HISTORY OF THE OLEANDER PROJECT
By Dan Smith

Early CPR and XBT Work

The Hardy Continuous Plankton Recorder (CPR) is the primary instrument for sampling plankton, the small plant and animal creatures that drift in the currents. The CPR has a streamlined body that is towed behind a ship to filter plankton from the seawater on a role of gauze and preserve it in a tank of preservative. The sample is brought back to the lab for the plankton to be cut into uniform distance samples, identified, and counted. Most plankton are microscopic but the larger ones are a few mm. in size. Jellyfish are the largest plankton.

The goal of the CPR survey is to determine the location and abundance of the plankton species and through monthly multiyear sampling, determine changes and trends in the planktonic concentrations. This has been useful in finding the cause of the flip in abundance between Cod and Haddock on Georges Bank and the Gulf of Maine.

CPR work that preceded the Oleander project were done by John Colton and Robert Marak of the National Marine Fisheries Service (NMFS). They did multiple tows back and forth across Georges Bank and the Gulf of Maine on several cruises during the 1950s.

In 1972 Daniel Smith was hired by Ken Sherman of the NMFS Marine Resources Monitoring Assessment and Prediction (MARMAP) Field Group in Narragansett to service and deploy CPRs aboard United States Coast Guard High Endurance Cutters. The towing was done during their steaming to and from the World Meteorological Organization Ocean Weather Stations Bravo and Delta which are hundreds of nautical miles to the NE and E of Newfoundland. Within a few years the Ocean Weather stations Bravo and Delta were discontinued. The CPRs used for this were on loan from the Sir Allister Hardy Foundation for Ocean Science, (SAHFOS). Ken Sherman sent those CPRs back to SAHFOS and sent Colton and Marak's CPRs to SAHFOS also for reconditioning.

In about 1973 Mert Ingham and Steve Cook moved from the Miami, FL. NMFS Lab to the NMFS Lab in Narragansett. They and others formed the NOAA NMFS Atlantic Environmental Group (AEG). Steve Cook was responsible for the Expendable Bathythermographs Program. Expendable bathythermographs (XBT) are streamlined probes that resemble hand held bombs that WW I pilots threw out of their planes. They were dropped from the ship from a hand held launcher that resembles a flare gun. The probe falls through the sea trailing a 2 conductor wire that stays connected to the launcher. An electric current is passed down one conductor, goes through a resistor and back up the second conductor to the launcher and then to the ship board XBT Recorder. The resistance of the resistor varies inversely with changes in the temperature surrounding the probe. Steve Cook equipped several commercial freighters to do XBT drops during their steaming in and out of the ports of NY and New Orleans.

In 1974 Steve Cook and Bob Benway installed a CPR and XBT system aboard USCG High Endurance Cutters Cruising out of Norfolk VA to Ocean Weather Station Hotel, about 200 nautical miles SE of NY. On the way they steamed ESE through the Shelf Water, The Gulf Stream, The Sargasso Sea then back NE through the Gulf Stream and into the Continental Slope Water. This was the first use of the CPR with XBTs that I know of. The plankton

distribution can be plotted over the Temperature plots and a relation of plankton to temperature structure became evident. When these surveys are repeated monthly, changes in plankton can be related to changes in the temperature structure of the sea.

Sampling on the NY to Bermuda transect.

In 1975 there were several XBT tows leading out of NY towards Bermuda. In 1976 there were 9 months sampled with most of them towing CPRs. By this time, Robert Benway was servicing CPRs and XBT systems while Daniel Smith was analyzing plankton. Reed Armstrong, Woody Chamberlin and others whose names escape me plotted XBT profiles by hand and Jack Jossi processed and archived CPR and XBT data.

USCG cutters dedicated to offshore Fisheries Law Enforcement were recruited for XBT and CPR surveys from NY out to 140 nautical miles towards Bermuda to supplement the freighter coverage of the route. It was difficult for Steve Cook and Bob Benway to find ships to do the work and then outfit them with CPR and XBT gear. The USCG would not tell us when they would sail because they would not let fishermen know when the USCG would be monitoring them. We had to over equip the USCG ships in order to accomplish monthly sampling.

The Oleander project.

Steve Cook met Vince Zigowitz (supervisor of NWS Port Meteorology Officers) who referred him to the MV Oleander, a container ship which was at the time the best weather reporting ship. Negotiations with the officers and owners (the Bermuda Container Line) resulted in the AEG being given the privilege of placing one, sometimes 2 volunteer ship riders a month, every month on the Oleander so they could launch hourly XBTs and load /unload the CPR and supervise its launch and hauling in by the crew. The Oleander sails between Elizabeth, NJ and Hamilton, Bermuda every week.

Steve Cook and Bob Benway installed a MK 4, paper chart, XBT recorder and a CPR towing davit and sampling began in 1981. Harvey Therm, a NWS official rounded up dozens of NWS employees to ride the Oleander as volunteer ocean observers. NOAA/NMFS and NOAA HQ employees rode the Oleander in months for which there was no NWS employee available. NMFS/ AEG personnel would meet the NWS ship riders at the Newark AMTRAC or airport, drive them to the ship, brief them in the operation of the XBT and CPR systems and send them off. The ship gave them a room and board. AEG personnel would meet them on their return to Elizabeth Port, debrief them, retrieve the data and samples, and drive them back to their public transportation. The volunteers came from several varied states. Some of the NMFS staff who briefed/debriefed ship riders and troubleshoot equipment problems were Bob Benway, Steve McDermott, Bill Brennan (who eventually became NOAA Administrator for Pres. George W. Bush) and Glenn Strout. In 1986 Daniel Smith began to do nearly all of the ship visits.

In 1991 the BCL replaced the Oleander (mfg.date 1979) with a new ship built with a CPR towing davit and a hold space for an Acoustic Doppler Current Profiler (ADCP). NOAA's Atlantic Oceanographic and Meteorology Lab (AOML)'s Warren Krugg installed a thermosalinograph (TSG). The TSG on the Oleander measures the temperature and salinity of the seawater that is pumped into the ship through a dedicated sea cock. URI's Oceanography Department and Brookhaven National Laboratory installed the ADCP on the new ship. George Schwartze did

the maintenance and upgrades to the system.

In 2001 the GOES transmitter succumbed to the Y2K problem and was unable to determine the date. James Farrington of AOML brought an Inmarsat C transmitter to the ship in order to resume XBT and TSG transmissions. In about 2011 an Iridium satellite modem replaced the Inmarsat transmitter in order to reduce transmit costs.

Through the years Dan Smith became responsible for servicing the XBT and TSG systems hardware and software, the TSG and CPR systems. He did some ADCP software manipulations while listening to George Schwartze's instructions over the telephone.

In about 2011, give or take a year, The Woods Hole Oceanographic Lab's Expendable Instrument Lab installed an automated 12 probe XBT system that eventually eliminated the need for a ship rider and 2 times a month ship visits. The ship's Chief Bosun was trained to load the launcher and a way to pay him was found.

In 2014 Daniel Smith retired from federal service. The NMFS Northeast Fisheries Science Center director decided not to replace him and cancel the most cost effective federal oceanographic monitoring program. The CPR and TSG monitoring were stopped. The Oleander Project's National Science Foundation grant talked AOML into loaning them a TSG and the SAHFOS decided to continue the CPR survey at their expense. Tom Rossby and Charles Flagg currently maintain the Oleander Project's ADCP, XBT autolauncher and TSG.