BIOSTRATINOMY OF RECENT INTERTIDAL BIVALVES AT FALSE BAY, SAN JUAN ISLAND, WASHINGTON, U.S.A.

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The importance of hydrologic processes in determining where and how a shell will be deposited is widely acknowledged, but few actualistic studies of these processes have been conducted. Additional knowledge of how the hydrologic regime influences the post-mortem distribution, orientation, and burial of modern shells can provide valuable paleoecological insights.

For the purposes of biostratinomy, single and articulated shells of *Macoma nasuta* and *Clinocardium* sp. were studied in False Bay, a semicircular inlet located on the west coast of San Juan Island, WA. Dead shells of these species were the most numerous and conspicuous skeletal elements present on the tidal flats. Transects were used to quantify the valves' natural distribution, orientation and depth of burial. Shell concentrations were significantly greater toward shore and decreased toward the center of the bay. The majority of these valves were articulated (56.4%) and oriented in the convex-up attitude (71.7%).

Tides and waves were the bay's dominant hydrologic forces. Spring low tides (maximum range of -0.8 m to 2.6 m) leave most of the bay subaerially exposed. During periods of immersion, waves from the Straits of Juan de Fuca underwent refraction, diffraction, and shoaling as they moved into False Bay. This influence was evidenced in the concentric sand bars which average 100 m long, 20 m wide and 0.5 m high. Painted and numbered valves were used to determine the effects of waves and tides. Shells were place in m^2 areas both in a tidal channel and on a sand bar at low tide and then left for 1-2 tidal cycles. Recovery rates of shells ranged from 76.7% to 93.3%. Regardless of initial attitude, the majority were found in a convex-up attitude; convex-up valves remained in that orientation (89.8% - 97.7%) while those initially convex-down were reoriented to the convex-up position (75% - 86%). These findings confirmed that the convex-up position is the most hydrodynamically stable.

The most interesting aspect of this study was the nature of valve transport. Valves placed in the tidal channel moved less than one meter while those on the sand bar showed a strong bimodal distribution: shells moved either less than 2 m or distances ranging from 10 to greater than 119 m. The long range transport was unexpected; it was caused by the flotation, under calm meteorological conditions, of subaerially exposed convex-down shells on the incoming tide. This mode of transport moved the valves considerably greater distances than either saltation or traction in bedload. Shell flotation was not correlated to valve size, handedness, nor species.