

Tidal facies and stratigraphy of a muddy macrotidal estuary in the southern bight of the Minas Basin, and potential for synthetic aperture radar (SAR) monitoring of active intertidal areas

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Three major macrotidal estuaries empty into the Minas Basin, the Cornwallis, Avon, and Cobequid Bay - Salmon River estuaries. The sedimentology of the Cornwallis estuary is the least studied of these. The Cornwallis estuary can be subdivided into three areas, the inner estuary, between Wolfville and Kentville (described elsewhere), and the outer estuary, separated into eastern and western parts by the Cornwallis River channel itself.

Six main facies zones may be recognized in the outer beach, nearshore mudflats, offshore mudflats, sandflats, and sand bars. High (*Spartina patens*) and low salt marsh (*S. alterniflora*) are readily distinguished by vegetation assemblages. Relatively narrow sand beaches are developed locally, especially at the base of actively eroding sandstone cliffs. Nearshore mudflats are planar and water saturated. Offshore mudflats are more silty, typically planar or rippled, and dissected by tidal channels. Sandflats are typically rippled and coarsen offshore. Sand bars, developed within and at the margins of major channels, are characterized by 2-D and 3-D megaripples, commonly with smaller, superimposed ripples. These facies are comparable to those described in the Cobequid Bay - Salmon River estuary, although the proportion of sandy facies is much higher there.

The western and eastern parts of the outer estuary are

distinguished by much thinner sediment cover and corresponding abundant bedrock outcrop in the latter. The western part has no outcrop south of Kingsport. The core of the Starr's Point bar is not exposed, but the abundance of glacial clasts in the outer mudflat area suggests it has a till core.

Over most of the eastern area, a thin veneer of tidal sediments rests on a wave-cut platform of Triassic sandstone. "The Guzzle", which separates Boot Island from Evangeline Beach, is a historically recent (ca. 1800) channel, but it follows the course of an older bedrock valley. The Quaternary stratigraphy preserved in The Guzzle comprises: red till, probably derived from the north; laminated red and grey mud, interpreted as delta bottomset deposits; a peat layer with tree stumps dated at about 4000 B.P.; grey marine, tidal creek, and saltmarsh muds; drowned gravel beach ridges; and recent tidal muds and sands.

The major facies zones and bedrock features show up well on Synthetic Aperture Radar (SAR) images. Comparison of old maps and air photos shows that the outer facies zones are relatively mobile, in contrast with the salt marshes, where channels may persist for centuries. It is not clear whether these intertidal facies shifts are due to storms or gradual processes. SAR will be a useful tool for studying such changes.