ROV Survey Methods for

South Atlantic Bight MPA Project – Panama City

A remotely operated vehicle (ROV) owned and operated by the National Undersea Research Center (NURC) at the University of North Carolina at Wilmington (UNCW) was used to gather imagery for the characterization of habitats and the estimation of fish densities. Multibeam maps produced during a previous or concurrent NOAA projects were used to select sampling sites and guide the course of ROV dives. Currents required the use of a downweight to keep the ROV umbilical cable near the bottom throughout the dives. This downweight was tethered to the ROV umbilical and the ROV operated on a 30 m leash which provided sufficient freedom of movement to investigate habitat features within visual range of the transect line. The downweight configuration also allowed the ROV to hover just above the bottom at a controlled over-the-ground speed of approximately 1.4 km/hr (range 0.9 to 2.8 km/hr). The geographic position of the ROV (± 3m) was constantly recorded throughout each dive with a tracking system linked to the ship's DGPS system. The ROV was equipped with lights and a forward-looking digital color video camera which provided continuous imaging data. Each dive produces between two and four hours of underwater video documentation depending upon the size of the feature and the time constraints of the mission. The video footage was used to delineate and quantify habitat type as well as fish species presence and density within each habitat type. All fish within a 5 m radius of the transect line on the video tapes were identified to the lowest discernible taxonomic level and counted (5 m was determined as the maximum distance that fish could reasonably be identified). Fish densities (#/m2) were determined by estimating the area of view of the video camera during transects. The area of each transect was determined from transect length (L) and width (W). Transect length was calculated from latitude and longitude recorded by the ROV tracking system. The width of each transect was calculated using the following equation: $W=2(\tan(\frac{1}{2}A))(D)$ where A is the horizontal angle of view (78º, a constant property of the camera) and D is the distance from the camera at which fish could always be identified. The average distance (D) was 2.5 m (range from 1 m to 3.5 m) and was determined by the clarity of the water. Transect area (TA) was then calculated as: $TA= (LxW) - \frac{1}{2} (WxD)$ (all equations from Koenig et al., 2005). Densities of grouper and snapper species were calculated by dividing the number of each species by the TA. Average densities were calculated for each target species and then compared among the different areas examined.