Date: **October 1st**

Time: **10:30 AM**

Location: **Olin 305**

Speaker: **Dr. Patricia Tester**
Center for Coastal Fisheries and Habitat Research,
National Ocean Service, NOAA

Title: **"Fine Scale Physical Measurements and Biological Productivity: A Handsome Marriage"**

Abstract

Part I Alpha Test Run of Ranger, a Micro AUV

The utility of micro AUVs (autonomous underwater vehicles) for detecting and monitoring hydrographic features that concentrate phytoplankton cells was evaluated during a study in a shallow, tidal estuary. The micro AUV, called Ranger', is approximately 3.5 kg and 91 cm long, may be launched from a small boat and can carry a number of environmental sensors depending on the needs of the user. In the Alpha Test Run four Rangers were programmed to operate autonomously in a prescribed area moving back and forth over a 0.5 km path undulating from the surface to 1.2 m depth for period of 3 hours. The objective of the Rangers' first field test was to detect a hydrographic feature (salinity frontal zone) where chlorophyll values can be more than 2 fold higher than either up or down river from the front. In the course of a 3 hour mission four Rangers collected approximately 87,000 observations that proved satisfactory in mapping the progressive development of the salinity front. With a maximum speed of 4 knots and a maximum mission duration of up to 10 hours the Ranger is capable of monitoring coastal, estuarine and riverine environments on fine time and spatial scales. http://www.nektonresearch.com/

Part II Daily Cycles of Destratification Primes the Oxygen Pump

Belize is home to the largest barrier reef in the western hemisphere. The reef complex is bounded by the azure Caribbean Sea and encloses a wide (10-40 km) central lagoon characterized by patch reefs and small mangrove islands. Much to our surprise some of the mangrove islands with shallow embayments have rich phytoplankton communities supported by rapid regeneration. A unique combination of island morphology, wind sheltering and low tidal amplitude favors accumulation of material and limits flushing in these embayments. Typically, these sheltered mangrove embayments are less than 3 meters deep with a shallow sill, which limits exchange with surrounding waters. The study focused on a shallow, productive mangrove embayment at Peter Douglas Cay off south central Belize. At Douglas Cay the chlorophyll a concentrations were 20 fold higher than in the surrounding oligotrophic lagoon. To examine the productivity of this mangrove embayment, a YSI Sonde 660 was moored for periods up to seven days to record chlorophyll fluorescence, salinity, temperature, PAR and oxygen. In addition wind speed and direction and rain fall were recorded at a nearby location. During a period of low rain fall and high, consistent winds a very regular daily cycle of productivity, indicated by chlorophyll a and oxygen production, was noted. Daytime oxygen saturation varied between 20 and 40 percent and was maximal at or near noon. However, the highest oxygen values did not coincide with the mid-day chlorophyll peak or even lag it by several hours. After sunset (1900 hours) the oxygen saturation increased sharply with a maximum of 50 to 75 percent saturation at midnight. Destratification, caused by cooling of the surface waters after sunset, resulted in a daily turnover that oxygenated the entire water column. Benthic, rather than water column, productivity was the source of the high night time oxygen levels.