Late Holocene glacier fluctuations and changes in bed elevation are recorded in the alluvial fill of the west fork Nostetuko River valley, southern Coast Mountains, British Columbia. Valley-wide aggradation coincides with periods of local and regional glacier advance on centennial timescales. Peat layers containing in situ tree roots and stumps formed during periods of floodplain stability that coincide with intervals when glaciers were less extensive than today. Radiocarbon ages on roots, tree stems, and woody plant detritus in the peat layers record five major phases of Holocene glacier advance, the most recent at the culmination of the Little Ice Age. A high-resolution record of Little Ice Age glacier fluctuations was derived by cross-dating ring-width series of fossil trees in the peat layers with a previously established master ring-width chronology and by constraining floating ring-width chronologies with radiocarbon ages.