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Lionel N. Eleuterius

Gulf Coast Research Laboratory

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RECENT CHANGES IN THE LOUISIANA MARSH NEAR
VERMILION BAY

by

Lionel N. Eleuterius
Gulf Coast Research Laboratory
Ocean Springs, Mississippi

A special interest in marsh ecology led to the present study. Permanent sampling stations, whereby long range changes can be observed, have been neglected by researchers and there is only one known in the Gulf Coastal marshes. The uniqueness of the permanent transect offered an opportunity to study the floristic changes, if any, which occurred over a period of 18 years. Notes on the topography and other influencing factors were taken, as well as general observations on the surrounding marsh areas.

The Louisiana marsh in the vicinity of the Mermentau River has in recent years undergone intense dredging operations. The canals crisscross the entire marsh from the saline areas of the south to the freshwater areas to the north. O'Neil (1949) described this marsh as a *Scirpus olneyi* (three-cornered grass) dominated area and stated that Vermilion Bay was surrounded by one of the most productive three-cornered grass marshes on the Gulf Coast.

In September of 1951, Gunter and Shell (1958) established a short permanent transect crossing a "three-cornered grass" marsh on Buck Point, a finger of land which extends into Vermilion Bay. The primary aim of their work was to appraise the aquatic fauna living in the two large lakes located in the Mermentau River Basin and to determine what modification, if any, of the general program of lock operation would be feasible or beneficial. The transect was surveyed and marked with concrete monuments and the plant composition and zonation was recorded. The concrete monuments were placed inland 56 feet from the north shore and 93.43 feet from the south shore. Buck Point was chosen because it lies near the mouth of Schoner Bayou and would be liable to change, if anything affected the Vermilion Bay area. The area was reported as a *S. olneyi* dominated marsh. The composition of the transect in 1951 is represented in the insert shown in Figure 1. They also noted that the marsh composition was generally the same as that described by O'Neil in 1949.

In April of 1969, Mr. William Shell, Mr. John Carothers of the Corps of Engineers, U. S. Army, and the author surveyed

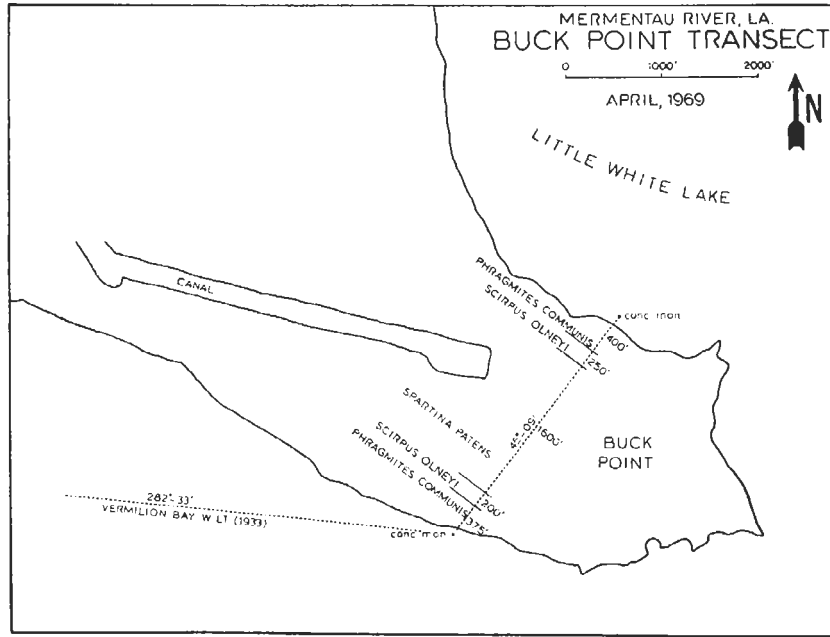


Figure 1. A: Buck Point transect showing the zonation of dominant plants in 1969.

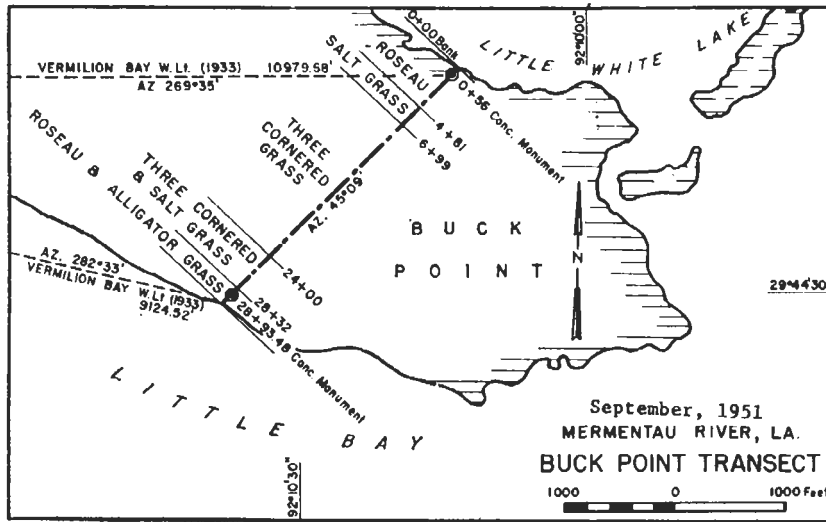


Figure 1. B: Buck Point transect showing the zonation in 1951. [B reproduced from Gunter and Shell (1958) by permission of the authors.]

the Buck Point area again. The concrete monuments of the transect were located, the zonation of the dominant plants were measured, and all species recorded.

The concrete monument on the north side of Buck Point was found 46 feet from the shore. Comparison with the original location of the monument showed 102 feet of erosion had occurred. The monument on the south side of the point was found six feet from shore indicating erosion on this bank was 99.48 feet. Thus, a total of 201.48 feet of erosion had occurred on Buck Point in the past 18 years. The small marsh islands once located immediately off the north shore of Buck Point (see Figure 1), had eroded away and no traces remained.

Table 1. Plant species occurring on Buck Point in 1969. *Species not reported in 1951.

<i>Phragmites communi</i> Trin.
<i>Scirpus olneyi</i> Gray.
<i>Spartina patens</i> Muhl.
<i>Vigna repens</i> Kuntze.
* <i>Juncus roemerianus</i> Scheele.
* <i>Asclepias lanceolata</i> Walt.
* <i>Panicum virgatum</i> L.
* <i>Hydrocotyle bonariensis</i> Lam.
* <i>Amorpha fruticosa</i> L.

The marsh vegetation in April 1969 was composed of *Spartina patens* (wire grass) bordered centrifugally by zones of *Scirpus olneyi* and *Phragmites communis* (roseau cane). The zonation of the transect is represented in Figure 1. A list of plant species occurring on Buck Point in 1969 is presented in Table 1. *Alternanthera philoxeroides* (alligator grass) and *Avicennia nitida* (mangrove) were found by Gunter and Shell (1958) to occur "right on shore," which gave way a short distance inland to "roseau cane." *Vigna repens* (deer pea) was found in profuse growth in the *Distichlis spicata* (salt grass) and *S. olneyi* zones. They attributed the presence of *V. repens* to a drying of the marsh. The "mangroves," "alligator grass" and "salt grass" have all disappeared from the point.

Buck Point in 1969 was bordered by an eroding bank which was higher in elevation than the central and western portions. The central portion was covered with pools of water. These pools appeared to resemble the pictures of "eat outs" in O'Neil's book on the muskrat. A wide canal had been dredged from a westerly to easterly direction down the center of the point, terminating a short distance from the transect. The highest portions of the point were dominated by *P. communis*. This

zone also included *Panicum virgatum* and *Hydrocotyle bonariensis*. The second zone from shore was dominated by *S. olneyi*. This zone also contained *Juncus roemerianus* (black rush) and some patches of *V. repens*. The central zone, which made up the largest part of the flora, was composed only of *Spartina patens*. This species occurred in a patchy distribution in the central portion of this zone, and the area was also characterized by floating mats of rhizomes. Only by walking on these clumps was it possible to keep from sinking.

The vegetation north of Buck Point along the Vermilion River was composed of *Scirpus californicus* (bullwhip) which is now called *S. validus* and *Spartina cynosuroides* (hogcane). In the marshes in Mississippi, *Scirpus validus* occupies areas of low salinity and *Spartina cynosuroides* is found in an intermediate range of salinity.

In 1968, a 125 x 12 foot canal was dredged from the mouth of Freshwater Bayou to Schooner Bayou. The canal has a control structure with locks located at the southern entrance which is called the Freshwater Bayou locks. Plants observed along the spoilbanks were mainly freshwater species. The canal was bordered by spoilbanks in some places reaching a height of 20 feet. They formed a continuous levee with little or no exchange of water between the canal and the marsh behind the spoilbanks. The tide apparently had little controlling effect on the marsh; if it did, it was greatly modified by control structures and levees. It was further noted that the area behind the spoilbanks and adjacent to the canal was filled with spoil some 100 to 200 yards. The plant composition on these deposits and in the adjacent marsh was mainly freshwater species.

The *Scirpus olneyi* marshes, which 18 years ago dominated the Vermillion Bay area, are no longer present. Gunter and Shell (1958) stated that the residents of the area said that the marsh had changed and, based on the author's data and the recent vegetational type map of the Louisiana coastal marshes, prepared by Chabreck, Joanen, and Palmisano (1968), the greatest change in species had been from a domination by *Scirpus olneyi* to *Spartina patens*.

Scirpus olneyi has narrow environmental tolerances in comparison with the wide tolerances of *Spartina patens*. The author has seen *S. patens* occurring in very wet habitats and also in profuse growth on the tops and sides of spoilbanks 20 feet in height. This has also been reported by Salyer (1950). Reed (1947) and Oosting and Billings (1942) show that *S. patens* has a wide latitude in relation to salinity. *Phragmites communis* (Gillham 1957) and *Panicum virgatum* are found in fresh or low salinity marshes.

In conclusion, it should be pointed out that, based on species composition alone, the brackish marshes of Vermilion Bay have been reduced in area by more than half to intermediate marshes which have very low salinities and approach freshwater habitats in plant composition. The brackish marshes which remain have changed in composition, as pointed out herein, from *Scirpus olneyi* (sedge) to *Spartina patens* (grass) dominated marshes. The presence of new species and the absence of others previously reported, and the general shift toward a freshwater species composition, seem to indicate that the entire Vermilion Bay area has become fresher. However, as evidenced by the low central portion of Buck Point, subsidence, as well as other factors, may be affecting the marshes. Special attention should be given to the fact that these changes have taken place in the relatively short time of 18 years.

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