

SUMMER STREAMFLOW AND SEDIMENT YIELD
FROM DISCONTINUOUS-PERMAFROST HEADWATERS CATCHMENTS

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The presence of permafrost in a catchment system affects the hydrology and water quality of streamflow. Summer streamflow and concentration of suspended sediment in streamflow from first-order catchments in the discontinuous-permafrost taiga of central Alaska (latitude 65°10'N) have been analyzed. In terms of resultant streamflow, permafrost-underlain terrain is much more responsive to precipitation inputs than is permafrost-free terrain, and proportion of permafrost, with concomitant cold, thick organic layers overlying mineral soil, is a primary determinant of differing streamflow characteristics in headwaters catchments. A permafrost-free first-order stream consistently has higher (summer) baseflow than does an adjacent permafrost-dominated first-order stream. A small permafrost-dominated catchment has consistently lower suspended sediment concentrations than does a similar-size virtually permafrost-free catchment. During storm-free periods, suspended and dissolved loads are consistently less than $5 \text{ mg}\cdot\text{l}^{-1}$ in both basins. Concentrations are commonly an order of magnitude higher during storm events. Sediment and streamflow relationships are highly variable in this stream system.