WHAT LIVES ON A WIND-TIDAL FLAT?

A casual observer would quickly conclude that wind-tidal flats are devoid of life. Irregular flooding, hot summer temperatures, little freshwater inflow, and salty soils don't allow typical marsh plant communities to develop. Although not found on all wind-tidal flats, felt-like mats (Fig. 5) of microscopic, one-celled, blue-green algae (Cyanobacteria) behave like plant communities, that is, they convert sunlight into energy that can be used by other organisms (photosynthesis; primary production).

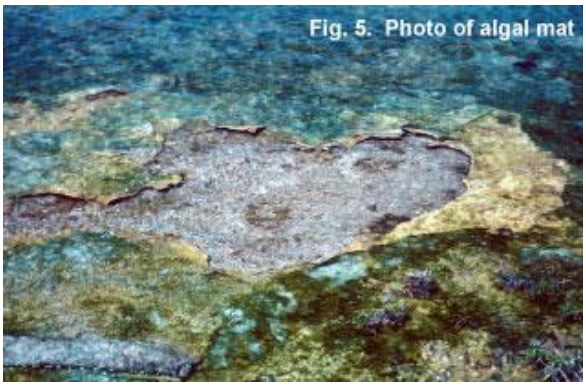
Fig. 5. Photo of algal mat

Flats that are frequently flooded are important biomass conversion sites, that is, areas where primary production is converted into animal biomass for use by higher-level consumers. Although some primary production is directly consumed, much of it enters the food chain as detritus. Many invertebrates live on the surface of the flats (epibenthic) or within the substrate (benthic or infauna) and are the primary consumers on wind-tidal flats (Fig. 6).

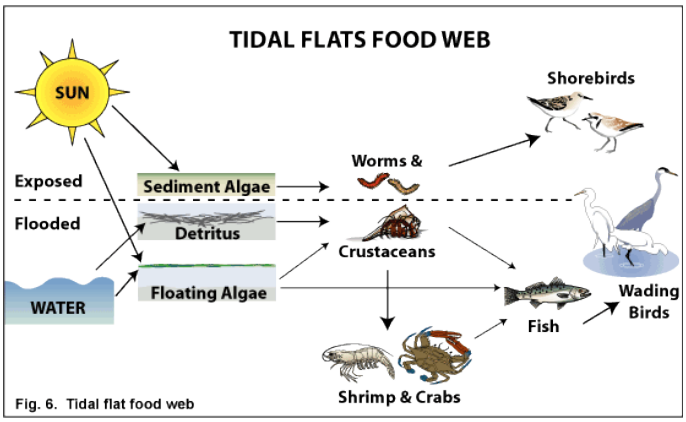

Fig. 6. Tidal flat food web

Flooding is necessary for abundant benthic and epibenthic invertebrate communities to develop and persist on wind-tidal flats. Swimming invertebrates, such as shrimp and blue crabs, may be found on flats when they are flooded. Most benthic and epibenthic invertebrates are recruited to wind-tidal flats during the seasonal high tides that occur along the Texas Gulf Coast during fall. Benthic invertebrates are usually most

abundant during winter and spring. Few if any survive the summer low tides when flats are exposed for long periods of time and become very hot, dry, and extremely salty.

Many aquatic and semi-aquatic benthic organisms are found in the wet areas of tidal flats. At the interface between the flat and the adjacent bay where there is little chance of drying out, polychaetes, amphipods and tanaids are the most common organisms. Sometimes bivalves are found deep in the sediments, but they are not very common. In wet areas at slightly higher elevations, fly larvae are the most common organisms. In the higher, drier areas of tidal flats, salt-water adapted insects like rove beetles (Family Staphylinidae) that live on the surface are the only invertebrates able to survive.

Although fish such as sheepshead minnows may be found on wind-tidal flats when they are flooded, shorebirds that use exposed flats as foraging habitat are the most important vertebrate organisms found on tidal flats. Wind-tidal flats in the Laguna Madre are one of the most significant feeding areas for shorebirds on the Texas Gulf Coast. At least 26 species of shorebirdshave been reported on wind-tidal flats in the Coastal Bend. Several shorebird feeding guilds can be found. Shorebirds such as plovers find their food using their eyes. They see their prey or some evidence of the prey, like a burrow entrance, then use their bills to capture it. Other shorebirds like sandpipers and dowitchers find food by probing into the substrate and feeling their prey with special cells (Herbst corpuscles) at the end of their bills. These organs cause the bill to open and the prey is captured. The prey that shorebirds capture is determined by the length of their bill and their feeding strategy (Fig. 7).

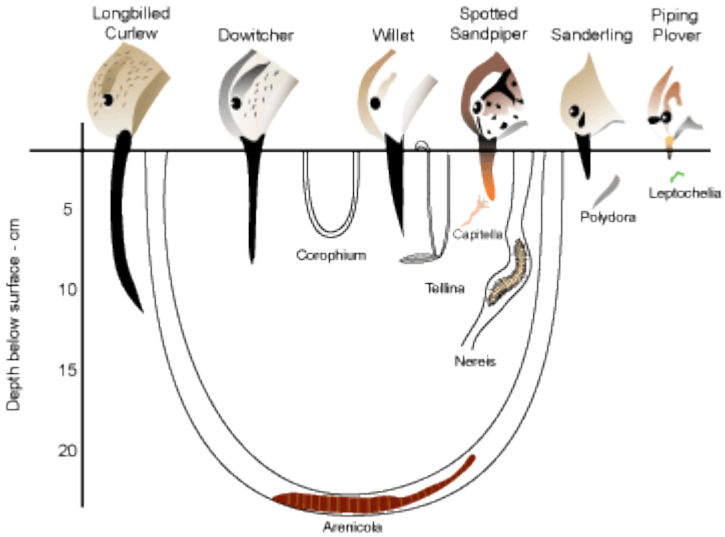

Figure 7. Diagram showing different shorebird feeding styles.