OFFICIAL FORECAST

Last Updated: Dec-2018

North Platte River Basin Forecasts

Location	Variable	Time Period	Forecast Value	Forecast Category ⓘ
Lewellen gage (NE)	streamflow	May-July	81,800 acre-feet	Below Average
Glendo reservoir (WY)	inflow	May-July	416,400 acre-feet	High Average
Alcova reservoir (WY)	inflow	May-July	305,200 acre-feet	Low Average
Pathfinder reservoir (WY)	inflow	May-July	233,500 acre-feet	Low Average
Seminoe Reservoir (WY)	inflow	May-July	420,500 acre-feet	Low Average

South Platte River Basin Forecasts

Location	Variable	Time Period	Forecast Value	Forecast Category ⓘ
Julesburg gage (CO)	streamflow	May-July	84,500 acre-feet	Average
Kersey gage (CO)	streamflow	May-July	214,900 acre-feet	Average
South Platte higher elevations	max snow water equivalent	WY2019		Available Jan 2019
South Platte lower elevations	precipitation	April-June	Probability >50%: 69% Probability <33%: <5%	

Forecast Category	Exceed %	Lewellen	Glendo	Alcova	Pathfinder	Seminoe
Above Average	<20%	>372	>562	>523	>531	>885
High Average	20-40%	226-372	414-562	397-523	368-531	761-885
Average	40-60%	154-226	366-414	332-397	290-368	503-761
Low Average	60-80%	100-154	322-366	289-332	209-290	316-503
Below Average	>80%	<100	<322	<289	<209	<316

units: thousands of acre-feet

Forecast Category	Exceed %	Julesburg	Kersey
Above Average	<20%	>332	>554
High Average	20-40%	101-332	272-554
Average	40-60%	38-101	143-272
Low Average	60-80%	14-38	58-143
Below Average	>80%	<14	<58

units: thousands of acre-feet

Discussion

The most notable feature of global seasonal forecasts during the 2018-2019 winter continues to be the expected moderate-strength El Nino event in the tropical Pacific Ocean. As of this update, a weak El Nino exists presently but has shown little if any growth over the past few weeks. However, much warmer subsurface ocean temperatures exist in the tropical Pacific so growth to a moderate El Nino is still plausible over the next 1-2 months.

As noted in previous research, the presence of an El Nino has historically had little to no bearing on the North Platte basin. Meanwhile, there is a statistically significant, albeit weak impact on the South Platte basin, favoring wetter springtime. This is being reflected in the December forecast with a 69% chance of above normal precipitation in the South Platte lower elevations, up from 64% in November. There has also been a ~15% increase in the Julesburg and Kersey flow projection from the November forecast, although both are still in the Average category.

Similar to November, the main driver of the December 2018 forecast in the North Platte is the PDSI condition across the western United States. Figure 1 shows sharp gradient of PDSI values across CO and WY with drier than normal higher elevations and average to wetter lower elevations. Overall, the basin-wide PDSI is near zero (i.e. average), which generally promotes near average flow forecasts. However, note that the Pathfinder and Seminoe forecasts have dropped by as much as 20%. This occurred due to a drop in the PDSI tendency (the change of the PDSI over time), which was strongly positive through the fall but has now leveled out to near zero. This predictor is unlikely to experience a large change over the next month so further forecast flow declines at the upstream sites are not anticipated, at least not from this predictor.

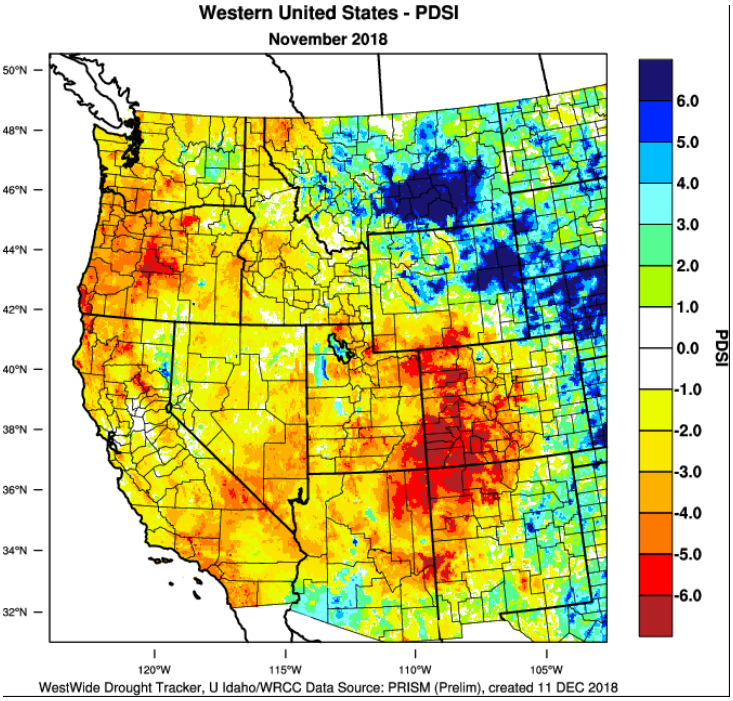

Figure 1

PROBABILITY OF LOW FLOW

During 2018, additional forecasts were developed to inform the probability of "Low Flow" for (i) Guernsey April-September outflow and (ii) Lewellen May-July streamflow. These forecasts are being used operationally for the first time. Note that Low Flow was defined as flow below the 25th percentile at each site. This translates to 2,931 c.f.s. for Guernsey outflow and 621 c.f.s. for Lewellen.

Table 1 shows the probability of Low Flow continues to be significantly higher at Lewellen than Guernsey, although there has been little to no change since November. The main reason for the difference is due to relatively high reservoir storage (see "Reservoir Storage" below), which factors into the Guernsey prediction but does not at Lewellen. However, even the Lewellen Low Flow forecast does not exceed 50%.

Table 1: Probability of low flow at Lewellen and Guernsey Reservoir.

Forecast Location	Time Period	Probability of flow <25%	
		Forecast Time	
		Nov	Dec
Guernsey reservoir outflow	Apr - Sep	17%	16%
Lewellen streamflow	May - Jul	44%	41%

RESERVOIR STORAGE

As of December 1, 2018, the total reservoir storage at the five main reservoirs upstream of Lake McConaughy (Seminoe, Pathfinder, Alcova, Glendo and Guernsey) was 1,665,603 acre-feet. Using data from 1959-present, this value is in the 53rd percentile for December 1, down slightly from the 55th percentile observed in November. Although total storage has decrease significantly over the past 2 years, it continues to remain high enough to buffer against any significant precipitation deficits for at least one more runoff season during winter/spring 2019.

COMPARISON TO OTHER FORECASTS

Forecasts developed herein are compared to similar forecasts from the US Bureau of Reclamation (USBR), the Natural Resources Conservation Service (NRCS) and the Climate Prediction Center (CPC).

USBR

Forecasts for WY2019 are not available until January.

NRCS

Forecasts for WY2019 are not available until January.

CPC

The graphic below shows the March-May 2019 precipitation forecast from the CPC. Both the North Platte and South Platte are now both expected to see above normal springtime precipitation. This is a (slight) change towards wetter conditions from the previous outlook, when only the South Platte was in the above normal category. It is important to note that this forecast states there is a 33-40% chance of above normal precipitation. This implies that there is a 60-67% chance of NOT seeing above normal precipitation. In other words, there is still a higher chance that precipitation is either in the normal or below normal category. This represents a significant limitation of the CPC forecasts, as has been previously documented.