

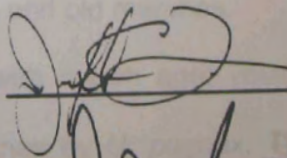
LOW MARSH SUCCESSION ALONG AN OVER-WASH SALT
MARSH CHRONOSEQUENCE

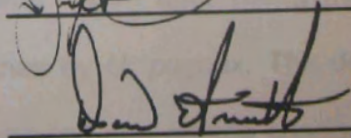
John Patrick Walsh
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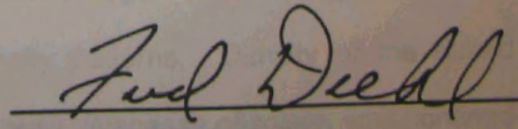
B.S., Florida State University, 1970
M.S., Florida State University, 1972

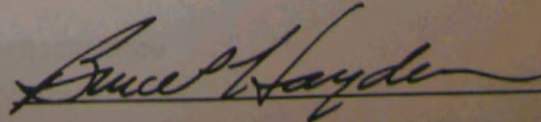
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ABSTRACT

Young marshes of the Hog Island marsh chronosequence possessed well aerated sediment that was composed mainly of sand grains, and also showed high pore-water redox levels, but low sulfide, and ammonium concentrations. With age, these variables changed in a monotonic way, until the mature marsh, 150Y, demonstrated poorly oxidized sediments, composed mainly of fine grains, and low pore-water redox, with high nutrient levels. Distinct physico-chemical stages were described using correspondence analysis (CA). CA also showed that temporal stability in physico-chemical characteristics of these marshes generally increased with marsh age.

Spartina alterniflora end of season biomass was greatest in marshes of intermediate age and lowest in very young and old marshes.

Uca spp. composition changed with marsh age: young marshes were inhabited by *U. pugilator* and older marshes by *U. pugnax*. The density of the marsh periwinkle, *Littorina irrorata*, also showed age related changes that were related to *Spartina alterniflora* stem density patterns. Density of the ribbed mussel decreased with age, and the mud snail, *Ilyanassa obsoleta*, was confined solely to the two older marshes of the chronosequence.

Each community was best described by the composition of its snails. Young marshes were characterized by greater periwinkle (*Littorina irrorata*) densities, while older marshes contained more mud snails (*Ilyanassa obsoleta*) than periwinkles. Community inter-annual stability, like physico-chemical stability mentioned above, generally increased with marsh age.

A species-poor ecosystem, these low marshes of the Hog Island chronosequence, underwent succession that tended toward a climax ecosystem or attractor. The important aspects of this process were summarized by the variables on correspondence analysis vector one, entitled 'bio-aeration'. Factor scores of vector one generally proceeded from values associated with low levels of pore-water sulfide, ammonium, redox and high *Uca* spp. density in young marshes to the opposite variable values in 150Y, the mature marsh of the chronosequence. As was the case for physico-chemical stage and biological community, young marsh ecosystems showed much greater inter-annual instability than marshes older than about 21 years.

