The Chhota Shigri glacier is one of the important glaciers situated in the Lahaul-Spiti district of Himachal Pradesh, India. Discharge patterns of the Chhota Shigri glacier shows increasing trend from June onwards, attains its maximum value in July and August and after that starts declining. Storage characteristics of the meltwater inside the glacier are stronger during the early part of melt period, and reduces with progress of melt season. The time lag between generation of meltwater over the surface of Chhota Shigri glacier and its emergence as runoff is higher during the beginning of melt period as compared to the peak melt period. Strong relationship was observed between glacier specific discharge and air temperature of the study area, showing that air temperature regulates the magnitude and variation of meltwater runoff from the Chhota Shigri glacier. Maximum suspended sediment concentration and load in the study area was observed during the month of July and August, whereas minimum suspended sediment concentration and load was observed during the month of October. There is a strong relationship between suspended sediment concentration and load with meltwater runoff of the Chhota Shigri glacier.