

Population Estimates of Surf Zone Animals
BIOL 370L – Principles of Ecology Laboratory
by,
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Introduction

The surf zone is a high-energy habitat with various unique characteristics. Wave action increases turbidity and limits primary production. Shallow depth exposes organisms to the forces of the waves. However, the surf zone, during certain times of the year, does support a large number and variety of fishes and invertebrates. Some of these organisms enter the surf zone for reproduction while others forage here for food. Autumn is a particularly good time to sample the surf zone as many small fish migrate along the coast at this time of the year. Fish (and inverts) occupying the surf zone need to "conform" to the bottom (that is they live in it or stick close to it). Other organisms swim freely in the surf zone and must be constantly in motion to deal with the unstable environment.

Some of the more common bottom dwellers include the mole crab, donax (coquina clam), gulf whiting, stargazer, and the lesser electric ray. Free-swimming organisms include crabs (blue and spotted), menhaden, mullet, silversides, and pompano. Most fish (and most inverts) in the surf will be small, generally juveniles. Larger fish are further offshore (but not too far). We may see schools of (large) mullet and menhaden, plus maybe dolphins, sharks and mackerel. Red and black drum and sea trout hang in deeper "gut" or channels that run more-or-less parallel to (or obliquely from) the beach out beyond the surf zone.

Sampling

The goal of today's lab is to derive an estimate of how many organisms now occupy the surf zone of Waites Island. Our estimate will be based on a relatively small sample of the surf zone. Each group will be responsible for one "good" sample. A "good" sample is defined as one where a) the lower edge of the net remains in contact with the bottom at all times, and b) an incoming wave does not accidentally empty out the net. Use the measuring tape to mark a 5-meter section of beach. Use flags to indicate this distance. The goal is to capture all organisms in that 5-meter section of the surf zone. We will define the surf zone as the area extending from the beach to a water depth of 1 meter. Make one pass with the net by simply moving from deep water to shallow water. **Keep the lower edge of the net close to the bottom.** When you get out of the water, sweep the net **upward** so the organisms do not escape. Put all organisms in a bucket. Identify them and count them. The data from each group will be considered one sample.

Assuming that Waites Island has a beach zone 2.5 miles long, estimate from the class samples the population sizes of various organisms (1 mile = 5280 feet; 1 meter = 3.28 feet). Sample size will depend on class size. Calculate means and standard errors for all population estimates. When you write your report, consider the factors that likely contributed to errors in deriving population estimates for the entire island beach zone. If you did this sampling exercise again and had more time, what might you do differently to get better estimates? How would season and time of day likely affect your population estimates?