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Freshwater export from the Labrador Current to the North Atlantic Current at the Tail of the Grand Banks of Newfoundland.

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At the Tail of the Grand Banks of Newfoundland the major branches of the wind-driven and thermohaline circulations collide. The warm Gulf Stream approaches from the west and splits into several distinct branches, one flowing north to feed the North Atlantic Current. The cold Labrador and Deep Western Boundary Currents approach the Tail from the north and bifurcate with some fraction retroflecting offshore. A seminal study by Schott and colleagues provided the first description of the complex absolute velocity structure east of the Grand Banks, yet to this day the details of the cold retroflection pathways near the Tail of the Banks remain obscure. In this study, 100 years of historical hydrographic data are used to investigate these pathways. We show, using salinity anomaly as a tracer, that the Labrador Current does not simply bifurcate at the Tail, but that freshwater is advected offshore along the full length of the boundary between Flemish Cap and the Tail of the Banks. The retroflected Labrador Current water returns north as an identifiable component of the western North Atlantic Current. Knowledge of the mean freshwater pathways in this region is crucial to understanding the propagation and significance of anomalies associated with climate transients.