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MOLLUSCAN COMMUNITIES OF THE  
WEST FLORIDA SHELF

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The West Florida Shelf (Figure 1) is an area encompassing more than 30,000 square miles of the Eastern Gulf of Mexico, beginning just north of the Florida Keys but including the Dry Tortugas, then extending northward to Cape San Blas. Inshore, the fauna varies from primarily tropical Caribbean species in the south to warm-temperate continental species in the north. Several communities defined by temperature, salinity, and substrate are discernible.

The Dry Tortugas consists of a group of seven small islands in the extreme southeastern Gulf approximately 80 miles west of Key West but separated from the Keys by Rebecca Channel. The fauna consists almost entirely of hardier, more tolerant, shallow water tropical species. Substrate is entirely tropical carbonate and salinities almost always exceed 35 o/oo. The Tortugas are situated somewhat north of the moderating temperatures of the Florida Current, and the fauna is severely reduced in some years by extreme cold fronts from the north. Low salinities from freshwater Everglades run-off and toxicity from southwest Florida red tides have also been implicated in faunal damage.

Farther north, a strong tropical influence is exerted by the Loop Current, which passes on its downward swing over the outer portion of the shelf and occasionally releases eddies of Caribbean water to wash onto the shelf. Certain tropical species are doubtlessly recruited by this means. The Florida Middle Ground, a group of reefs rising to perhaps 20 m below the surface from depths of 30-40 m, provides a unique feature in the northeastern Gulf (Hopkins et al., 1977a, b). Many tropical species characterizing the fauna are rare or absent elsewhere on the West Florida Shelf (Lyons, 1976; Turgeon and Lyons, 1977).

Estuaries dominate the coastline from Cape Sable to Cape San Blas. Vegetation varies from vast mangrove forests in the south to *Spartina-Juncus* marshes in the north, and several species of seagrasses are common throughout the region. Sediments are primarily terrigenous quartz sands, but oyster reefs provide some hard substrate. Salinities vary from near zero to about 34 o/oo and temperatures fluctuate greatly (e.g., Taylor et al., 1970). Macronutrients are generally high. Molluscan diversity is high, especially in seaward portions of estuaries. I have recorded nearly 350 species in Tampa Bay. The southern Ten Thousand Islands and northern Big Bend areas are actually huge estuaries gradu-

ally merging seaward with offshore shelf communities. However, between these and to the far north, estuaries such as Charlotte Harbor, Tampa Bay, and St. George Sound are separated from the Gulf by a series of barrier islands with sandy, seaward beaches.

At least three vertical zones of faunal distribution occurring seaward from estuaries along the west coast of Florida have become apparent during analysis of material collected during the

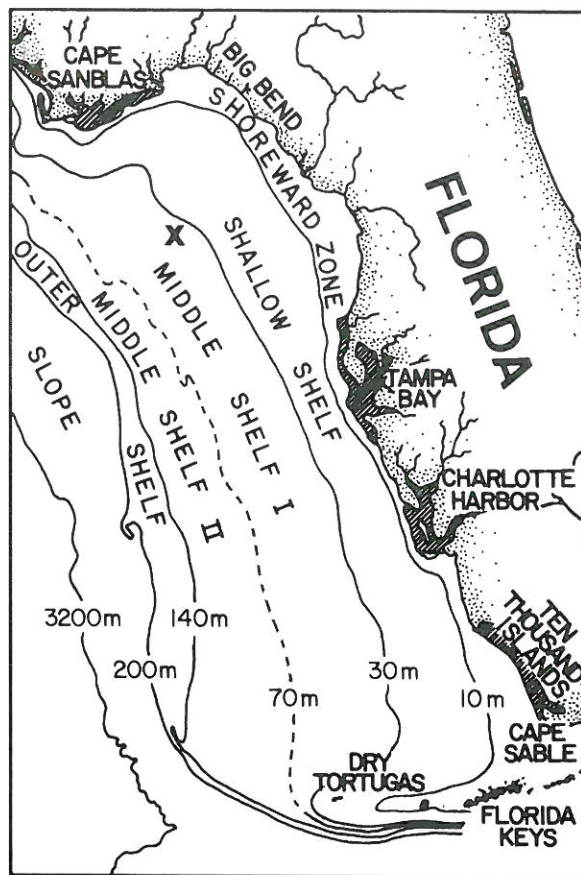


Figure 1. West Florida Shelf, showing subdivisions based upon faunal differences. Florida Middle Ground (x) and major estuaries (slanted shading) indicated.

Hourglass Cruises, a series of some 700+ dredge and trawl tows made by the R/V Hernan Cortez at 10 stations in depths from 6 to 73 m during 1965 through 1967 (Joyce and Williams, 1969). Distributional patterns indicating these zones have been discerned in analyses of several groups, including stomatopod, amphipod, isopod, and decapod crustaceans, mollusks, echinoids, and several families of benthic fishes.

The "nearshore," or "shoreward" zone (Lyons and Collard, 1974) occurs from the beach out to depths of approximately 10 m. Sediments are quartz sands, with little hard substrate except that provided by dead shells of large mollusks. Annual temperature fluctuations are considerable (Figure 2), and salinities usually range from 31-34 o/oo (Joyce and Williams, 1969). The fauna is characterized by warm-temperate bivalves. *Donax variabilis* is abundant along beaches. The nearshore fauna is dominated by large and moderately sized, warm-temperate bivalves; such species as *Anadara transversa*, *Noetia ponderosa*, *Atrina rigida*, *A. seminuda*, *Dinocardium robustum*, *Trachycardium egmontianum*, and *Merceneraria campechiensis* are common, as are large, predatory gastropods such as, *Polinices duplicatus*, *Busyccon contrarium*, *Fasciolaria hunteria*, and *Pleuroploca gigantea*.

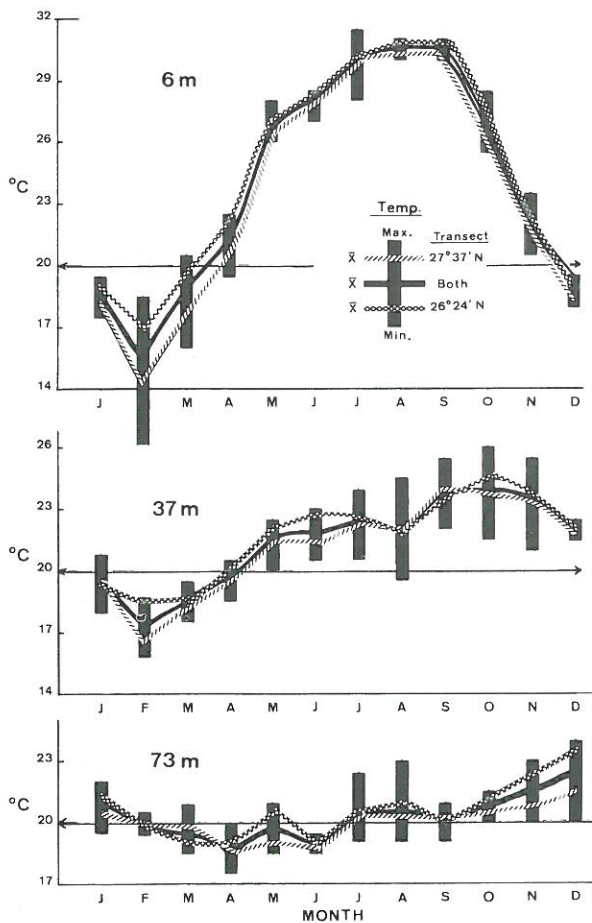


Figure 2. Minimum, maximum, and mean bottom temperatures at three depths (6, 37, and 73 m) each along two transects (26°24'N; 27°37'N) on the West Florida Shelf, August 1965 through November 1967; 37 m station of northern transect sampled bimonthly, all other stations sampled monthly.

The zone may be characterized as a rich, warm-temperate, upper euryhaline fauna, with obvious relationship to the estuary.

The next zone, designated the shallow shelf (Lyons and Collard, 1974), extends seaward to depths of about 30 or 40 m. Shallow depths permit considerable temperature fluctuations and the area is overlain by a mass of green, coastal water with salinities usually about 35-36 o/oo (Joyce and Williams, 1969). Although quartz sands persist, many warm-temperate Carolinian species have disappeared, and scattered limestone outcroppings provide substrate for a number of submerged, shallow water tropical species. As at Dry Tortugas, these are generally species more tolerant of environmental fluctuation.

At depths of about 30-40 m, the shallow shelf fauna intersects a deeper fauna which has been designated middle shelf (Lyons and Collard, 1974). Near the 30 m isobath, green coastal waters intersect with clearer, less enriched, but more stable blue waters of the middle and outer shelf. Salinities remain around 35 o/oo and temperatures seldom fluctuate more than 3 or 4 degrees from the 20°C isotherm, stabilizing seaward (Figure 2). Sediments are predominantly calcareous except for a small intrusion of quartz sand off Charlotte Harbor, and limestone outcroppings are fairly common. This area, extending from about 40 m to about 140 m, may actually contain two subdivisions, but sufficient data is not available for the area beyond 73 m depths. That two zones may exist is indicated by an apparent center for abundance for many species between 50 and 60 m, and the rare occurrence of some apparently deeper water species at 73 m. Literature records indicating species whose ranges start at about 70 m and extend to about 140 m suggest that a second zone may exist within the middle shelf. The fauna is tropically derived but generally is distributed only along the more environmentally stable outer shelves of the southeastern United States and Gulf of Mexico. Much of it has descended from former Tertiary stocks of the southeastern U.S. As many as 600 to 800 molluscan species may inhabit the middle shelf, such diversity being allowed by the favorable environmental stability of the zone.

Material from commercial specimen shell dredgers indicates a distinctive fauna near the 200 m isobath. Literature records for many species additionally indicate a molluscan assemblage beginning at about 140 m and extending across the 200 m isobath to perhaps as deep as 400 m. To further illustrate these communities, I analyzed species of Muricidae on the West Florida Shelf. Of 27 species of muricids known within the area bounded by the northern Gulf and Florida Keys in depths 70 m or less, 21 species occurred in Hourglass collections. The six "missing" species include two *Dermomurex*, *D. elizabethae* and *D. pauperculus*; the latter was reported in the eastern Gulf by Radwin and D'Attilio (1976) but I have not seen specimens. *Trachypollia nodulosa*, a rock dweller seldom occurring deeper than intertidally in the Keys and Dry Tortugas, is absent to the north, and *Hexaplex fulvescens*, the common large, warm-temperate, continental species, is absent except in the extreme northwest corner of the shelf near Cape San Blas. *Favartia alveata*, a tropical species of the Florida Keys and Dry Tortugas, has been collected at the Florida Middle Ground and may further indicate the more tropical nature of that fauna. The sixth species, *Urosalpinx tampaensis*, is a west Florida endemic so restricted to estuaries that Hourglass sampling began seaward of its range.

Table 1 shows the number of samples containing a particular species at each depth in the Hourglass collections. Greatest incidence of occurrence for each species is underlined. Six species occurred at the 6 m stations, and three of these characterize the nearshore fauna. *Urosalpinx perrugata* is a west Florida endemic

(Radwin and D'Attilio, 1976), *Calotrophon ostrearum* occurs only in west Florida and northern Yucatan (Bullock, 1976), and the west Florida range of *Eupleura sulcidentata* was only recently extended to northern Cuba, the Bahamas, and southeast Florida (Lyons, 1977). The remaining three are wide-ranging, common species apparently adaptable to diverse environmental conditions. All six species also occur in west Florida estuaries.

The shallow shelf, consisting of the 18 and 37 m stations, is the area where the well-known shallow water species are most common. *Chicoreus dilectus* and *Favartia cellulosa* are most evident. *Chicoreus pomum*, although captured most often at 6 m, is assigned here on the basis of other collections. It is widespread on the shelf and, with *Chicoreus dilectus* (see Vokes, 1974) and *Calotrophon ostrearum* (see McLean and Emerson, 1970), are the only Gulf muricids to show changes of form with depth. *Murexiella glypta* is a rare species confined to the shallow shelf.

*Muricopsis oxytatus* is assigned here because of its more shallow occurrence at Dry Tortugas, the Bahamas, and Caribbean islands; it is fairly common at the Florida Middle Ground (Turgeon and Lyons, 1977). Overall, these species comprise a submerged, shallow-water tropical group.

Of sixteen species collected between 37 and 73 m, eleven are restricted to or are characteristic of a middle shelf zone. *Murex cabritii*, *Murexiella levicula*, and *Ocenebra minirosea* are quite common. As indicated in Table 1, ranges of several species may only be beginning at 73 m stations. The possibly subspecific variant of *Chicoreus dilectus* was found only there. *Ocenebra emipowlusi* occurs from 70 to 140 m, and *Poirieria stimpsoni*, not collected at 73 m stations, occurs from 90 to 180 m (Radwin and D'Attilio, 1976). These species suggest faunal distinctiveness of the deeper part of the middle shelf.

*Murex bellegladeensis*, *Murex rubidus*, and *Murex anniae* also

TABLE 1.  
MOLLUSCAN ASSEMBLAGES OF THE WEST FLORIDA SHELF  
AS EXEMPLIFIED BY SPECIES OF MURICIDAE  
IN HOURGLASS COLLECTIONS

Distributional Zone	Samples Containing Species	Hourglass Sampling Depths(m) <sup>1</sup>				
		6	18	37	55	73
1. ESTUARINE/NEARSHORE (0-10 m)						
<i>Urosalpinx perrugata</i>	37	<u>37</u>				
<i>Eupleura sulcidentata</i>	5	<u>5</u>				
<i>Calotrophon ostrearum</i>	14	<u>7</u>	2	3	2	
2. SHALLOW SHELF (10-30 m)						
<i>Chicoreus pomum</i>	69	<u>26</u>	12	15	9	7
<i>Favartia cellulosa</i>	64	<u>11</u>	<u>21</u>	<u>22</u>	5	5
<i>Chicoreus dilectus</i>	99	2	<u>44</u>	<u>36</u>	17	
<i>Murexiella glypta</i>	2		<u>1</u>	1		
<i>Muricopsis oxytatus</i>	2			2		
3. MIDDLE SHELF (30-140 m)						
<i>Acanthotrophon striata</i>	2			2		
<i>Murexiella macgintyi</i>	4			1	<u>3</u>	
<i>Aspella senex</i>	3			1	<u>1</u>	1
<i>Murexsul</i> sp.	2				2	
<i>Murex cabritii</i>	73		1	12	<u>43</u>	17
<i>Murexiella levicula</i>	125			12	<u>81</u>	32
<i>Trachypollia didyma</i>	6				3	3
<i>Ocenebra minirosea</i>	73				<u>36</u>	<u>37</u>
<i>Chicoreus</i> sp. ( <i>dilectus</i> ssp.?)	26					<u>26</u>
<i>Ocenebra emipowlusi</i>	1					1
<i>Typhis sowerbii</i>	1					1
4. UNCERTAIN <sup>2</sup>						
<i>Murex bellegladeensis</i>						
<i>Murex rubidus</i>						
<i>Murex anniae</i>						
Total Species		6	6	11	11	10

<sup>1</sup>6-73 m depths sampled 118, 170, 168, 167, and 113 times, respectively.

<sup>2</sup>Many immatures not adequately sorted.

occur in the collections but are not enumerated because a large number of juveniles remain to be sorted. The first two were common at several stations, however, and *M. anniae*, at least, is clearly an inhabitant of the middle shelf.

Beginning at 140 m and extending beyond 200 m is a group composed of *Murex tryoni*, *Murexiella hidalgoi*, *Pteropurpura bequaerti*, and *Siratus beauii*. These are joined at about 200 m by *Pterynotus phaneus* and *Paziella pazi*, all apparently constituents of a deep shelf/upper slope assemblage.

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