

Summary of Data

Water quality sampling occurred at six sites within the Lake Glenville watershed on 06/01/22. All sites were located as close as possible to sites sampled in previous monitoring years, however the location for the Glenville Creek sample had to be changed due to the high water level at the regular site. The sample location on Glenville Creek was moved upstream to where Hwy. 107 crosses the stream. The 06/01/22 sampling was a dry weather sampling, however the area around the lake had received 0.63 inches of rain from 05/26/22 – 05/27/22 (Figure 1). Previous sampling was conducted with less than 0.1" precipitation amounts for the preceding week. The suite of parameters sampled included water temperature, dissolved oxygen (DO), pH, specific conductivity, turbidity, fecal coliform, ammonia, nitrite/nitrate, phosphate, and alkalinity. Overall, the water quality at the six tributaries to Lake Glenville as observed on 06/01/22 and indicated by these parameters was very good.

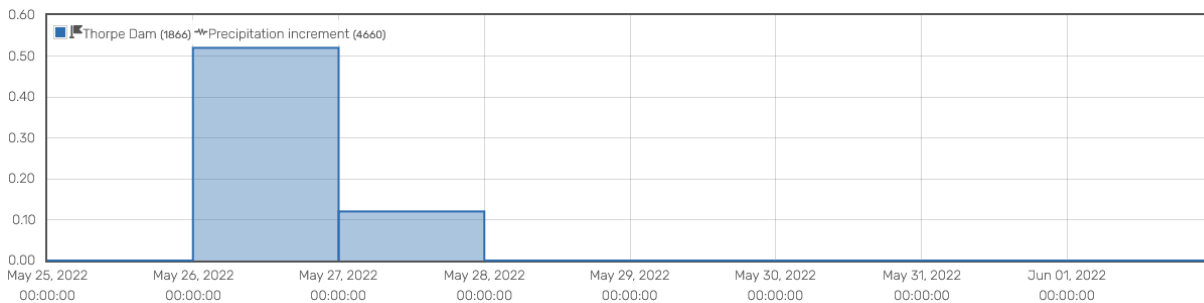


Figure 1. Precipitation for the week preceding sampling.

Turbidity during the sampling event was 1.2 NTU at Cedar Creek, 1.2 NTU at Hurricane Creek, 2.6 NTU at Norton Creek, 4.9 NTU at Mill Creek, 5.0 at Glenville Creek, and 6.2 NTU at Pine Creek. Turbidity within this range is considered low, as the regional Volunteer Water Information Network VWIN mean is 6.2 NTU.

Dissolved oxygen is the amount of oxygen dissolved in water. The concentration of dissolved oxygen in surface water is affected by temperature and has both a seasonal and a daily cycle. Cold water can hold more dissolved oxygen than warm water. In winter and early spring, when the water temperature is low, the dissolved oxygen concentration is high. In summer and fall, when the water temperature is high, the dissolved-oxygen concentration is often lower. Dissolved oxygen is important for ecological health as most aquatic organisms need oxygen to survive and grow. Some species, such as trout and stoneflies, require high DO levels (>6 mg/L) for survival, and trout show improved reproductive health when DO levels are above 10 mg/L. Dissolved oxygen concentrations for the sampling event ranged between 8.7 mg/L and 9.5 mg/L. These concentrations are very similar in comparison to the 06/01/2021 sampling.

Acidic waters are not uncommon for high elevation streams in the area. Depths to bedrock are shallow with thin soils and rock types do not have a mineralogy that buffers groundwater as it moves through the ground and reemerges in the streams. However, there are anthropogenic

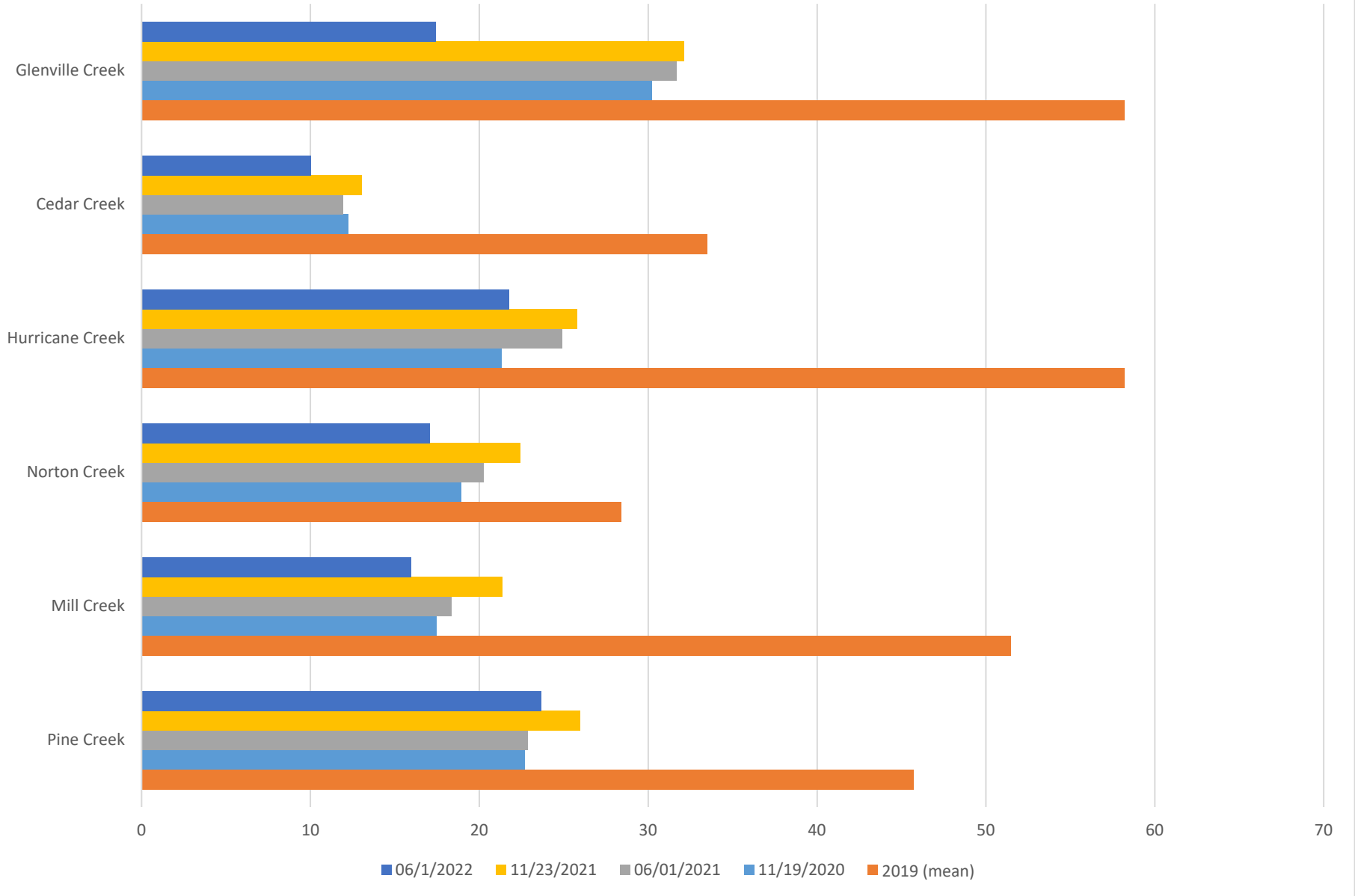
sources which can increase the acidity in streams to levels which are unhealthy for trout. Increased industrial emissions caused by the burning of fossil fuels release SO₂, NO, NO₂, and NH₃ into the atmosphere, where it can attach to water vapor and fall with precipitation in the form of H₂SO₄, HNO₃, and NH₄⁺. High elevation areas of eastern Tennessee and Western North Carolina receive elevated rates of atmospheric acid deposition in comparison with other areas on the east coast, resulting in increased episodic stream acidification events, adding to the acidification of soil and surface waters. Episodic stream acidification occurs when increased rates of atmospheric acid deposition occur, bringing increased precipitation to soils and water bodies, resulting in periods of increased stream flow and decreased water pH. The range of pH levels was from 6.1 to 7.4; Norton Creek had the lowest pH sampled and was the only stream with a pH lower than that measured on 11/23/21.

Ammonia concentrations were low at all the sampled locations, ranging between 0.05 mg/L and 0.11 mg/L. The regional VWIN mean is 0.09 mg/L. Nitrite/Nitrate-Nitrogen concentrations were also very low, ranging between 0.1 mg/L and 0.2 mg/L. Phosphorous concentrations ranged from <0.02 mg/L to 0.06 mg/L. The regional VWIN mean for phosphorous is 0.9 mg/L.

Under state rules, fecal coliform in fresh waters “shall not exceed a geometric mean of 200 colony forming units (CFU)/100 mL based upon at least five consecutive samples examined during any 30-day period, nor exceed 400 CFU/100 mL in more than 20 percent of the samples examined during such period.” As such, any single sample is difficult to compare to the state standard, but as a rule of thumb low numbers are good and numbers exceeding 200 CFU/100 mL are bad. Fecal coliform concentrations ranged from 10 to 120 CFU/100 milliliter. Pine Creek fecal concentrations were nearly 80% lower than they were during last year’s summer sampling. Some reduction of the fecal coliform concentration could be attributed to the preceding precipitation event.

Specific Conductivity ($\mu\text{S}/\text{cm}$)

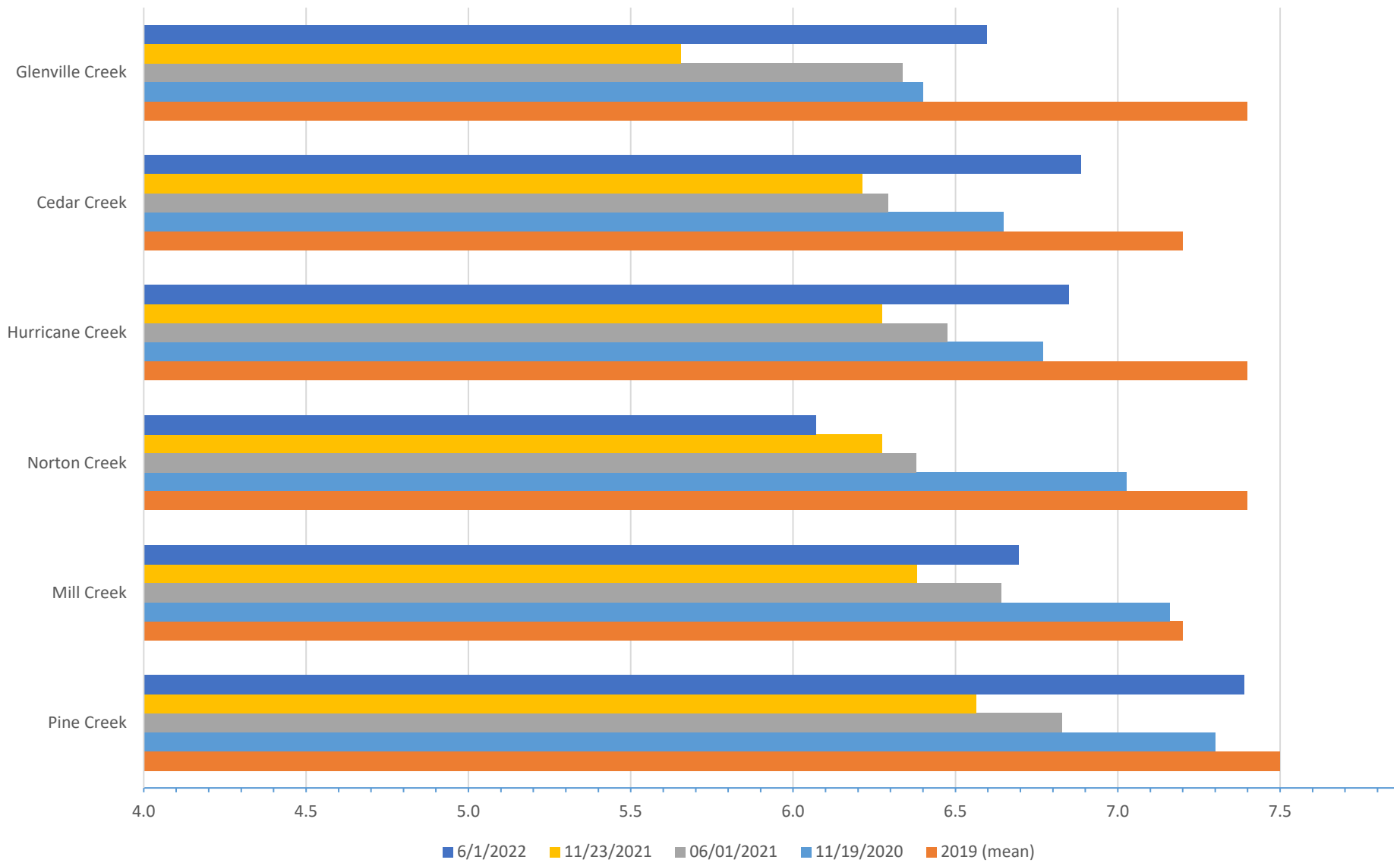
Regional VWIN mean 60 ($\mu\text{S}/\text{cm}$)- (used to compare results against typical regional values)



*2019 data collected and analyzed by Western Carolina University Environmental Health staff and students

pH

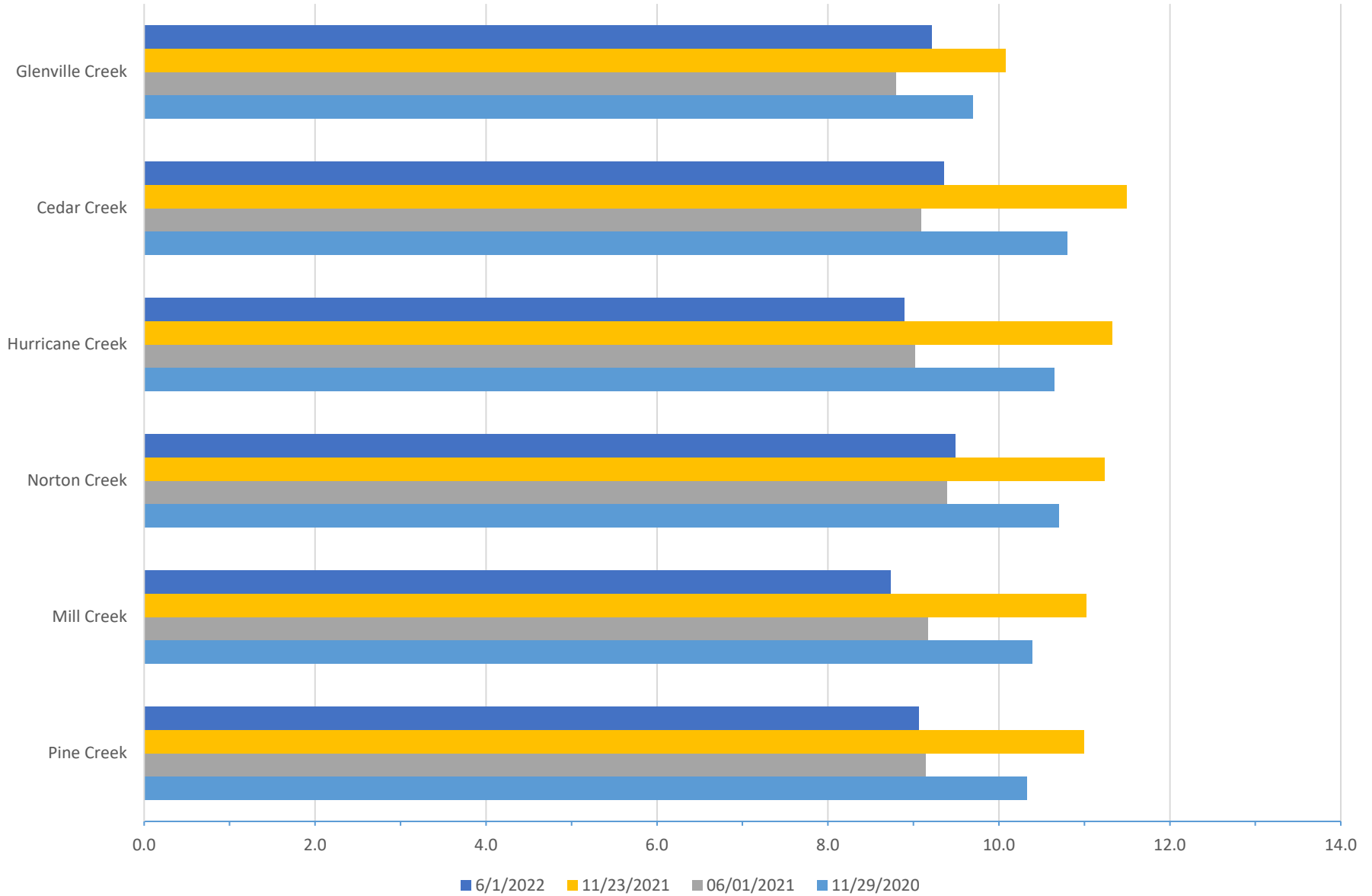
Regional VWIN mean pH 7.1 - (used to compare results against typical regional values)



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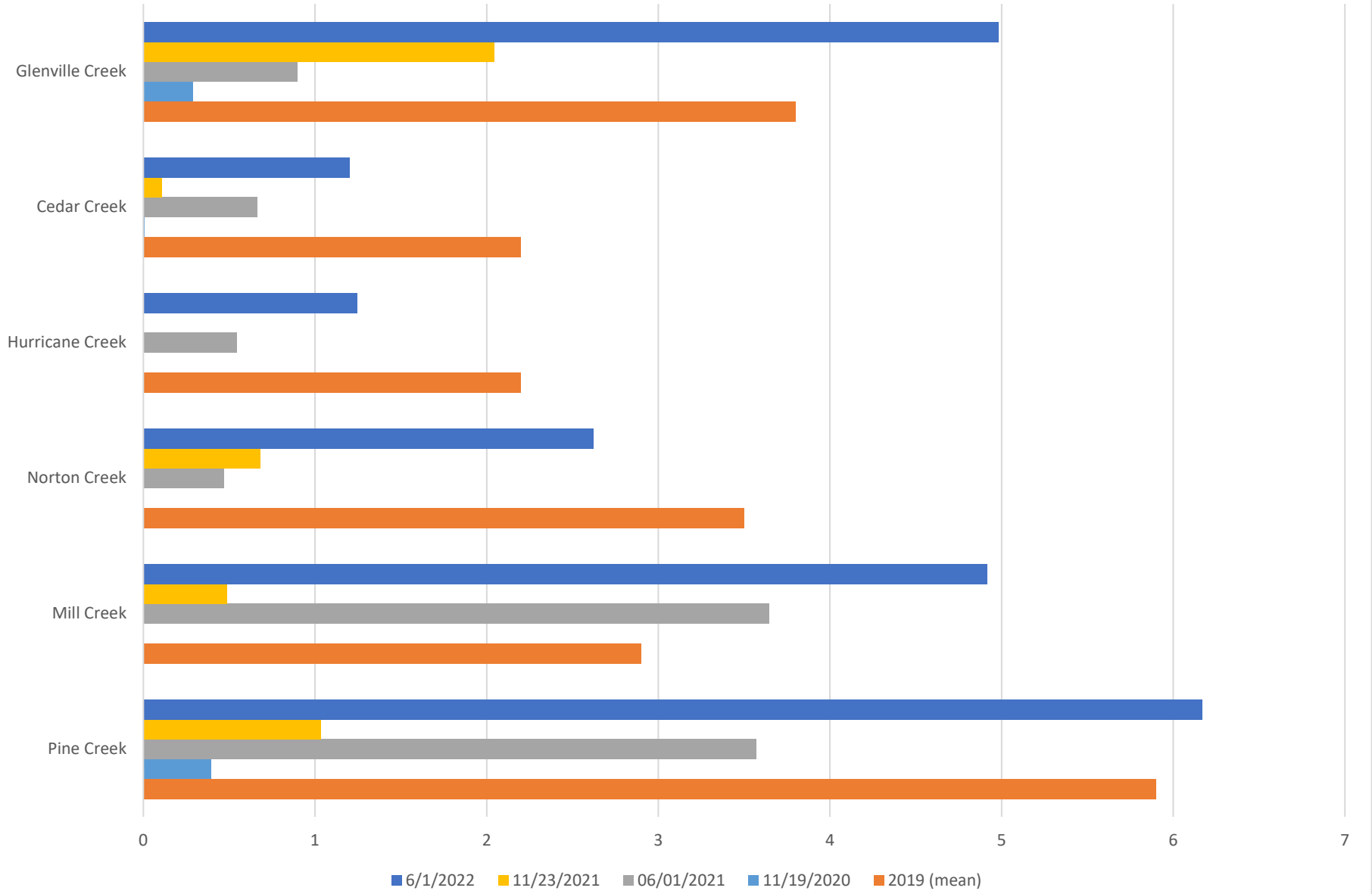
Dissolved Oxygen (mg/L)

NC Trout Water designation standard ≥ 6 mg/L



Turbidity (NTU)

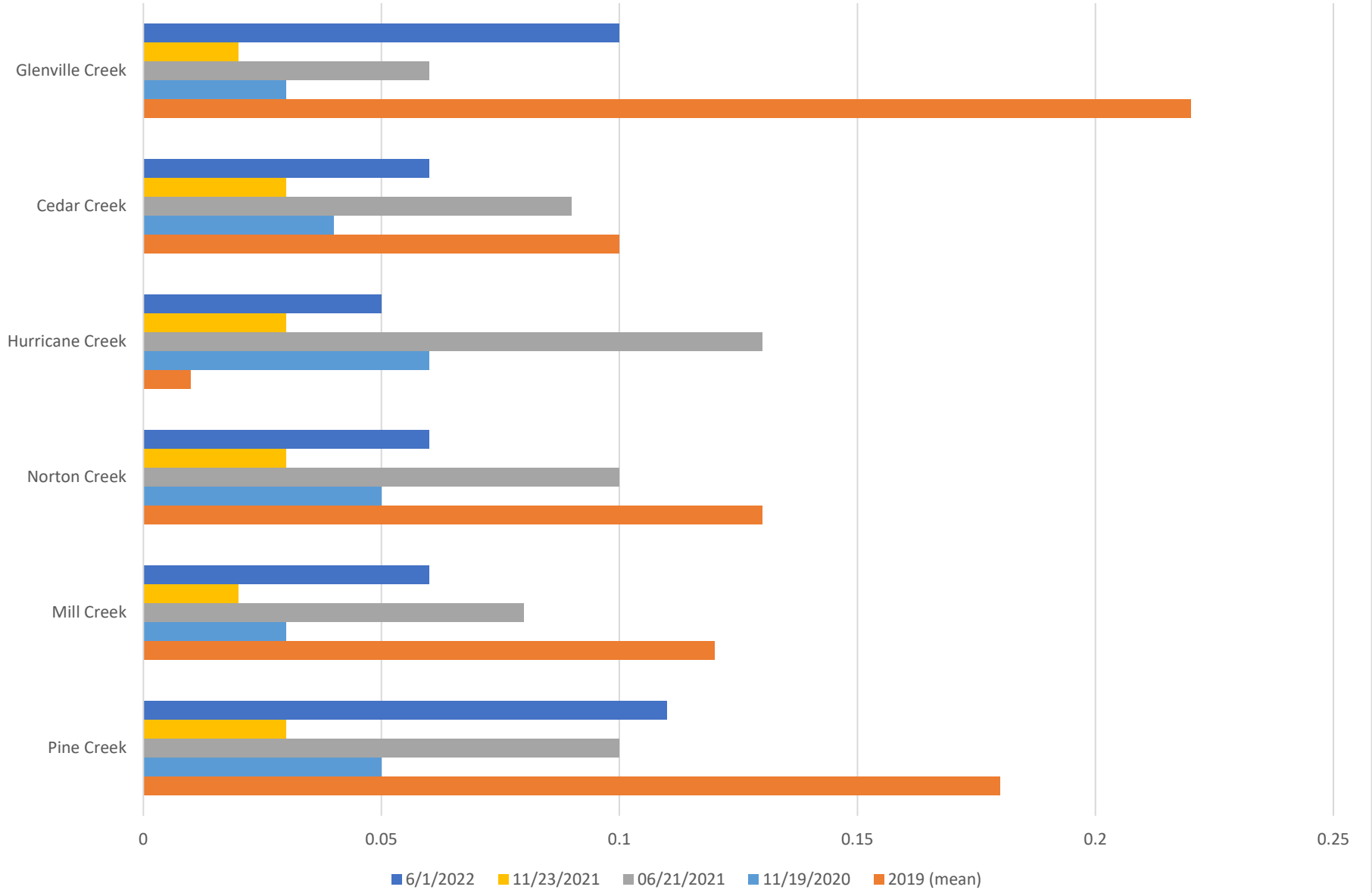
Regional VWIN mean 6.2 NTU - (used to compare results against typical regional values)



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Ammonia (mg/L)

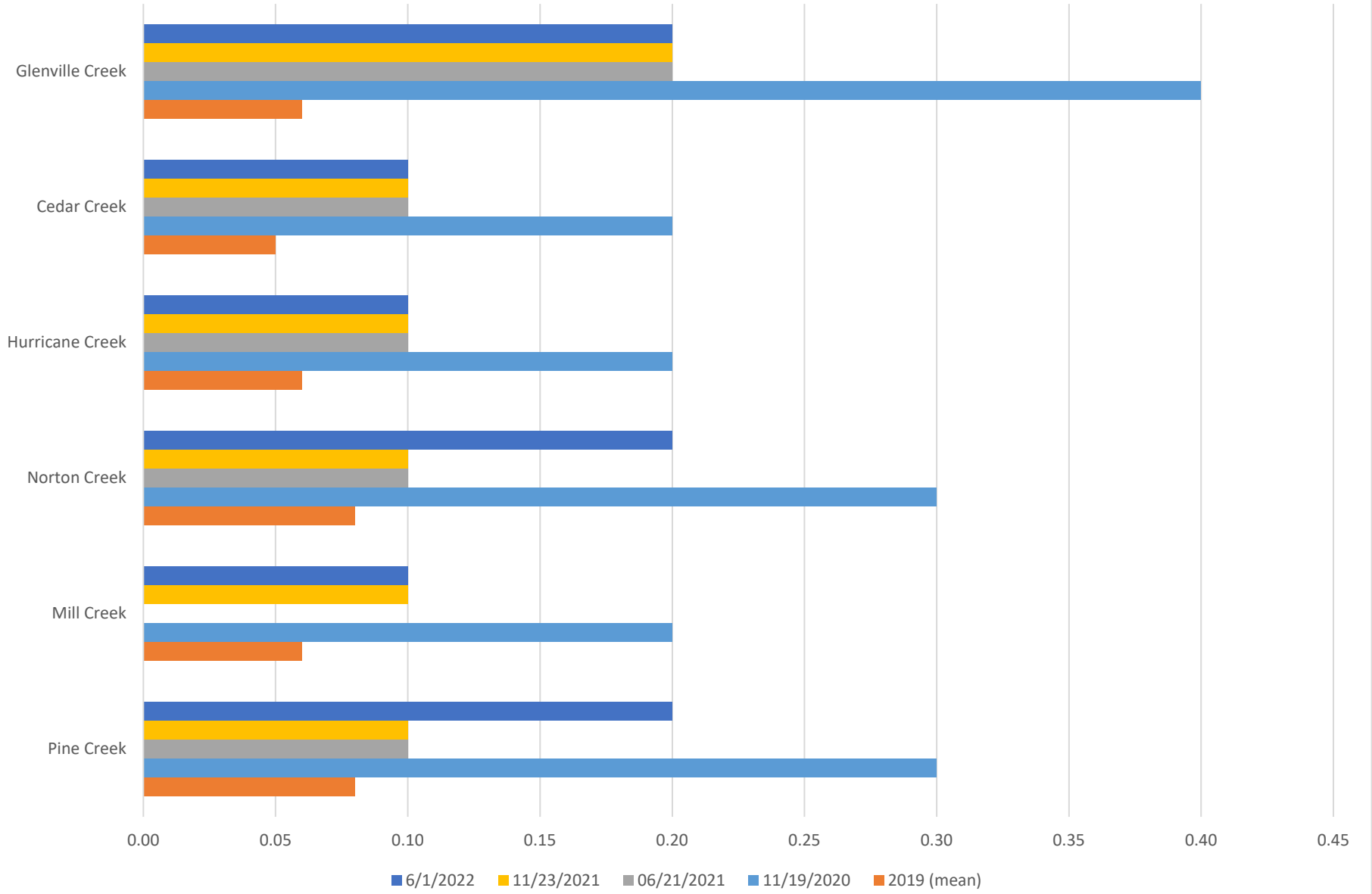
Regional VWIN mean 0.09 mg/L - (used to compare results against typical regional values)



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Nitrite/Nitrate-Nitrogen (mg/L)

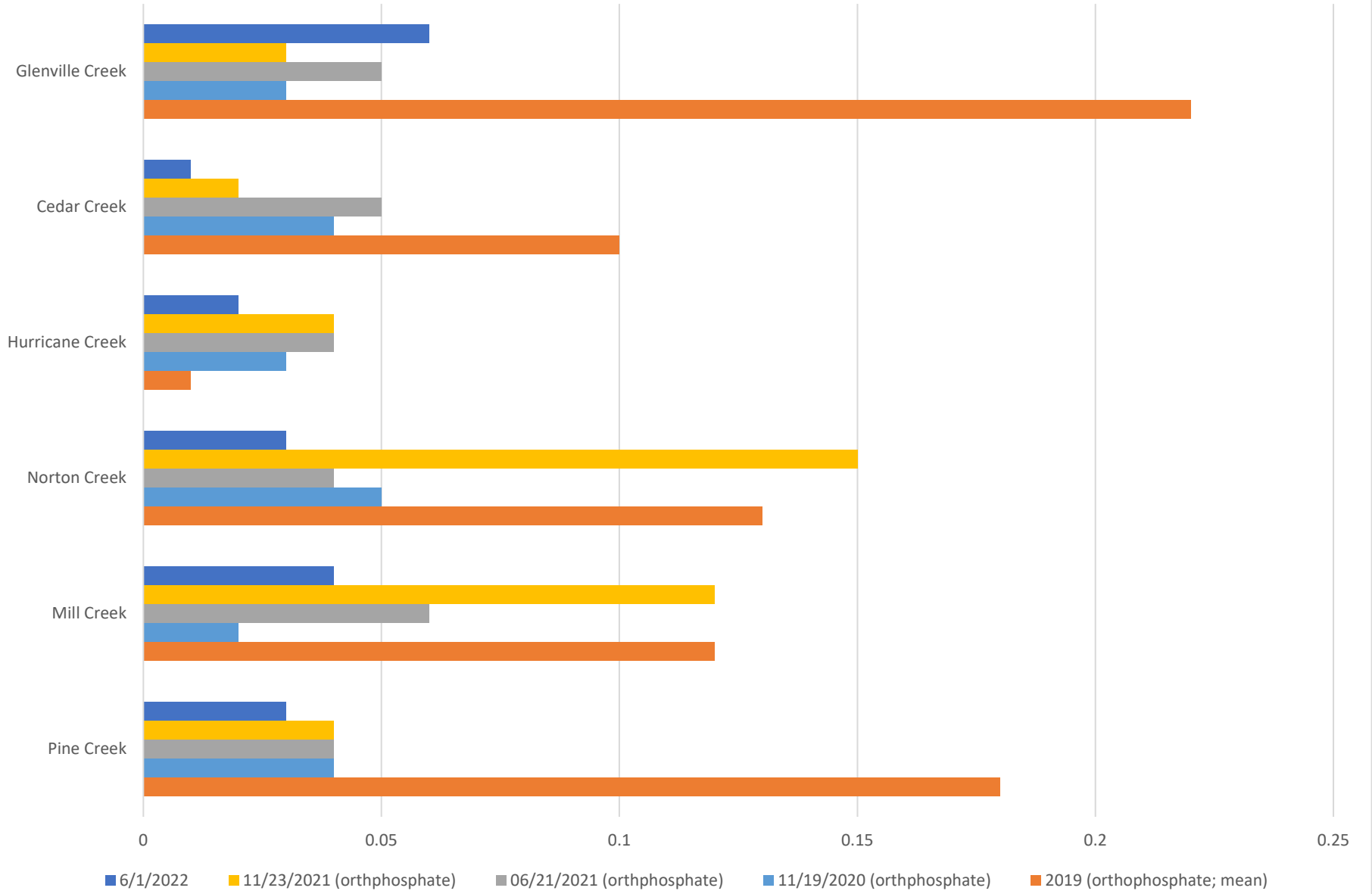
Regional VWIN mean 0.5 mg/L - (used to compare results against typical regional values)



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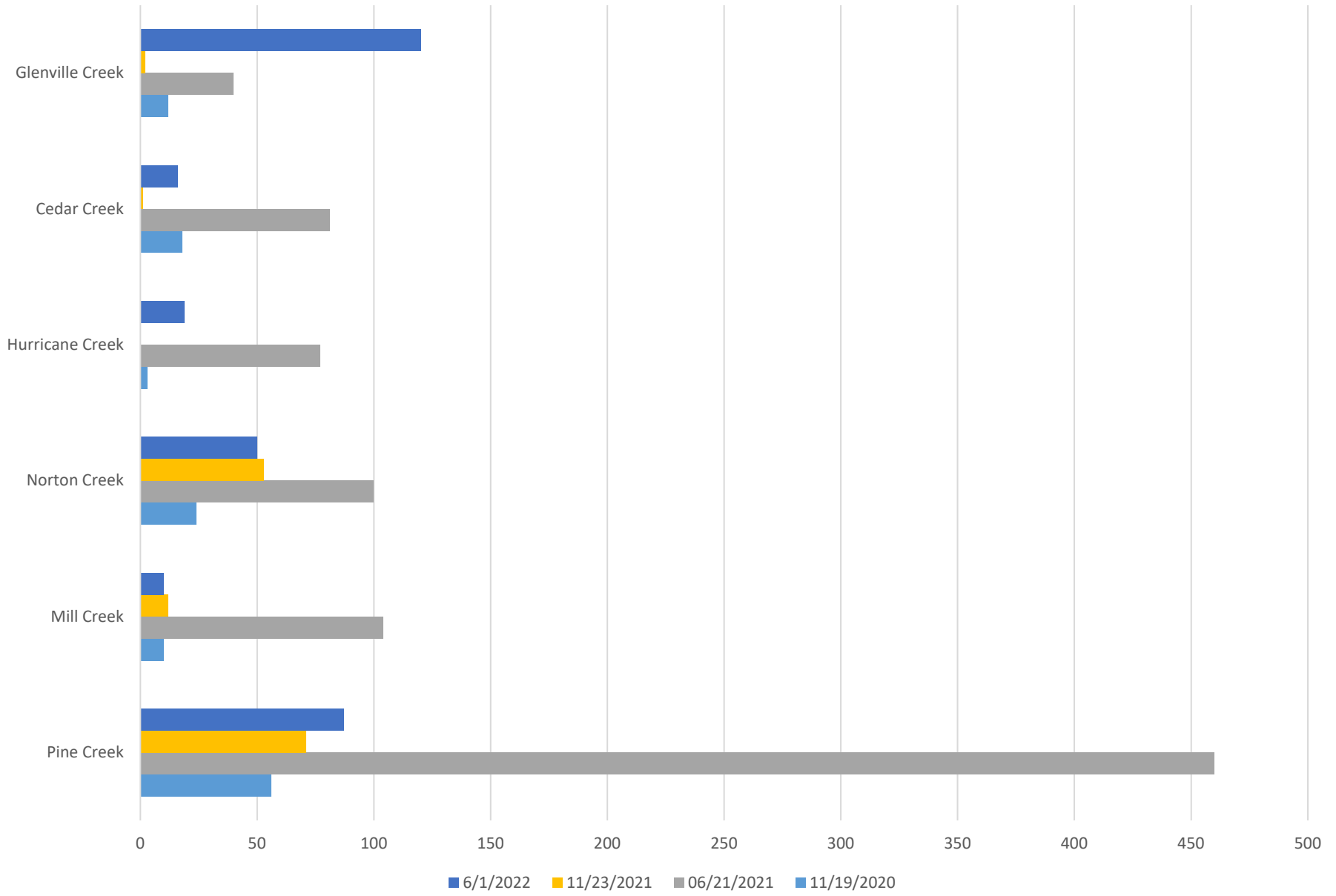
Phosphorus (mg/L)

Regional VWIN mean 0.09mg/L - (used to compare results against typical regional values)



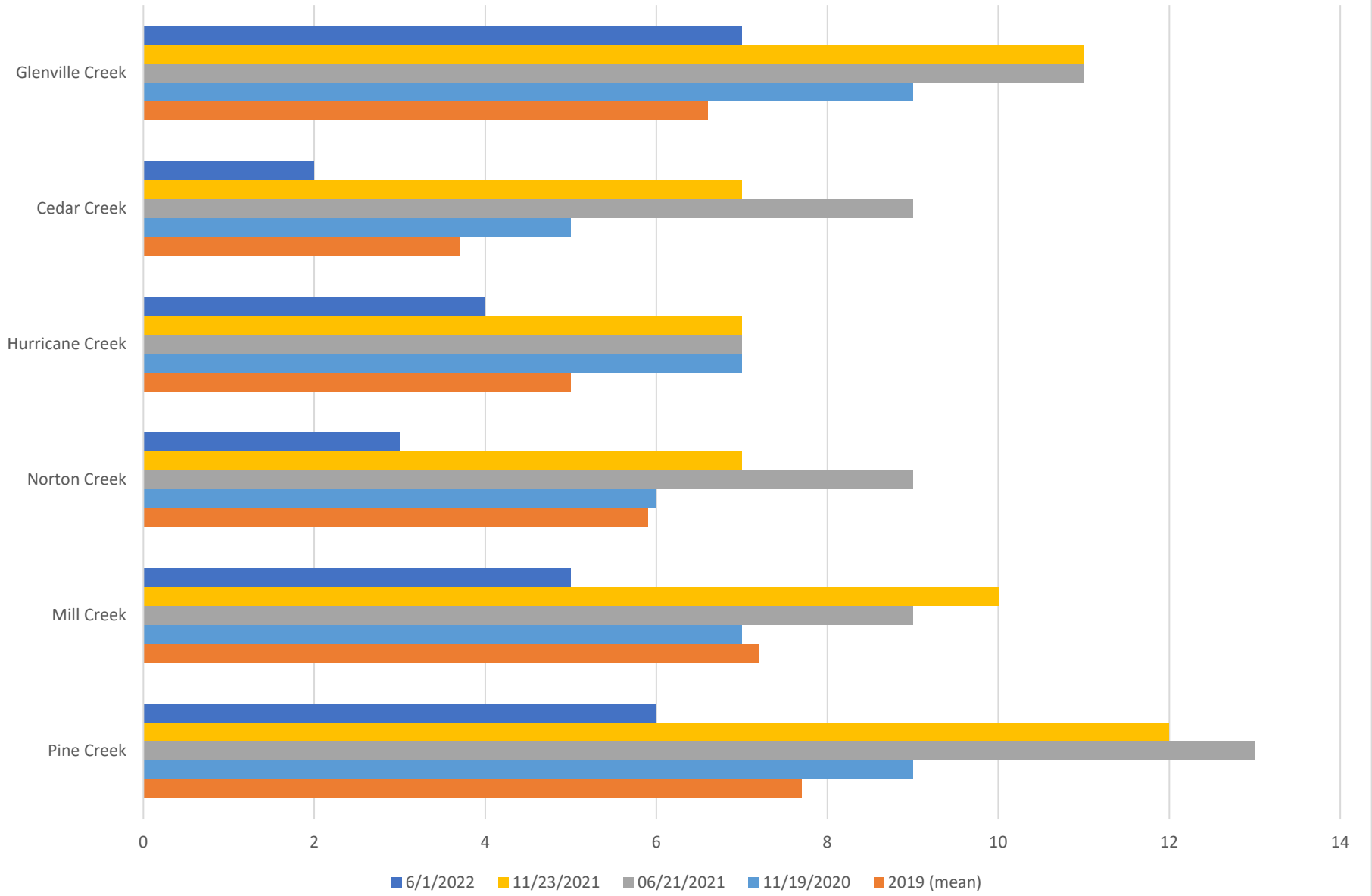
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Fecal Coliform (CFU/100 mL)



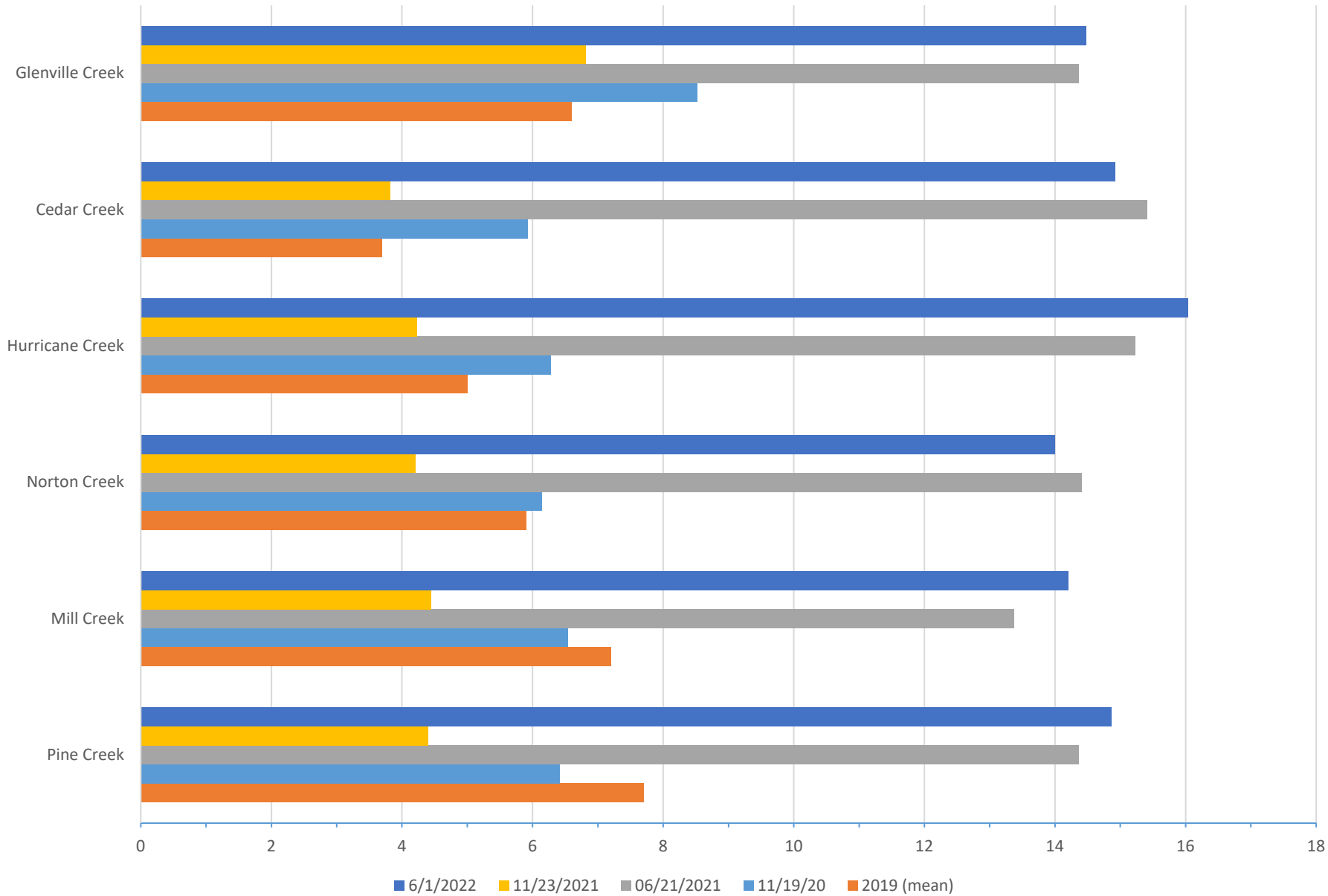
Alkalinity (mg/L as CaCO₃)

Regional VWIN mean 22.3 mg/L - (used to compare results against typical regional values)



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Temperature (°C)



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