A series of 1D cross-sectional averaged theories of long waves in channels have been developed (e.g. Peregrine, 1968; Teng & Wu, 1997). However, none of them is able to account simultaneously for i) arbitrary and asymmetric cross- sections with respect to the direction of wave propagation, ii) channel cross-sections that can change appreciatively within a wavelength, iii) curvature in the horizontal plane, iv) branching and v) viscous dissipation from the bottom boundary layer. In natural streams, however, riverbanks are not straight, channels can often have bends or branches and the cross- section may be highly non-uniform. Examples of such are found in tsunami waves traveling along rivers, ocean tides in fjord systems or storm surge entering harbors. In this paper we summarize part of the authors' work (Winckler, 2015; Winckler & Liu, 2015) to account for some of these phenomena.