Sandy beaches were surveyed during daytime, spring low tides in the late summer and Fall of 2011, prior to MPA establishment. Quantitative samples were collected along 3 shore-normal transects that extended from the lower edge of terrestrial vegetation or the bluff to the lowest intertidal level exposed by swash. The 3 transects were randomly assigned to locations within a 100 m of shoreline portion of a chosen segment of beach using a random number table and a distance measuring wheel. To minimize disturbance of the mobile fauna in the lower beach, spacing between transects included a minimum buffer zone of 5 m. The lowest portion of the beach exposed by the swash was sampled as close to the time of predicted low tide as possible.

Each transect was sampled with 150 cores (10 cm diameter, 20 cm deep) at uniform intervals of 0.25 to 3.0 m, depending on intertidal width. At each of 15 tidal levels, 10 consecutive cores were grouped and placed in a mesh bag (1.5 mm aperture) for sieving, retaining macrofauna that were preserved for analysis. This sampling design yields a total sampling area of 3.5 m² and 45 biological samples at each beach. Most species of macrofauna likely to be prey of shorebirds are retained on a 1.5 mm sieve. Samples where large amounts of coarse sediments were retained were elutriated to separate the macrofauna. Samples outside of the talitrid amphipod zones were elutriated on the beach. To elutriate a sample, about 1/5 of a 3-5 gallon bucket was filled with coarse sediments from a mesh bag, then filled about 2/3 full with seawater. Sediments were vigorously swirled by hand in the seawater for about 10 seconds, taking care to not spill the contents out of the bucket. Quickly, the seawater and any animals elutriated from the sediments were decanted into a mesh bag draped over an empty bucket. Animals retained by the mesh were retrieved and placed into a ziplock plastic bag. The process was repeated until three consecutive elutriation attempts yielded no animals. The remaining sediments were briefly inspected for any missed animals before being set aside. This process was repeated until each zone that requiring elutriation was completed. All retained animals were placed in labeled ziplock bags, chilled for transport to the laboratory and either preserved in formalin or frozen (upper zones) until they could be processed. If elutriation of samples from the zones with talitrid amphipods was required, the core samples were bagged, hauled from the beach, returned to lab and frozen prior to prevent the loss of animals (due to jumping) during the elutriation process. Frozen samples were defrosted elutriated in the laboratory as described above, as soon as possible after field sampling and then re-frozen for subsequent analysis. All animals retained were placed in labeled ziplock bags, and then frozen for later processing.

All macrofauna retained were placed in labeled ziplock bags, chilled and transported to the lab for processing. All fauna were identified, enumerated, blotted dry and weighed to the nearest 0.001 g. Shell and carapace lengths of clams and crabs, respectively, were measured with vernier calipers to the nearest mm.

Sticky traps, and standard net sweep samples were also be used to estimate the composition and availability of wrack-associated macroinvertebrates. Flying invertebrates were collected with standard insect net sweeps along a 1 m wide swath from the upper beach to the swash zone on each transect prior to collection of cores. The insects were placed in labeled plastic ziplock bags and frozen for later analysis. To collect flying and crawling invertebrates, 2 sticky traps (commercial fly paper strips, Revenge) were opened and deployed using pin flags on fresh brown macroalgal wrack located within 1 m of each transect for 15 minutes. After 15 minutes, the strips were collected, folded in thirds and placed in labeled 1 gallon ziplock bags to be frozen for later analysis. All invertebrates were identified and counted with the exception of flies and talitrid amphipods on the sticky traps. The amphipods on the sticky traps were counted, and the flies which were grouped into size classes and counted.

Wrack cover was measured using a line intercept method on each of three shore-normal transects of used for the macroinvertebrate surveys. Along each transect, a transect tape was used to
measure the extent and presence of each type of wrack 0.5 cm long or greater including macrophytes, driftwood, carrion, tar, etc., yielding total wrack cover (in units of length) by wrack type for each transect. Data are expressed as estimates of wrack cover (in m²) per meter of shoreline for each major type of wrack.

Physical parameters measured along each transect were: GPS coordinates, transect length, locations of the water table outcrop (WTO) and high tide strand line (HTS) and beach slope at the WTO and HTS. In addition, surf zone wave height and period, and swash width and period were visually estimated at the middle transect.

Sediment grain size was determined from one sample taken at the WTO and HTS of each transect. Sediments were rinsed in fresh water to remove salt residue, dried to constant weight and then shaken through a series of sieves (screen apertures [microns]: 5600, 4000, 2800, 2000, 1400, 1000, 710, 500, 355, 250, 180, 125, 90, 63, 45) to determine the relative abundance (by weight) of sand in each size class. Data reported from this analysis are the geometric mean, standard deviation (=sorting), skewness, kurtosis for each sample.