Glacial retreat in the tropical Andes has been accelerating in recent decades. The Nevado Coropuna ice cap has lost 24% of its mass over the past three decades and the effect of this retreat on water resources in adjacent watersheds is unknown. In order to evaluate the impact of rapid glacial retreat locally, hydrochemistry and water stable isotopes are used to quantify the contribution of each to four drainages surrounding the glacier. Spring and surface waters were sampled during March and October 2019 in order to obtain representative samples of the wet and dry season changes. Hydroisotopic signatures of springs and surface waters collected in the north versus south facing slopes are different due to the altitude effect and the rain-shadowing effect on precipitation. Radiocarbon dates on several springs show a pattern of increasing age with elevation with older waters found near the foot of the glacier and younger waters at lower elevations down drainage. These data demonstrate the potential of tracing glacial meltwater with radiocarbon in groundwater. We find that drainages surrounding the glacier have a high proportion of glacial meltwater contribution. With the loss of this meltwater water resources will be reduced 33 to 99% in this region.