GEOMORPHOLOGY OF PLUMMERS ISLAND

Plummers Island consists of a series of terrace straths and intervening slopes that record the abandonment of the Bear Island terrace and stepwise incision of the Potomac River to its present channel. Dozens of cosmogenic ages along the gorge between Great Falls and Plummers Island (Bierman, 2015) indicate that the segment of the Bear Island strath between Carderock and Plummers Island was last occupied by the river approximately 75,000 - 100,000 ybp. The presence of a series of prominent rock buttresses (map unit Rb) with near-vertical downstream faces, along with the abrupt termination of the wide Carderock segment of the Bear Island strath at the island, are strongly suggestive of a former falls, or knickpoint, at this location - similar in form to the former knickpoint postulated by Bierman (2015) to have existed at Black Pond prior to the inception of the modern Great Falls. If this inference is correct, Plummers Island and the confined section of the gorge it occupies would represent an even older knickpoint.

Remnant terrace straths and channel meanders at Plummers Island (map units Qt1 - Qt3) indicate that subsequent incision of the river to its present level probably proceeded by uniform downcutting rather than steady upstream knickpoint retreat. In this process, higher terraces were progressively cannibalized, leaving a fragmentary record of intermediate river levels.

Based on the present distribution of vegetation communities, together with soil structure and colors observed in sparse exposures, terrace soils become progressively more weathered and base-depleted higher in the landscape, reflecting progressively longer weathering. However, soil pH and nutrient availability are also strongly affected by flood frequency at any given place in the landscape; major floods deposit significant amounts of nutrient-rich, calcareous alluvium in protected places throughout the landscape, producing lateral variations in soil quality and resulting vegetation on any given strath or landform.

References