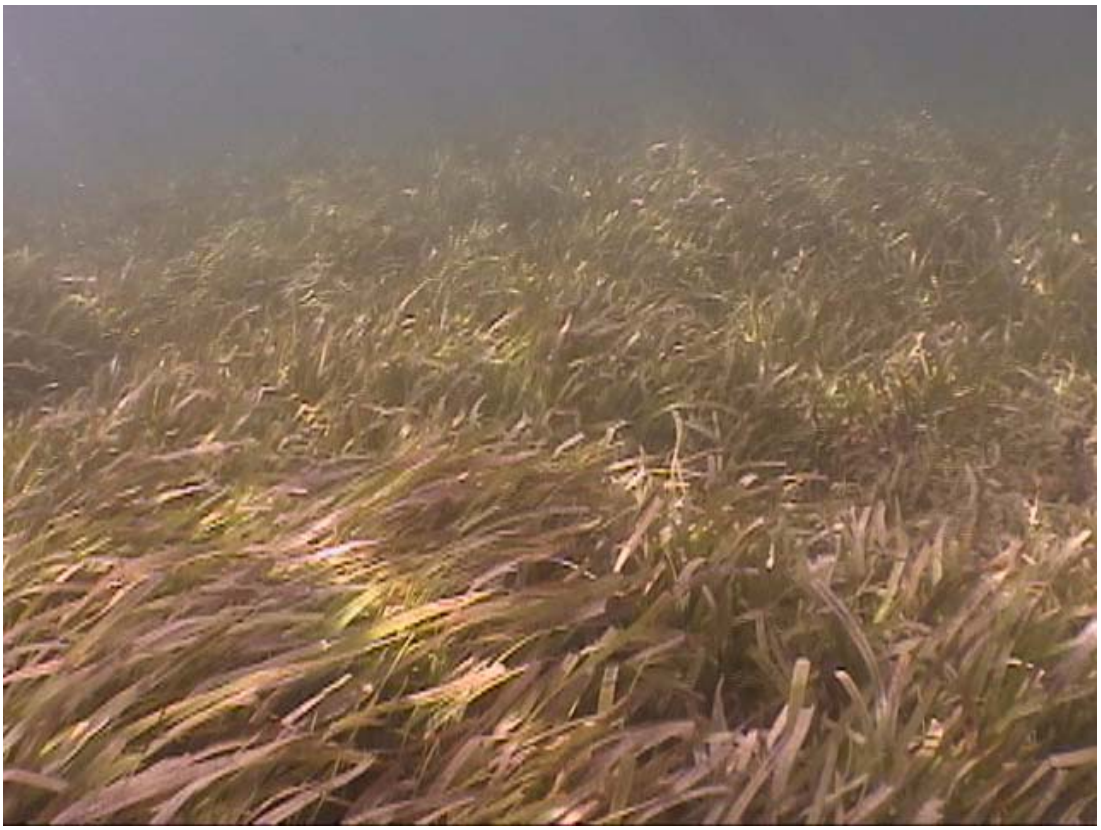

STATUS OF THE SHALLOW-WATER SEAGRASS COMMUNITIES AND CONCH POPULATIONS WITHIN THE LUIS PEÑA CHANNEL NO-TAKE NATURAL RESERVE, CULEBRA ISLAND, PUERTO RICO

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SUMMARY

The Luis Peña Channel No Take Natural Reserve (LPCNR), Culebra Island, Puerto Rico, is the only Natural Reserve under State jurisdiction where fishing is permanently prohibited since year 1999. The eastern coast of Puerto Rico, including Culebra Island, is one of the most important fishing grounds for Conch. However, there is a lack of information concerning the status of spawning stocks and juvenile stocks of these species in the region. From the essential fish habitat (EFH) standpoint, there is also a lack of information regarding the status of their habitats. One of the most important tasks of the CFMC in relation to EFH for each of the life stages of Conch species is to identify the location and distribution of individuals, as well as to assess the condition of these habitats. The role of MFRs to help restore Conch populations has been poorly documented and where adequate management and enforcement is lacking, there have been mixed or negative results. The 475 hectares of the LPCNR is the only location under the Puerto Rican state waters jurisdiction that Queen Conch fishing is permanently prohibited. Therefore, the LPCNR can become a permanent control monitoring station to address natural fluctuations of Conch populations. Also, it can be used as a model management tool to help restore shallow water populations of the Queen Conch within the U.S. Caribbean. However, it still lacks a management plan. Thus, it is important to establish a baseline data bank regarding the status of Conch populations and their EFHs within the LPCNR to which future stock and EFH assessments can be compared. This study was aimed at producing that baseline data bank. There were highly significant differences in the three major benthic components cover among study sites, including the % of seagrass, algal cover, and biomass. The highest % of seagrass cover, and *Thalassia testudinum* density, leaf area index (LAI), leaf length and width, and in the standing crop biomass were documented within the LPCNR, with the lowest at Puerto de Manglar control site (PMA-C). This site showed the highest % of algal cover and macroalgal standing crop biomass. There was also a significant correlation between biomass and LAI of *T. testudinum*, and the horizontal water transparency. The higher the transparency, the higher the biomass and LAI. But there was a strong negative correlation between % algal cover and biomass, and horizontal water transparency. The lower the water transparency, the higher the algal parameters. PMA-C is showing early signs of rapid seagrass declines due to water quality degradation associated to a combination of natural changes, land clearing activities, non-point

source pollution, recreational boating activities and anchoring. Geographically-based clusters were more clearly distinguished using multivariate analysis by means of cluster analysis (Bray-Curtis Ordination) and by a MDS ordination. PMA-C, and in a minor degree Bahía Mosquito control site (BMO-C) and Bahía Tarja reserve site (BTA-R) were clustered separately from the core seagrass bed habitats from the LPCMFR. The global ANOSIM-1 test revealed a highly significant difference (0%) of the seagrass bed community structure among sites. The pairwise ANOSIM-1 test revealed highly significant differences in the seagrass bed community structures within LPCNR sites, within control sites, and among LPCNR and control sites. Therefore, although seagrass habitats within the LPCNR are generally in better shape than controls, this was not completely clear for some sampling sites within and outside the Reserve. SIMPER analysis revealed that the % of relative seagrass cover was the most important benthic component for discriminating among all groups of sites in 8 out of the 10 comparisons of sites. Conch populations through all of the shallow-water study sites were depleted. There were no significant differences in the densities, maximum shell length or lip width of Conch populations within and outside the LPCNR. Only a total of 71 Conch were counted during the present study, which surveyed a total of 94 replicate 200 m^2 belt transects. These figures included 58 individuals of *Strombus pugilis*. The remaining Conch individuals included 12 *S. gigas*, and only a single individual of *S. costatus*. Conch show deterministic growth, thus, there were no relationships between shell length and lip width, suggesting that most of the shallow-water *S. gigas* and *S. pugilis* populations are juveniles. Conch populations sufferered also a major collapse (85-99%) within the LPCNR between year 1998 (1 year before designation) and 2002 (3 years after designation). These differences could be the result of natural fluctuations in conch recruitment patterns, a possible spatial and/or temporal shift in their aggregation behavior or the result of overfishing. It also suggests that lack of adequate enforcement and management by the PR Department of Natural and Environmental Resources enforcing personnel could have resulted in major overfishing of the LPCNR stocks. Several recommendations are presented to address the problem of seagrass bed habitat conservation in Culebra, lack of enforcement within the LPCNR, and to monitor seagrass bed communities and conch populations. But, given the threatened status of shallow-water conch fisheries in Culebra, the CFMC should evaluate: 1) the status of deep-water conch populations and habitats; 2) the alternative of expanding the seasonal closure to include the Fighting Conch, *Strombus pugilis*, and the Milk Conch, *S. costatus*, in

order to avoid “accidental” catches of juvenile *S. gigas*; and 3) the alternative of expanding the seasonal closure from March to September. A stronger effort should be put to restore conch populations within the LPCNR.