

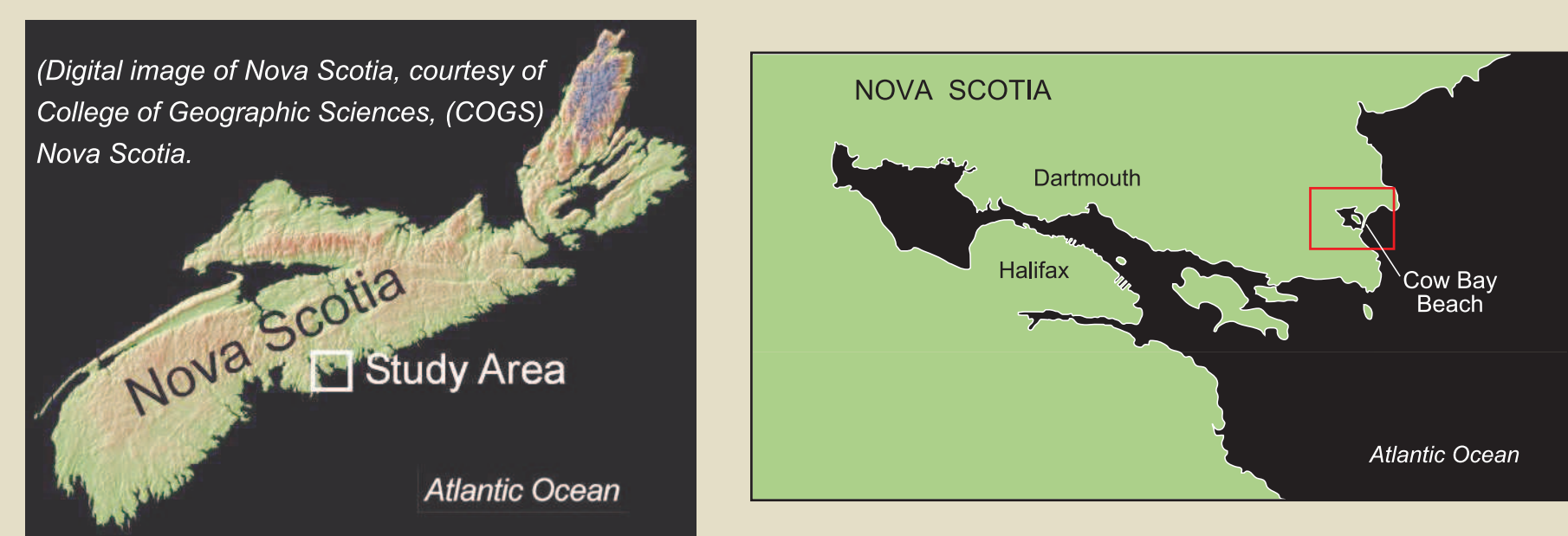
# HISTORICAL CHANGES IN COW BAY BEACH, HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA

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Views of Cow Bay Beach from its east end circa 1910 and 2002 showing dramatic changes in its size and forest cover. For visual reference, arrows mark the same locations in both photos.

## LOCATION MAP



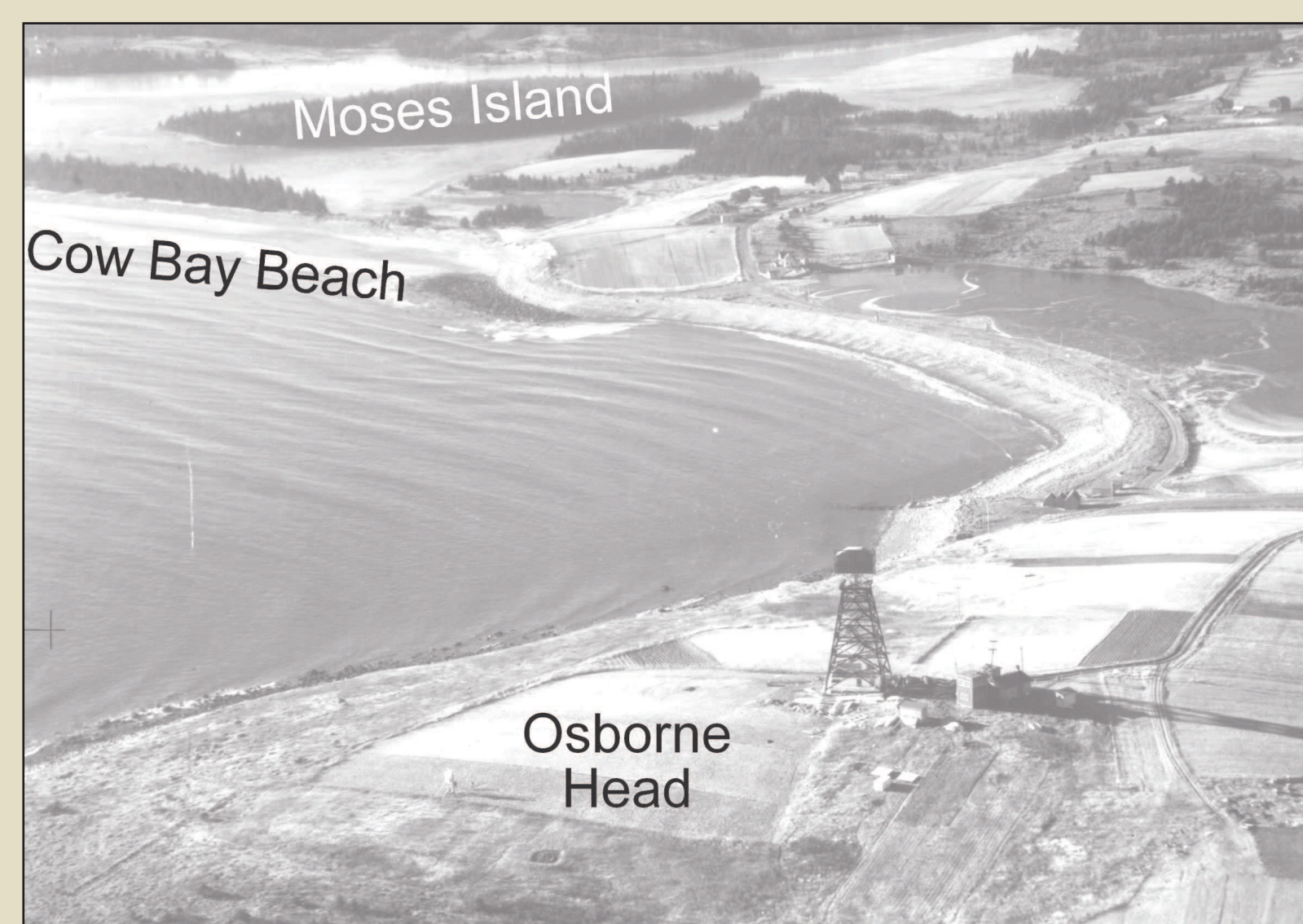
## ABSTRACT

From the early 1900s to the 1950s, Cow Bay Beach, also known as Silver Sands Beach, was one of the largest and most popular recreational beaches near Halifax. As many as 5000 people would use the beach on a hot summer Sunday. Recreational facilities included canteens, picnic sites, a merry-go-round and a dance hall. Only minor physical changes in the beach were observed during that period. By 1956, a commercial operation began extracting sediment from the beach for construction of the new airstrip at the nearby Shearwater airbase and for other structures in the Halifax area. Trees were cut down. Power shovels and drag cranes worked along the shore, from west to east, to remove a total of nearly 2 million tons of sediment during the mid-1990s and 1960s. The resulting collapse of the western beach and expansion of the inlet allowed for the transfer of large volumes of near-shore sediment into Cow Bay Lake. This lasted until at least 1974, when the inlet was nearly closed off again. Sediment excavation was stopped by the courts in 1974.

Since the 1950s the 200 metre (m) wide beach with its multiple beach ridges covered by trees has switched to a very low, single beach ridge less than 28 m wide. The seaward edge of the beach has migrated landward from 96 m to just over 200 m in fifty years. In the process, the foundation of a dancehall, once at the back of the beach, is now seaward of it. After the excavations, the fragile beach began slowly rebuilding until the late 1980s. However, it was unable to withstand the impacts of storms during the mid-1990s and so it began migrating rapidly landward. By 2003, waves from Hurricane Juan had cut two channels through the beach, subdividing it into three parts. Since 2005, the landward migration of the central section of beach has accelerated and will continue to do so unless the beach is flattened and submerged below high tide level by storms. If not, it will migrate and build against Moses Island, in Cow Bay Lake.

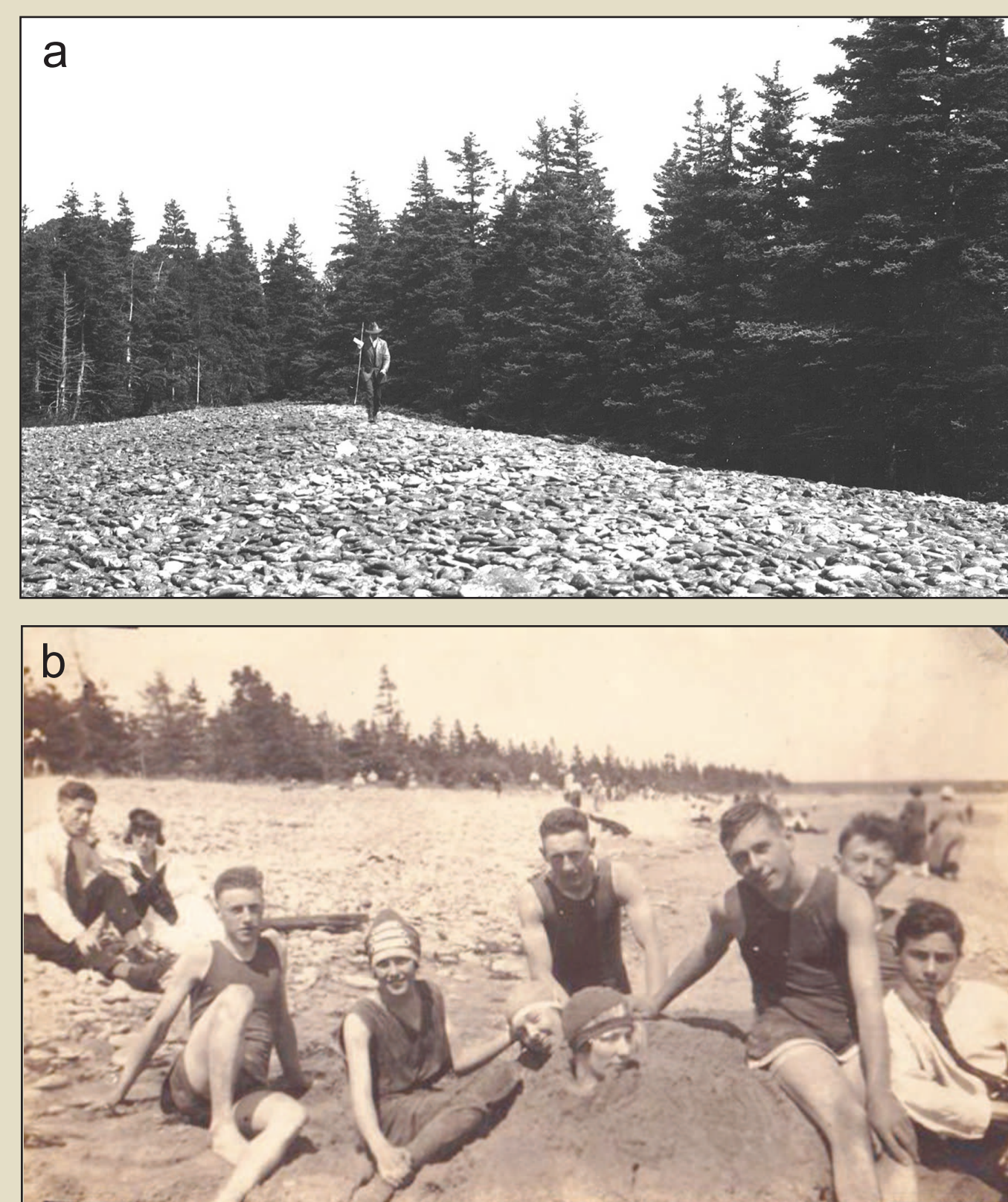
Cow Bay Beach is a striking example of the long-term impacts caused by sand and gravel removal from Nova Scotian beaches, during the post-World War II construction boom. Beaches are the product of sediment accumulation over 100s and possibly 1000s of years. Sediment supply is therefore limited. Cow Bay Beach is also a reminder of the constant clash between individual property owners rights, and the struggle to protect provincial shorelines for long term public benefits.

## AERIAL VIEW, OSBORNE HEAD AND COW BAY BEACH 1941



Aerial view shows the extensive woods that still existed on Cow Bay Beach, including those seaward of the pond at the east end of the beach. (photo REA 251-450, courtesy of DND)

## PRE 1950S - STABLE BEACH RIDGE WITH TREES

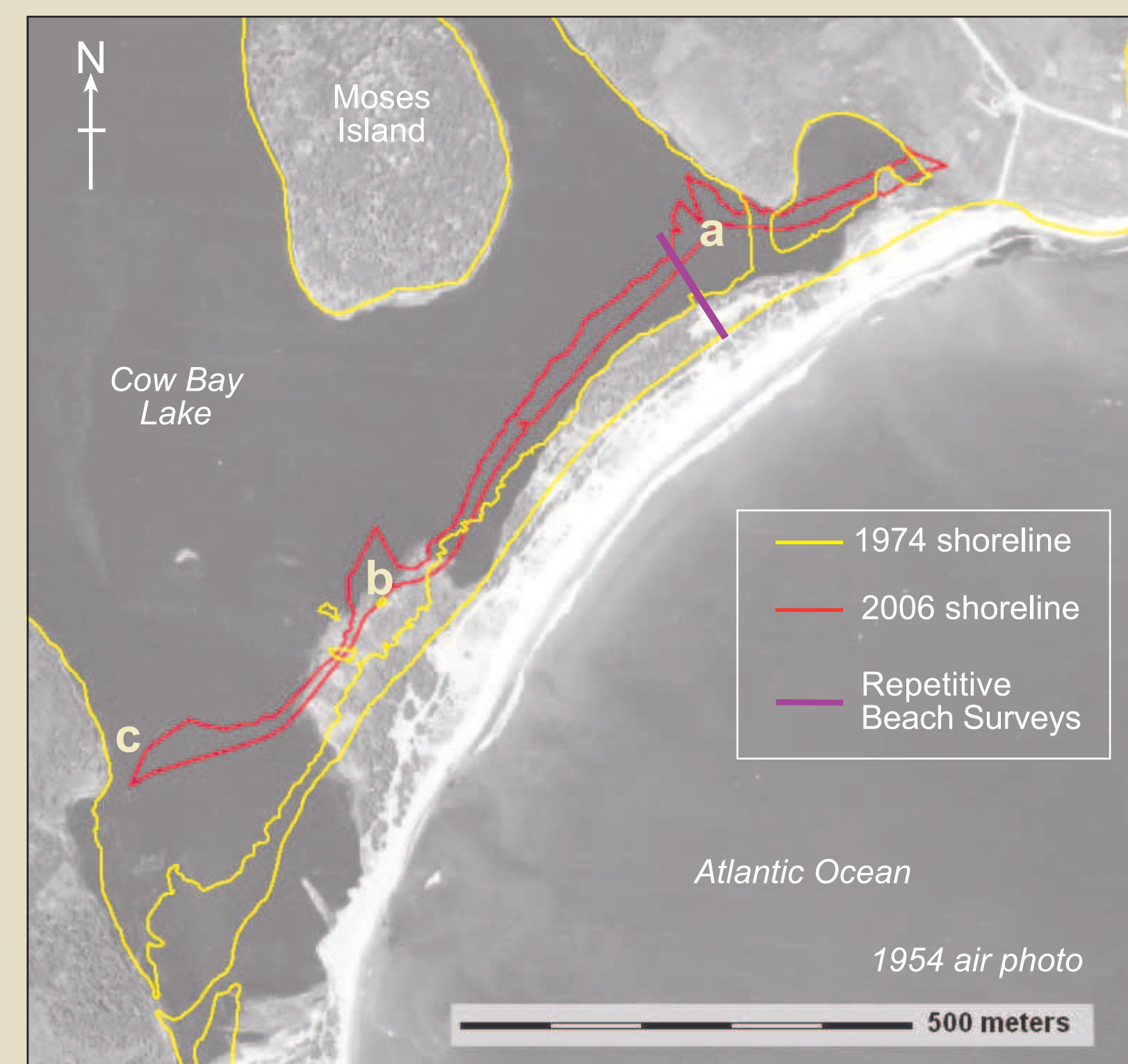


Views looking east: (a) in 1914 of the high cobble beach ridge along eastern Cow Bay Beach and (b) in the 1920s showing the same ridge from the ocean side. (photos courtesy of: (a) J.W. Goldthwait, from GSC Archives, Ottawa; (b, c) Marie (Porter) Curran and (d) G. Stockley & Mosher family, Cow Bay, N.S.)



Trees provided shelter from the winds and an ideal location for a merry-go-round in the 1920s, and for family and company picnics in the 1950s.

## BEACH CHANGES 1954 TO 2006



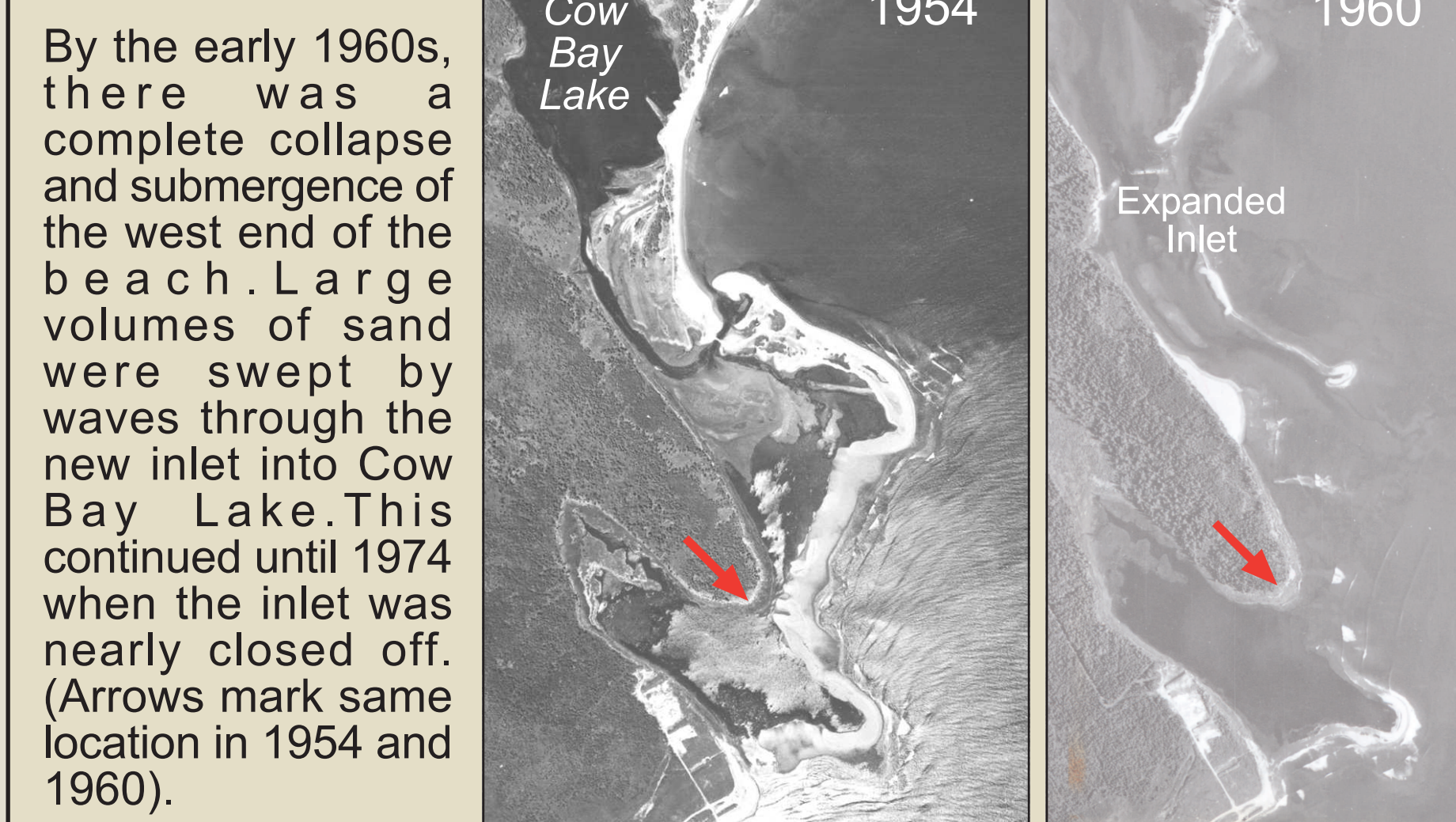
Vertical air photos of Cow Bay Beach were georeferenced and overlain to show the reduction in its size and landward migration between: 1954 (air photo), 1974 (yellow lines), three years after sediment excavation had stopped, and in 2006 (red lines). Between 1954 and 2006, the central beach (between a & b) was reduced from 200 m to less than 30 m wide and its seaward edge had migrated nearly 170 m landward. By 2003, the beach was cut into three segments by two wave washover channels (a,b) and an inlet (c) at the west end of the beach.

## COMMERCIAL SEDIMENT EXTRACTION



In April 1957 power shovels, drag cranes and large trucks removed more than a million tons of sand and gravel. Excavation began at the west end of the beach (shown here) and continued eastward.

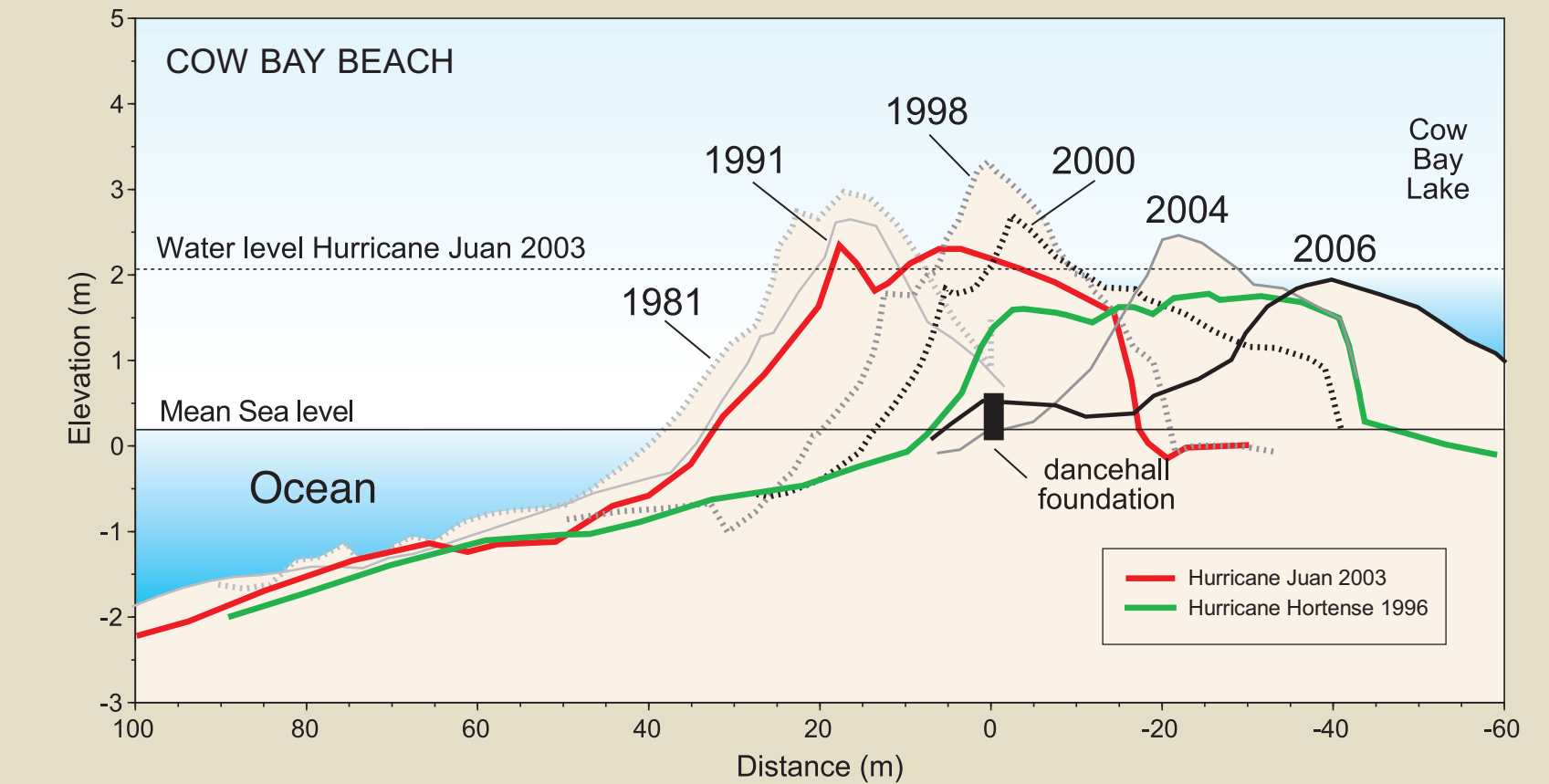
(Photo republished with permission from Halifax Herald Limited).



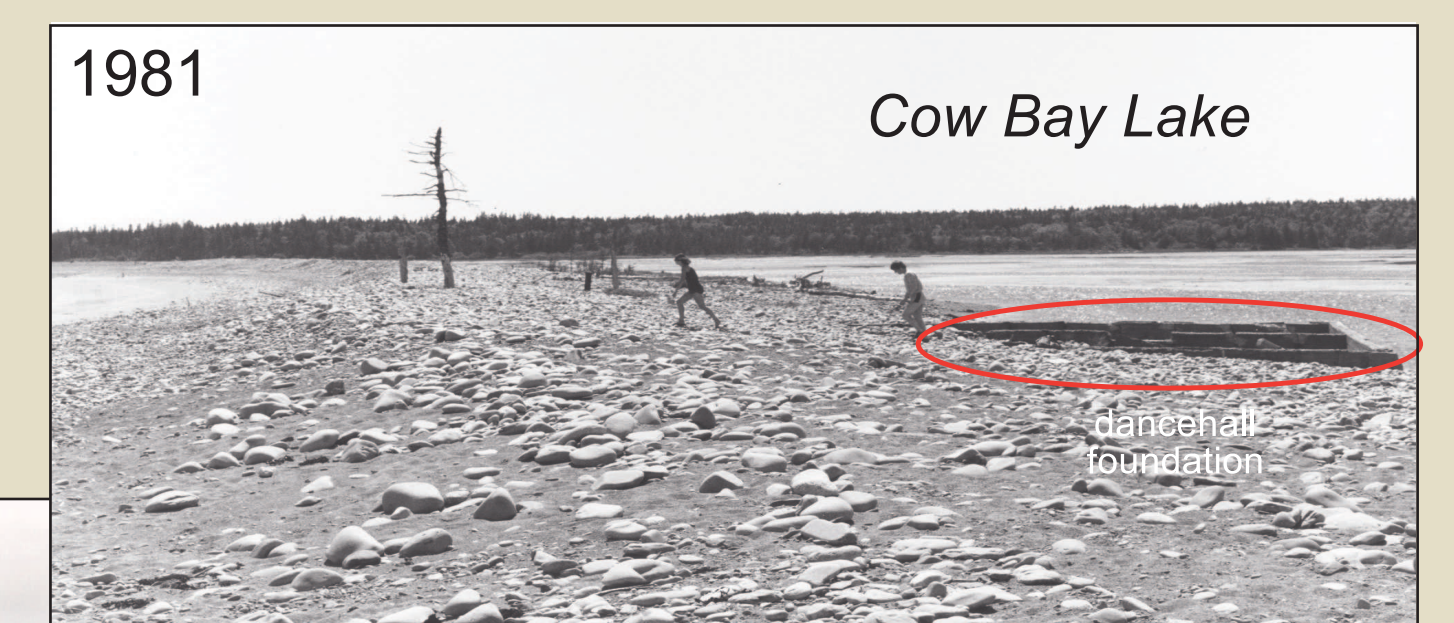
By the early 1960s, there was a complete collapse and submergence of the west end of the beach. Large volumes of sand were swept by waves through the new inlet into Cow Bay Lake. This continued until 1974 when the inlet was nearly closed off. (Arrows mark same location in 1954 and 1960).

## LANDWARD BEACH MIGRATION

Repetitive cross-shore surveys illustrate how the central part of Cow Bay Beach (between a & b, photo to left) migrated landward. It is repeatedly built up, pushed over and flattened, particularly during large storms such as hurricanes Hortense and Juan, shown on graph. Between 1991 and 2006 the beach was completely rolled over (what used to be the back of the beach is now the front).



The foundation of the dancehall provides a reference for watching the beach migrate landward. In 1981, the foundation (circled in red below) existed at the back of the beach. During the 1990s it was buried in the beach and re-exposed seaward of the beach in 2004 as the beach migrated past it. At this location the beach has migrated 53 m landward from 1981 to 2006.



## BEACH BREAKDOWN



Waves cut through Cow Bay Beach at the red arrow in March 2005. In 2006, the central barrier (left of cut) was migrating landward at 7 metres/year in contrast to <1.5 metres/year at the ends of the beach.

## SELECTED READING:

Goldthwait, J.W. 1924. Physiography of Nova Scotia; Geological Survey of Canada Memoir 140, 179 p.  
 Johnson, D.W. 1967. The New England- Acadian Shoreline (Facsimile of the 1925 edition) Hafner Publishing Co. New York and London: 608p.  
 McIntosh, K. 1916. A study of Cow Bay Beaches; Nova Scotian Institute of Science, Proceedings and Transactions, V.14, Part 2 109-119.  
 Taylor, R.B., Shaw, J., Forbes, D.L. and Frobel D. 1996. Field Trip Guidebook Eastern Shore of Nova Scotia Coastal Response to Sea Level Rise and Human Interference; Geological Survey of Canada Open File Report 3244, 45p.  
 Taylor, R.B., Wittmann, S.L., Milne, M.J., Kober, S.M. 1985. Beach Morphology and Coastal Changes at Selected Sites, Mainland Nova Scotia, Geol. Surv. Can. Paper 85-12, 59 p.

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