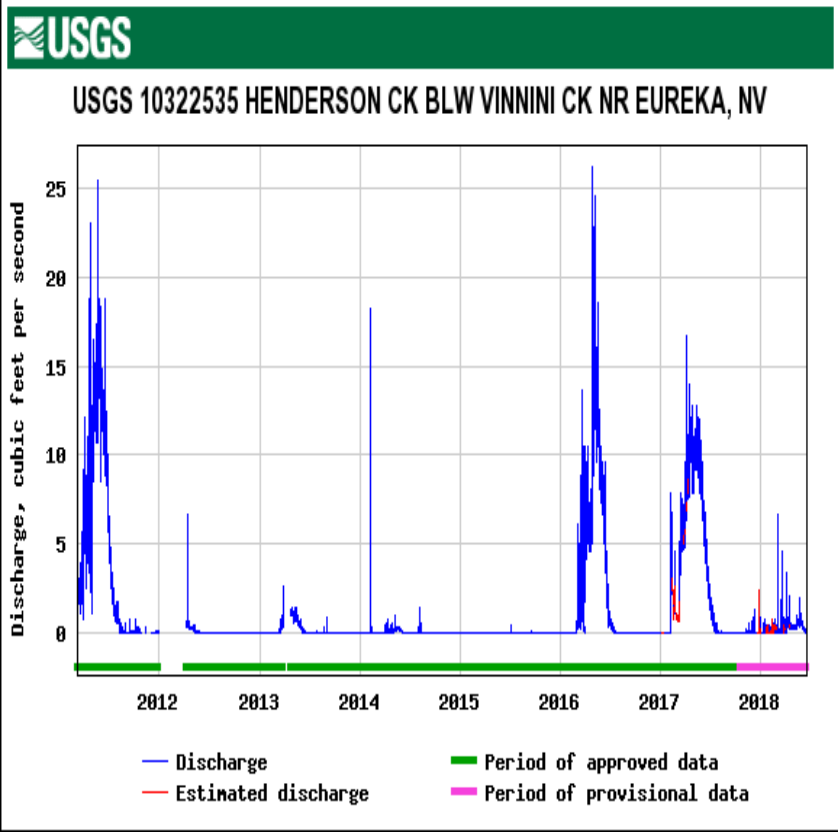
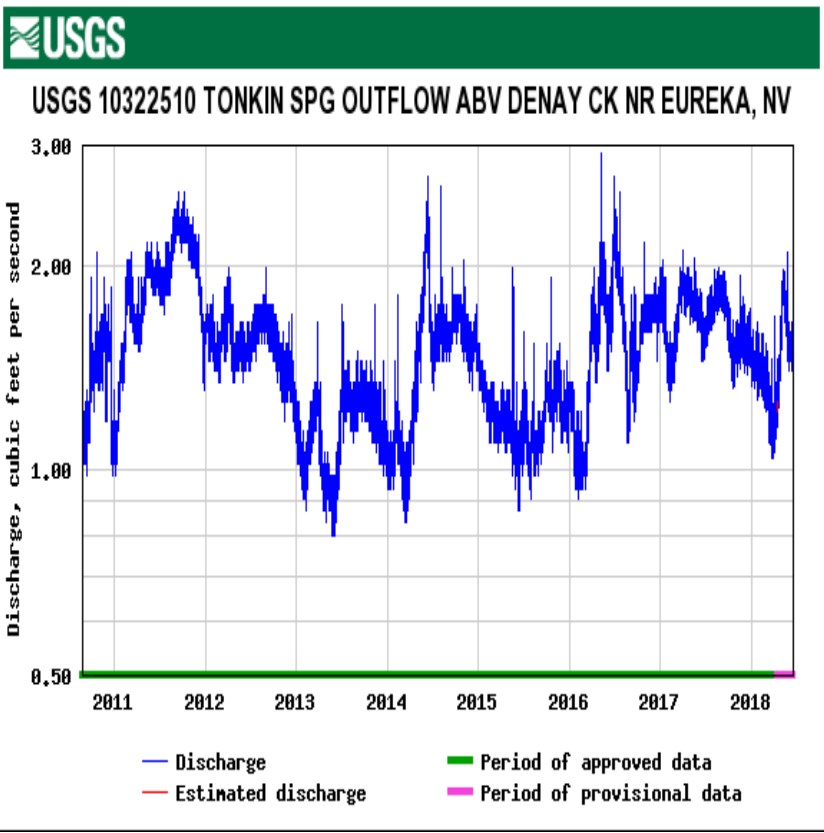


USGS 10322555 PETE HANSON CK ABV HENDERSON CK NR EUREKA, NV



USGS 10245970 ROBERTS CK NR EUREKA, NV





Precipitation

Precipitation in Eureka County (Antelope Valley) is shown in Figure 7-7. The average annual precipitation as measured at Antelope Valley between 1955 and 2012 is 12.74 inches. The wettest ten-year period was 1980 to 1990 followed by 1990 to 2000 averaging 13.1 and 12.8 inches respectively. The period of 2000-2017 saw an average of 12.54 inches.

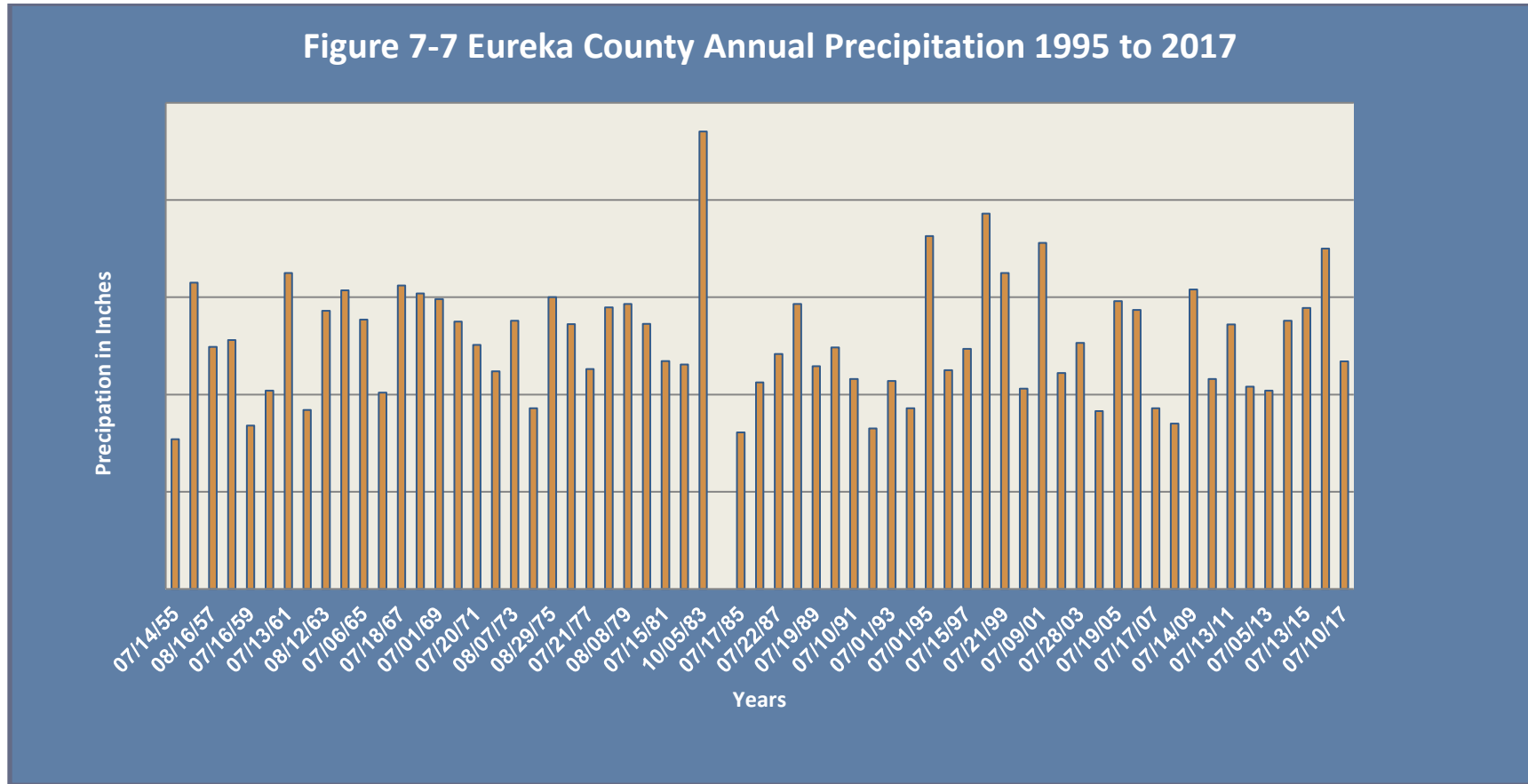
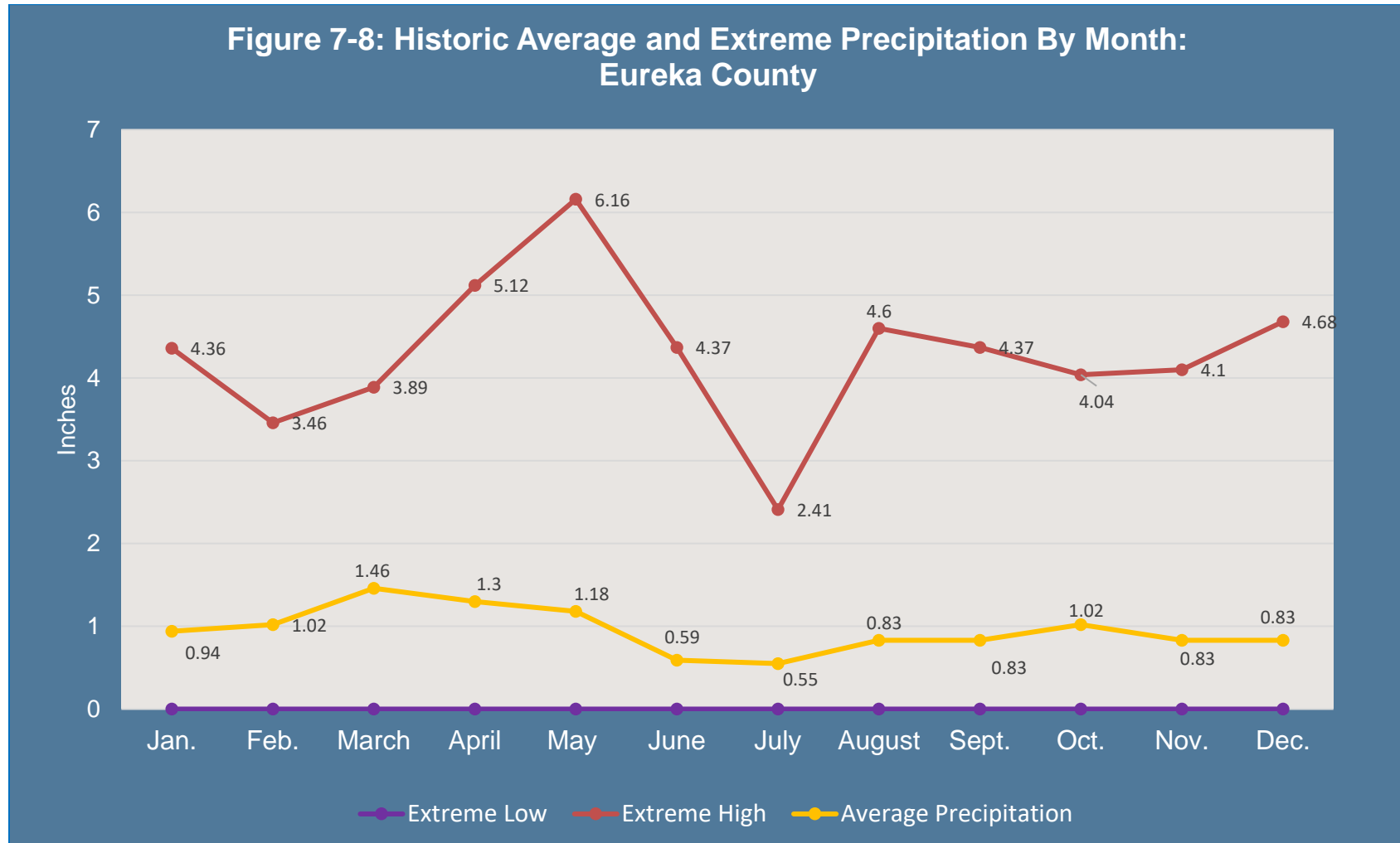


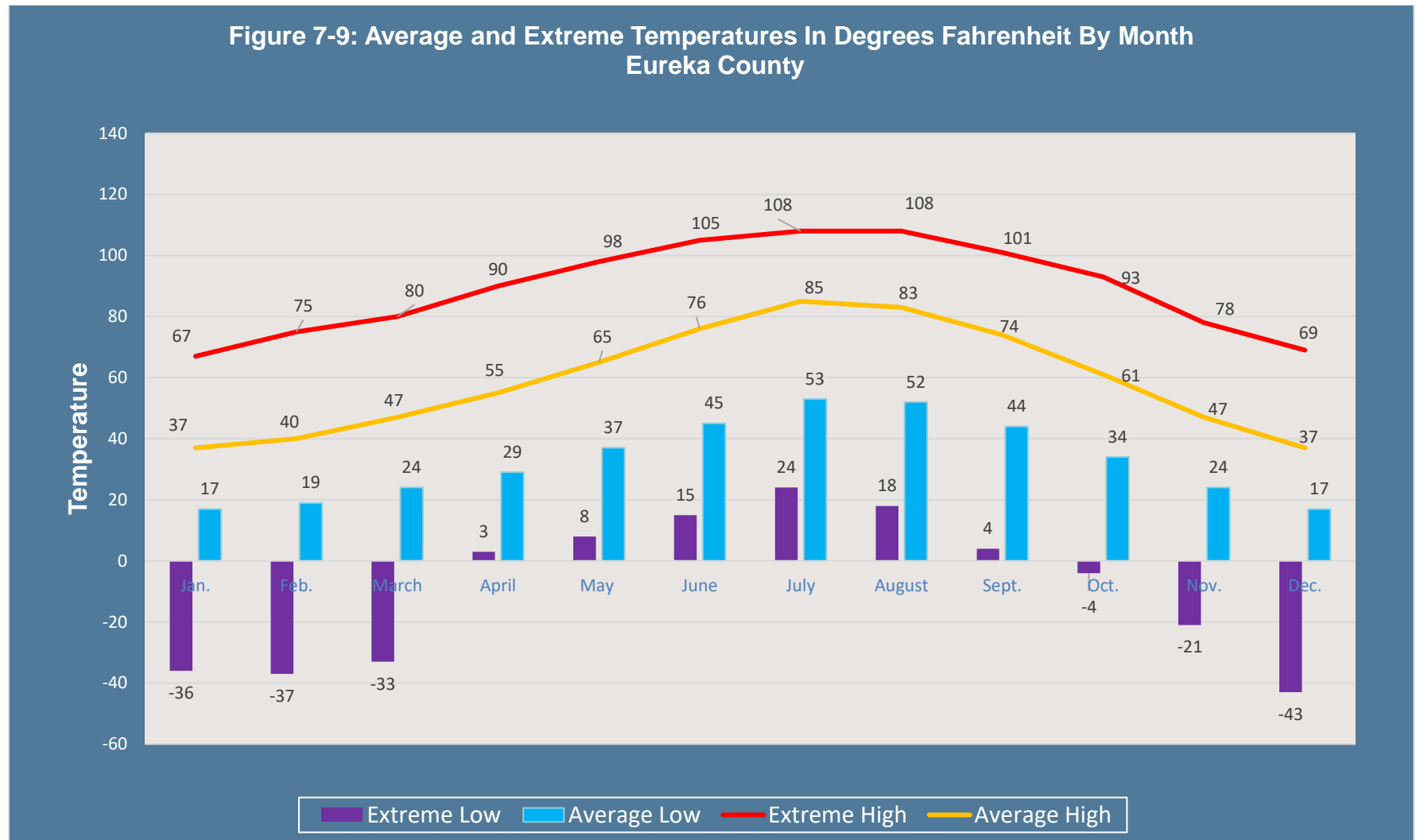
Figure 7-8 shows the historic average precipitation and the extreme recorded precipitation by month. The spring months of March, April, and May have the highest average precipitation and extreme high precipitation amounts.



Source: NOAA



Figure 7-9 shows average high and low temperature as well as the highest and lowest extreme temperatures recorded since 1931. Temperature in Eureka County has large variations from highs to low creating average temperatures which appear to be somewhat moderate. The extreme recorded temperatures show a 151-degree range.



Source: NOAA, National Centers for Environmental Information



Recreation

A variety of outdoor recreation is available in Eureka County. The vast areas of public lands are open to uses such as hunting, fishing, camping, day use, hiking, among others. Due to the dispersed nature of outdoor recreation use, there are few available measures to gauge the level of recreation activity in Eureka County. Hunting and fishing license purchases and hunting activity are two reliable measures available. Table 7-4 shows fishing and hunting licenses purchased in Eureka County. Figure 7-10 and Figure 7-11 provide data on annual mule deer and pronghorn antelope harvest in Eureka County hunt units. In recent years, deer and antelope populations in key Eureka County hunt areas have increased.

Table 7-4 Fishing and Hunting Licenses: 1995 to 2015															
Eureka County Fishing and Hunting Licenses	1995	1997	1999	2001	2003	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015
Residential Fishing	159	187	264	191	105	120	146	151	152	156	155	173	152	147	135
Non-residential Fishing	28	65	67	44	29	26	27	37	45	47	35	28	24	34	41
Total Fishing Licensing	187	255	331	235	134	146	173	183	119	203	356	356	176	181	176
Residential Hunting	67	73	66	67	60	58	56	42	43	46	42	41	34	30	22
Non-residential Hunting	5	11	10	14	9	15	2	9	6	4	5	6	5	3	0
Total Hunting	72	84	76	81	69	73	58	51	49	50	47	47	39	33	22
Total Hunt/Fishing Combo	153	183	235	183	145	119	122	103	97	106	85	89	93	89	89
Total Licensing	419	537	597	508	366	356	394	359	357	377	342	367	338	325	306

Source: NDOW

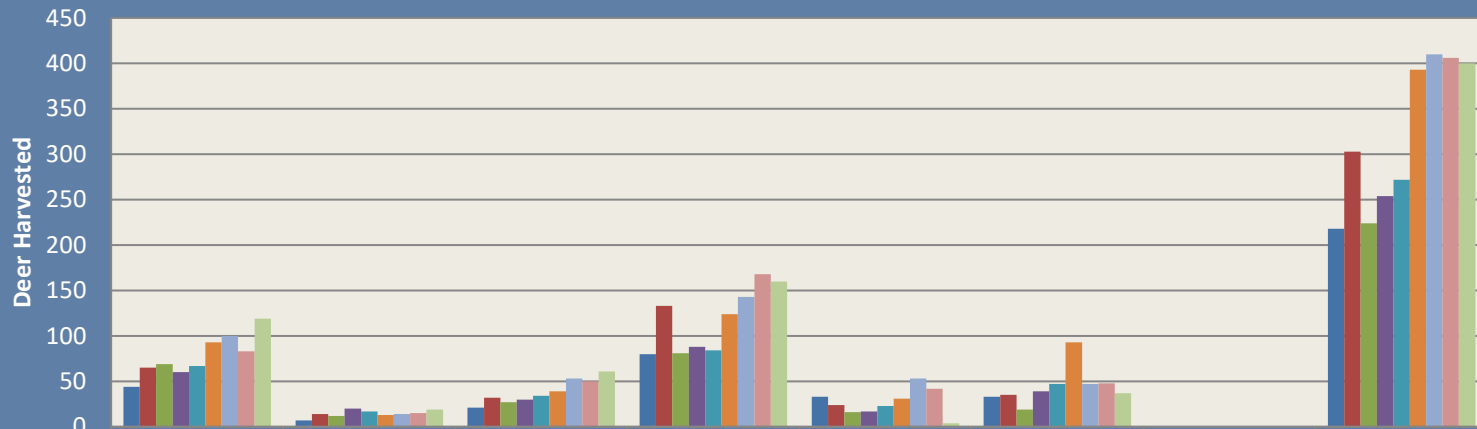


Table 7-5 Fish Stocking Activity in Eureka County			
Stream Name	Fish	Species	Date Last Stocking
Roberts Creek	500	RBT	5-23-2018
Tonkin Springs	500	RBT	5-22-2018

NDOW also collect information on recreational fishing on various streams in the County.



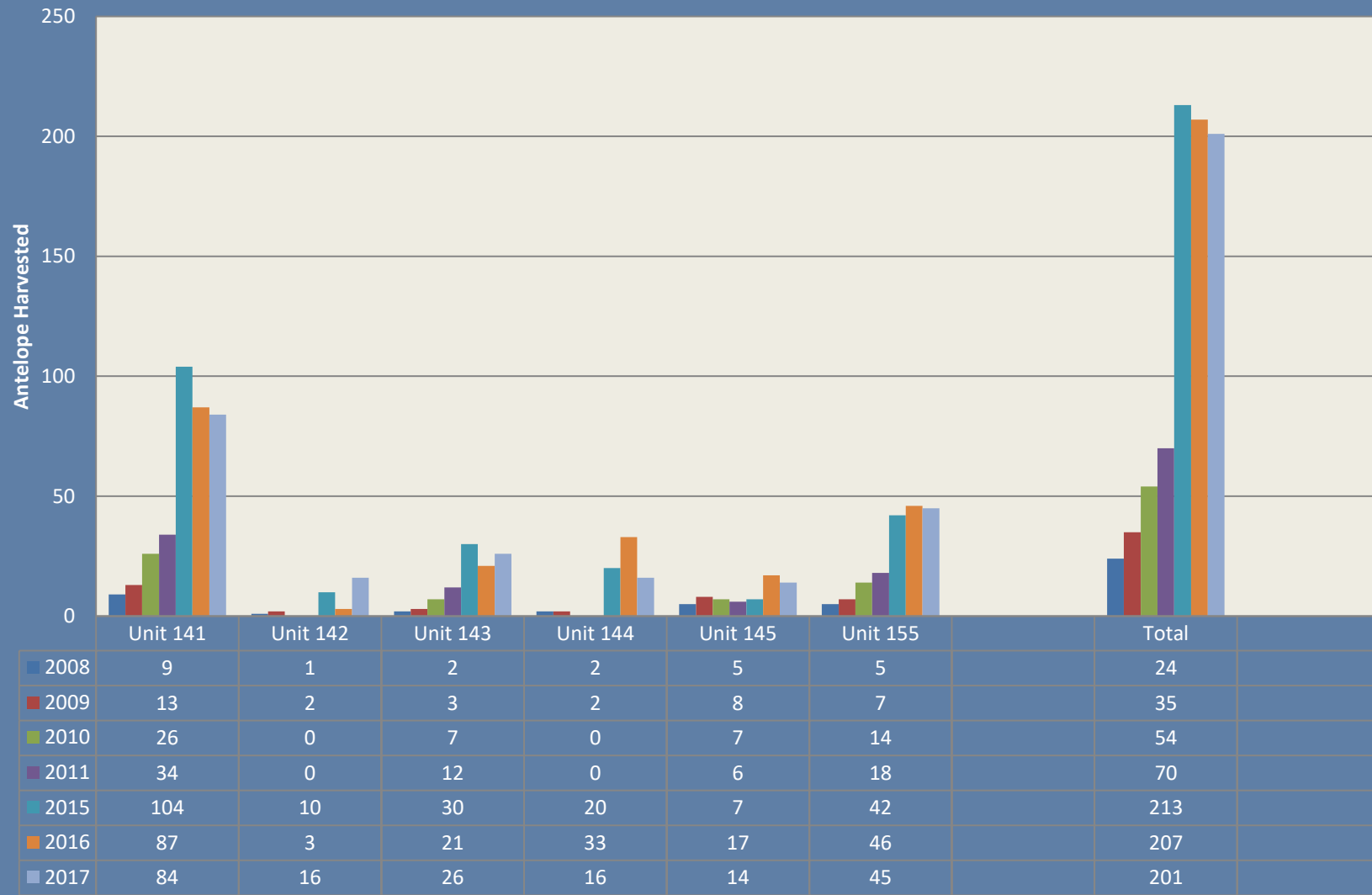
Figure 7-10 Annual Deer Harvest in Eureka County Hunt Units: 2005-2017



	Unit 141	Unit 142	Unit 143	Unit 144	Unit 145	Unit 155	Total
2005	44	7	21	80	33	33	218
2008	65	14	32	133	24	35	303
2009	69	12	27	81	16	19	224
2010	60	20	30	88	17	39	254
2011	67	17	34	84	23	47	272
2014	93	13	39	124	31	93	393
2015	100	14	53	143	53	47	410
2016	83	15	50	168	42	48	406
2017	119	19	61	160	4	37	400



Figure 7-11 Eureka County Antelope Harvest: 2008-2017



Agriculture

Figure 7-12 shows Eureka County hay production and acreage harvested from 2000-2017. On average Eureka County produces between 80,000 and 100,000 tons of hay with an average of approximately 20,000 acres harvested. Figure 7-13 shows Eureka County cattle and calves inventory. The average inventory is approximately 21,000 head and has remained relatively stable over the last 5 years. Public land grazing supports cattle herds in Eureka County. Figure 7-14 shows the number of animal unit months permitted for grazing allotments in Eureka County. Total AUMs active continue in a downward trend.

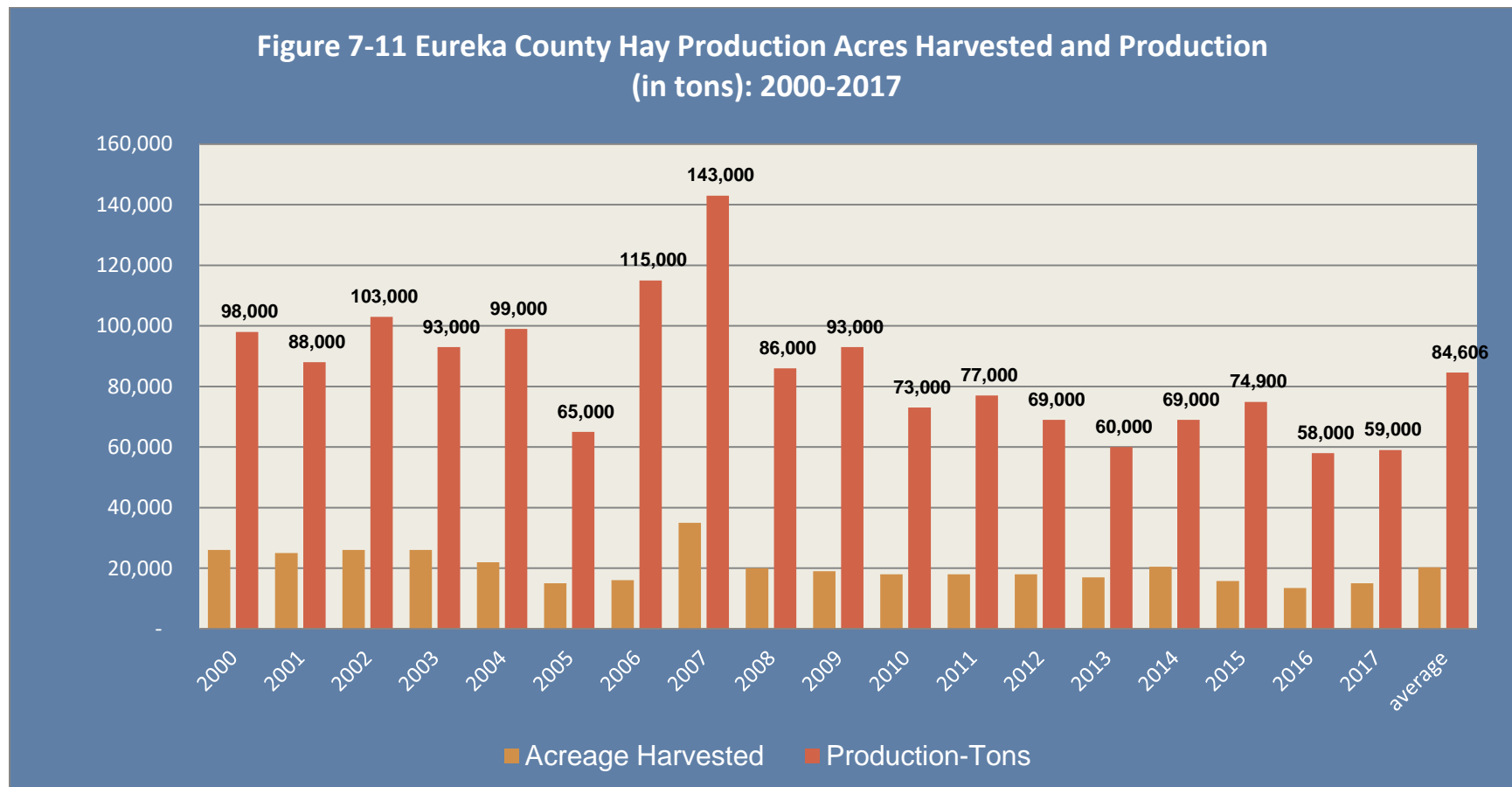
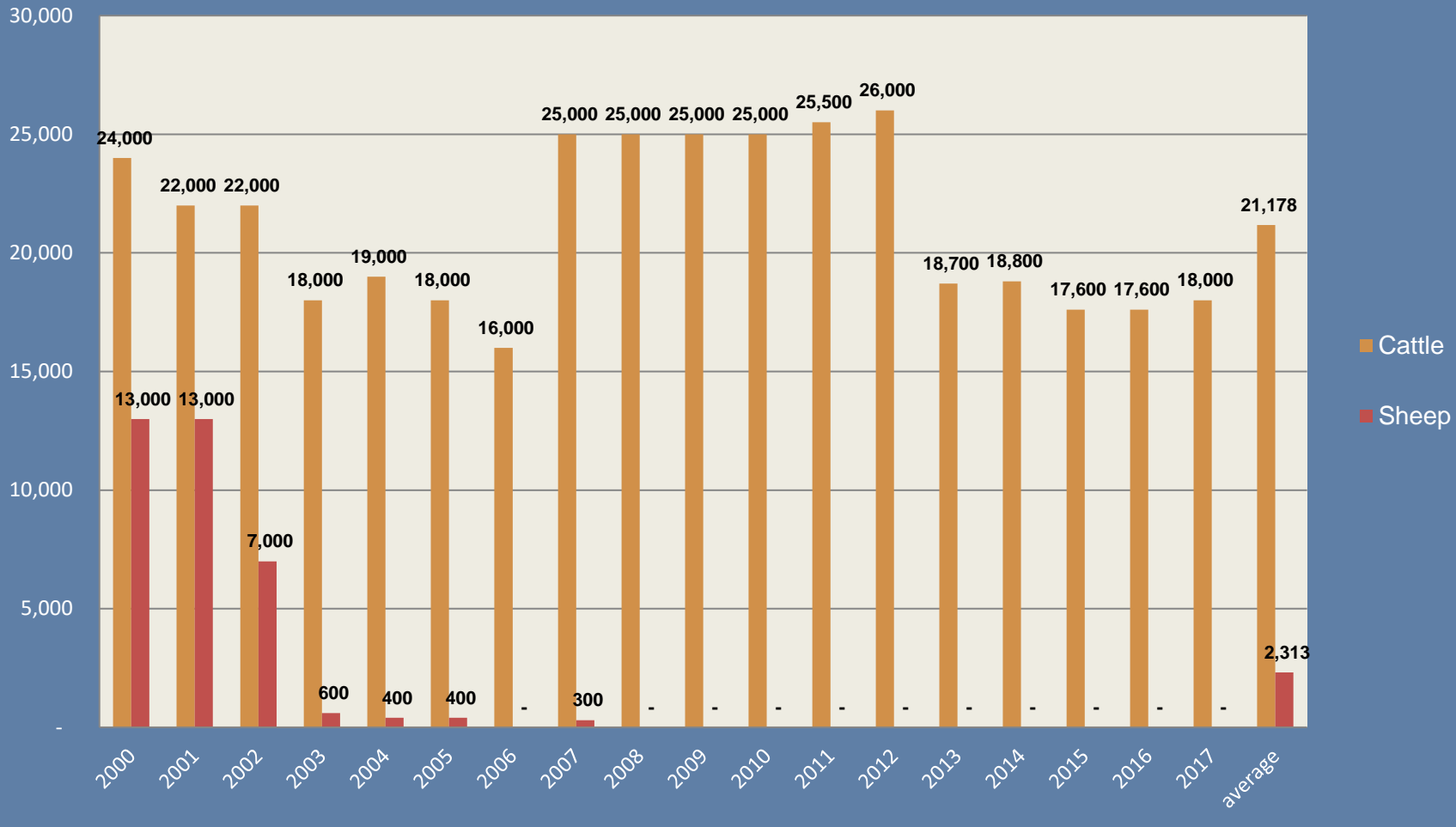


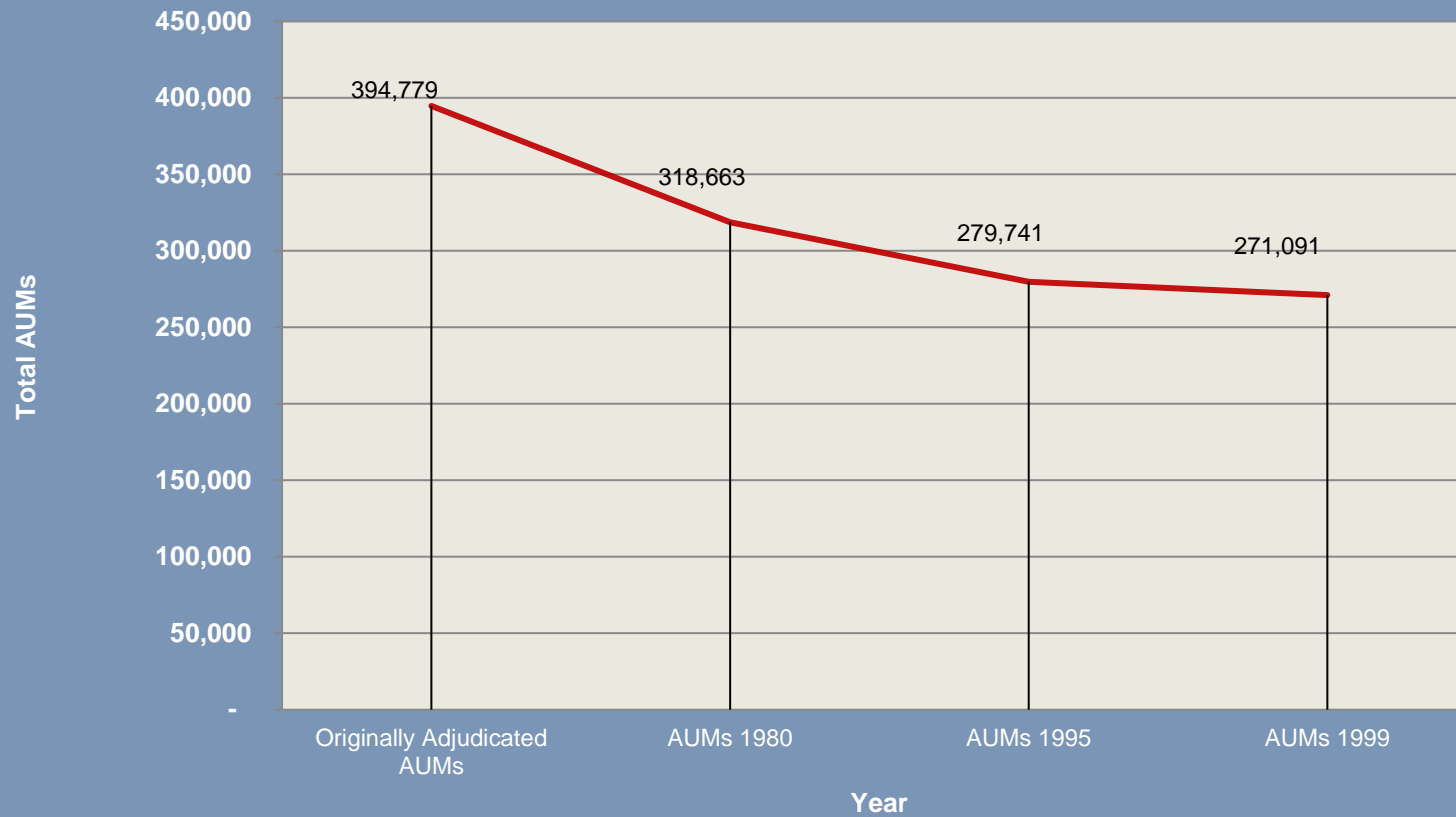
Figure 7-12 Eureka County Cattle and Sheep Inventory: 2000-2017



Source: USDA NASS



Figure 7-13 Eureka County AUMs : Adjudicated - 1999
Bureau of Land Management



Source: Bureau of Land Management, Battle Mountain District Office



References:

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6. Municipal Water Users for the Town of Eureka, Crescent Valley and Devils Gate GID, Eureka County Public Works, Ron Damele.
7. Bureau of Land Management, Animal Unit Months, Battle Mountain District Office.

