

Acadians flourished behind their aboiteaux

By David J. Penny

Long before the Europeans came to Canada, the Malacite and Mi'kmaq people were growing food on the narrow band of fertile land that separates the forest from the North Atlantic Ocean. They called this narrow band quoddy (fertile land) and algatig (place of encampment). Was this the Vinland that the Viking explorer, Leif Eriksson spoke of around 1100 AD? Vin is the Nordic name for plain or pasture, not wine. The Maglemosian Culture had introduced farming on similar lands in Scandinavia as early as 7,500 BC, after the last Ice Age retreated due to global warming.

Combining the two native words, explorer Giovanni da Verrazzano called the area Arcadia (pastoral paradise) when he returned to France in 1534. As the French began to settle this land they became the Acadians. From the late sixteenth century, Acadian settlements were established along the Bay of Fundy where the twelve metre high tides pushed several kilometres up the great fresh water rivers, creating vast areas of fertile marshland.

In order to convert the marshland to cropland the Acadians built dykes or levees

(from the French verb *lever*, to elevate) to hold back the salt water tides. At the bottom of each levee they constructed an aboiteau. Initially these consisted of a large hollowed out log to form

than the British/American alternative, which involved clearing the forests from the land. By the mid eighteenth century several thousand acres of salt marsh had been upgraded to arable land, making it

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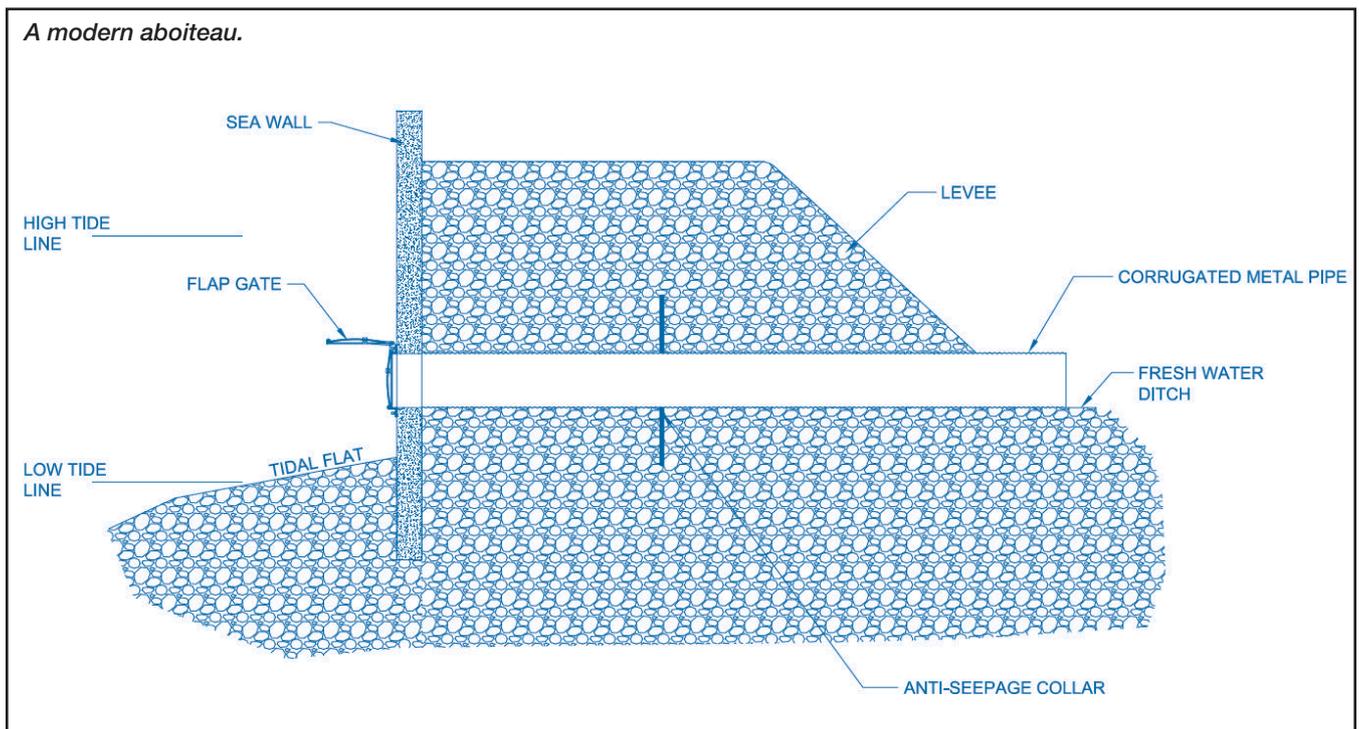
a trough and slab wood fastened with wooden pegs to form a roof. A hanging wooden flap gate on the ocean end slammed shut as the tides rose, excluding the salt water and swung open at low tide to drain the excess fresh water that was trapped in ditches behind the levee.

After a few years the fresh water diluted the salt from the land, making agriculture possible. By the seventeenth century sawmills had been established and aboiteaux were built with squared timber. Corrugated metal pipe was introduced in the late nineteenth century which, when combined with anti seepage collars and cast iron flap gates, has become the aboiteau of today.

The aboiteau agriculture of the Acadians was much less labour-intensive

attractive to the invading British and settlers from America who remained loyal to Britain. Refusing to proclaim loyalty to Britain, the Acadians were expelled from their land in 1755. Many resettled in Louisiana where the Acadians became known as Cajuns. Over the next 250 years the Cajuns helped to develop the Mississippi Delta and New Orleans with their aboiteau agriculture.

Initially levees, ditches and aboiteaux were built by hand so they remained relatively small in scale. As excavating equipment, steel sheet piling, pumps and larger mechanized water control gates were developed, the earthworks became higher, protecting significantly larger areas. In many cases they completely excluded salt water from the fresh water





An engineer from a Member Company of the Corrugated Steel Pipe Institute inspects the new PLCSP culvert installation.

ivers, creating fresh water lakes behind the aboiteaux.

The ecosystems that have developed behind the aboiteaux are unique. At the Sackville, New Brunswick, Waterfowl Park more than 180 species of birds and 200 species of plants have been recorded. Behind the aboiteaux one can also find a network of farms, towns, drainage ditches, lakes, roadways and a challenging construction environment. Soils are typically soft, deep marine clays with limited bearing capacity and corrosive tendencies.

The areas are vulnerable to fresh water flooding due to storms and spring breakup of frozen lakes and rivers, as the gates must remain closed during high tide. Salt mist from the ocean is ever present and as the land is often below sea level, there is always the risk of a salt water intrusion and flooding. Recently Hurricane Katrina brought many of these realities home to the people of New Orleans and raised additional concerns about global warming, increasing sea levels, and increased frequency and magnitude of storms.

The challenges have been and are being addressed through engineering innovation. An example is a new 1400 mm diameter polymer laminated corrugated steel culvert pipe, installed under the west bound lane of the Trans Canada Highway (TCH) near Sackville. As one

crosses into New Brunswick from Nova Scotia one passes over the culvert and the Tantramar Marsh. Looking to the right one can see several thousand hectares of reclaimed agricultural land, Radio Canada's communication anten-

nae, a large water control gate and fresh water ponds. To the left are the elevated east bound TCH and a rail line that acts as a levee against the rising tide. At high tide the area beyond the levee is a flooded salt water marsh but at low tide a muddy red brown river channel and tidal flat are exposed.

Excellent drainage is key to the success of aboiteau agriculture and corrugated steel pipe (CSP) has been used for culverts in Acadia for many years. Traditionally CSP was asphalt coated to improve its durability in this aggressive fresh water/marine environment but an improved material in the form of polymer laminated CSP (PLCSP) is now available and widely specified in Canada.

Not surprisingly PLCSP is well accepted and has been used for over 35 years by the State of Louisiana for installations behind the aboiteaux. The Acadians have come home.

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