EDITORIAL

The Bruun Rule — Twenty Years Later

Twenty years have passed since a theoretical proposition was named, and first appeared in print as, "Bruun's Rule" (SCHWARTZ, 1967). In the interim the concept, popularly referred to now as The Bruun Rule, has been adopted (HANDS, 1976, 1977; O'BRIEN, 1987), adapted (DUBOIS, 1975, 1977), quantified (ALLISON and SCHWARTZ, 1981a, 1981b), verified (PICKRILL, 1985), and vilified (LOWENSTEIN, 1985).

According the BRUUN (1962): as sea level rises along a beach with an equilibrium profile, sediment eroded from the upper beach is depositied on the nearshore bottom down to a limiting depth between nearshore and offshore sediment. Quantitative relationships in this exchange, when an equilibrium profile is developed, are as follows (Figure 1):

(a) There is a shoreward displacement of the beach profile as the upper beach is eroded.

(b) The material eroded from the upper beach is equal in volume to the material deposited on the nearshore bottom.

(c) The rise in the nearshore bottom as a result of this deposition is equal to the rise in sea level, thus maintaining a constant water depth in that area.

A profile of equilibrium is defined as that of a stable beach, adjusted to the prevailing wave regime, which returns to the same form and location through daily, monthly and seasonal cycles. Such a condition can be found at the head of pocket beaches or along a beach sector where the volume of shore-drifted sediment entering a unit cell equals the volume going out.

The above two paragraphs, in themselves, are easy enough to understand; but over the years, the meaning and intent of the rule have been changed or completely misconstrued. The, too, at other times, totally irrelevant issues are brought in to further confuse the issue. While no apology is needed, or intended, this editorial is being written to bring some clarity back to the issue.

Consider for a moment the published statement (LOWENSTEIN, 1985) that the Bruun Rule will not work because increased storminess will change the profile; as if some future, unexplained, *increased storminess* would not change the profile even without a rise in sea level. Then there was the time I was confronted, triumphantly, by someone who pointed out that the Bruun Rule would, again, not work if the coast were undergoing uplift at the rate that sea level was rising, my challenger not realizing that what he was describing was no effective sea level rise at all.

But these are isolated, and minor, arguments. The main misconception over the past two decades seems, to me, to be one of semantics. The Bruun Rule is continually being listed, or referred to, as one of the causes of the ongoing worldwide erosion of sandy beachs. It is sea level rise, among many other processes, that may be the cause (BIRD, 1985); the Bruun Rule only describes the ideal manner in which the process occurs. All other variables held constant, as in a lake, reservoir, or laboratory wave-basin, a rise in the water surface will bring wave action higher up on the shore, thus establishing (eroding) a new profile location. The distance of lateral translation depends upon the slope of the land and the magnitude of the sea level rise. It is this natural and inevitable change that the Bruun Rule outlines in quantitative terms.

So, sea level rise causes shore erosion and the Bruun Rule describes how it happens. Yet, 74 words above, this was all put in the context of the ideal; and that ideal, many people maintain, does not exist. They say that other natural processes are in constant operation as well. And this brings us to another point! On a nice, normal, sunny day, many different processes are going on simultaneously along the world's coastline; and not one of them has to stop because we coastal specialists minutely an-

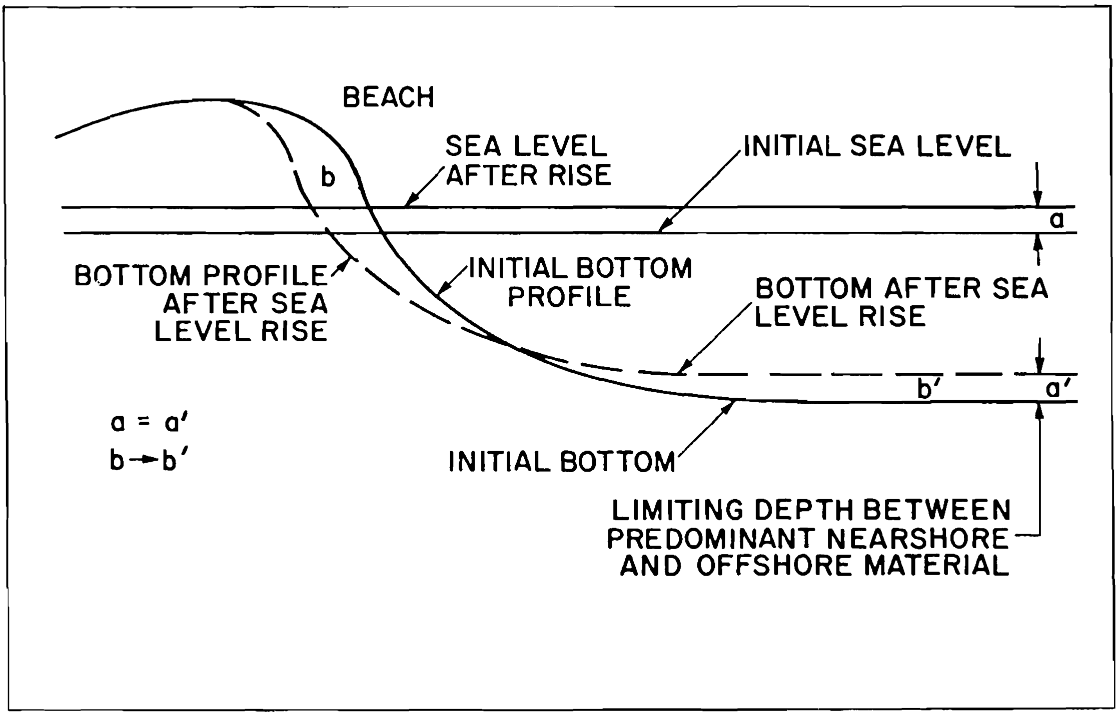

Figure 1. The Bruun Rule (from SCHWARTZ, 1967).

alyze and describe them as individual entities. STRAHLER's (1966) tidal-cycle beach profile changes; DUNCAN's (1964) scour-deposition in relation to the foreshore-water table intersect; MILLER and ZEIGLER's (1958) sediment size and sorting gradients, landward and seaward of the breaker zone; and INGLE's (1966) littoral drift, are all carefully delineated in the literature as discrete and separate processes, but they all can be occurring at the same time on the same stretch of beach. If wind parameters (velocity, duration, fetch) change, then there are corresponding adjustments in each of these processes; but they still go on happening together. In a similar fashion, when sea level rises, many changes can take place at the shore, and the Bruun Rule merely describes the ideal that one process is working towards.

In summation, frivolous detractions aside, the Bruun Rule describes what tends to happen at an equilibrium-profile beach when sea level rises, and this process is not exclusive of other occurring in the same time and space. That is, essentially, what was proposed twenty years ago.

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