# The Christmas Cove Dike of Coastal Maine

Photos and poster by J. G. McHone, Feb. 2012. Dike locations at Swans Island by David Bailey. Other map sources:

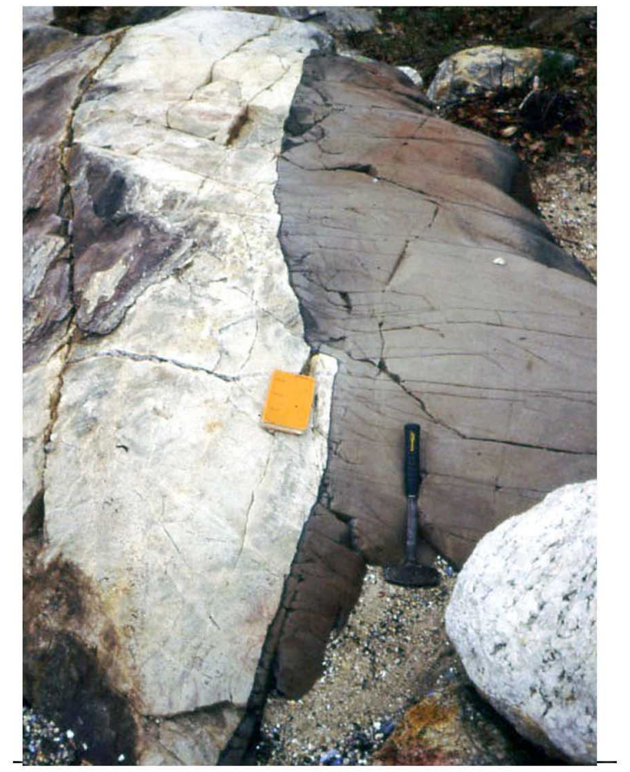

Berry. H.N. and Hussey, A.M.II, editors. 1998, Bedrock geology of the Portland 1:100,000 quadrangle, Maine and New Hampshire. Augusta, Maine Geological Survey, Open-File Map 98-1.

Hussey, A.M., II, 1971, Geologic map and cross-sections of the Orrs Island 7 1/2 minute quadrangle and adjacent area, Maine: Maine Geologic Survey, Map GM-2, 18 p. text.

Hussey, A.M.II and Marvinney, R.G., 2002, editors, Bedrock geology of the Bath 1:100,000 quadrangle, Maine. Augusta, Maine Geological Survey, Open-File Map 02-152.

Bedrock base map for the upper right section: Bedrock Geologic Map of Maine, 1985, ed. Osberg. P.H., Hussey, A.M., and Boone, G.M., Maine Geological Survey, 1:500.000.

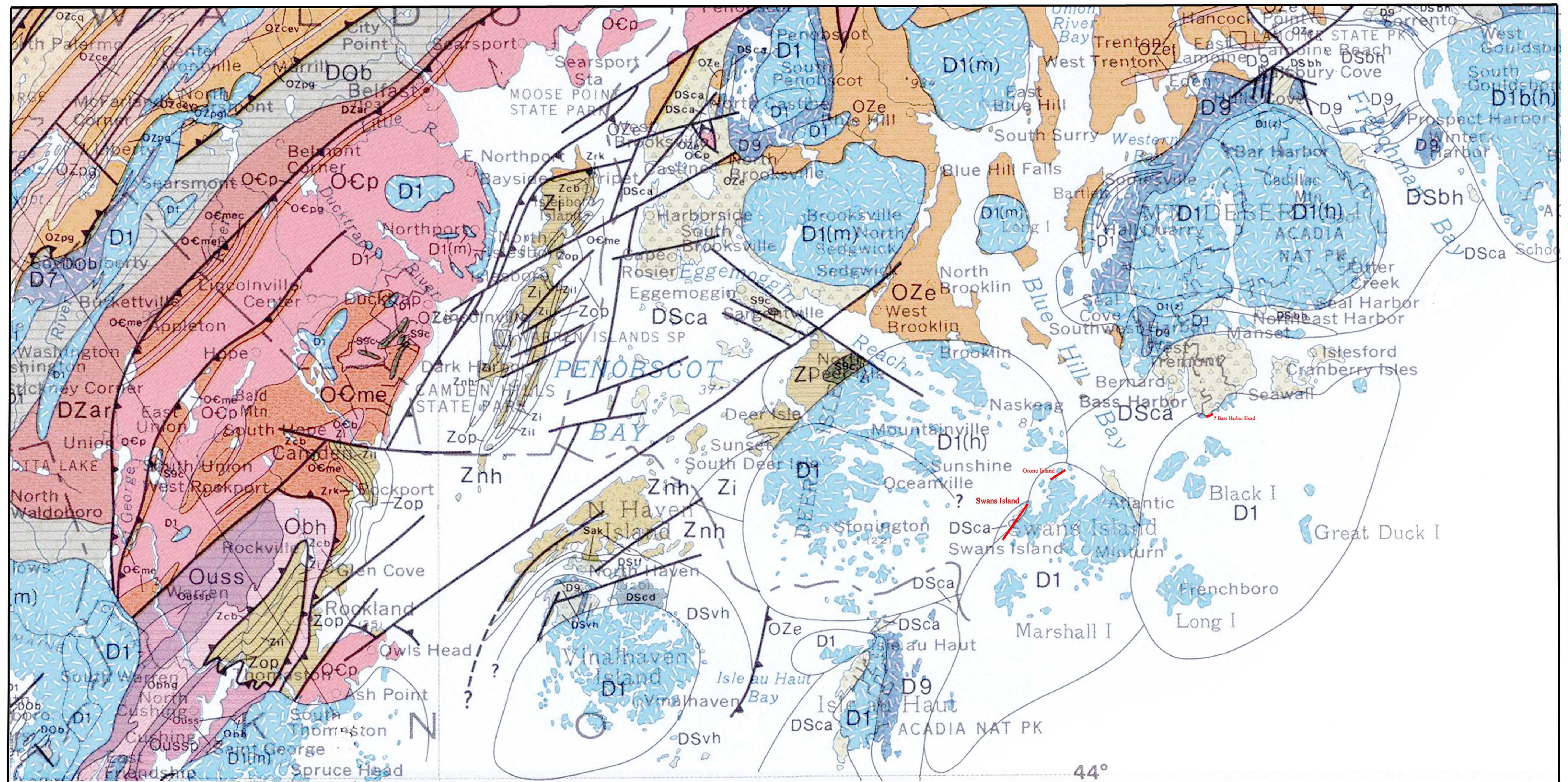

Contact at Falmouth Foreside

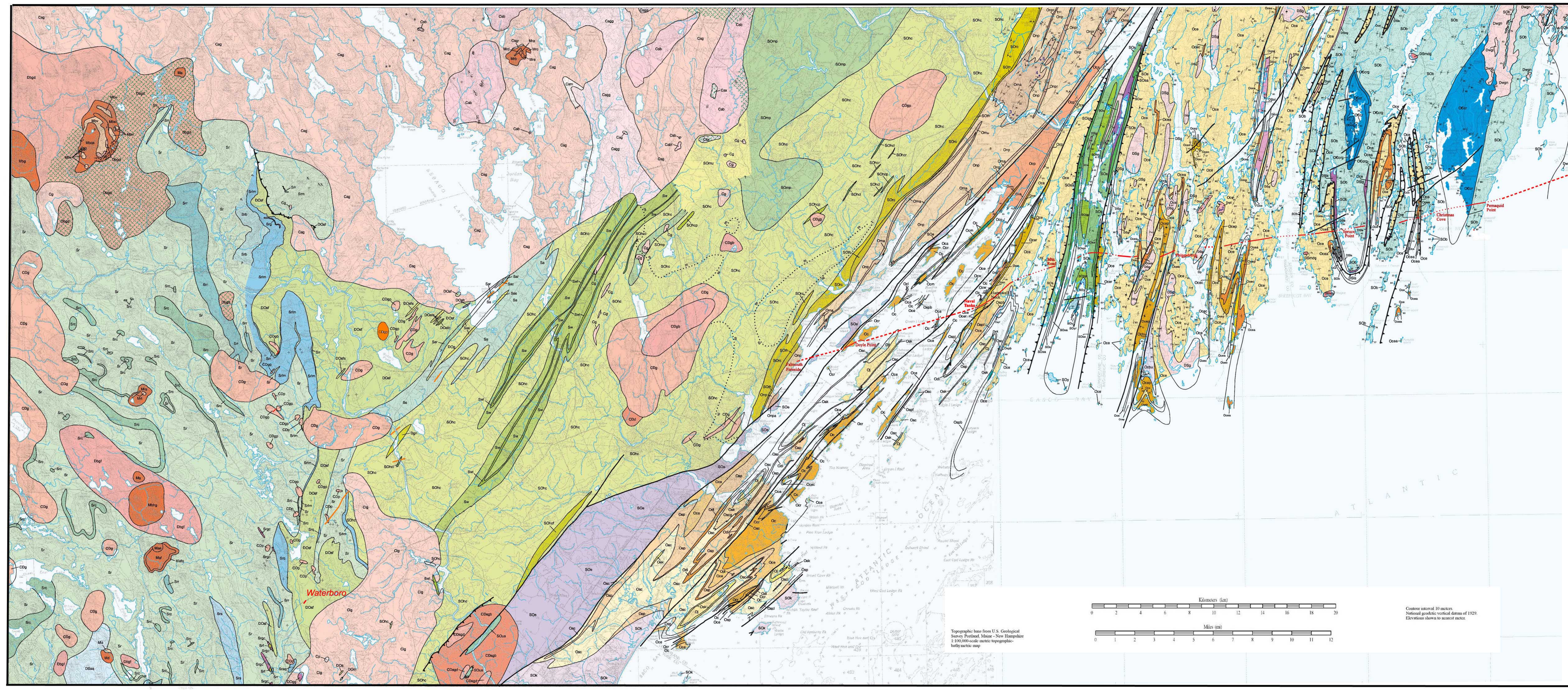


Joints in columns at Harpswell Neck

Tilted columns at Mountain Road (Harpswell)

"Whalebacks" at Spruce Point (Boothbay Harbor)




THE CHRISTMAS COVE DIKE OF COASTAL MAINE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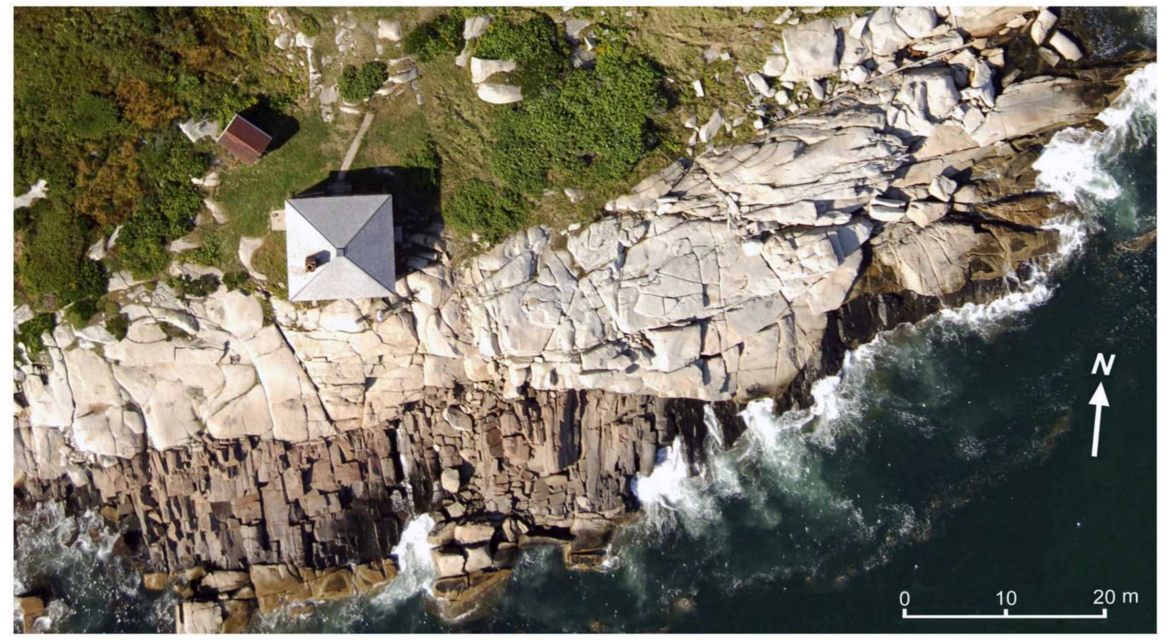
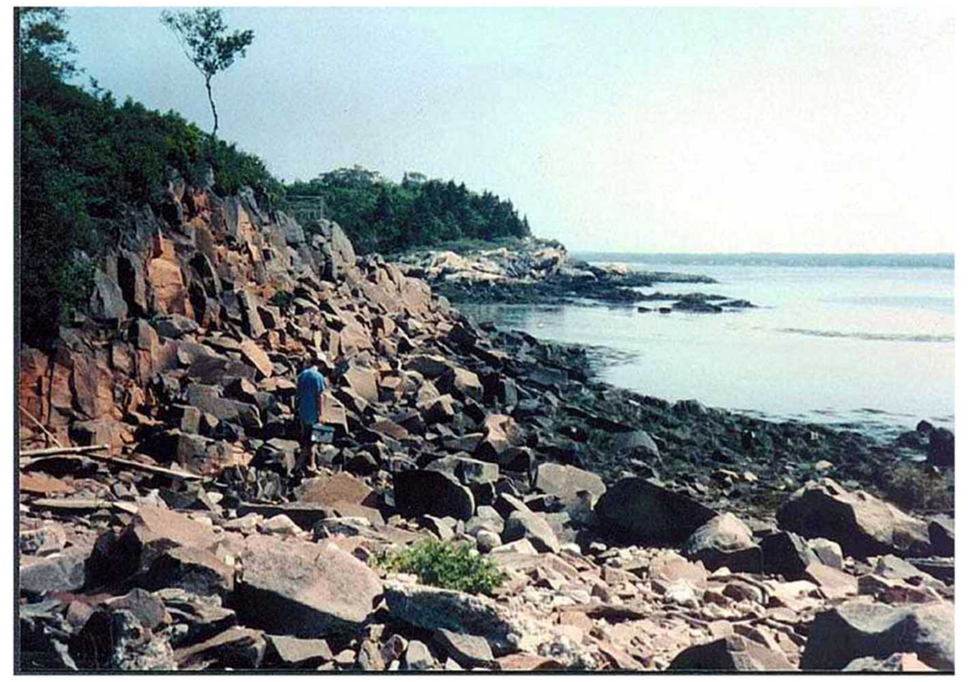
A large post-metamorphic quartz tholeiite dike has been mapped for 160 km along the coast of Maine, USA. Including its type locality at Christmas Cove (South Bristol, Maine), the dike has features of a generally ENE strike; dip usually steep to the SE but less than 55° in short sections; and widths of 18 to 35 m. $^{40}Ar/^{39}Ar$ whole-rock dates for this and associated regional dikes are close to 201 Ma, in agreement with ages of other Early Mesozoic dikes and basalts in northeastern North America. The dike rock has a distinctive cross-columnar field appearance, and a subophitic to diabasic texture with scattered, corroded orthopyroxene phenocrysts, abundant Ti-rich augite, calcic plagioclase, and contact zones that show clumps of glomerophyric augite.

The geographic position, age, whole-rock chemistry, and petrography indicate that the Christmas Cove Dike is continuous with the Higganum dike of southern New England, which was a source for the Talcott Basalt of the Tr-J Hartford rift basin. It thus provides a connection with the Fundy rift basin in Atlantic Canada as a fissure source for the initial rift basin basalts preserved in northeastern North America. This and other Early Mesozoic regional dike systems in northeastern North America form a diverging and time-sequential series of giant fissures for flood basalts of the northern part of the Central Atlantic Magmatic Province.


Above: air photo at Whitehead Island (St. George). Photo courtesy of Marinas.com

Below: eroded dike interior at Christmas Cove, South Bristol



Above and below: weathered columnar exposure, southwest shore of Swans Island.