

Climate Change and Two Rivers Farm, Flat / Belle River, PEI

Richard Davies and his wife Judy operated a sheep farm in the Flat River area known as “Flat River Farms” in 2011 which started when they purchased a farm in 1979. This farm is now known as Two Rivers Farm Inc. and is operated by Bradley (son of Richard and Judy) and his wife, Lisa MacDonald.

Richard was the Director of Environmental Health with the PEI Government in the 1980s and 1990s, chair of the advisory committee to the provincial minister of the environment for several years, indicating his concern about environmental issues. He was particularly concerned about the impact of climate change on the coastline along the 2 kilometres of shoreline of the farm and asked the author to come out to the farm to see these impacts firsthand.



Figure 1: Judy Davies, Hon Robert Mitchell, Richard Davies, Amber Nicholson

An unusual feature of the farm is several freshwater marshes on the property which are subject to saltwater intrusion into them during storm surges. Evidence of this was confirmed during field inspection in June 2011. (see figure 2). One of the marshes used to have an outlet to the Northumberland Strait which became blocked after migrating sand plugged off the outlet.



Figure 2 - Storm surge infiltration into fresh water marsh

Shoreline Erosion: The shoreline is composed of sand dunes and recent sand deposits, sandstone cliff and glacial till cliff. There is evidence of recent erosion from storm surges in all shoreline types. The most southerly area of the property is actually an area of accretion with evidence of recent sand build up in the area, including creating a blockage to a freshwater marsh in the area. Along the exposed till and sandstone cliffs at Nicholson Point there was slumping and undercutting from wave action causing trees to lean towards the beach with some trees actually now on the beach or side of a cliff. This was likely caused by storm surges in 2010 on January 2nd and December 21st. Mr. Davies was interested in any action that could be taken to reduce erosion along the shoreline.



Figure 3 - Trees over bank at Nicholson Pt., Flat River

One of the freshwater marshes on the north end of the shoreline area is in jeopardy of becoming saline. Storm surges in 2010 and 2011 have washed over the dunes protecting this marsh and eventually this could result in an open channel to the Strait.

Adaptation: Comparison of historical aerial photos / vector shorelines provide some clues about erosion and accretion rates in the area as can be observed on the following figure comparing erosion rates in the area from 1968 to 2010.

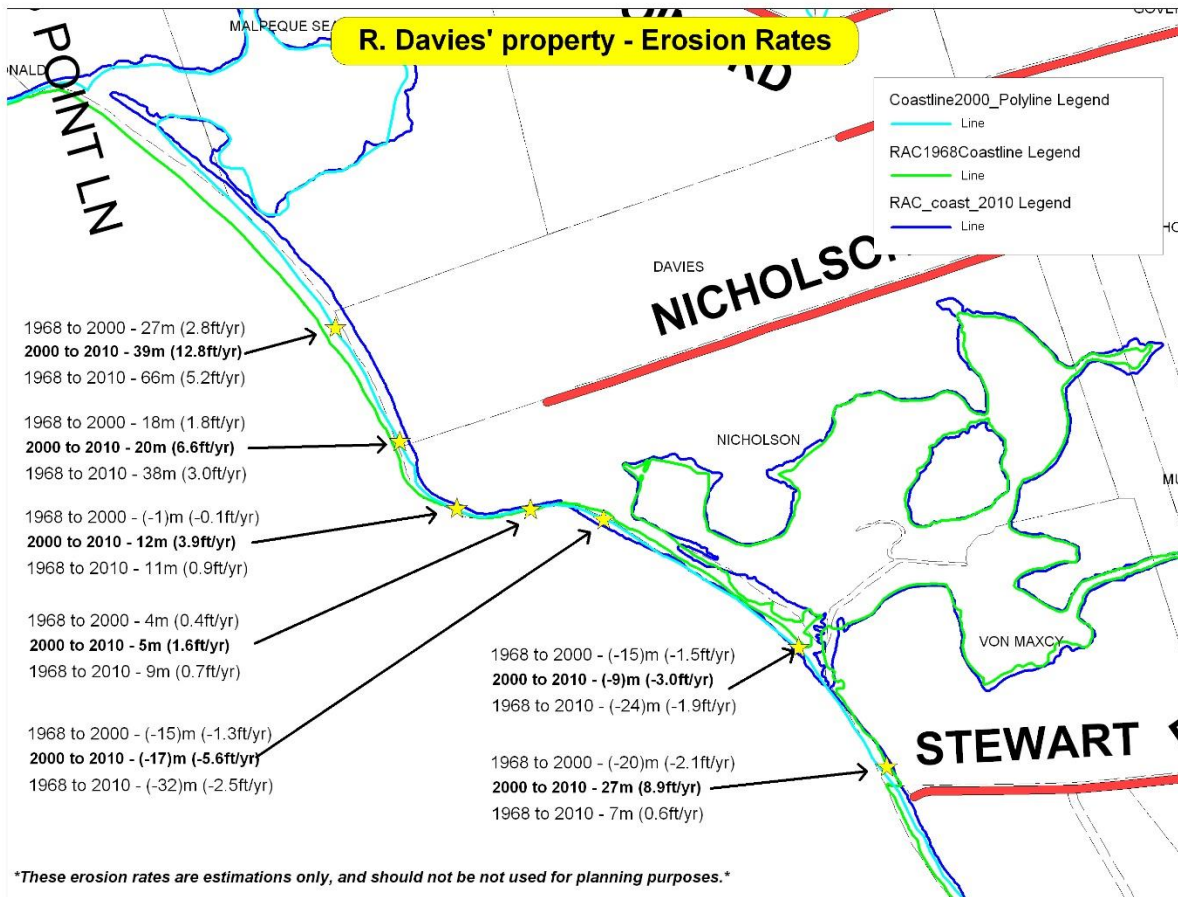


Figure 4: Map Showing Shoreline Change at Two Rivers Farm

Mr. Davies was trying to preserve the natural conditions on his property of over 1000 acres and having this information on historical erosion rates provides useful data to help understand the erosion processes and impacts in this area.

Coyote Emigration to PEI:

Mr. Davies indicated that Flat River was the first area where coyotes were sighted on PEI in 1977. The coyotes apparently first came ashore in Flat River after travelling across the ice on Northumberland Strait from Nova Scotia. This has not been good for sheep in the area as the coyotes have regularly tried with some success to use his sheep as a food supply. Coyote tracks were observed on the sand on the beach when walking along the shore in 2011. Richard advised that an autopsy completed on a female coyote caught by a trapper and the examination indicated that she had had 12 pups during her most recent gestation.

Climate / Weather Station:

Richard agreed to allow UPEI to install a climate monitoring station on the farm near the house and sheep barns in the fall of 2013. This was one of the first stations installed by UPEI across the province in an effort to obtain climate data from various geographic areas across the province to help identify if there are localized microclimates in different geographic regions of the province. The Flat River area in southern Queens County is widely thought to be slightly warmer than other areas of the province, and Mr. Davies would frequently state that his farm was located in the “banana belt” of the province.

Shoreline Erosion Monitoring:

The UPEI Climate Lab expanded the historical shoreline monitoring network established in 1984 by the PEI Dept of Environment with the addition of new monitoring sites including some locations on the Davies Farm in Belle River / Flat River in 2015. The largest amount of erosion in the 2016-2017 field season was measured at Belle River with 2.25 to 4.6 m lost from cliffs on the Davies Farm due to coastal storms.

Transition

Bradley and Lisa took over the farm operation in 2018 after the sudden death of Richard on December 16th. They continued the interest in the natural environment which was practised since the farm was purchased by the Davies family and the farm is now listed as a certified organic farm. They have added more livestock to the operation including Dexter cattle, heritage pigs, chickens, sheep, and horse and practise selective harvesting of timber, firewood and other products from the forest to enhance the biodiversity of the operation.

Volunteer Weather Observer

The interest in observation of weather and environmental data has been passed from father to son as Bradley agreed to become a volunteer, with the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) in March of 2021. This involves daily measurement of the various forms of precipitation at the farm in Flat River on a daily basis providing valuable local precipitation data.



Figure 5: UPEI Climate Station and CoCoRaHS Station at Two Rivers Farm, Flat River

Sources: Richard Davies from an interview by DE Jardine, June 27, 2011; Bradley Davies and Lisa MacDonald, December, 2022; Note on Coastal Changes on PEI, Canada, K. McCaffrey & J. Granzoti, 2017; [Atlantic Open Farm Day](#), 2022; DE Jardine, December, 2022; Obituary, Dec. 22, 2018, <https://www.saltwire.com/obituaries/richard-james-davies-12415/>