This study investigated the impacts of El Nino-Southern Oscillation (ENSO), Pacific-North America (PNA) pattern, West Pacific (WP) pattern and Pacific decadal oscillation (PDO) teleconnections on the interannual to interdecadal variability of southwestern (SW) Canadian streamflow anomalies. It is shown that El Nino (La Nina) episodes lead to significant negative (positive) streamflow anomalies during spring and/or summer following the ENSO onset year, the high phase of PNA could produce an El Nino-like streamflow response over the region, and the ENSO-streamflow relationship appears to be modulated by the interdecadal PDO. The interaction between PDO and ENSO was found to be constructive when the two are in phase and destructive otherwise. The potential of using ENSO, PNA and PDO for long-range streamflow forecasting in SW Canada was assessed. While partial correlations with all three indices were found to be statistically significant for several basins, the ENSO and PDO effects appear to be far more important than the PNA pattern. The winter season SOI, which is an indicator of the mature phase of ENSO, shows modest correlations with basins whose flow regimes are dominated by winter rain/spring snowmelt. Conversely, the winter season PDO shows relatively strong correlations with basins originating in the Rocky Mountains, whose flow regimes are dominated by spring-summer snow/glacier melt. The modest SOI-streamflow relationships are partly attributed to nonlinearity induced by the interference from the extratropical sources of variability (i.e. PNA and PDO). Long-range streamflow forecasting strategies for this region should thus incorporate information from the three large-scale climate anomalies.