

PRNC-197 PUERTO RICO NUCLEAR CENTER ENVIRONMENTAL STUDIES OF THE PROPOSED NORTH COAST NUCLEAR PLANT UNIT NO. 1 SITE FINAL REPORT June 1975 VOLUME I OPERATED BY UNIVERSITY OF PUERTO RICO UNDER CONTRACT NO. AT (40-1)-1833 FOR US ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION ---Page Break--- ---Page Break--- ENVIRONMENTAL STUDIES OF THE PROPOSED NORTH COAST NUCLEAR PLANT UNIT NO. 1 SITE FINAL REPORT June 1975 VOLUME TWO Prepared for the Puerto Rico Water Resources Authority by the staff of the Puerto Rico Nuclear Center of the University of Puerto Rico. The Puerto Rico Nuclear Center is operated by the University OF Puerto Rico under Contract No. AT (40-1)-1833 for the U.S. Energy Research and Development Administration ---Page Break--- ---Page Break--- APPENDIX 1 VOLUME 2 Intensive Measurement and Analysis of Istote Nearshore Currents, 1. January-February 1974 2. May-June 1974 3. August-September 1974 Results of Rogue Study Aerial Dye Drops Study Sediment Transport at Islote Salinity and Sigma-T versus Depth Plots Arranged Chronologically by Area: Te1ote, Punta Manati, Tortuguero Bay Relative Abundance of Forbs, Grasses and Trees Found in the 36-Acre Area of Islote List of Trees and Shrubs, Forbs and Grasses Found in the One-Mile Exclusion Zone of Islote Fruit Trees Found in the One Square Mile Exclusion Zone Medicinal Properties, Poisonous and/or Toxic Properties, of Forbs and Grasses Found in the One Square Mile Exclusion Zone Poisonous Trees, Shrubs and Forbs, and Grasses Found in the One Square Mile Exclusion Zone Effects of Plant Density as Influenced by Moisture 1974-75 Average Number of Individuals per Plot: Plot No. E-2 East, Center and West Transects Species Composition, East, Center and West Transects Composition by Slope Aspect: North Facing, Ridge and South Facing Slopes Frequency of Plant Species Summary of Number of Species of the Quarterly Periods Found by Sampling Plot for each Total Phytoplankton Abundance (Cyanophyceae not included) 61 Te Bt 10.5,

10.5. 10.32 10.36 10.40 10.44 mt ---Page Break--- B 15 6" 8 9 20 a 2 Ce (£205 Of Total Numbers of zooplankton, Percentages, and Other Species by various categories (1:2,3) and offshore areas (6'5)- Crustaceans and other taxa. Intermediate Values, Means, Variances, and Confidence Intervals for Zooplankton Groups are presented in the table for Zooplankton Groups at stations 1, 2, 3, and 4. Organisms Collected in Preliminary Hard Bottom Samples. Organisms Collected from Permanent Sampling. List Of Fishes Observed in the Islote Area. Monthly Tally of Species Caught on Algal. Monthly Tally of Species Caught on Rock Outcrops. Monthly Tally of Species Caught on Sand. m1 15.1 6 m4 18.1 19.1 20.1 and 22.1 ---Page Break--- APPENDIX | SECTION 1 INTENSIVE MEASUREMENT AND ANALYSIS OF ISLOTE NEARSHORE CURRENTS, JAN-FEB 1974 Puerto Rico Nuclear Center Mayaguez, Puerto Rico ---Page Break--- SISEELY offshore from the proposed NORCO Plant site during January-February, 1974. Ten current meters recorded speed and direction over a period of a month, supplemented by drogue measurements on 3 separate days. Results indicate a strong tidal influence on flow, essentially parallel to the coast, with peak tidal velocities of around 30 cm/sec, alternating westward and eastward. Average speed was found to be 3 cm/sec westward, appearing to accelerate the net westward flow. ---Page Break--- In situ Coastal currents were measured off Islote during the period 15 January thru 27 February, 1974. Ten current meters were located in 5 stations positioned such that the stations formed a cross perpendicular to the coastline (see Figure 1). During the above time period, on 3 separate days surface drift currents were measured with 10 drogues deployed by ship and 19 expendable anchored drogues deployed by aircraft. The rhodamine dye patch diffusion observations which were made concurrently will be reported elsewhere. Data were recorded by aerial photographs. Hydrographic data were taken offshore.

during late January for the purpose of relating with nearshore current measurements. Intermittent

sea level measurements were recorded. INSTRUMENTS 'The 5 current meter stations were laid out in the form of a cross in order that 4 adjacent triangles could provide flow continuity information, each triangle being self-sufficient. The CENTER station was a taut-wire installation consisting of a large concrete block (approximately 500 kg), 2 ducted impeller type Bendix Q-15 current meters, a subsurface buoy (about 250 kg net buoyancy) and a surface marker buoy. The Bendix current meters were at depths of 5 m and 13 m, and the sea floor was at 20 m. 'The EAST station consisted of an automobile engine block on the bottom at 20 m, a tilt-type (film recording) General Oceanics current meter at 16 m, a Savonius-rotor type Hydro Products current meter at 6 m, two 9-liter polyurethane foam subsurface floats, and a surface marker float. The WEST Station consisted of a small Danforth anchor and chain and a weight on the bottom at 20 m, a General Oceanics current meter at 17 m depth, and a surface marker float. The SOUTH station consisted of an automobile engine block on the bottom at 13 m, a General Oceanics Current meter at 11 m depth, an identical instrument at 6 m depth, and 4 surface marker buoys. 'The NORTH station consisted of an automobile engine block on the bottom at 5 m, General Oceanics current meters at 48 m, 32 m and 15 m; a smaller polyurethane subsurface float at 10 m, and a surface marker float. Ten sea surface drogues were constructed of 1.2 cm plywood squares. Galvanized wire connected the plywood to the arm of four 0.6 m square vertical vanes made of galvanized sheet metal, hanging at a depth of 3 m. The 19 aircraft expendable anchored surface current probes (drogues) were manufactured by EOTECH. EQUIPMENT LOSSES & MALFUNCTIONS Due to ambient winter weather typical of the north coast of Puerto Rico, a number of the small surface buoys and one large (6 ft high) "menvtype" surface buoy at the CENTER.

station broke their Lines and/or chains and were lost. Two current meters sank to the bottom due to loss of surface and subsurface buoys at the EAST station but were recovered. The tyero 'rofets instrument was removed from service; the General Oceanics instrument was put back down, although in need of repair. The 2 Bendix current meters were only operational about 50% of the time due to loss of and damage to direction vanes and electrical cables, and to inadequate battery charges. The vanes were modified and repaired to the best possible in the field. During the final recovery of one Bendix meter, the recorder unit opened up and became flood damaged. ---Page Break--- The General Oceanics current meter at 15 m depth at the NORTH station was lost due to a material failure of its swivel. Of the 10 total current meters set out, 6 provided data, 3 failed to operate under the prevailing winter conditions, and 1 was lost. A Weather Measure type F552 water level recorder was installed on the pier inside the jetty at Arecibo, after installation at Palmas Alt proved impractical. During the first week of operation, the recorder was lost for reasons unknown. A second recorder was ordered and installed several weeks later. Limited results indicate that sea level at Arecibo is in good agreement with predictions for San Juan. Phase at Arecibo appears to lag San Juan by 0 to 0.4 hours (Figures 3 and 6). Dietrich (1957, plates 6 and 7) in his cotidal chart indicates that the diurnal tide wave passes essentially from west to east along the north shore of Puerto Rico, and that the semidiurnal tide wave passes in the opposite direction. Measurements indicate that tidal forces dominate the flow along the coast with maximum velocities of about 30 cm/sec, alternately westward and eastward. The net flow averaged over a month and several current meters indicates a value of about 3 cm/sec westward, of about an order of magnitude less than maximum daily tidal velocities. Qualitatively observed surge velocities from 1 to 2 swells of

around 5-6 seconds period over a bottom depth of 20 m appeared to be an order of magnitude larger than sax- Amun E1dal velocities during average winter conditions. Figures 2 through 6 contain graphs of measured current speed versus time for the CENTER and the NORTH stations. Speeds are given positive for westward flow and negative for eastward flow. As can be seen from

the direction versus time data in Figures 7 and 8, the flow is generally southwest parallel to the shore. Predicted sea level at San Juan versus time is presented alongside measured speed in Figures 2 through 6. The eastward flow follows flood tide and westward flow follows ebb tide, with maximum speed lagging mid-flood tide or mid-ebb tide by 1 to 2 hours. The complex nature of the identified flow requires further analysis. Table 7 presents measured current speed versus time for current meters at the WEST, SOUTH, and EAST stations. There is notable agreement in the fluctuation of all these current meters. Westward-only flow from 20 January through 1 February at the SOUTH station is probably attributable to wave-induced alongshore flow. This station is along the coastline with a net tendency to progress slowly westward at WEST, SOUTH, and EAST stations (Figures 10 through 13). As a result of strong southeast winds (Figure 9) eventing 29 January through 1 February, the flow moves consistently westward. The progressive vector diagram for the CENTER station is presented in Figure 14 with x. On 19 February at 1100 hours, the instrument 11-6 was observed underwater. Its direction vanes indicated a current toward the west. Current speed was estimated at 25 cm/sec. The speed estimate is in good agreement with measurement (Figure 6), but the directional measurement of 340° (Figure 14) is definitely not in agreement. Also, on 25 February at 1035 hours, instrument vanes were observed indicating a current toward the east as contrasted with measurement indicating south-southeast. Furthermore, intermittent failure of

Electrical connectors caused readings to go off scale toward 360°. The nature of the direction sensor is such that high electrical resistance indicates a high direction number. In addition, the electronic adjustment for the direction scale is such that error magnitude increases nearly with direction number from 0° to 360°. There could be an error of +20° at east and one of +60° at west. Drogue measurements indicated east-west flow. The northward net flow indication of the CENTER station is inconsistent with other observations. We progressive vector for the NORTH station in somewhat deeper water indicates net flow toward the east (see Figure 15). During the windy period of 29 January through 1 February, eastward progress was nearly arrested. This effect is in agreement with the effects of wind action shown in Figures 10 through 13. The situation for the CENTER station requires that the measurements be repeated. If in fact flow at this station is northward and flow at the NORTH station at all depths in the water column is eastward, then there is an eddy circulating clockwise off Islote. Such an eddy could seriously affect the removal of heated water. In any case, it appears that a cooling water intake located substantially seaward of the heated water discharge (perhaps twice the distance from intake to shore) would involve minimum risk of reentrainment. If the intake were nearer shore than the discharge, the former would be likely to ingest heated water for a good part of each tidal cycle. Drogue measurements indicate a gradual drift toward shore during both westward and eastward tidal excursions (Figure 16). Drogue measurements will be done more extensively and with better instruments during the spring sampling period. The data for winter 1974 off Islote are summarized as follows: WEST station net flow 5.8 cm/sec toward 237° (westward), maximum hour averaged velocity excursion (mean): 35.0 cm/sec westward, 35.1 cm/sec eastward, net flow 3.7 cm/sec toward 298° (westward).

2.2 ea/sec toward 280° (westward) Gotten) maximum hour averaged velocity excursion (tidal) westward 33.3 cm/sec (cop) 23.1 ea/sec (bottom) eastward 25.8 cm/sec (eop) 20.9 en/sec (bottom) net flow 2.1 cm/sec toward 217° (westward) maximum hour averaged velocity excursion (tidal) 11-8 ---Page Break--- net flow 4.2 maximum hour net flow 4.6 maximum hour 26.0 ea/sec westward 23.6 en/sec eastward en/sec toward 342° (northward) averaged velocity excursion (tidal) 30.8 en/sec westward 23.1 en/sec eastward sec toward 101° (eastward) averaged velocity excursion (tidal)

35.0 en/sec westward 35.1 en/sec eastward ---Page Break--- ---Page Break--- ---Page Break---  
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Break--- ---Page Break--- ---Page Break--- ---Page Break--- [APPENDIX 1 SECTION 2  
MEASUREMENT AND ANALYSIS OF ISLOTE NEARSHORE CURRENTS, MAY ~ JUNE 1974  
Puerto Rico Nuclear Center Mayaguez, Puerto Rico 28 June 1974 ---Page Break---  
INTRODUCTION Coastal currents were measured off Islote during the period 1- June 76 (figs 1 &  
2); Five General Oceanics current meters were located at 3 oceanic sites which had been  
previously measured during January = February 1966 These locations are referred to as the  
NORTH, CENTER, and EAST stations. One instrument at the NORTH station failed to record. Data  
from the signals (current meters) at the EAST station will be presented in a later report, with results  
that are expected not to be significantly different from earlier measurements at the EAST station.  
Discussion Earlier reported measurements at the CENTER station for winter 1974 had stronger  
data that were suspected of being not representative due to instrument failure and calibration error.  
The related data results for the "Islote Frere" period and the presently reported period, 1-6 Jun, are  
tabulated in Table 1 principally. The apparent 180° difference (Table 7) tratat.

{love direction at around 1s meter depth for artificial; the persistence "PES" gE cistran (Fig. 3)  
clearly illustrates the dominant western current, the EEE Rearbottom velocities during June  
correlate with the difference of a well-mixed surface layer found (from hydrographic data) during  
December 1976. \* See, topical report "Intensive Measurement and Analysis of Islote Nearshore  
Currents, Jan-Feb 1974," dated May 1974. ---Page Break--- notes) are: fully AURAL was, parar co  
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MIQOTIN—GRDWUBAY UNOH WHICH = 9LEL Lda NOLES has the 2-6 ---Page Break---  
APPENDIX SECTION 3 MEASUREMENT AND ANALYSIS OF ISLOTE NEARSHORE  
CURRENTS, AUG-SEPT 1974 Puerto Rico Nuclear Center Mayaguez, Puerto Rico 10 December  
1974 ---Page Break--- Introduction Coastal currents were measured off Islote during the period 27  
August through 4 September 1974, coincident with 24 hour (expanded time scale) coe level  
measurements at Muetie Arecibo. Four General Oceanics current meters were positioned at the  
Center and East stations. Also, currents were measured during the period 17-27 September 1974  
with two General Oceanics current meters at the East station in conjunction with measures velocity  
average over a 5 meter thick surface layer of water and io drift-poles (an improved type of drogue  
that is relatively unaffected by surface wind). Previous current measurements were reported in  
"Intensive Measurements and Analysis of Islote Nearshore Current, Jan-Feb 1974," dated May  
1974, "Measurement and Analysis of Islote Nearshore Currents, May-June 1974," dated 28 June  
1974. Detailed bathymetry of the nearshore area off Islote and hydrology of the ocean Guine north  
coast of Puerto Rico, encompassing the Islote area, including SSTalleg temperature and salinity  
structure for Jan 1973 through May 1974 were reported in "Environmental Report for Nuclear  
Power Plant, 'Section 2.5.2 submitted

2 August 1974, a revised version of the Environmental Report section 2.5.2 concurrently being  
completed will include additional hydrology data. Discussion: Current measurements off Isolate  
indicate a net flow eastward during August-September 1974 (see Table 1). A reference station to  
the east of Isolate shows that, furthermore, drift-pole (drogue) measurements indicate eastward  
flow (Figures 1, 2, and 3). This net eastward flow is in contrast to net westward flow during  
January-February 1974 and May-June 1974. ---Page Break--- This tends to mask any long-term net  
flow whenever measurements are limited to a few days or less (all previously reported

measurements of currents around Puerto Rico by other groups). The North station measurements during January-February and June 1974 were the first clue that net flow to the east occurs (see Table 1). During January-February, wind wave-induced alongshore transport is westward from the shore out to a demarcation line of no net flow, somewhere between the Center station (20 meter depth contours) and the North station (50 meter depth contours). During May-June, wind wave-induced alongshore transport has diminished considerably and appears to be limited to a well-mixed surface layer of about 10 meter thickness. By August-September, wind waves no longer come from the northeast, but from the northwest. Alongshore transport is now to the east. This net flow to the east during August-September appears stronger than other seasons because it is probably the sum of alongshore eastward flow and an annual net eastward flow. ---Page Break--- +69 ze rie wee "ideg~6my st iNai6 conor ote ce ove o'se das~ "my % even — INaBe son at eve or aides on1e6 -06 v8 eee over "0s, ors -98 os au ze "idas~"6my 1 stic6 stor ve ovo £792 "tdas~Eny » ies suiv6 ote ee eee 02 "1eag-2z"Bmy %1 zu68 087 96 eee Mee Len2e "omy Sy sowsa eee ote 16 ove ez vidas, ssnou WE Reyes +96 or 69 ose "ides easy ys (298/u0) —(208/uo) (298/u9) seg (aw vorizeag Molten puemise's pueomisom, "ON 261 uidog (28e40ny uno} 4119010, wnspey 1 ev. ---Page

Break--- ---Page Break--- 340781 ---Page Break--- ---Page Break--- ---Page Break--- APPENDIX 2 RESULTS OF DROGUE STUDY Puerto Rico Nuclear Center Mayaguez, Puerto Rico ---Page Break--- Figure 2.1 2.16 a7 FIGURE Lecenos Current Speed (cm/sec) eastward and westward along North Coast of Puerto Rico and San Juan predicted sea level August September 1974 Current Speed (cm/sec) eastward and westward along North Coast of Puerto Rico and San Juan predicted sea level September 137 Current Speed (cm/sec) eastward and westward along North Coast of Puerto Rico and San Juan predicted sea level October November 1974 Current Speed (cm/sec) eastward and westward along North Coast of Puerto Rico and San Juan predicted sea level November 1974 Current Speed (cm/sec) eastward and westward along North Coast of Puerto Rico and San Juan predicted sea level December 1974 Current Speed (cm/sec) eastward and westward along North Coast of Puerto Rico and San Juan predicted sea level December January 1975 Drogue Study 18 September 1974 Drogue Study 19 September 1974 Drogue Study 19 September 1974 Drogue Study 6 December 1974 Drogue Study 6 December 1974 Drogue Study 6 December 1974 Drogue Study 19 December 1974 Drogue Study 20 December 1974 Drogue Study 20 December 1974 ---Page Break--- ---Page Break--- 'adi il Sp earcarn ren fi Va py ez "815 ---Page Break--- Paya sr wart ---Page Break--- Fig. 2.7 ---Page Break--- 310781 ---Page Break--- 6 613 2.26 ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- APPENDIX 3 AERIAL DYE DROPS STUDY Puerto Rico Nuclear Center Mayaguez, Puerto Rico ---Page Break--- Aerial Dye Drops 12/4/74 'The first run began at 0924; the area was observed from the air and drops were made at 0930. The spacing was too close with only one outermost balloon beyond the 20m contour. Standard Navy sea markers were used; partially inflated toy balloons were tied to ensure.

Flotation, three observation runs were made at an altitude of 1,200 feet at about 20-minute intervals. Six dye packets remained in view throughout the period. Currents were to the east at all points with a slight shoreward component toward the end of the observation period. "When observation was resumed at 12:20 PM (Drop 2), four of the six packets were still streaming and were seen in the vicinity of Punta Palma Altas (Barceloneta). The second drop was made at 12:25. Initial movement was apparently to the east. The patch closest to shore (A) entered the current zone slightly to the east of its original position, and the dye disappeared in the surf (12:35). Patch B

appeared to reverse direction, moving westward and entered the surf zone near Punta de las Tunas after approximately four minutes. Patch C moved eastward generally parallel to the coast for about 40 minutes and then moved towards the west and shoreward. Patch D moved eastward close to the coast with shoreward movement increasing at the end of the hour. Patches E and F moved parallel to the coast in an easterly motion for the first hour and then exhibited more motion shoreward. As it appeared that a current reversal might be starting, an additional drop was made at 1:40 PM (due to scheduling requirements, the helicopter was scheduled to be in San Juan at 6:30 PM). At the start of this run, dye patches E and F from Drop 2 were clearly discernible. Patch D was highly diffuse in the area of the awash rocks, and A, B, and C were gone or dissipating in the area west of the drop line. Patch B moved westward, patch C was essentially stationary, and patches D, E, and F moved westward toward the south. ---Page Break--- DYE STUDY COMMENTS 12/9/74 Drop 1 ~ Drop 3 - All parallel to coast and westward - Patch A dispersed in view between T3 and T4. Three offshore patches to the west (D, E, F). Inshore patches moved west then east. All patches moved west; patch A entered the surf zone near the headland and dispersed at T3:33. ---Page Break--- Drop 1 - Drop 2 - Drop 3 = 12/9/74 Initial motion eastward, fast forward motion.

per uit time showed a marked increase between Tz and Ts. Some onshore movement but generally parallel to the coast. One packet (innermost) can be at 01 helicopter float and deployed at the end of and west of the drop line. Eastward motion initially by all patches with a strong shoreward motion. Patch i reversed direction. All patches moved west and shoreward. Package A entered the surf and dispersed at T; - At time Ts, packet B was lifted onto the cliffs of the first headland. ---Page Break--- DYE STUDY COMMENTS 12/19/74 Drop 1 - Drop 2 - Drop 3 - A really mixed bag - The drop went at 0918 - buoy CH was straddled - a slight easterly motion was apparent at Ty, ALL patches except patch D had moved eastward - patch D moved westward at T. Patches 4, C, D, E & F had moved eastward and shoreward to varying degrees. White patch B moved northward. At T-3 patches A, B, C, D & E had moved westward while patch F showed continued motion toward the southwest. At 1220 an overflight indicated that dye patches from drop 1 were in the area of the N-S line from CH buoy and met tower - for this reason the drop was made on a N-S line passing through the westernmost awash rock. Initial motion was westward. Patch A moved very rapidly westward and washed ashore near the first headland to the west of the site at Tz. The balance of the dye patches moved approximately westward during the observation period. The drop was not made on a N-S line due to high velocity winds - Motion was generally parallel to the coast - Patch A entered the "eye" between Tz and T3. 3.5 ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- | | \*\ od FA | sf2çaeçè8 Pbedee oy ---Page Break--- ---Page Break--- ---Page Break--- 22£bsags \$s 38282 gy ---Page Break--- [ee Ws S'ee2a2 9 aa 28 eee ---Page Break--- meet = 6 peleuzr :ere0 ---Page Break--- ---Page Break--- ---Page Break--- APPENDIX & SEDIMENT TRANSPORT AT ISLOTE by Hounir T. Moussa, Ph.D. Associate Professor of Geology University of Puerto Rico, and Scientist, Environmental Studies

Project, Puerto Rico Nuclear Center, Mayaguez, Puerto Rico March 1975 ---Page Break--- Sediment Transport at Islote A field study of sediment transport in the nearshore waters off the NORCO NP-1 site (see Figure 1) was conducted on 15 October 1974. A large sample of sand which had previously been collected from the site was washed to remove salt, dried, and a subsample removed for grain size analysis (see Figure 2). The remainder of the sample was dyed with a fluorescent dye using the method of Wright as described in Ingle (1966). The dye solution consisted of 17.69 grams of anthracene dissolved in 1.0 liters of chloroform. SCUBA divers released 2.5 kilograms of dyed sand at the center of a steel grid which had been placed on the seabottom (5 meter depth) at the study location with one axis oriented North-South. The dyed

sediment was then subjected to normal sediment transport forces for a period of four hours. Samples were then taken from 24 grid locations (see Figure 3) utilizing plastic cards coated with a thin layer of machine grease. The cards were pressed firmly against the sea bottom by divers and the surface sand grains became entrapped in the grease coating. The cards were returned to the laboratory where the number of fluorescent grains adhering to the grease coating were counted under ultraviolet light. Results were plotted on polar coordinate paper (see Figure 4). Net sediment transport was to the east which is in agreement with diver observations on current direction during the study period. No quantitative estimates of sediment transport can be derived from the study. Reference: Ingle, Jr., James C., 1966, The Movement of Beach Sand- Amsterdam, Elsevier Publishing Co, 221 p. 42 ---Page Break--- I-aN“OORION 10181 18 Apmig Wwodsues 1 juswypas Jo UONED07 “| “Bi °.sp1803N 507 ~¢ Nv390 S1LNVLV ---Page Break--- + TT ---Page Break--- of Sampling sta ple Release Poin: 45 ---Page Break--- ---Page Break--- Table 1. Fluorescent Grain Counts per 5.7 x 8.9 cm area Station No. of Grains Station No. of Grains nt " st

19 nz 8 32 3 N3 6 83 "7 ner 32 swt 20 Nez 30 swe 15 Ne3 15 sw3 3 a 57 “1 1m 2 54 we 2 3 38 “3 9 sel 51 war " se2 26 ne 10 Se3 40 ns, 7 47 ---Page Break--- ---Page Break--- [APPENDIX 5, SALINITY AND SIGMA-T VERSUS DEPTH PLOTS Arranged chronologically by area: Islote Punta Manati Tortuguero Bay Puerto Rico Nuclear Center Mayaguez, Puerto Rico 5.1 ---Page Break--- DEPTH cap) HYDROSTATION VERTICAL: PROFILES FOR SAMPLE SALINITY AND SIGMA-T. TRANSECT 16-1, DATE 1/24/74 ® » » 9 Po ee eas ! ~y " ves | se | pif ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR SALINITY AND SIGMA-T. TRANSECT TSL-2. DATE 1/24/74 DEPTH re 5.3 ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR SALINITY AND SIGMA-T, TRANSECT ISL-1, DATE 1/27/74 DEPTH cat ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR THE TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT ISL-4, DATE 1/24/74 | Lo OFPTH co 5.5 ---Page Break--- DEPTH cn HYDROSTATION VERTICAL PROFILES FOR DISSOLVED OXYGEN AND REACTIVE PHOSPHATE. TRANSECT ISL-5 DATE 1/24/74 e 1 2 3 4 § 6 xC,t 1 GR 8 ey “ 2 “4 6 2 1,2 Ca as \ bo 5.6 PHOSPHATE ---Page Break--- ---Page Break--- ---Page Break--- DEPTH HYDROSTATION VERTICAL PROFILES FOR THE SALINITY AND SIGHT. DATE 5/22 y se 108 SALINITY DATA Sls ---Page Break--- TRANSECT VERTICAL PROFILES ETMAE, TRANSECT ISL-4, DATE 5/22, ROSE ents cn 2 36, 2” ete 1 22 22 aa HE ee 102 2e0 see. ---Page Break--- DEPTH HYDROSTATION VERTICAL PROFILE FOR TEMPERATURE, SALINITY AND SIGMA-T TRANSECT ISL-5. 1/24/74 ---Page Break--- DEPTH oD Teor RAT ---Page Break--- epi cm ---Page Break--- ---Page Break--- SEPIA Om ae] LAL PROFILES FOR TEMPERATURE, ---Page Break--- Let FEGLUTATION VERTICAL SALINITY AND SIGMA. TRANSECT 16. 6, DATE ---Page Break--- ---Page Break--- ---Page Break--- HYDROSTATION CRITICAL PROFILES FOR THE TEMPERATURE, SALINITY AND SIGMA, CT 181.3 ---Page Break--- VERTICAL PROFILES FOR THE TEMPERATURE 5.20 ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA. TRANSECT ISL-5. DATE 1/07/74 2H Ed » orera crn 228. ---Page Break---

OFPTH (HD) HYDROSTATION VERTICAL PROFILES FOR SALINITY AND SIGMA-T, AT 511073 ERATERE TEMPERATURE. ---Page Break--- DEPTH (HD) HYDROSTATIC VERTICAL PROFILES FOR TEMPERATURE: SALINITY AND SIGMA-T, TRANSECT PRE. DATE: S11772 = % x oe ol te | ee teem. : grow t ej 8 \$ 7 ° = 2 108 ° 7 a = e te 200 ‘32a. ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT PMA-4, DATE 6/1173 B \* Zz oe cnet nn) a a HLivtk 2 2 me ° sigma-T gp 12 e — co = 162 2 @ zs E 5 se 100 200. 300 ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR

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HYDROSTATION VERTICAL SALINITY AND SIGMA-T. TRANSECT HALT, DATE 1/22/74 TLS  
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16 18 ze | 2 24 26 a T 120 5.52 ---Page Break--- DEPTH cp HYDROSTATIC VERTICAL  
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TEMPERATURE, SALINITY AND SIGMA-T TRANSECT TOR-4, DATE 5/1/73, 38 EA y 1 12 2 et 26 26 TEMPERATURE ° SIGMA-T 8 aes T ° : 2. 52. 100 120, DEPTH cm a 5.55 ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT TOR-5, DATE 5/10/73 35. % vy OP ey very . v6 1B aw 2 24 2 28, TEMPERATURE ° SIGMA-T 8 aes T ° : 2. 52. 100 120, DEPTH cm a 5.55 ---Page Break--- DEPTH cd HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE SALINITY AND SIGMA-T CT TOR-6, DATE 5/12/73 100 ---Page Break--- ---Page Break--- Depth ot ---Page Break--- ee ve Of Pd z & a 5.59 ---Page Break--- HYDROSTATION VERTICAL #8 SALINITY AND SIGMA-T. TRANSECT TCS-4, DATE dy 8/73 depth cm ---Page Break--- ---Page Break--- TOR-1 NO DATA ---HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE SALINITY AND SIGMA-T. TRANSECT TOR-2, DATE 12/74 2% EA x : oe net 1p 19 ed 28 temperature SIGMA-T we 5.62 ---Page Break--- DEPTH CHD see Row g rea: 200 HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T TRANSECT TOR 3. GAIT Ret te 18 2g. 22 24 26 \_y TEMPERATURE SIGMA-T ---Page Break--- DEPTH CHD HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE SALINITY AND SIGMA-T. TRANSECT TOR-5, DATE 12/9/74 = 36. 2 oe unity o 16 18. ze 2 Ey 26 26 temperature s ASAT SESTAT gp we e 2: 82. 198 et 2: se. 102 208 ee 5.64 ---Page Break--- DEPTH cH ree HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE SALINITY AND SIGMA-T. TRANSECT TOR-5. 5.65 ---Page Break--- HYDROSTATION VERTICAL SALINITY AND SIGMA-T. PROFILES FOR TEMPERATURE. TOR-1 NO DATA TRANSECT TOR-2, DATE 5/22/74 25 x x ° vi 1B, we, et me ° ° 18 < t T e 2s se 162 100 5.66 SALINITY TEMPERATURE SIGMA-T ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE SALINITY AND SIGMA-T. TOR-3 NO DATA TRANSECT Token DATE 5/22/74 ---Page Break--- DEPTH cr HYDROSTATION

VERTICAL PROFILES FOR TRICERATURT SALINITY AND SIGMA-T. TRANSECT TOR-1, DATE 1/14/74 3:00 2° 4 salinity etc. 1 ee tt mee aperpaine eB 8 stout e 1 ss t t ep mn a | 2 i 102 e+ 2. | 100 i 5.68 ---Page Break--- DEPTH CHD HYDROSTATIC VERTICAL PROFILES FOR TRICERATURUS. SALINITY AND SIGMA-T, TRANSECT TOR-2. DATE 1/14/74 3:36 Ba Oty o \_t6 12 22 22 24 26 22 rrmersat ° ---' stuna-t 8 [Se e - f 2 se. mnt 2s: 82 102 320 ---Page Break--- DEPTH (ro HYDROSTATION VERTICAL PROFILES FOR TRICERATLAE. SALINITY AND SIGMA-T. TRANSECT TOR-3, DATE 1/14/74 6:00 oe etry ee ee ean ° 'SIGMA-T 4 8 2 2: 5.70 ---Page Break--- HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT TOR-4, DATE, 1/30/74 3:00 12 me 2 6 22 repens . 'SIGMA-T ---Page Break--- DEPTH cr Siasceet foes. DATE. 1/14/74 3:00 7 of Pt tt ht SALINITY eh ee eae arrears ° 'SIGMA-T ° 3 eo : 2 va 100 e4- tt zs 2 120 20 xe HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. ---Page Break--- DEPTH cD HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT TOR-1, DATE 1/30/74 z= 36 7 OP ity vow we eae cerermarene ° SIGMA-T e+ we ¥ t q 2 25: 5.73 ---Page Break--- DEPTH CAD) HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT TOR-2. DATE 1/02/74 5:36 x co Ee SALINITY v1 2 22. 22. 2a 26 28, TEMPERATURE A SIGMA-T gS TT | 2 eo see 22 5.74 ---Page Break--- DEPTH crn ree HYDROSTATION VERTICAL PROFILES FOR TRICERATURT, SALINITY AND SIGMA-T, TRANSECT TOR, DATE 1/14/74 ---Page Break--- DEPTH cD HYDROSTATION VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT TOR, DATE 1/24/74 3 6 2 og cant if 12 2g 2B 2a 26 28 TEMPERATURE + tp IP 1 a2, 2) . 2 4 A SIGMA-T \$ ES TET et 1 a 5e a see 228 5.76 ---Page Break--- DEPTH cD ° \$ e e 8k HYDROSTATIC VERTICAL PROFILES FOR TEMPERATURE, SALINITY AND SIGMA-T. TRANSECT TOR-5, DATE 1/30/74 36 % . Pe unity 16 18 2e. 2 2a 26 28 temperature Ufa R SIGMA-T ~o ¥ Tt ---Page Break--- ---Page Break---

## APPENDIX 6. RELATIVE ABUNDANCE OF FORBS, GRASSES AND TREES FOUND IN THE

36 ACRE AREA OF ISLOTE FORBS AND GRASSES Totimacad Abundance Sentinestte wane common Hane se afstts Suacytargees jomatcensia | verbena alelafalala | dena ptoea varascita suvertre | alasafalala | centronensputescone Flor de Pito clalelele|e hoatiace sore Doratders clelele|ele tele ts "el | eta noatttora ctaréa clafalelele | Parthenium hysterophorus Arcenica Cimarron | clafalejale | Lantana camara cartaguitie alefafajala | Aderonopium gossipi folium 'Tau Tua, Tuatéa dlalele ale tiaoes sotice vortviviv, weivts | afefala fale Test #1 undncicied ef | fe petertta ha Leetactiio afelelafate Tndlgotara sndscashyLia Jai e Patto afelelelele samen cinerea abo de Buty ' snedretta rosters cerbacana ' ele Selanun sorwe tereajena cimarrons | a) | fe fa - widespread; b - large patches; - small patches; d - one of two individuals disseminated throughout the entire section. 6.1 ---Page Break--- Appendix 6 (continued) Estimated Abundance Scientific Name Common Name Per Section@ 1213] 4[3[s ededia erilobata vaneanttta do Playa | eafalalala PeyLtancus slruet Quinino de esbre alalelelele orb #2 unidentified ale fa Achyranthes dndtea snam, Rado de taron | clelelele orb #3 unidentified afafalafele Yelochin pyrantdata aretoniea ficaniaat | alalalafala Ricinus communis 'Higuereta, Ricino | © eonotis gupetaetotia toton de Cadete ale sorus praccatortus Peronta clafe (rotolaria strtata cascabetttio | ela 'Teidax procunbens 'Tridax | a Dlerenexa occidentalis edtonda efafalale Dessodiua çp. Satsabaces, Fess tess | |» lalale|a duaranthus spinosus Mero tspinoso c} fale datacnea capitana vatva c} fe Salvia serotioa Voradttta Azul ' uphovbia hypertetfolta Lechecttta alelelelele DoLteholus ain Fetjottti0 clafalalele upatortun oforatum Senea tart 4 Dessodlun ep: tega toga Peguero | a ala lalale Batata sonenttotta faye gue t0 cose ' Yeon rt obata vaiva Ciaareona de | ' Flores Lilas, Cadillo Gordie corynbo Cordia rugosa alalale 'ta ~ widespread; b ~ large patches two individuals dis © = anal patches; d - one of two individuals disseminated throughout the entire section.

6.2 ---Page Break--- Appendix 6 (continued) Scientific Name Common Name Estimated Abundance Commelina diffusa Creeping Bluebell 1 Ricinus communis Castor Bean 2 Vigna repens Wild Cowpea 3 Aeschynomene indica 4 Momordica charantia Bitter Melon 5 Cenchrus echinatus 6 Asclepias tuberosa Butterfly Weed 7 Portulaca pilosa Don Diego Silvestre 8 Jatropha integerrima 9 Solanum exhaustivum 10 Tetraphysa tetrasperma 11 Commelina diffusa 12 Stevia rebaudiana 13 Pluchea purpurascens 14 Salvia clearea 15 Euphorbia heterophylla 16 Chenopodium ambrosioides Pazote 17 Forb #6 unidentified 18 Forb #7 unidentified 19 Hyptis pectinata 20 Maranta arundinacea 21 Carex sp. 22 Eclipta prostrata 23 Eleusine indica 24 \*a - widespread; b - large patches; c - small patches; d - one or two individuals disseminated throughout the entire section. ---Page Break--- Appendix 6 (continued) Estimated Abundance Scientific Name Common Name Estimated Abundance Paspalum paspalodes 1 Eleocharis interstincta 2 Digitaria decumbens 3 Crassula 4 Paragutta 5 Tetraploid repens 6 Digitaria sanguinalis 7 Panicum purpurascens 8 Bromelia pinguin 9 Amaranthus dubius 10 Blero Blanco 11 Bandta sitis 12 Tithonia diversifolia 13 Calophyllum brasiliense 14 Casuarina equisetifolia 15 Citrus aurantiifolia 16

'terus auranciun Marana Ageia 1 Gites Mson Limon de cabro afi Citrus sinensis onina 1 oe0s vet fora Patna de Coco 5} 2d ujas} [a7 Grescencta cujete Higuero 1 "e~ widespread; b - large patches; c ~ small patches; ç - one or fo individuals disseminated throughout the entire section. ---Page Break--- Appendix 6 (continued) Scientific Names Estimated Abundance | Hipponane mancinel la | Bersca azerfcane womieatae | Pht | | Aguacate: | 1 | coerahe : send : | Teyepstte » | two individuals disseminated throughout the entire section. 6.6 = widespread; b ~ large patches; c - small patches; ç - one or ---Page Break--- APPENDIX 7 LIST OF TREES AND SHRUBS, FORBS AND Grasses FOUND IN THE ONE MILE EXCLUSION ZONE TREES AND SHRUBS Scientific Name English

Common Name 'Spank Common Name Albieta Lebek Anacardive occidentale Andira soernis  
'Annona suricata Annona rettevlata Bronelta pinguin Bursers stearub Byrsontea coriaccia Gactus  
sp. Calophylius brastlicase Garica papaya Casuarina equisetifolia Gecropia peltata Chaleas  
exotica Ghrysobatanus icaco Citharenyctue fruttcosun Gltrus aurantifolia Gisrus nobtlsa, Citrus  
poradisi Citrus sinensis Clusia rosea Tibet, Lebbek cashew 'cabbage angelia Soursop Custard  
apple Turpentine tree Locust berry Finger tree Not available Papaw tree Australian bee food  
Trumpet tree Coco pun Florida fladiewood Line Tangerine Grapefruit Orange Wild manne Acacia  
anarilla Pajuil | Moca Guanabana | corazon Maya Alnacigo Maricas Arbol de dedo Maria del pais  
Papaya Pino, Cesuarina Yagrano henbra Cate de 1a india Teaco prieto Pendula Lizon Mandarin  
Toronja China Cupey det rio ---Page Break--- Appendix 7 (continued) Pithecellobium dulce  
Pichocellobius saman Punica granatum Pediive guajava Randia aculeata Roystonea boringuena  
Sabal caustarum Sesbania grandiflora Spachodea campanulata Spondias soabin Tabebuta  
heterophylla Tamarindus indica Terminalia catapa Thespesia populnea Teichtita hirca Not available  
Not available Unidentified citrus like tree Unidentified dark leaf Raintree Pomegranate Guava  
Boxbriar Puerto Rico

royal palm. Puerto Rico palmetto Agatti African eulip tree Wogplun nite cedar 'Tamarind Indian  
almond Portiatree Broomstick 'Not available Not label or available English Spanish Scientific Name  
Coron Kane |\_|\_Gosmon Name Phyllanthus actinocarpus Gooseberry cree Grosella Pimenta  
racemosa Bay-rum tree Malagueta Guana azericano Sanan Granada cusyaba Tineélle Paina real  
Paine de sombrero culo Tolipan africano obo Robe 'Tamarindo Alvendro Peajagutlla Tinaeto Teaco  
blanco Jobo efemarron Maria azericano 12 ---Page Break--- Appendix 7 (continued) English  
Scientific Name onsen Name Soccotobs wifers Seagrape uvas de playa Cocos auciferus Golvorina  
reclinata Cardia alsiodes Croton capitatus 'Elasodendrum sylocarpum Exithrina pospichiana Ficus  
elastica Swietenia sepulchralis Hibiscus macranthus Hipponae sanctinella Malpighia puniceifolia  
Mone: Mangifera indica Manilkara sp. Melicoccus bijugatus 200 sp. Opuntia dillenii Persea  
americana Pachira bicolor Coconut tree Soldierwood capa Calabash tree Flamboyant tree Marble  
tree Mountain immortelle India rubber Shortest fig Mother of cocos Sea hibiscus Manchineel West  
Indian cherry Mammee apple Mango Bullet wood Ginep Avocado Palma de coco navi capa prieto  
Higuero Flamboyant Coscorrón Bucare gigantea Jaguey blanco Mata de ratón Majagua Manzanillo  
de playa Acerola Navey range Ausubo Quenepa Laurel sp. Aguacate Teagutito 7.3 ---Page  
Break--- Appendix 7 (continued) grasses = [stasis sn | a | axonopus compressus Carpet grass |  
verbena watsoniana Ghorts inflata | Yerba paraguica Comodon gactylon | Bermuda grass Pangola  
grass Yerba pangola Yerba berouda Yerba de guinea Bostrichus coagulatus Sporobolus virginicus  
cons, Yerba malojillo Sour paspalum Yerba horqueña Yerba cortadora Dropseed Cerrito Seashore  
dropseed grass Yerba natosa de burro | Tricholaena repens Yerba rosada Not available Yerba de  
saya Now Not available Yerba de Playa Xo. 2 Migiearis sanguinatus Crabgrass Pendejito Gygorus  
rotundus Nutgrass Eleocharis isocorystis Rush once equinatus Sandbur sorojo 7h ---Page Break---  
Appendix 7

(continued) Fores Engst | \_ Shanta Scleneifte Same common Kane | \_\_\_connon Sam Abrus  
precatorius Achyranthes indica | Aderonoptum gossipifolium 'Agalinis fasciata! Agave snyderiana  
Aloe vulgaris Amaranthus dubius Amaranthus spinosus Argemone mexicana Asclepias Al Batis  
maritima Bidens pilosa Chamaecrista pyramidatum Boerhaavia diffusa Irythraea verticillata  
Bryophyllum pinnatum Cenchrus moritima Casia odorata Catharanthus roseus Centrosema  
pubescens Black nightshade Century plant Aloe Amaranth Spiny amaranth Mexican poppy Bastard  
ipecac Acamacho lily Saltwort Shoppera's needle Life plant Ay bean Water Lily Periwinkle Butterfly  
pea Abode raton Tautua Yerba veronica Maguey Sabila Biero blanco Biero espinoso Cardo santo

Algodoncito duende Planca de sal Margarita silvestre Yerba de papagayo Yerba de puerco Botón blanco Bejuco, Haba de playa Lirte de agua Playera Flor de pato 15 ---Page Break--- Appendix 7 (continued) Fores English Spanish Scientific Name Common Name Common Name -  
Chamaecrista aescynomene Chenopodium ambrosioides Cissus sicyoides Goleus anbotanicus Gomphrena diffusa Gordonia corymbosa Crassina elegans Crotalaria striata Desmodium Desmodium sp. Ditremexa occidentalis Dolicholus antoinus Dryopteris sprengelii Eichhornia crassipes Eleocharis palustris Ralfsia tora Entelia sonchifolia Eupatorium odoratum Euphorbia hirta Euphorbia hypericifolia Gomphrena glomerata Wormseed Pinakop, Spanish sorghum French weed Zinnia Stinking weed Fern Water hyacinth Butrush Norivis bobo Pazote Bejuco de caro Oregano brujo Contera Cordia rugosa Zinta Cascabelito Pega pega pequeño Salsabacoa, pega-peps Meatonda Frijolito, Helecho de tana Jacinto Junco Doradilla tuye que yo cojo Santa marta Echeveria techeciia Stenotaphrum vivace stivestre 7.6 ---Page Break--- Appendix 7 (continued) Scientific Name English common Name Spanish Common Name Hypericum perforatum Indigofera decapetala Ipomoea pes-caprae Agononon 41 Jatropha curcas 'Lantana involucrata Leonotis nepetaefolia Lepidum virginicum Lepidion pustulatum Lippia nodiflora Macroptilium

1athyroides Matachea capieaca Octaus sanctus theniun Motersphorus Pas flora sp. Pectis cil Trailing indigo Bay hope Moon vine Physic nut Yellow sage Violet sage Lion ear Cape weed Mallow Broom wood Senaieive plant carpet weed Wild balsas-apple Basil Fewew fev? Passion frutt Maruvio Anil de pasto Bejuco de playa Besuco de vaca Tartago Certaquiio amarillo Cariaguillo Ula Boton de cadete Mastuerso ctaron Mabichuela Malva Bretonia piranidal aretonia afelpada Mortvivi Alfonbra cundeasor Atbahaca, puereo Artentsa cinarrona Parcha Romero cinarron ---Page Break --- OO Appendix 7 (continued) ona case Ration Spanish Sctentstic Mane conan Kane Common Hane Phaseolus adenanthus wild bean Mabichuela cinarrona Phylanthos afrurt Gate of the vind | Quinine de pobre Hluchea purpurascens Saivia ctmsrrona Poinsettia heterophylla Pascua stivestre Portulaca oleracea Purstane Verdolaga Fortulacs pilosa Don diego stivestre Eeidtue guajaus 'Reiaws cosmunts Castor ott plane | uiguereta Sansevieria guincensis | African bovstring Neap Lengua de vase, Salvia serotina Yoraditlo azul Scoparta dulcis Cutaserttto Senectotdes cinerea Long, shoot Rado de buey, yerba sociatieta Sida carpintolta Wire weed Bacoba blanca Solange cartbacun Nghe shade Yerba nora Solana torvun Turkey berry Berenjena ciaarrona Stachyearpheta janatcons! Verbena Stignaphy1ton tonentoaun Besuco de toro Synedretia godt flora cerbatana eagta yolubits Singing vine Pringanosa Tribulus eistoides Projo Fetdae procumbens Tetdax 7.8 ---Page Break --- Appendix 7 (continued) Spanish Common Nm Scientific Name Brena lobats cagitio rena extlobaca cadiito Vigna repens Frifol silvestre wedelta cettobata Manzanitla de playa Arbusto de playa Not available --- Wo. Not available ras lable Not available Arbusto do playa Ko. 2 Not\_avatab! Arbusto espinoso Not available ot avai table Bejuco de atgua Noe avatlable lable Bejuco de pendeja Not available ab Bejuco trepador Not\_avatlable Not\_avatlable Malva cémarrona 2.9 ---Page Break --- ---Page Break --- APPENDIX 8 [FRUIT TREES FOUND IN ONE SQUARE

MILE EXCLUSION ZONE | | Guieass paradisi Encotoa aviter Soeoloba ueifere faiptab Fontes ein English Spanish Scientific Name Common Name Common Name Anacardium occidentale Cashew Pajuil Annona muricata Soursop Guanabana Annona reticulata Custard apple Corazón Cartes Papaw tree Papaya Thryscaebatus icaco Leche prieto Chrysobalanus icaco Leche blanco Citrus aurantiifolia Lime Citrus reticulata Tangerine Mandarina Citrus paradisi Grapefruit Toronja Citrus sinensis Orange China Coccoloba uvifera Seagrape var. playa Tocos nucifera Coconut Pithecellobium dulce Mamey sapote Annona apetala Atemoya Punica granatum Pomegranate Spondias mombin Spondias tuberosa Tamarind Terminalia catappa Coconut tree West Indian

cherry Malpighia emarginata Acerola Mango Mangifera indica Quenepa Melicoccus bijugatus  
 Aguacate Guava Pomegranate Hog plum Tamarind Indian almond Palma de coco Acerola Honey  
 Mango Quenepa Aguacate Granada Jobe Tamarind Almedro ---Page Break--- ---Page Break---  
 APPENDIX 9 MEDICINAL PROPERTIES, POISONOUS AND/OR TOXIC PROPERTIES OF  
 TREES, FORBS AND GRASSES FOUND IN THE ONE SQUARE MILE EXCLUSION ZONE  
 TREES Spanish/English | Scientific Name Medicinal use Common Name Albizia lebeck Use not  
 available. Acacia angustifolia Acacia, Lebbek Anacardium occidentale Fruit coat is used as a  
 vermifuge Pajuil and for healing warts and callouses. Cashew Andira inermis Bark and seeds have  
 been employed as a vermifuge, purgative, and narcotic. Cabbage palm Annona purpurea  
 Insecticide for lice has been made Guanabana from the leaves. Soursop Annona reticulata The  
 pulp is used in home remedies. Corazón Bursera simaruba Insecticide has been employed in  
 cures. Cecropia peltata Leaves, bark, and latex are employed in local medicine in some countries.  
 Clusia rosea Yellow resinous latex of bark, fruit, and other parts have been used in medicine.  
 Astringent roots and bark have been used in medicinal concoctions made from the bitter bark and  
 leaves. Alstonia scholaris Seeds and leaves have been used in home medicines.

Crescentia cujete Fruit pulp, although poisonous, has been employed in local medicines. Custard  
 apple Atmaciso Turpentine tree Yagrano henbra Trumpet tree cupey Mamee vas de plays  
 Seagrape Mavi Soldierwood Copa prieto Copa Higuera Calabash tree ---Page Break--- Appendix 9  
 (continued) TREES, Spanish/English Scientific Name Medicinal Use Common Name Some parts of  
 the plant, such as Aguacate leaves, seeds, fruit rind, and Avocado bark have been employed in folk  
 medicine. Pimenta racemosa Myrcia oll, which is used in Malagueta medicines, is extracted from  
 the Bay-run tree Pithecellobium dulce Punica granatum Sesbania grandiflora Tamarindus indica  
 Thespesia populnea Jatropha gossypifolia Agave americana Aloe vera Bark is an ingredient in  
 home remedies. a. Bark extract has an anti-helmintic effect. b. Fruit is used as an astringent in  
 cases of diarrhea and dysentery. Extracts of leaves, flowers, and bark have been used medicinally.  
 Fruit pulp is employed in home medicine as the source of a laxative. It has antiscorbutic properties.  
 Fruit is employed medicinally for the treatment of FORBS AND GRASSES Leaf extract used to  
 treat gastric ulcers, colds, and as a diuretic. a. Root extract used as a blood depurative. b. Dried  
 leaves used as an anti-inflammatory agent. c. Leaf extract used as a cathartic and as an  
 emmenagogue. d. Low dose acts as an expectorant. Guama averrucana Granada Pomegranate  
 Agati Tamarindo Enajagua Portia tree Toutua Maguey Century plant Aloe 9.2 ---Page Break---  
 Appendix (continued) FORBS AND GRASSES Scientific Name Medicinal Use Spanish/English  
 Common Name Argemone mexicana Bidens pilosa Bryophyllum pinnatum Chenopodium  
 ambrosioides Cissus sicyoides Cyperus rotundus Remex occidentalis Jatropha curcas Lantana  
 camara Lepidium virginicum Matachara capitata a. Vegetative parts used to treat warts and  
 external ulcers. Infusions from green leaves are used as a cough suppressor and as anti-asthmatic  
 with action similar to opium. b. Fresh seeds are used as a purgative. Used as emmenagogue in

infusion as expectorant against colds. Leaves used as demulcent and as expectorant. Leaves and  
 flowers used in extract as anthelmintic particularly against intestinal worms. Use not available.  
 Used as diuretic and to dissolve kidney stones. Root infusion used as antispasmodic. Leaves have  
 anti-inflammatory effects. Use not available. Leaves in infusion are used to stimulate digestion and  
 food assimilation. Leaves used to treat scurvy and as diuretic. Leaves and flowers in infusion are  
 used as demulcent. Crushed leaves are used to treat inflamed areas. Cardo santo Mexican Poppy  
 Margarita silvestre Shepherd's needle Bruja Life Plane Pazote Worm seed jugo de caro Pinokodp  
 Coqui Nutgrass Hedionda Stinking woe Physic nut Yellow sage Mas tuerzo Not available Halva  
 Mallow ---Page Break --- Appendix 9 (continued) FORBS AND GRASSES Scientific Name

Medicinal Spanish/English Common Name Momordica charantia Ossia odoros Pepe moschata  
Phytolacca nigrica Scorpius dulcis Solanum Stachytarpheta Leaves have hypoglycemic effect.  
Leaves and flowers used to prepare aromatic baths to alleviate colds and rheumatism. Seeds used  
as anti-helminthic particularly against tenia. Roots, leaves, and branches are used as diuretic,  
stomachic, and fortifying tonic. Leaves and stem extracts are used as refreshing drink, medicinal  
tea, demulcent, diuretic, emollient, and in salad as an antiscorbutic agent. Crushed seeds have a  
vermifuge effect. Seeds contain cathartic oils. Use not available. Leaves in infusion are used to  
suppress body secretions like gastric acidity and urine. They are an antiasthmatic. Fruits have a  
purgative effect. Leaves have a energetic-cathartic effect and sedative. Cundeasor Wild  
Bolson-apple Santa maria Not available Calabar Not available Quinine de pobre Gale of the Wing  
Verdolaga Higuera Castor oil plant Culantel tio Yerba nora Nightshade Verbena Not available 9.4  
---Page Break --- [APPENDIX 9-A POISONOUS TREES, SHRUBS AND FORBS, AND GRASSES  
FOUND IN ONE SQUARE MILE EXCLUSION ZONE

Spanish/English Scientific Name Common Name Toxicity  
Albizia lebeck Acacia amarilla Inner bark only dangerous  
Tibet, Lebbek Acacia occidentale Pajuil Resin, seeds, and peel! Cashew toxic!  
Andira mocoa Bark, limbs and seeds Cabbage Angelin toxic.  
Annona muricata Guanabana Leaves only toxic.  
Soursop Annona reticulata Corazón Bark, limbs and seeds Custard apple toxic.  
Byrsonima coriacea Mariacoa Inner bark only dangerous  
Locust berry Calophyllum brasiliense Inner bark only dangerous  
Not available Carica papaya Papaya Seed and juice of Papaw tree Fruit toxic.  
Gecropia peltata Yasumo henbra Inner bark only dangerous  
Trumpet tree Clusia rosea Cupey de río Inner bark only dangerous  
Wild mamey Mamey Inner bark only dangerous  
Soldierwood Higuero Inner bark, fruit pulp Calabash tree toxic.  
Erythrina poeppigiana Bucare gigante Inner bark only dangerous  
Mountain Immortal Hippomane mancinella Manzanillo de playa Deadly fruit. Sap irritating. Wood  
smoke toxic to eyes.

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Appendix 9-8 (continued)

Spanish/English Common Name Toxicity  
Mamey Seeds toxic to poultry and fish. Peel of fruit  
Mangifera indica Mango Sap and juice of green mango Fruit toxic.  
Manilkara sapota Sapodilla Inner bark only dangerous  
Aguacate Seeds and bark toxic Avocado to animals.  
Malagueta Inner bark only dangerous Bay-rum tree  
Pithecellobium dulce Guama americana Inner bark only dangerous.  
Pithecellobium saman Seman Paintree Inner bark only dangerous.  
Psidium guajava Guayaba Inner bark only dangerous.  
Sesbania grandiflora Baculo Inner bark only dangerous.  
Spathodea campanulata Tulipán africano Inner bark only dangerous.  
Tabebuia heterophylla Tóbolo Inner bark only dangerous.  
Tamarindus indica Tamarindo Inner bark only dangerous.  
Terminalia catappa Inner bark only dangerous.  
Teichisia hires Tinacio Inner bark only dangerous.

BUSHES AND FORESTS

Abrus precatorius Perón Seeds only toxic

Not available

---Page Break ---

Appendix 9A

(continued) Spanish/English Scientific Name Common Name Toxicity Adenorop iva gossypi-  
Tautua Sap irritating. "Safe Not available Agave americana Asaranthus sp. Argemone Canavalia  
maritima Capsicum frutescens Catharanthus roseus Cenchrus cistioides Chenopodium  
ambrosioides Crotalaria sp. Dittrichia occidentalis Indigofera endecaphylla Ipomoea pes-caprae  
Jatropha Lantana sp. Ragüey Century Plant Cardo santo Mexican poppy Phyla Pertwinkle Abrojo  
Senddure Pazote Wormseed Cascabel Not available Edionda Stinking weed Anil de pasto Trailing  
indigo Bejuco de playa Bay hops Tartago Physic nut Cariquitito Yellow or Violet sage Toxic to  
cattle. Toxic to cattle. Seeds fatal to pigs. Medicinal sap dangerous in overdose. Toxic to cats. Can  
be lethal if ingested in large quantities. Inhaling smoke from burning petals can produce  
hallucinogenic effects. Toxic to cattle and poultry. Can be lethal if ingested pure in large quantities.  
Toxic to cattle and poultry. Toxic to cattle. Toxic to cattle: Ingested seeds can cause hallucinogenic  
effects. Toxic to cattle. Leaves, seeds toxic to humans and cattle. 9-A-3 ---Page Break--- Appendix  
9-A (continued) Spanish/English Scientific Name Common Name Toxicity Momordica charantia  
Cundeamor Seed, leaves Phaseolus adenanthus Portulaca pilosa Ricinus communis Sida  
carpinifolia Grasses Cynodon dactylon Panicum maximum Solanum caribaeum OTHER Manihot  
esculenta Wild balsam apple Habichuela cimarrona Wild bean Don Diego silvestre Not available  
Higuereta Castor oil plant Escoba blanca Wire weed Berenjena cimarrona Turkey berry Verbena  
Bermuda Not available Guinea Yerba mo Nightshade Yucca Cassava toxic! Ingestion of beans  
toxic. Pollen causes allergies. Toxic to cattle. All parts except oil toxic. Toxic to cattle. Fruit and  
seeds toxic. Juices can be toxic. Toxic to farm animals. Causes photosensitization in cattle. Fruits  
or erroneous medication can be fatal. Lethal if eaten raw. ---Page Break--- ---Page Break--- ---Page  
Break--- ---Page Break--- we Ee ej pho. 003 ooh vp wep Fam, Malvaceae a 86 oa TB

103.6 46.9 18 5 2.9 0, 1.9 155.4 EP oil 4 iy ---Page Break--- APPENDIX 10 et Sheet 1 of 27 pages.  
Average number of Individuals per plot in Plot No. 2-2 of the WACO RP-1 Site for 1974-1975.  
Average Individuals p: SCIENTIFIC NAME (waa) 50 Digitaria tecuivens. Digitaria sanguinalis Scop.  
- = | = fos | es Hleusine insica t. Guerta. Panicus fasciculatus - | os} - Joa | es Panicus saxatilis  
Jacq. Panicum purpurascens Paspalum conjugatum Berg. Sporobolus virginicus (Stenotaphrum  
secundatum (Walt) Kunth) Feteolaens repens Willd.) Hitch. 'WasuiArts Kees. Fam. Cyperaceae  
Cyperus rotundus b 5 | 53.5 [1280.5] 555.5 [sre.5 | 100 Gramineae =p: Pan, Commelinaceae  
Commelina diffusa Burm. £. Pas. Acanthaceae Blechum pyramidatum (Lam.) Urban fuellie tteroea  
L- Fam. Aizoaceae Helianthus berterianus L. Pan. Amaranthaceae Achyranthes aspera NOI,  
Alternanthera sessilis (L.) R.B. - - fost = [on | 2s Alternanthera dbl Gomphrena disperse Standley  
Pan, Apocynaceae Catharanthus roseus (L.) Don ---Page Break--- APPENDIX 10 (L-2) Sheet 2 of  
27 pages Average Number of Individuals per plot in Plot No. E-2 of the NORCO NP-1 Site for  
1974-1975. SCIENTIFIC NAME Fam. Boraginaceae Cordia corymbosa O. Don Fam.  
Capparidaceae Cleome gynandra (L.) F. Caricaceae Senecioides cinerea (L.) Kuntze Synedrella  
nodiflora (L.) Gaertn. Tridax procumbens t- Dedelia tritubera (L.) Hohen, Fam. Caesalpiniaceae  
Chamaecrista aescynomene (L.) Greene Ditrenewa occidentalis (L.) Britton & Rose Bellis  
perennis (L.) Britton & Rose Micoscea padica L. Fam. Cactaceae Kalistroenium axinicum (L.) P&C  
Tribulus cistoides L. Pas. Cucurbitaceae Luffa cylindrica (L.) Roemer Hordea "harant! Fam.  
Euphorbiaceae Adenostylus gorsigifolius L. (Pott) Euphorbia tirucalli (L.) titisp, Euphorbia  
hypericifolia Euphorbia nutans: (07 Polak part Poinsettia heterophylla (L.) K. Garoke Pan.

Sterculiaceae *Melochia pyramidata* (L.) Britton *Selookia* Average Individuals per plot ---Page Break--- SCIENTIFIC NAME Fam. Fabaceae *Sophora p.vescens* Benth Rev. Heyer xylose 2) Teubert Fagaceae *Aesculus setnasinaces* Fam. Rubiaceae *Borreria*

ccteoides (Burn f.) Te feitiats <1.) jenidiedia ceinifolir (Witte) Fes. Verbenacene *sopia nolifitere* (L) 'ene. Hiachyeamheta fansicene's Vout APPENDIX 10 (L-2) Sheet 3 Average Murer of Individuals per plot in Plot No. Of the NORCO APSI Site for 197hc19) - fost - 2 fans | sto Dye? fan's os } = | + - | eto - | - fos 2 -| - | - das - |e fies kes | aa - for v | 59 = | oa - [ee 2.0 | 2a ~ fos - fro a Jno as] 5.9 ---Page Break--- APPENDIX 10 (4-2), Sheet 4 of 27 pages. Average thaber «Individuals per plot tn Plot Yo. \*-3 (of the NORCO WP-1 Site for Loveeig7s. serene rs Family Poaceae *Axonopus compressus* *Cenchrus echisatus* L. Shorts sari Eqmoden *dactyion* L. (rer, apps) - f - [aus] so Sactylecsenite tearot fan { . (wstxa) SYP J of pas fey 2 Disttarts test EIAFiR JRCUIRETi® Scop, dies T- Gaern - [o> [| es | o6 | es Pastas careier *Panicus satus* Jacq epelue sontcatas *Paspalus Fiabriatia* © *Setarie genicuiate* (cin.) Bequy Spercbelue indieus (1.18, 3 *Sporobolus virwtnicus* (L,) furth *Stenotaxhns securaatun* Walt) Kuntze Fefcholuene repens (etiia.) Witch. as} - 1 -| - | o6 | as Telenachne insu 7" 32.5 [2-7-5] o.5-f.73.5 | 222.5] 100 Fan. Cyperacene *Cyperus rotundus* Sipenie er. *Commelina girnce* Bure ø. Pas. Acanthaccee Blestue gyre Rueitie tuber, Fen. Attoncene tam.) Urban 35} 2 | 65] 155] 6.9 {200 Wotiuge Rertertana 1, & 10 *Achyranthes tngtea* Mi21, else (L.) 8.3. Aleeroanthera = dearantrs dibiee - fas os Gemphrena slepersa Stantcy = fs 26 Fan. Apootnacee *Catharantius roses* (1.) Dow ---Page Break--- aprennix 10 (1-2) Sheet § ef 27 pages Average Number of Individuals per plot in Plot No. E Of the NORCO NP-1 Site for 1974-1975. 'Average Individuals per plot sraly [oct J sen. ive. [ves sen Poensity] ScOle Ke Fas, Boraginucene *Cordin conmbosa* a. Don Fen. Ceparidacene Clecee mance (L.) Fas. Corduaceae *Bidens pilosa* L - fe fe] - Jos Jas Bailie fonchifolse (L.) 20 ws} - | - [6s | 20 Fen. Cesalpinacea *Chazaccristis aeachynanene* (5c) Green Ditrerenn ccldentalis (L.) Britton & nose | - | - [2.5 | 25 E.) Britton & Rose as | = 1 B88 eta

eyiinartee (L.) Roenar Mesoraive sharariie 1. Fen, Euphorbiaceae 5 100 *Adenoropiun gosstpifolive* L. (Poh) ote Euphorble Erte (L.) Milles. a fe Euphorbia iyperiet forse. Buphorbia gutene (L.) Polak 2 yt 4. heterophylla (L) KL &carcke =f 05 | = J = | = Fan, Bstercultnceae cles przanidata (1) Britten = foe fs pass | ua] so 30 25 2% ---Page Break--- APPENDIX 10 (L-2) Sheet 6 of Ayetage Muaber of Individuais per plot im Plot No, E-3 of the NORCONP-1 Sit. for. 137 SCIENTIFC NNEE Fas. Frbaceae *Densin Snelus intaus* (1) siedie, Tnligsfers erdecapyla Tdigofers surfrutieose Mil. 2) vrbn 95 ]23 | 209 Joes fassu frco Fics, Wictaginagscacear Beerhaaver giftuse asfs Jas} - | 2s |r Pan, Poiigelascar Eosote virsate (54) Kuntoe Fan. Portulacacese *Portulaca Scosandra Forualuce oleracea*. frst | - | 06 | so *Portulaca pilose* 1. spa] es [es Pea. Rubiaceae Borrerte cetmoides (Burn £.) De. Eorreria vareiettiase !.) 'yer -| - : Henidotia seinifolie (viuna' Fes. Verbenacene Hippie noaiftorn (1) sich. cs 5 achytarphela *Janaicensis* Vahl. bese} - |» za | se ---Page Break--- AePENDIX 10 (L-2) Average Number of Individuals of the NORCO HP-1 Gite for 197 sr plot in Plot Mo, E-! 7 pages. SCIEWrsTe Naw Fastly Foacese 'eonopus conpreseus Consnris s Shioris Senin aeayptivn 1. (#124) *Digitaria Aecubene* *Digitaria eenmuitalis* Scop, Eleusine irdica t. Gaern. palus coh Usatin Berg. Faselgun Flsbrists *Sporobolus indicus* (Le) R. Br. Storotolut Vincinicur (us) peseh *Stenotaphnan secundatun* (Walt) Kuntze Fricholaena resens (Hilld.) Hitch. Frichacine insularie Nees. Fen. Cyperacene Syperus rotuntue t. Spens # Fas. Comelinaceae *Commelina diffuse* Bure £. Pas. Acanthacene Beshun pyranicetus (las.) Urban fuelife titers Fam, Atzoacene Molluge berteriana L. Pea. Anarenthacese 100 25 25 oo ---Page Break--- APPENDIX. 10 (L-2) Shect @ of 27 pases. Average Number of Individuals per plot in Plot Nos E-4' fof the NORCO NP-1 Site for 1974-1955. ArrageTatviduis pr pak sexonore me wer [iy [coe [san [isa | eens se. *Sorginacene ordia*



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'Gleome mmandra (L.) an, cergaceue -]-]- | 2 bosc o| 29] % chymenene (0c) Green -] + fos  
Sdentaris TE.) Setton' & Rose a8 o Beeliste tora (L.) Britton & Rose =] + feos Jes | as.6 idsose  
pulica 1. ffs firs [os | ia Pen. Cigoftiaceae KaLlstroeste maxing (L.) 7 4 C Tribulus custotaes 1. Pan,  
Cucurhttareae lutte cy1ndrice (L.) Roeser Megoreiga Sharantie 2. Fen, Euphorbiaceae Menoropin  
gospifolina 1. (Pot) Eaahorule Waser Tho) Malven. 5 | 3 | 50 -] - des 4s Euphorbia Fyperiet alia  
sfoi dus] ty of) 8 Eupporbie sutane (L.) Polak fs] fes] os | xe] o Bullen: atric! 1. Dy] of fa - | ia] 8  
Poinsettia heterophylla (L) 1 & caroke foe fe pos} a] s Pan. Estercultacene Welochin nyrasidata (1)  
Britten =] - fas fas foe] se Neloshie "1 a oe | 8 ---Page Break--- sePeNDIX 10 (1-2) Average  
Number of Individuals, of the NORCO NP<sup>o</sup>1 Site for 197 Fes. Fabaceae Gontrogera pubescens  
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sul?rcticoze M: Hasropeii si 1athyroties (E.) Urbs. Fnseclus secant . er. Poiigaiaceas Fao.  
Portulacacoue Fem. Rubiacene Boreerin gctanites (Sura  $\phi$ .) De L,Y Heyer Tas. Verbenacons Lippi  
nodétiore (2) Mich. 'Staghytargheta: fanascensie Vat. Sheet 9 01 er plot in Plot No. Et peneity| - |  
os |oa - 22 os oe ans | ne [ra T | 3s | (26 - | - for - 08 2 Lk wg |roi.s| re - | - foe us| - | ow 22) s fare -  
|e jos = jos for os) 2 fuk - ont 195 we pages Fd 2 100 5 25 320 25 ---Page Break--- Sheet 10 of 27  
pages APPENDIX 10 (t-2) Paes Averare tiamber 0 Individuals per plot in Pot to. of the WHO W-1  
Site for 197b1975, es ve ee Pe foe Faatly Poaceae Axcoopus conpreseus ooane 7 en co) raneh  
annus seewdatea (walt! Kuntze - foe] - aa |e Seve rerene Willd.' Hitch. - foe} ef onfae | | Pan,  
Araranthacene Achyeane: ind SS ts seanttey - - Pen, Apoinaene i 0:74 ---Page Break---  
APPENDIX 10 (L-2) Sheet 11 of 27 pages SERBS SWBBer OF EnGLvidueds per prot sn Pot Xo.  
& Of the NORCO NP=1 Site for 1978<sup>o</sup>1955 Average Individvais per plot seurwenrze mate [je Lowy  
vam [ave | one an, Roragtoncene

ordie conmmosa 0. Den aa, caparidacese i Gleome gynandra (L.) Fam, Carduncene gens pitoen 1  
Bettie SSFecieue 2.) oo AS intze -]-] -]e fe 2 (1 caer, fpr} tye Chanaccrista aesckynonene (OC)  
Green = f= fe fos] ro] Bisson -Sclialalie (L.) priston& noee | slasl> ol ace Euclists tore of & Rose ase  
| sc | ax Hisoee L pos] sofas | re | 5 Fees, Cigottiacene Katastradte caxina (L.) 2&6 -]-fe : Fralue  
Fas, Cucurhttarese gularica (L.) seense Fas, Bughorbiacnse Adenropiun goseipifeliua L, (Pokt) ;  
Euphorbia bibte (e-tatiien, a fa fas 2.2 | r00 Balers Waerictioe sterorbylia (L) <1 4 Garoke Fes.  
Esterculincae Melochie zyranatéata (1) Britcen foe foe} - foca Meloenie = ---Page Break--- wrrenoix  
10 (1-2) sheet 12 of 27 pages Average Number of Individuals per plot in Plot No C-2 OF the  
NORCO NPCI Site for 1972 $\phi$ 19950 Fem. Fabaceae Ceutrosera pbescene Berth Grotslarie Fetize  
Ge celaria strzata Doctbelue minsms (1) Medic. Tpligotere endecapay a Indigofera sufrsticose Ws  
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osfus| - | 7 | ee} : os} a - fas = potifiors SES RAGES SG leenete van, os os | a 8 Jace ---Page  
Break--- APPENDIX 10 (L-2) Average tiumber of Individuals per plot in Plot No. (of the WORCO  
NP-1 Site for 1976-1975. SCIOMIFIC BRE Panty Foucet 'Axonopus conpreseus Genshrus  
echinatus t Seloris inflate tink Gyrodon dactyion L. (Pers.) Bartyisctentum teziptinn i. (W214)  
Digitaria tecuben Digitaria saguineite Scop. Eleurine ssdiea 1. caerta, Sporoseias indicus (L.)'R. Br.  
Sporobolus virginteus (1) Kanth Sterotashnwa seewtatun (walt) Kunttee Frichotaere repens (willd.)  
Hiven. Feicuachne Supers rotundue 1. Gere 'Fae, Conmelinacene diefues Sum f. Bleshus  
pyrentdatun (Lam.) Urban Belli tuteros Fan. Aizoncene Mottuge berter Sonphrena disperse  
Standley Fan. Apoctnnene Gatnarantiue roseus (L.)

Dow i Sheet 15 of 27 pages 300 50 50 100 ---Page Break--- sheet 14 of 27 pages APPENDIX 10 (1-2) ° Average Number of Individuals per plot in Plot No. 3 of the NORCO WP=1 Site for 1974-1995, Individuals per plot SCIENTIFIC NAME Oct. | Jan. | Ave. Pseudotr Pex. Boraginaceae *Gordonia comosa* G. Don Fabaceae *Capparis gymnantha* (L.) Fess. Carduaceae *Bidens pilosa* & *Eclipta prostrata* (L.) Hassk. *Trichosanthes procumbens* L. *Wedelia trilobata* (L.) Hoven. Pan, Caesalpiniaceae *Chamaecrista fasciculata* (Oç) Greene *Steyermarkia chalcone* (72.) Britton & Rose Bee 8... Fen. Cichorieae Fess, Cucurbitaceae *Luffa cylindrica* (L.) Roemer *Adenostyles gossypifolia* L. (Fob) *Euphorbia hirta* (L.) Willd. ESSHE *hypericifolia* *Euphorbia moters* (L-) Total *Pulmonaria sirari* 1, *Poinsettia heterophylla* (L) 1 4 Garoke Fan, Asteraceae *Melochia pyramidata* (L) Britton *Helochia =p* (ios) ---Page Break--- APPENDIX 10 (L-2) Sheet 15 of 27 pages Average Number of the NORCO MF of individuals per plot in Plot No. 1 "Site for 199801575 ve [were aro pe | ScrUETeTe WA Fax, Pasaceae *ubescens* Benth fale -{- |e fo 2 ais fes |e fo Fed Figs *giganteus* tases (C 35 | 8 a fas} os be enSSSie *sineres* Pers. Pde S| Oe | Bo pe *smbeiaicus* tow u | - | as] oe fo Sette ser sata Jaca. - |e | - da foe fe aes | 2s 9 [36.9 jroo vacate (54) Hontze Fan, Portulacaceae wy | - | es] - fers foo *Rorreria coinolae* & *erecta* i 2 t-|- foo fe Hen Motsa *centrotie* (Willa) Pen. Verbenaceae *Lygodium palmatum* (2) Miche. *Feachytarmhets jasminensis* Vahl. ---Page Break--- Sheet 16 of 27 pages APPENDIX 10 (L-2) Individuals per plot in Plot No, te tor 1ik-agts. Average number of the NORCO WP=I § n scronTie mee Fastly Poaceae 'unongus *compressus* fpod. 3 osf ijt 2 wanes eyo ds x efx fa | - fass fos ne Pe es - ts 3 SSE an beg es : os va | ss foo Ean + Bose Siesta It) Tanten Hee aera spas ft ef e fou des ear ees va, crperncene carer *rotundus* se f= fa | sets wat = Dy fot ye pag] Pen, Comelinaceae *Comelina diffuse* Burm £, Fas, Acanthaceae *Blechnum pyramidatum* (Lam) Urban Helis

tuseraea Le wo | - fans] | o6 }rs Fan. Atzoncete *Moniuze bertertana* 1. Fax, Anarantnacene *Aenyrantes seasea* 1 'Aiverearstora *aeietlie* (L.) a. Geeshrera ---Page Break--- APPENDIX 10 (L-2) 'Average Number of Individuals. pe 'of the NORCO HP' Site for 1974-1975. SCIRTLFTC WWE plot in Plot No. C-4 Sheet 17 of 27 pages Average Individuals per plot oot. Jen. Fam. Boraginaceae *sombosa* @, Den - Caparidacese *leone gmandre* (L.) Fan. Carduaceae Farther *Beneckota Sivesreie* *Friaux procumbens* L *Hedetie tritevate* (2) Hoten. Fan. Cesalpinacese *Chanaeerista aeschynanene* (DC) Creen *Ditreness oscigentatie* (E.) Britton & Rose ore (L.) Britton & Rose 'Sizes *pols* Fan, Cigoftiaces *Kalistroente aaxtea* (L.) THC *Trivalog cistoider* ©. Pam. Cucurbttarene *Lufta qylingrten* (L.) Roemer *Hemordica sherartin* ©, Fan, Euphorbiaceae *Adenoropiun gossipttoliun* L. (Pohl) *Soptorbie Fires* (es) uittsy *Euphorbia Fyperies fo1sa* *Euphorbia sutane* (1) *Pelak Poillanthu genic* 1 *Tpeteropiyyia* (L) #1 Garoke Fen. *Estercutiacene Melochte pyrantéata* (L) Britton *Ketosnis* © 0.5 05 os} cz oe yee ---Page Break--- APPENDIX 10 (L-2) Sheet 18 of 27 pages Average Number of Individuals per plot in Plot No. C4 of the MORGD WE Site for 19TH ISHS oct. [so [ave | =. Average Individuals SCImOTFIC mee Pan. Fabaceae *Centrosensa pubescens* Benth *Crowolarie revs* (1) tease. *Tndigofera spdecepayia* - *fuaigellers sureties* wi. ge *lattyroides* (L.) Urban *Phaseolus alesanthus* G.F-x. Veyer . SV *réunere a* | - tes *eaimenre capitata* SHy *cercreron* he | oot 2 *Brena iobete* *Srenm Griobata* ve Pax. *tietaginass Boerhaaves aifiuss* © - fos} =] - Joa fas Fan, *Polisataceac* (SH) *munte -fa*] - [oe [os - | ss 3 % - fous ae | 7 *Lippie nodittore* (L) Miche. . - 'Einslyearpheta *jenatcenste* Vahl. vs [os |r 32 ---Page Break--- APENDIX 10 (L-2) Average Number of Indiv OF the NORCO WP=I Site for 197h 1975. SCTETIVTC He juals per plot in Plot No. We? Sheet IS of 27 pages Fantly Poaceae *Axonogus comprehensus* *sion dacyion* L. (Pers.) *Sigicctsste seapttue* i (vinta) *Digitaria teeusbens aris fanguinalis* Scop. *Eleusine indica*

L- caertrn. *Panicum faseiouiavun* *Saxims Jacq.* *Sieur purpurascens* *Faspalue confugstun* Bere. *Puspels fabrisha* HBX *Setarin genicuiaca* (Laa.) Bequ 'Sperceolus *indicus* (L.) , Br *Sporsholus*

virginicus (L.) Kunth Stenotaphrus secundatus (Walt) Kuntze Telepolaene repens (Willd.) Hiten,  
 'elchachne 'nsularis Nees, Fan. Cyperaceae Cyperus rotundus 1. Spee e Fax. Coonelinaceae  
 Gemnelina 4iffuea Burm f. Fas. Acanthaceae Blectus\_pyramtdatus (Lax.) Urban fieliie beroea 1.  
 Fan. Aizoaceae Hediuge dertertane L. Fea, Anaranthaceae Actyranthes indies vsti. Gh) Ra, 6 %  
 ---Page Break--- PENDIX 10 (L-2) Sheet 20 of 27 pages Average Number of Individuals per plot in  
 Plot No. M-2 'of the NORCO NP=1 Site For 1374-1995. SCIENTIFIC WOE Wer oie [ee [om [are |  
 se Pan, Boragtnacene Sondie sorysbose G. Don Pas, Caparidaccae Sheone gynandre (L.) A  
 Bidens pilose b. a fares | 33.5 37.6 | 100 Faille Fechicclae (1) Beneciosaes Synedrele Feigae  
 procimbens 1. Setelse tri (L.) Hoton. sritton b Rose "ie (Ey Britton & Hose -| - |e Misoee pulice L. os  
 Fan. Cigoftiaceae Kalietromfe saciza (L.) 7 & C 50 100 Fan, Buphorbiaceae 50 % 3 3 Adenoropie  
 gotetpifoliun L, (Foht) os} = | 05 Eoerets Re (ey titles. a | 2] 8 fe Ripterbis Rperict 'outa -fife |\* Bere  
 ee Po a PP ly | os fetes siet Eensettia} fin heterophyiia (L) 1 & caroke Fan. Esterculiacene  
 Melochia ryanidata (L) Britten af-] -] - | ce] 2 Eeloenie oa ---Page Break--- perenoix 10 (L-2)  
 'Average Number of Individuals per plot in Plot Mo. W-2 lof the NORCO NP-t Site for 19741 Fes.  
 Fataccue ibecene Beth, Far. Mictaginaginaceae Boerhaaves difnuse Pax, Poligalacese E,gote  
 virgata (Sw) Kuntze Fem. Portulacaccne Fortulace scosandre Lippte nodttiore (L) Michx.  
 Etaehytarshefts fenascensie Vahl. os 35 85 0.5 sheet 21 of 27 pages 2 | os 20.5] 6 -]us o5] 1.0 3.5]  
 9.8 00 25 2 ---Page Break--- apPeWIX 10 (4-2) Average Nuaber of Individuals (of the HORDO  
 NP-1 Site for 197 SCIOMT'TC KE Sheet 22 of 27 sf plot in Flot No, W-3 1915. Featly Poaceae  
 Axonom compressus Cenchrus ech inate eftate Tink See ee eae. Sister as,

Bigleerie HeetaTie seop, Elsuine euice 1 Gaerta Bniom sac Panos Te. Paspalus con urna Berg,  
 Puspelus Fisbriutn W204. 'Setarie genaiiete (Lan.) Bequv Smioies alas (2. 'or irginfeus (2.) Kane  
 Seenoteshrud recurdatus (vale) tantze Eee ae icholnena repens (Wiild.) Histeh. pooramencrs Pan.  
 Cyperaceae Cyperus rotunda &, 'Gera =p Pen, Comelinacene Commelina gittusa Burm £. as.  
 Acanthaceae Blechun pyrasidatus (Lam.) Urban luellie tuterose =. Pan, Alzoaceae Hotiuge  
 bertertana L, Pen. Amaranthaceae Fen. Apooinaese Gatnarancie yoteus (L.) Dow ---Page  
 Break--- APPENDIX 10 (L-2) Sheet 23 of 27 pages Average Musber of Individuals per plot in Plot  
 No. ¥-3 'of the NORCO P-1 Site for 1974-1975. ScrmTrlc NOE Fea. Boraginaceae Sordi consrbess  
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 fperics atte tapers ate (TB Polak Melochta pyresidate (L) Britten Helochi ---Page Break---  
 APPENDIX 10 (L-2) Sheet 24 of 27 pages Average Munber of Individuals per plot in Plot No. W-3  
 of the NORCO Hol Sie For Pas, Fabaceae Senteerea mbescers Best. - f= | - foosf oa | 2s potclarie  
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fe9.5 | es | 157-9 | x00 Fan, Rublacene forsece cestas ups ¢.) Do. rrer:a verticiiiexs (L.) seyer  
 Hemidiodia is osiaiforia (vita) Fes, rerbenaceae 'Hipta noatflore (1) Miche. 'Euachytarphete  
 fenslcensie Vahl. ---Page Break--- APPENDIX 10 (L-2) Average Number of Individuals per plot in  
 Plot No, Wo! of the WORD HP-] Site for 1976-1975. Sheet 25 of 27 SCOTT NRE Average

Individuals Per Plot Poaceae deonopue conprosous Genchrus echinatus t. Skior sJo5 dactylon L. (Pere. Pacticecrentum aegyptisur C. (Wi21d) Digitaria tec. Digieerie sanevinalie Scop. 5 2 Siles \ Kae Stenotaghrrs secundatue (Walt) Kantse fcholaene repens (Willé,) Hitch. Frishachne ihsularle Mees: Pan, Cyperacene Cyperus rotundus L. 'Sperus =p Fea. Commelinaceae Somraline sftues Bam £. Fan. Acanthacone Blechus pyranidatun (Laz.) Urban Bueilie tubereess L. Fan, Atzoacese Nottuge bertertana L. 'Geaphrens aispersa Standley Fan. Apocinene Cacharanttie roseus (L.) Dow 35 as os a as 7 |e n0e.5 feo9.5 25] & os | - er | 935 ie - | os if. 258.5] 85 oan ae aa 20.9 od 6.9 a8 | 2 319.9 | 100 ua | 7 23 | 50 Jas2.6 | 200 i [es 0.2 | 50 0.2 | a5 63.4 | 00 ---Page Break--- APPENDIX 10 (4-2) Sheet 26 of 27 pages Average Number of Individuals per plot in Plot No. W-h of the WORCO WP=I Site for 197k-1995. Average Individuals per plot SCLEMIFIC WHE Fan, Boraginaceas Sortie conmboss G. Don Fam. Ceparidacene eon gmandre (L.) Pan. Carduacene Bidens pilose L. lis sonehifoite (L.) Do tcrius sdoretie © theniur Rysteroghorus L, Senecioides cinerea (E.J Kintee 'Syneirelia seaifiare (i.) Gaerta. Feld procumbens &, ea EELiccate (L.) Hoten. Pan, Cesaipinacene Qasaccriste seschymcmene (Dc) Green Ditresexa occidentalis (C.) Britton & Rose Eneliste tara (L.) Britton & Rose Minors pufice 1. Pas, Cigottiacene Madistroeste aaxine (L.) 7k C t Pam. Cucuritaesc Ulta eyiindricn (1) Romer Mosordica sharantie 1. Pen, Euphorbiaceae Adenoptun gossipicoliun L. (Foht) Eales Tale (hep aiiien, erict folie ros Euphorbia sutane (LJ Polak Puillanthus aims 1, Holneetein heterophyiia (1) X14 caroke Fen.

Esterculiaceae Melochte pyranidata (1) Britton Selocnie f ---Page Break--- APPENDIX 10 (L-2) Average Number of Individuals per plot In Plot No. =H for the NORCO Not Site for 137 SCRENEFIC wwe 75. Sheet 27 of 27 pages Average Individuals say Jos Fan. Fabaceae Dictebetue Tiligofere and Tuligoters sur Teiroede cineres Fac, tantacoas scscors cerisaca L. ¢ vet Fes, Portulacaceae Portulaca Scosantra Fortuinice gleracra Hortaiects poloss L Fan. Rubiaceae Borrarin coimattes (Bum t.) De ate (2. Heyer (wana) ipote modi tore (L) Hicts. Puachyeariets feraicensis Vahl. 38.5 35 36] a = | 23.5 5 06 10 so ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ey Howe ---Page Break--- ay alone ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ws) som race Ee oe we Bo ' 4 34 23 a 4 ge og8s ae 5 Be 3 33 e 3 @ 3 8 a ' 3 ---Page Break--- ---Page Break--- aoa 4 2 a a ag a foç 4 4 « @ @ @ 4 (-) ---Page Break--- ---Page Break--- a 6 eo @ arog a ç ag oa aoa 4 ea G 4 @ oy xia ---Page Break--- ---Page Break--- APPENDIX 11 SUMMARY OF NUMBER OF SPECIES FOUND BY SAMPLING PLOT FOR EACH OF THE QUARTERLY PERIODS. Grasses Dry Season" "Wet Season" 1974 1974 1975 Transect Plot No. May "July October \_\_\_ January Fost e2 3 2 5 5 £3 3 2 1 3 Bh 2 2 5 4 Center 2 4 3 5 9 3 5 5 7 a ch 3 5 5 3 West wee 3 2 4 3 W3 5 5 5 8 wt 7 4 8 7 Center 2 1 0 u 16 c-3 3 6 B 4 coh 7 3 15 7 West 6 "4 3 EEE ---Page Break--- Appendix 11. (continued) NUMBER OF INDIVIDUALS AND SPECIES ON POSITION OF ONE SQUARE METER QUADRATS Plot No. &-2,1 May, July, October, 1974 NO DATA JANUARY, 1975 Individuals/ Plot No. Species Plot E21 Cyperus rotundus 13 30.2 Dactyloctenium aegyptium 82 143. Thamnosyce hirta 8 119 'Sida carpinifolia 2 10. 'Euphorbia nirea 40 1.0 Stachytarpheta jamaicensis 33 68 Gellite tara Tata fore By 5:4 Paspalum conjugatum 2 us a 15 26 'pilosa 10 "7 Poinsettia heterophylla 10 u7 thioris ina 7 42 Gentrosema pubescens 6 1.0, Ghanieeriste-seschyronene 6 vo Tephrosia cineraria 4 0:7 Desmodium 89 2 0:35

Hinosa padica 1 0.17 1 0.17 Total 372 MAY, JULY, OCTOBER, 1974 £22 Cyperus rotundus 801 92.49 Soinsetiia heverophy 12 30 36 tootiste tors 5 ua Gyroden dactylon 2 138 'ypets capitata a 0.46 ittarta sanguinalis 3 0.36 'Talgefera sulfruticosa 1 on Total 366 ---Page Break--- Appendix 11 (continued) JANUARY, 1975 Individuals/ Plot No. Species Plot Percent 2.2 Cyperus rotundus 938 89.5 Paspalum conjugatum 71 Bidens pilosa 10 Euphorbia Kieva 7 7 ° ° Poinsettia heterophylla 7

0.67 a 0 o 0 'Stachytarpheta jonateensis Tentrosena pubescens Gyndon dactylon Eupatorium odoratum Tora 1048 MAY, JULY, OCTOBER, 1974 £31 Paspalum conjugatum 169 Ruelia tuberosa 'Sida carpinifolia Enelista fora 02 6 "64 "60 Tok Tok ven S Total 192 JANUARY, 1975 3.1 Sida carpinifolia an Paspalum conjugatum wy Relochia pyranidata Achyranthes Indica Ruelia tuberosa Parthesiom nysterophorus Stachytarpheta jamsicensis Forcuthsa priosa Borreria verticillata Thunbergia nutans Eleusine Tadic Thunbergia Hirtula Dactylon elongatum Seqyotie Euphorbia Reta Tonphrena dispersa gossypifolium Total 667 ---Page Break--- Appendix 11 (continued) MAY, JULY, OCTOBER, 1974 Individuals/ Plot No. Species Plot Percent Sida carpinifolia Paspalum conjugatum a Fepthes Tea rsterthorus 3 Rages atta 3 Pena seta 5 Tinodan dactylon 3 Raranthus aebias : FatsetiTS Retevophy! ta : 'Stachytarpheta jonatcers 1 Terai 32 JANUARY, 1975 £-3.2. Paspalum conjugatum 200 48. Saree erste 165 35. Highest blrta 22 a mbites tubers 7 3 'benptotpRSCs ona consis i 3 Paptataen pilose to 22 choy onda 3 7 ice afsretie ur Aenyranthes Tadic 6 3 Birfanans eceTaantalt 5 um igre 3 ots Gemeayee pirwe : imerises i O83 Fatthanti fysteroptorus 2 0.13 famine ties i 0.22 7 ts Pot Wo. 4.1 hays duly, Oétober, 1974 No ATA sawuany, 1975 eh Stylosanthus hamate 165 Be Sida carpinifolia 130 263 Paspalum conjugatum 5 5.2 aalsania pyraanints % ae 2 40 i 32 consis 12 ah 3 us cre ---Page Break--- Appendix 11 (continued) JANUARY, 1975 ees Individuals/ Plot No. Species Plot Chamesyce nutans Paspalum Finbraiton Sporobolus

sirginteus fephersta hires Trichachie Tas laris Parthentun Rysteraporus Bidens pilose Borreris vertici iota hanoesyce RiFES Uppia nodiFiors eeesssssssS—"" CR Tore ist \$ret MAY, JULY, OCTOBER, 1974 E42 Moja Menuda\* 235 Chloris inflata 32 conju com 23 = 27 Beinn bastTicum Portulaca piles wel Tin tuberosa Stachytarpheta jansicensis Toleut anbotnicus Grotataria striate : eS Total 38 ANUARY, 1975 42 Emelista tora 85 Sida carpinifolia 3 Stylosanthus hamata 59 Paspalum coniugatum ig aby ha janalieensis # Portutacs FS Euphorbt : 2B Kinosa pudica 5 'Thamoecrista aeschynomene 2 'Seimun sanctun u Ghanaesyee nutans 3 Ehioris tat tata a phrosia cinerea 7 Chanaesyce hire 6 Borrerts scimstdes 4 3 3 2 ---Page Break--- 'Appendix 11 (continued) JANUARY, 1975 Individ tauata/ fot. masias ee rpercent ea a a ee scons 1 e { on Fy terophorut 1 oa Fatnsetets Reterogytta 1 oua2 foetstas preaches 1 oa est i oa Tort ch ies We, Gok favs Juiys tober, 1974 vo ona saan, 1975 C241 Stenotaphrunsecundatum 251 Ei i ests 37 musica x Tse Erste seschynonn 3 Senecloides clneren 34 Fees See an is eee rete 3 Pere sera eae % ae " oe 3 peepee conn 1 Cenchrus. equinatus Taphorbte Wirt Tharaesyce Rirta 6 5 ao 4 Ts nod Fiora 3 Borreria ve rete lata 2 2 1 Foelista tora Stylesanthus hana Total 653 MAY, JULY, OCTOBER, 1974 62,2 "Hoja menudat\* 97 we Paspalum conjugatum 69 26.43, Sporobolus virginicus 35 13.40 Eres 2h a9 Sida carpinifo! 21 oi Tephrosia cine: 4 1.53 ---Page Break--- Appendix 11. (continued) MAY, JULY, OCTOBER, 1974 (cont.) Pot mo soectes lee percent cad capone Riese 2 076 'Saute op : oe Fiber virgnta ; ore Seeacr seer ittoe i on Tigiterts SeepetnatS ' 8338 Potala Se ' O38 Fert geptectaea ! 038 ty IgReSs Teta reensts ' O38 Total 261 ~ aman, 1975 eae 1 corpinifotia ny a tage ett Ww 3: mire a 'at Sera toe a 7 Se act 2 3, EarSreteriste i a Elaehytarphets"Jonaicensts 23 Seoetiae es tamer ? 3, ie eacemceere 2 oe 't i on es ' 3a Paspstae habit ' O31 Teshrostar eras ' 3 Total 479 var, uty, ocTo8es, 1974 ; 65.1 Sporobotus vinatateus 159 37.0 noe 2 me Paap

coh uta 8 i Ear sea 8 ee Heater i Be fie secrete i Se 0 er H i 'ilose ; te Digitaria Songatatis i 133 marae gees 3 os Seterin verier tata 2 ote tome Tina at rae : sae Hae piste ' 0:23 hana T5ts seschynonene ' OB Tait 3 = ---Page Break--- Appendix 11 (continued) JANUARY, 1975 Plot No. 3, Species Paspalum conjugatum rena dispersa Stenotaphrum secundatum Cyperus sp. Desmodium 5 Sporobolus virginicus Mimosa pudica Digitaria sanguinalis Euphorbia hirta Tynadon dactylon Enneach sonchifolia Senecioides cinerea Thananeristia aeschynomenes Bact letpenTon seaypeiun

Hyptis sp. striata Synedretia nodiflora Individuals/ Plot 105 53 Percent 22.7 3 12.3 TTT 8B nav, sULY, ocToReR, 1974 3,2 Sporobolus virginicus 58 Cyperus rotundus 51 spate conta tue, 2 tofews meine 3 Wiases padleg é 3B: 5 frrens: di spensa 5 Sa smartS SRpintferiae 8 5 corymbosa 1 pasar 1 hasae? Tote aevehynonene 1 ConneTina d¥fTasa 1 Portulaca pilos 1 Total 35 sawuany, 1975 63,2 Syredreta nodiflora 199 2 stan carpintfotta = 154 2.8 Cyperus =~ @ 10.3 Desmodium sp. rh 68 Geapbrens laperss 3% of ---Page Break--- 11 (continued) JANUARY, 1975 (cont) Individuals/ Plot No. Species Plot Percent 3,2 Cyperus rotundus 23 37 Mimosa pudica 23 37 Sporobolus virginicus 23 37 Paspalum conjugatum 7 20 'Ghansecr sta seschynonene 5 0:80 Stylosanthus hamata 5 0.80 thanseyee Ritts 2 9.32 'ynodon dactylon 1 0.16 Enneach tora 1 0.16 Hyptis sp. 1 0.6 Total 2 Phot Mo. C-441 May, July, October, 1974 No DATA JANUARY, 1975 cay Paspalum conjugatum 181 se caine 146 Mimosa pudica 55 Syredreta nodiflora 49 Thanaeerista aeschynomena 35 Enneach tora 7 Ruellia tuberosa 4 Jorreria verticillata 3 Desmodium sp. 3 ittatges ple 5 Tentrosene pubes Chloris inflata Beira guinatus Stachytarpheta. [ar icensis Cyperus rotundus 'Senecioides cinerea 1 Biipersa Seyforsnthay Reaata fateches spe Paspalum Fibratum Satie rttans 7 4 4 4 3 3 2 2 1 1 1 ' Total 572 ---Page Break--- Appendix 11. (continued) MAY, JULY, OCTOBER, 1974 Individuals/ Plot No. Species Plot Percent 42 Paspalum

conjugatum 22 42.58 Thioja nenua™ 78 33.84 farpini folia 4 15.96 fa tuberosa 20 380 Stachytarpheta jamaicensis 15 2.85 poste 2 0.38 Eymodon dactylon 0.19 Portulaca pilosa 1 0.119 Sporobolus virginicus 1 0.19 Total 526 JANUARY, 1975 cue Sida carpinifolia 135 3h Stylosanthus hamata 53 wg aspalum conjugatum 30 16 Thatorts Tattsee 2 5.6 17 3 6 wg Dactyloctenium aegyptium 5 3 Desmodium sp. 5 38 Stachytarpheta jamaicensis 1 35 Tentrosena pubescens 10 25 uel tuberosa 7 13 Sporobolus virginicus 7 1 Zenchras equinus 2 ost Syrodon dactylon 2 0.5; Boerhavia verticillata 1 0.25 Sonchus dispersus 1 0.25 Tuberosa tuberosa 1 0.25 | MAY, JULY, OCTOBER, 1974 (2, Paspalum conjugatum 20 67. wen Geers tnd 3 20.78 is pilosa 36 8.49 Euphorbia hirta 6 var Helochta pyranidata 2 ou Desmodium sp. 2 0.47 Sida carpinifolia 2 0.47 Trichotaena repens 2 0.47 Boerhavia phaseoloides 1 0.23 Total was ---Page Break--- Appendix 11. (continued) JANUARY, 1975 Individuals/ Plot No. Species Plot Percent eacarnnnnnnnsepervesseseeeeemmmmmmeese way Paspalum conjugatum 315 56.1 Bidens pilosa 13 20.1 Mimosa pudica 6 6.6 Sida carpinifolia 2 5 Desmodium sp. 2 3.7 Euphorbia hirta 1 2.5 Rebyranthes sp. 1 0.25 Total 561 MAY, JULY, OCTOBER, 1974 wa, Paspalum conjugatum 12 73.93 Cyperus rotundus 6 8 Bidens pilosa 2 7.27 ThomsecrT=ts "seschynonene 7 Ae 'Sida carpinifolia 6 3.63 Desmodium sp. 1 0.60 Mimosa pudica 1 0.60 Total 165 JANUARY, 1975 2,2 Paspalum conjugatum 255 53.2 40 16.7 48 10.10 Mimosa pudica 25 5.2 Enelista tora 2 6 Desmodium sp. 20 2 Dactyloctenium aegyptium 8 Nn posthasves ai phrase ? en 'Bubescens 0 Euphorbia ce 4 0.84 'Thunbergia hirta 2 0.32 'Sporobolus aegyptifolius 1 0.21 Chamaesyce nutans 1 0.21 Fonorditis charantia 1 0.21 'Tephrosia cinerea 1 0.21 Total 473 wat ---Page Break--- 'Appendix 11 (continued) MAY, JULY, OCTOBER, 1974 Individuals/ Plot No. Species Plot Percent The Sontem maximum 3 ra Paspalum conjugatum 8 185 Faepitae te nn

Eqn aaety on 2 63h Sayama 7 535 Pant eun purpurascens 3 336 eapnermis Hists i 37 pasate op 3 2b TagoTera endecophy!la 3 238 Tevet i awuany, 1975 V3.1 Bidens pilose B ne Ghamassyee Fira : Ponies anata 51 2 ria wires & 3 Bites pastes 3 7 EEpTosoRtnue honata x \$3 evista seschgromene a um Faspaton conjsestay ie os Ebon viata i sa Seeanatae sy 7 tS Star arpa fovia ; 3 Tepnesste elneres 5 « febiaties prises 3 oes cSmetise SFFen 2 orks Shoe tare : ize Hoes puilea : ode Towel 156 mar, JULY, ocroRER, 1974 W3,2, Paspalum conjugatum 1 ue Bardaraea prose 43 28.33 Fidens piar 8 8.87 Sporabelus airginteus 3 i "opener é 3B Euphorbia niet ' 8 iiages paste ' 236 fra Shdecaphy! ta : 035 eanereis eines : Be Terai 16 er ---Page Break--- 'Appendix 11

(continued) JANUARY, 1975 Individual Plot Percent W342 80 13.0 67 6 Finosa pudica 5h 29  
thansesvee Ate ay 10.5, rodtun 5 42 10.0 Thansecrista aeschynonene 30 rm Paspalum conjugatum  
25 63 cnibrts inflata 33 'Stylosanthes hamata 3 3 Sida carpinifolia 3 24 Faspatan FlabrTatun 3 ng  
'Sporobolus virginicus 7 ur Cenchrus equinatus 5 12 Tephrosia cinerea, 5 12 Euphorbia Reto ~ 4  
0.35 jerus rotundus 3 oni eaeacantor segyptive 3 or portelacs prioss 2 0:48 Eentrosems  
pubescens 1 0.24 Total 420 MAY, JULY, OCTOBER, 1974 Wid Paspalum conjugatum 107 60.79  
Cyperus 38 29.59 'Trilobata 16 3.08 jesmodium sp. 3 170 Bidens pilosa 2 113 Cenchrus  
echinatus 2 13. 'Thanaeesta aeschynonene 2 a3. Gonphrena dispersa 2 iB Rxonopus  
'compressus 1 ° Euphorbia hirta 1 0.56 Diuraria decumbens 1 0.56 Urena triloba' 1 0156 Total 176  
---Page Break--- Appendix 11. (continued) JANUARY, 1975 Individuals/ Plot No, Species Plot  
Percent wat Paspalum conjugatum 24g 373 tyee 187 28.0 Digitaria sanguinalis 8 33 Gonphrens  
dispersa 51 716 Euphorbia Ales 30 us Detmodata 21 31 Portulaca pilosa 2 Br Hinosa pudica 16  
as Senecioidea cToerea u Le rena Tabata' 5 os Sporobolus virginicus 3 2 dens pilosa 2 0.3  
Dactyloctenium aegyptium 2 o4 ype: 2 o3 Stachytarpheta Jamaicensis 2 03 Centrosema  
pubescens 1 0.15 Tonnetia diffusa 1

0.15 Tynodon dactylon 1 og Total 667 wens fazaies conjgn 3 ees 3 Gramineae wensnere i Total  
186 aa ---Page Break--- Appendix 11 (continued) JANUARY, 1975 Individuals/ Plot No. species  
Plot Percent wae Peapalum conjugatum 70 BT . Gonphrena dispersa 9 . pertusea proserpinaca 38 36  
Digitaria sanguinalis 50 a3 igharis sang 5 83 torts his a ra ty Tota m ae: ive 2h 4 Seaman ope 15  
2s Thamsecr?sta' aeschynonene " " Eentroseno 5 rovers gubesceny 3 M5 Bass Srtoss 5 0  
Sporobolus virginicus 5 0:83 Secreets vereettians 3 95 iw ni 7 3 0.5 neg ofdes cinerea 2 933 Stoa  
corpinifolia : ot Stachytarpheta Jamaicensis 'ony Total 606 rts ---Page Break--- ---Page Break---  
---Page Break--- ose z66'e 4S oz ogo s ase one's 65 t ozgo « Bere agi's 68 t 0560 : 1 ase 95'S of .  
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x1puaddy 12 ---Page Break--- APPENDIX 13 MEANS OF TOTAL NUMBERS OF DIATOMS,  
DINOFLAGELLATES, COCCOLITHOPHORES, AND OTHER SPECIES BY MONTH FOR  
INSHORE STATIONS AND OFFSHORE STATIONS. (8). ~ CYRNOPHYCERE NOT  
INCLUDES-CYSTSIE sae [Scie [Sei [sae] Fen Ef a2 oo) a7 19 @ | 202 508 aw 2 2 ast 190 n j a as  
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a0 384 a] oa 89 199 0 | 3 | ay san 264 ws | a} a 231 193 159 may 1. ¥ | 1165 463 az 2is al Jae "6

66 156 x | oe ss 270 22 4) 9 30 St 3a aE a3 1R7 ws @ " 92 250 gun 1. 1,922 aa os ' 39 23 17 2%] eas 806 136 yet @f 338 208 mn 239 3. | 221 1,506 ar a 21025 2136 308 18! ---Page Break--- Appendix 13 continued Diatoms Dinoflag. Coccolith. other goly LE 2,782 619 sn 1,139 a 202 569 46 PR x 835 ean 1,227 1,475, a 297 78 235 429 x 1,908 628 855 1,283 4 1,226 to 381 400. aug 1. & 1,779 ns 287 1,332 4 2,183 6 105 338 2k 7,122 490, 308 1,180 4 6,819 140 167 260 3. 7,463 608 298 1,256 é 4730 el 130 291 ser. © 2,754 323 215 3,335, 4 824 230 9 48 2 F 2,198 1,065 am 1,269 4 586 332 96 33 3. 2,516 927 239 2,298, a 736 282 80 65 oct. 1. 3,896 789 120 763 3 1832 496 64 263 2 1,461 932 377 898 4 842 481 283 376 x 2,669 883 346 853 a 1861 457 307 301 Nov. 1. ¥ 1,996, ais 282 650 a 339 16 33 180 2 F 2,370 888 327 835 é 913 283 25 Br 3. 2,183, 852 305 743 a 729 206 45 176 13. 2 ---Page Break--- Appendix 13 continued Diatoms Dinoflag. Coccolith, other ecw 1. ¥ 3,129 905 505 734 a 345 266 ny 107 2 1,384 m5 ue. 762 a S71 313 291 22 a 2,257 840 676 18 4 aaa 27 275 162 yan. 1. ¥ 8,803 668 565 231 @ 'S10 76 37 307 @ 4,929 713 612 895 é 21817 309 268 261 a 6,865 691 389 863 4 23793, 210 181 302 1 = inshore 2 ~ offshore 3 ~ mean of all stations X~ mean = standard deviation 13.3

---Page Break--- ---Page Break--- APPENDIX 14 INDIVIDUAL VALUES, MEANS, VARIANCES, AND CONFIDENCE INTERVALS FOR ZOOPLANKTON GROUPS AT STATION S - TSCOTE™ PUERTO NGS AER ZOOPLANKTON GROUPS AT STATION 2. TSLOTE, PUERTO RICO.

---Page Break--- APPENDIX 1H sheet 1 of 15 arownss i700 #? Station 2. Istote, Puerto Rico pate Tow! Tow? Tow 3 Wan Variance \$5 Csl over @ 3 Aor 74 x aed 7 3 7 8 2 bom 1 ray a 5 4 2 5 a um 2 2" - % te Mtoe 2 ray 2 13 8 » 5 1 to 25 12 Sin oh 5 . 3 3 i 5s 25 din 7 2 3 0 a 3 80 19 9 dul st 0 2 % oh pt Me aut 3 " 3 0 2 ge3 20 he a ul 3 7 1 2) 10 se ' 6 é 6 ° 6007 2h sep 78 5 6 15 6 6 19 to 23 40 oce 7 3 18 10 19 8 Bion 22 bet 74 é 7 2 5 1 oon 5 Now 74 2 8 5 2 : Pio it 13 Nov 9 2 ul n 4 Wie a See 28 5 a 26 h 3 8 ts 35 16 Bee 10 9 7 5 2 ton 0 dan 35 3 " a 3 1 10 20 16 21 Jan 78 1% 8 6 % 3 10 2018 4 Feb 75 0 ie 7 16 2 12 to 20 1B har 78 3 1 " 10 i 301 TOTAL ZOOPLANKTON per =} Date. Tort Tow2 Tow3 Mean Variance ae Ter 3 hor Th 386 17 pr 7h 08 788 Cr 8294 65 to 917 a ovata asst Sia to 19 x 1876 1340 Nel to 2959" a 1003 oss reer "626 to 211 n 7 S98 30327 3H to 1208, in Be a3) act tosh Gun te 959 % 165138167 e626) 542 to 2400 % tena 591200 wes1o 245 to 2150 % ye 12761368 3065833 to 1803 m 393m 97 3693 «B23 to 1125, m ast 20k 2138 25562 895 to 3388 m ne tore 7 20688 e133 n ST sth 637473 te 609 n 1s tt3y 3st 20st BT we 1678, m 159138) ste 23731127 te 1957 a 13s 2482037 vi 1255 2938 n 407 38s 13) 1235 to 596 % nme ston 1205 7963 57 % Ngo 1033168 i799. 8. 187 6 269 TM1095 sioor 346 to 1601 650, m0 699 333654 to 7A ---Page Break--- sheet 2 of 15 coPero0s perm? Station 2. tstote, Puerto Rico Date Tow! Tow? Tow3 Mean Varlance «95.6.1 20 war 7h a ~ 3 tor 7h as) tT dor 7 306 498 sn 9 9196 151 to 628 thay 7 555 i imo 95 2972166 to 1023 15 May 74 roe 1329 au 39008737 te 1671 23 may 7 00 ig3 sus gr 5603 to 667 2 in 7 633 sar js 08 23107 fo 936 25 Jun 74 vee 586 B15 ty ce 633 9 Jul 7h ne 3 ol aaa 52103 fo 181 Pariery fey a6 mee Sioa tn 20 hig Ph mh 823, Sos 380, ry 0 Ta3t 10 Sep 78 32 287 m 0 591 to 888 24 Sep

Th "2620532038738 282083 to 3058 to oct 7 632 563 me 7738 to er 22 ot 7h Bt ay he ty '08 tae 5 Now 7h 1081 38 555995 821 fone 15 Now 7h wes zig 1089207 20587 Ss 1582 yee 7h 13715732 ae 680s 23st 16 bee 5 233 205253 318 bts 10 San 75 1031 560 es 53 e650 Eons Nien 1036 3 B28 1036 138155 2012 Feo 75 818 595 sea 18758 002 1B var 78 \$82 503 te st 23 "S30 vartance estimated 28 1/4 the range = CHACTOGNATHS per es Dore Tout Tow? Tow3 Mean Variance 35 Gat, a 3 her 2 9 17 Bpr 7h 0 33 39 38 25 0 5h Thay 38 2 2% mR 2 Rio 3 15 nay 74 eh 7 6 23 hay Th 20 g mS 282 ° 12 ben 7 ie 3 wm ay i . 25 Jun Th 25 5 BO 5 2 9 Jul 74 20 B 2% we 4 2h at 7h 53 85 3 5r 1479 ° 20 ug 7h 38 Me OB Hy o 10 Sep 74 5 " no 7 6 2h Sep 7h a Me 6 % au fo oce 7h 5 2 8 + 3 22 oct 7h 3 a Bon 4 2% 5 Now 74 @ ia 2% 220 Oto 13 how 7h sh 28 mt 69 St 7 5 bec 7 8 20



SL 50 er Bt 18 bee 74 1 2 7 OR 20 wes 0 6 at 53 Bee ° 5 atk 2 or ds rs st 653 2 Bio Me 7 1 nO 3  
ote 1s ---Page Break--- Sheet 3 of 15 Station 2. tstotes Puerto Rico ean variance 3 Boy a ao 88 H "  
bo 2 % ze % sot : > ost \* % & 10 3 3 2 \*% x 0 & 3 3 be x to 3 1 ce wee 7 resor00s\_per oP STI Sara  
ep eee Date 1 Tow? Tow3 Mean Variance «95 6.1 Bee 3 hor 78 17 Bor 74 Thay 74 15 hay 7 23  
May 7h 12 dum 78 25 um Je 9 Jul 78 2h sat 7h 20 fy 4 10 Sep 7 24 Sep 7h To oct 78 22 oct 7 5  
Wow 7 13 Wow 78 3 bec 7 1 dee 78 10 Jon 5 m3 4 Feb 75 18 var 75 ---Page Break--- sheet 4 of  
15 osteacons per w3 Station 2. Islote, Puerto Rico Sassen amaemmememeeessee date Tow!  
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ow 3 o " 2 4 2 ot we 3 ° ° ° ° ot 0 ° ° 8 ° ° oto & ' 2 5 ' oe 6 ° ° ° a ° oto 3 ° ° 8 3 er § ° , ° ° 1 ot 3 6 ° °  
° ° ot 6 2 8 ° ° t ote 3 ° ° ° 6 ° oto 10 ° o 3 36 Ot 8 ° u ' 2 \* Dio 7 5 é 4 é 4 rte 10 5 26 8 6 8 ote 186 3  
sz hase 0 5 60k . 3 ° ° bit 6 3 6 2 5 2 2 : owe \$ i 2 cies 6 5 cy owh ° : 3 ot 5 ° 1 ; ote t ° 3 5 Oto 6 2  
2 2 be 6 a i 3 ote 5 ° ° 8 Oto 8 ° ° ° Ot 0 2 : 2 ote § 3 5 6 Oto 38 5 < " Oto th i ' 2% tot 4 2 4 ow ° 5 8  
oto 2 1 2 Otek 3 1 3 Ot

5 ---Page Break--- sheet § of 15 Station 2. Islote, Puerto Rico Date Tow! Tow 2 Tow 3 Mean  
Variance 95 Cu! 2 : 2 1 2 1 Note 4 ° é 2 : 1 ot 3 ' ' 4 5 ° 3 3 7 ow 9 2 5 3 3 5 ow 7 5 ° 8 é 6 tz 3 u 3 7  
16 te i7 5 ° : 2 7 oe 9 2 i 4 3 { ee i 2 & ' ny oto at ° 8 & ' 4 owe ' 8 ° 2 " oto 10 6 ° ° ° bio 0 : ° 6 3 0  
ton "7 5 6 13 26 0 to 5 at 2 5 i" \* 0038 + 2 5 4 2 a 5 0 a 7 8 ots 3 ° 2 2 ' bi 7 ° ° ° ° ° ot 0 ' " 5 é 3  
oto? SIPHONOPHORE BRACTS per a Tow! Tow? Tow3 Mean Variance 95 Cals 5 i ° 4 3 2 8 é 3 "  
@ 2 é 8 15 30 8 126 " é % to 5 6 ° 0 2 8 é 4 5 3 5 2 8 8 : : 6 2 2 3 6 ' 5 é 5 2 3 é 7 7 2 6 i 3 2 i ° 8  
6 ° ° 2 ° t ' "7 4 6 9 5 m ° 3 7 & 3 5 6 i 2 5 3 4 4 : 8 5 8 4 7 Feb 5 ° 3 ° ° a 18 me 75 3 8 8 6 8 ---Page  
Break--- Sheet 6 of 15 THALUACER per w? Station 2. Islote, Puerto Rico Date Tow! Tow 2 Tow 3  
Mean 356 20 mar Je 7 @ 3 her 2 AT ier 18 ° ° ° ° o oto 0 Thay 7 2 3 2 : ' owt 15 hay 74 : 6 ' 23 may  
74 2 " 25 0 8 Bow 12 dun 7 3 Ff so to m Ton 25 Wun 7h 3 ° 3 4 2 Note 6 9 Jul 7h a 3 5 § 8 Oto 28  
Perry ° 8 8 ° 3 te 0 20 5 > 6 7 : tee 10 t é ° 6 ° oto 2 a ° ° ' : ' Note 6 10 ° ° ° ° 3 te 8 2 ° ° ° 8 ° be 8 5  
6 ° ° ° ° Oto 8 3 5 4 8 2 3 to > 3 ° ° ° 6 a note 0 8 8 3 1 8 ' oto 2 10 Jen ° ° 2 1 ' Bo b a 3 ° 2 2 4 Bie  
> 4 2 ° ° i 2 oto t we ne 78 ° ' : 2 \* bi 7 Tow? Tow3 Mean Variance 95 €.1 8 ot 10 ° feo' 87 2 0 50 6  
at 70 Dt 8m bt 6 5 t 2 to 5 8 te i Stor 5 o tot 6 3 3 Bot ---Page Break--- sheet 7 of 15 Station 2.  
Islote, Puerto Rico 1 Tow? Tow 3 Mean 195 C1. ° ° ° ° ° 1 ° : ' 3 ° ° 3 ° : 2 5 3 8 2 5 é ° 2 i i 3 3 é : 2  
5 6 ° ' i 3 6 ° o ° ° ° ° 8 8 ° 5 t 3 8 i a 1 é : 3 ° ° ° ° ° : ' 5 6 0 % ' & 3 B 2 ° 3 1 2 \* 1 ° : ° Ot 2 ° 2 t ' Oto  
t ° ° ° ° ow o " i 6 3 owe i 7 3 ' ' 2 To 8 3 ECHINODERH LARVAE per SPUN Sermme sere Date:  
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t 5 23 ray 7h "7 " 6 " % ° 12 dun 7h 2 ' 2 3 7 ° 35 dun 78 " 2 é é 2 ° 9 Jul 74 3 5 2 > Ey ° 23a bh 3 °  
3 2 3 ° 2 ° a 2 i ° 1 ° ' 5 7 ° 6 3 ' a 5 ° ° 8 1 ° i 8 ° ° ° ° ° ° 7 2 6 5 6 ° 3 ° 6 2 2 8 3 6 3 5 3

° ° ' t ; ° ° ° 5 ° 2 5 ° ° ° ° ° 8 ¢ ° 2 8 1 : ° ° 6 o ° o ° ---Page Break--- sheet 8 of 15 ECTOPROCT  
LARVAE per Station 2, Islote, Puerto Alco vate Tow! Tow? Tow3 Mean Variance 95 €.1 20 mor TH  
3 hor 78 17 Aor 74 Thay 7 15 may 7 23 ray 74 42 an 7h 25 dun 7 3 dul 74 2h at 7h 20 Rig 7h 10  
Sep 74 24 Sep 7h to oct 74 22 oct 7h 5 Wow 7h 13 New 7 3 dec 78 1 bec 7 10 Jon 75 2 Jan 75 4  
Feb 75 18 mor 78 BIVALVE LARVAE per w? Tow! Tow? Tow} Mean Variance 9 Cul 7 3 ° ° 3 1 3 a  
° o 2 1 i med 4% i a 2 : 3 2 ' 3 5 3 i "4 3 3 2 2 3 ws u 3 5 é % Sas 5 é 3 5 3 fieg 2 4 ° 2 3 di 6 2 8 ° :  
2 \* 5 5 ° 4 a 0 ° 3 1 3 1 2 3 1 : 7 5 5 7 3 é i ° t a 3 2 m8 a 2 2 . 3 1 2 é 2 A 2 ° : é ° ® 2 4 2 5 : 3 3 2 3  
° ---Page Break--- sheet 9 of 15 ASTAPOD VELIGERS per n3 Station 2. Islote, Puerto Rico  
-----S----- eee Date Tow! Tow? Tow 3 Mean Variance 95.1. — Se 20 var Je % 3 hor 74  
8 17 aor 74 2B 2 " ro 37 Tray 74 0 50 106 we & 15 hay 7h ste 23 may Th 2 " 6 awe 59 12 dun 7 2 "  
Oto 3 25 un 3h a a 3 136 27 § ut 78 8 a 885, 28 00.173, aha 74 2 cy mm 0 to 130, 20 hug 74 a Ey  
3 wee th 10 Sep 7 7 é 13 Sto 34 24 Sep 7h "a 5 573 a to 100 to ace 7 3 7 2 0 te ss 22 oct 7h 5 3 19  
ot 19 5 Nov 74 0 3h a oe 16 18 how 7 3 a m ot ie 3 dec 7 is 56 157 Bio x 16 dee 7 18 6 38 Oto 27

10 dan 75 5 8 3 aw 2 Jan 75 2 8 28 oe & 4 Feb 5 23 38 0 ate te 18 nor 78 ss & war on FORAMINIFERA per #3 Sa Snas Date. Tout Tow? Tow3 Mean 95.C.1 a 3 Aer 7h 17 Bor 74 7 2 ws 18 mar 75 ---Page Break--- Sheet 10 of 15 HALACOSTRACAN LARVAE per m3 Station 2. Islote, Puerto Rico = On 2 sot Puerto Rico -----E ee Date Tow! Tow 2 Tow 3 Mean Variance «35 C01, oe 20 war 74 7 3 Apr Th 16 17 for 74 2 4 37 25 137 ow sh m 3B 16 al 27 50 30 50 7 a6 2 38 a 2 30 a 3 143 20 61 % n 23 7 7 36 zt 32 nm 3 7 6 7 4 2t % 2 40 n a6 ash 0 to 101 i 2 2 8 4 Oto 32 w 20 2B 3 6 Mt 37 m 3 " 7 4 6 to 21 % 8 35 x 28 6 51 n 2 15 3 Fr ot te nt " 5 7 14 Bio nm 5 5 6 5 te 7 a 7 % 8 6 Hite 2 a 31 4 10 5 ote 50 % 9 9 6 " rte 2 i 10 16 ' n ote 2 i " 3 18 3 10 to 28 10 7 3 3 ote a5 18 ar 75 8 3 to 2 te 6 i FISH LARVAE per

a3) SEES aeE ee Date Tou! Tow 2 Tow3 Mean Variance 95 Cut De 3 hor Th 7 17 Aor Th 2 2 3 2 ° rio 4 1 hay 74 3 1 3 5 t ot s 15 may 7h ° 8 i 29 hay 7h 1 ° 2 1 1 ote 3 12 Jun 7h ° 2 ° 1 1 ot 3 25 dun 74 ° a ° 1 4 ot 6 9 dul 74 ° 3 3 2 3 ote 6 2h ut 74 2 ° 3 1 2 Ot 5 20 4 ° a 3 5 ow 6 10 ° 2 ° 1 1 oto 3 2 3 3 ° 2 3 ot 6 to ® 3 1 1 2 to 5 2 2 2 2 ° 2 3 5 ° ° 2 1 1 ote & 8 6 8 ° 2 " 0 to 10 3 Dec 3 ° 0 1 4 bio 6 16 bee ° 2 ' 1 1 ot 3 10 Jan ° ° 2 1 1 oto é 21 dan ° o 2 1 1 Bt & 4 Feb 2 ° ° 1 2 ote & 18 Mar ° 1 2 1 1 Oto 3 ---Page Break--- Sheet 11 of 15 isn 60s per @® Station 2. Islote, Puerto Rico ate Tow! Tow2 ToS Mean Valance 95 C21. 20 mar 7h 3 3 hor TH 3 V7 Aor Th 2 52 2 5 236 Thay 7b 28 82 a 50 339 15 hay 74 5 & 56 23 may 7h uh 8 so toy 53 12 Son 3h 01 B és 80 32 25 Jun 74 33 83 65 8 206 9 Jul 74 103 8 32100 R 2h sul 74 6a 55 7 us 62 20 hug 74 o & 63 6 i 10 Sep 7h 4 uM 2 33 Pd 24 Sep 7h 181 157 102 1h 1650 10 ect 74 wz 3 38 8 463 22 oct 3 37 31 Fa 33 9 3 how 35 a5 & a 288 ava 5 3 2B 50 238 ay 5 3 58 @ 204 aieR % 7 és n 51 48 bee 7H n B 3 fo 67 Je den 75 fo sh 3 46 338 Ln 8 n 30 38 30 7 18 Mar 75 0 5 7 és he variance rapolati Temora turbinata perm Date Tow! Tow? Tow3 Mean Variance 95 C.1. Weer 7 = 3 hor 7h 55 AP Aor 7h am 30 rs 8 hte 70 1 hoy 74 257 210 267 3560118 to 415 15 May 74 3h8 m7 53 23 May 7h 1 a 32 326 ow 7 12 Jun 74 39 nik an 12220, © to NBs 25 dun 74 2 252 163 7483 0 to 377 9 Jul 74 é 19 0 46 ote 8 2h Sul 74 23 ' % 5% ote 37 20 Aug 74 7 39 46 336 tt 10 Sep 74 3h 8 2 66 Tie Ms 24 Sep 7h 508 202 86h 63791147 to 780, 10 cee 74 56 2 6 1539) 0 to 158 22 Get 7h 3 5 5 3 ro 5 Nov 7h 26 20 223 233192 to 267 19 Now 74 '407 169 274 4761 0 to 576 3 dee 74 2h 158 22 609738 to 26 6 Fs 35 3% St 12 to 48 18 5h 170 3879 to 325 Jen 75 107 3 5 19760 to 130 Feo 78 264 185 133 438829 co 358 20 2 20 9 hte a7 ---Page Break--- sheet 12 of 15 emora atylite 3 Station 2, Islote, Puerto Rico = Pate Tow! Tow2 Tow3 ean Variance 95 6.1 oar Te 7 3 for 7h 2 17 for 7h 4 ' 1 3 2 ow 7 Tray 74 10 10 8 5 20 2 to 2b 15 vay 74 2 2 5 25 nay

14 a a 6 5 a 0 to 30 12 dun 7h 3 ° 2 2 2 bts 6 25 dun 34 2 ? 7 é Fe} Bt 27 3 Jul 74 2 sat 78 20 hun 74 1 Sep 7 2 ° ' 2 010 18 24 Sep 74 3 3 5 é 4 Tito 19 fo oct 7 é 3 1 3 1 oto 5 22 oct 74 ° 8 ° 5 tow 74 7 5 ' 6 1 st 9 18 how 7 " a 5 1% 208 ote 52 'yee 7h 3 4 8 2 65 0 to 28 ore : 2 \* 2 : ote s 10 fon 78 5 é 2 a 5 D018 2 dan 75 3 4 6 4 5 ote a 'Mies a 2 ° 2 é be wear 7s 3 5 6 5 2 ri 3 Shall calanotd cosepods per a3\* Date Tor! Tow2 Tow 3 Mean Variance 35 6 ee 3 hoe Dh 5 WT hor 1b a 197 ar 21 to 263 Thay 78 153 5 4205 ig to bi 15 may 74 405, 363, 23 may lh 183 ne 305 en 8 Gr 2 den 78 iss ios 7 2230 to 234 25 Jun 7h 168 13 eh 2765 Wee Sie 5 ul 74 163 88 165 25407 276 to 10se asad be 6a 2 Se3e2 Oto 395 803 an bis 27196 216 to tou? 28 rity 22137 to '32 138 sis 1083 35087697 to 1076, me 37 ta \$108 333 co 388 zh 18 273 229156 to 3 437 Wo 353 1823300 to 513 635 152 560 3307 fog to. Bae 54 066 thy nag 45724 JOD to 17k i 109 13133 ine 30 to 286 ys 606 a 63 6083 Mas ta a6 ns S28 62 15k 385 ta Shy ee 2S Bes Ses 2702 le tee Ea 238 228 3 Me Clevioealanes furcstes, Recynocers sTeeatsnus spe RET aT 5 Tas ---Page Break--- sheet 13 of 15 ss geactiie per 03 Station 2. Islote, Puerto Rico SE Date Tow! Tow? Tow3 Maan Variance 95 G.I. — 7 3 ° 5 7 4 3 2015 3 3 5 3 é ote 8 ° i : ° 3 3 2 : 2 1 oto 4 5 5 ° 3 8 Bion 4 8 6 27 27 2 to 69 3 2 ° 7 33 Oto 2 é 7 ° 4 \* Biot 3 é & 7 7 bt 3 5 3 & 9 Brot ° 0 ° ° ° Bee's ° ° ° ° ° Ot 2 ° ° 2 1 : Bro & 8 8 3 3 ° 8 19 28 3 3 3 3

a Deets : 2 2 2 é 2 2 2 ow 5 5 2 i i 2 ot 8 a i 2 4 2 ot 7 3 8 5 5 6 don scartia spicata per a? ate Tot  
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Hoo OR § sw aie BOR OR & bl 35 in 0 " 2 & \$83 3a urn me mis to tne Bhan % BBE 10 Sep 3 ne \$0  
fe nish a 8 @ 6 sen bern yoo Oe B 38h Beet 8 vos 2 eee Show 78 BB nee 3 how Je 3 2 08 bee 78  
Host we ape ¢ 1 % SER to ies 38 3 3 3 iss od ; Sos > 2 0 wher 8 Ce ee ee ee ---Page Break---  
sheet 14 of 15 wa gracitis Station 2, Islote, Puerto Ric oe Pere EE ate Tow! You 2 Tow3. Maan  
Variance 95 €.

—\_—S oS. es omar Te Er 3 tor 7h a 17 Ae 7h 3 85 8 Thay 76 7 2 58 15 may 78 2 16 25 hon 7 a e  
3 12 un Mh 36 sé % 35 dun 7 n 3 3 9 ut 74 255 132 167 2h a 5 0 2 30 fig 74 id @ 8 10 Sep 78 B 6  
» 2 Sep 7h a 3 2 40 oce 7h a 20 7 22 oct 7 42 26 27 5 Nov 78 46 35 35 18 Now 2 ee ai 3 bee 7 %  
6 202 1 bee 7 a 6 3 10 Jan 75 53 5 © 21 an 75 s a Ea 4 et 98 2 1s 5 we nar 75 50 si B Date Tou!  
Tow? Tow3 Mean Variance 35 1 Be 7 x & 6 45 ay au a to 10 2% a 132 ong 7 o 2B 3 . 3 5 ' Biot st 5  
a " 4s De be a 8 7 5 ae Bie 3 3 8 wr 3 2753 te att 15 136 135 175 90 to 156 8 63 We a 28 20 to 95  
a 7 3 a n Sto te n a3 Ey ia ate atom A 3 % 3 3 'Oto 22 2 a "7 2 3 Rte 2 a a 7 6 at wee 5 2 3 ta 2 u 3  
to 39 55 Fd 8 3 26 Oto 120, o 2 '3 u 2 Sto tt 2 3 3H 3 2 wie x u n 18 o Vite 3 & 35 35 uw nb bio 35 5  
% 3 na 0 to sz ---Page Break--- sheet 15 to 15 Puerto Rico % 10 Jan 75 3 a 19 8 a Bio ag 21 Jan 5  
5 n 6 & 195 to % 4 Fes 75 a 20 7 a3 big 05 106 18 ie 78 u 3 % 3 38 oS Succes spp. sun  
sereeeeeeee Date Tor! Tow? Tow3 Mean Variance 95 0.1 ee 3 hoe 7h 2 17 hor 74 i ° ° ! Thay 78 °  
; 5 3 15 may 78 6 ' é 23 may TH 6 5 8 ' 2 dun 7 2 2 ° ' 25 Jun 7h 2 2% 7 20 3 Jul 74 5 8 3 ir wh Sat  
7h 5 a @ 6 3 53 a e fo 5 8 a 8 % Ne 7 53 2 3 a @ 5 2 5 » 6 5 a a Ea 8 2 a 3 8 36 : 6 15 6 3 st i 8  
M6 is 2% 25 2 2 8 ir 6 7 3 2 3 16 ---Page Break--- APPENDIX 15 MEAN VALUES FOR  
ZOOPLANKTON GROUPS AT STATIONS OTT 2, 3, NOE, ISLOTE, PUERTO AICO 15.1 ---Page  
Break--- APPENDIN 15 sheet 1 of 15 piouass nts100 a? Individual Stations Istote, Puerto Rico SSS  
SS Date Station 1 Station? station 3. station & woo, SE Yow Te 7 70 5 3 hor 7h no % 5 thee Fh 7 4  
5 1 5 2 5 15 ie 6 8 3 4 2 % 3 a sr 5 Pa 5 it 3 3 % % 8 a 0 10 15 Ey 5 1 6 ie 6 6 3 2 " 0 1B ° 3 0 " 2 8  
5 ° 2 5 6 8 20 2 ; 2 3 a 3 ie % 4 B Ree i 6 ie ie S WO mar 75 e " Station 1 Station 2 Station 3 station  
4 oe tee ae 0 37 986 5 ms 27 és 315 Si 882 iy op 1940 os 639 33 738 a8 ye 1080 vat bot 61 B36  
671 a 783 '00 wa. 638 es 83 S87 on 53 1379 238 me au 33 He 178 st Be 33 st 2158 5 Ba tooo Su  
2097 so 933 Bs 762 oe 1205 nak S38 1358

"06 faa 4 Fe 75, 1099 399 46h ner 7s 33 138 a ee ---Page Break--- Sheet 2 of 15 copepods per a}  
Individual Stations Istote, Puerto Rico teres Poet Reo Date Station | Station 2 Station 3 station & 20  
mar Th 78 a ae eo si7 isp 592 376 592 389 tes 280 1256 535 25 mw 172 Hot 1000 387 327 ae 335  
im as 508 153 oi9 535 535 6 mat a7 ae Bu ins 373 386 ete iar 301 380 ets oso foe ino 180 m2 118  
ae! 337 id ose BE ty S53 30 995 76 tes 207 158 13h 20 13s, woe 25 253 ssi 16 bee 2 1135, 353  
300 ning 123 1096 389 ee 373 62 BS weg i 'l m ae haetognachs per m? Station 1 Station 2 Station  
3 Station & 7 0 B © 30 7 6 3 3 38 15 3 38 5 6 8 23 & 55 6 3 38 3 a 2 i 2 36 7 % 8 m 5 Fs 3 to 38 5 3  
2B 25 2 5 " a7 2 3 b n 46 2 7 : fo sk % 1 a 3 a 10 4 26 70 si . 3 f 2 2 : ie 50 a to i 3 2 a B be a 2 Fa  
ty ie 15 a 53 3" au ! 5 i 5 i ---Page Break--- sheet 3 of 15 Larvaceans per 03 Individual Stations  
Istete, Puerto Rico bate Station Station ? Station Station & 8 5 19 a Ba 8 \$ 8 2 3 i "7 2 a " so 2 0 3  
% iy 2" a i 6 20 s 3B i 9 3 11 7 Se & 67 6 2 3 a 3 19. 153 He 37 % ny i a % x na 5 3 a 83 0 2 7 5 iB  
2 4% 2 e is B 7 3 8 2 w 5 Fa 3 6 ry 38 % m 2 var 6 50 3 7 \* a 8 20 8 8 Station 1 Station 2 Station 3  
Station + 18 nar 75 ——— oo. ---Page Break--- Sheet 4 of 15 Ostracods per #3 Ingivia | Stations  
Istote, Puerto Rico Station | Station 2 Station 3 Station & Bo rar Te 3 Fi T a 3 hor 1h 196 209 156 2  
he 5 8 2 hay 38 3 2 § } whey 34 39 6 Fa i nay 8 ? 3 : 2 bon fe ° i : a 35 dan fe 5 4 8 § 3 det Pe a 3 '  
9 am 1 a ° t a 2 5 : ° i 3 3 8 5 By 5 ' 5 3 hh 3 a é 3 A ° ° ° a ° i : ° a : ° i : n & 5 ° ° z : 2 : 6 3 % é 2 t  
R 3 8 i 2 R a8 23 3 2 18 hor 15 : ° 3 ° Cladocerans per a3 oar anEnneeemeeeee ate Station |

Station 2 Station 3 station & ° 7 7 7 9 " 5 ° 5 3 i 6 30 2 ° t 5 3 8 ' t 2 ° 1 5 7 5 5 5 0 % a 5 : ° ° é t 8 ° ° 5 ° 2 ° 2 3 3 ° 1 8 3 ° ° ° é 7 ° § ' 2 19 i 4 i F a 3 ° ; ' : 7 2 2 6 ° 5 i ° ° i ° z ---Page Break--- sheet 5 of 15 edusae per a Individual Stations Istote, Puerto Aico ate Station | Station 2 Station 3 Station & 24 Sep 7 fo oct 7 22 oct 7"

5 Now 78 13 Now 7 3 bec 74 16 bee 7 10 Jan 75 21 san 78 Leet 75 1B her 75 8 2 5 ? 3 5 Siphonoshore bracts per a} sah x 5 % 8 17 for the 7 3 4 Hoan : 3 3 "8 Birk ' i 5 ; Bi it q ' 2 it Sk PF | auik 3 : \$ ; 5 @ 3 5 ; fy ; : : 2 3h 5 } i i 2 5 i : 2 To Son : : i 5 ie 5 t 7 3 te 3 : i i ---Page Break--- Sheet 6 of 15 individual Stations Islote, Puerto Rico date Station 1 Station 2 Station 3 Station 4 z =8re0- pon -conece-ovo@sS8-non t Date Station 1 Station 2 Station 3 Station 4 a a 3 hee Th 5 ° 17 for Th 3 5 Thay 74 5 2 15 may 7 a 0 23 vay 7 "8 1% 12 dun 78 25 dun 7h ' 3 Jul 74 2h ut 7h 20 Aug 74 40 Sep 7h a ie 2 5 8 6 4 18 rer 75 ---Page Break--- sheet 9 of 15 gers perm} 'Individual Stations —tslete, Puerto Rico Date Station 1 Station 2 Station 3 Station 4 a a % 6 2 ia a 3 5 n 3 H 33 53 iF 3 355 336 va 8 te to % a et 2 5 5 ie B iH 3 6 8 7 s & & ay 2 Ff 27 a 27 a 5 2 26 y a 3 ar Ey 2 i @ 6 3 26 5 6 2 n 2 2 3 2 3 a 53 3 rs 6 2 Ey 8 2 7 ° 7 o 2 8 " 2 Pt 2 5 a a i 38 date Station 1 Station 2 Station 3 Station 4 Wee oan 5 5 ; é 17 Aor 24 au 5 5 a 1 aby i 5 Hi > : ' ° : ; 8 4 5 x : : 3 % é 5 3 a a 3 i 3 a 3 ; a a 3 ; rs 3 : : 3 é \$ \$ Fa é 3 ; é ; FY 3 \$ 3 ; ; t 3 i Q ° 3 2 ° : 5 : \$ : i : 3 3 5 3 3 4 3 3 3 2 A 2 3 ---Page Break--- sheet 10 of 15 larvae per Individual Stations tatote, verte Ale SS SS date Station 1 Station 2 Station 3 Station 4 z 7 7 ei 9 6 3 rH ia 3 28 \$ 2 2 ie 3 FI 33 B é 7 3 i 10 3 0 2 2 ae ; 2 @ Fe "a 3 i 5 i 3 3 7 % x 8 @ it 3 2 8 2 6 6 n B 3 " 5 a % s 3 5 19 3 0 6 i : FA '5 a8 " 8 i 2 i 8 h 3 a 2 jan 38 to 3 i : ian 3 3 3 2% 5 ee B % Ey abe ' — Fish larvae per a3 Soar stan date Station 1 Station 2 Station 3 Station 4 Been 3 for 7h 17 aoe 38 ian 15 may 23 vay Th 12 Son J 25 Jan 7h 9 Jul 74 2 sar 7h 20 Aug 7h 10 Sep 7h 2h Sep 7h 49 oct 7 a2 oct 74 5 how 7h 13 Now 7 an ---Page Break--- Fish e995 per 0 station 3 25 un 74 9 Jul 74 2 ut 76 20 hap 74 10 Sep 7 2 Seo 74 fo oct 7 22 oct 7 5 Nov 7 13 now 78 3 dec 74 18 dee 76 10 Jan 75 2 dan 75 "4 Feb 5 whee 75 station 1 7 15 8 so ie 105 8 103 iy \*

Individual Stations Station 2 © 2 28 he sheet 11 of 15 Islote, Puerto Rico Station 4 7 2 ---Page Break--- sheet 12 of 15 Tonowa styliteca per m3 Individual Stations Islote, Fuerte Rico date Station 1 Station 2 Station 3 Station 4 eB % 2 " 5 lt 3 1 i 22 ab 2 2 ' 5 3 0 0 5 3 ° 7 2 3 8 8 5 a ' 7 4 ° a 3 ? 3 5 6 5 5 0 5 é 5 5 & 6 7 ' ° if 10 a 5 2 © 5 2 8 5 i 3 4 0 ° 5 5 10 6 smal eatanoid copepods per} Date Station | Station 2 Station 3 Station & e Tor Tor ¥ 126 08 185 a7 23 va 4 ot ml Me a 131 31% 387 28 irs} ie 268 eo 203 ah i m Soe 39 205 ist Fy gor ee 331 mm te a 24 ary 5 630 ite oe rf 383 703 123 138 Be ai yee it a 537 oy 25 2 fos 32 ie 'as en tet 386 8 330 zh 5 131 as 558 ue bs 26 fa 665 633 ie 450 ne 652 ma a8 4 Feb 75 518 305 % tay we mar 75 236 2 330 338 Clavsoeatanus fureatus, Mecynoce ---Page Break--- Sheet 15 of 15 Dlunons spp. pee mB Individual Stations stote, ruerto Rico See tte Peart ee Se bate Station 1 Station 2 Station 3 Station & — burn 7 7 7 7 mer % x i 3 we Mh 8 " 7 Fa my Th 7 8 i 3 my 7k 13 3 38 a my 7 5 3 3 2 an a i i 3 wnt % ul 3 " Bat je "3 rp " z aun '2 i 8 3 25 yal 38 a 108 i 18 10 Sep 7 6 6 z 46 Riek " sa 3 35 Hae 2 a 2 a a 22 Oct 7h 3 6 a x 3 hor 7 b 5 2 > gen % 1 5 % 9 tow 74 3 5 st Ps wie it 3 iS i 16 bee 74 u 28 3 & fo ssn 35 2 a % so 1 fe a & m 5 wanar 98 2 " = 6 SSS oncsea 2p. per a} Saar URninSaneeneeee Station 1 Station 2 Station 3 statien & Hee bobo og Sen Bg 8 ---Page Break--- APPENDIX 16 ORGAN ISHS COLLECTED Im PRELIMINARY NARD BOTTOM SAMPLES Pear KINGOOM Poylum Chlorophyts Aoséronene aseltate aarp Caen Feta zee ehlorophy ea ---Page Break--- A gin |e TRS Se EET Woe [ea a Oe never 22/941 foe yg os eo EE 900 07/888 [Oe 40 01/5 Prerer = 23 SEV 0 |e ieee = © 930 01/9, | ae Pe tera =a = % £1 20 01/8 Bie — EL boy 62s ec} = : se EL fry Ger(os)8 a BS EL fy 6z/(on)e xx oe «90 12/8 Soe ae SS 1 390 01/8 ee =e Tee = 87 Se ae \* 1 rowers as == = a i fill kal | 3 hasbts Eerfearooises eae. 'Galasaure mainats, Geligtella acerose ihpaaals Sigua ise Appendix

## 16 continued Phylum Spermatophyta

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cL 0 01/4 lhe x 3 a = é ao 4 : 238 5 8 Ba g £ > 2 gis 3 72.4 = : HE od 23338 i 2 iG P22bs 2 53  
sgass = zit ---Page Break--- Appendix 16 continues Class Cephalopoda Betopus sp. Phylum  
Arthropoda Gonodactylus ceresdii Order Amphipoda Fenty gamarides Order Tanaidacea Order  
Isopoda Faracersts \$5" order Decapoda Suborder Natantia dea ---Page Break--- Appendix 16  
continued Suborder Reptantia Section Anon a LTE OOCOnEEh ATE ey | ped ds i Lit Filme panos a  
: Sdiel bial sus gracilis a ! | ! ' FEES aaeus itl flu ---Page Break--- Appendix 16 continues ---Page  
Break--- APPENDIX 17 oncauisns couuectep exon Kk) KG) ok ke) ERRIMENTSSNPLTNG  
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jvstert 2 Dplagiograma io. 3 0 Diophus atternans, 1 Pocokiella variegata 22 Sargassum sp. 2h  
Phylum Rhodophyta Agardhiella tenera Bmensta mt 'Baghiroa sp. Ke rigigs BoEryacladto  
occidentalis Bryothamniion seatorth Thonpia. sal cornoides thondriasp. 3 Thryssnents'  
enteromorphe Gelarthara sbercist Mea Gorattina spp. 380 W112 15 Sorynenorghe av 8 co.  
Eryptonenta benary' 233 Dictyurus occtdentalis 1 8 : axaure marginata 3 : ; pais 1.8 13 23 13.9  
125.4 71.6 \*Values represent dry weight A ---Page Break--- Appendix 17 (continued) KRG) KO K(s)  
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Phylum Mollusca Class Amphineura Acanthochitena sp. A 1 Class Scaphopoda Dentalium  
antitiarum Orbigry BOA Class Gastropoda 6 A\_puchella Blainv: 2 Salis congidea Kurtz and  
Stimpson 1 Gerithiopsis grystallinum Dal? 1 1 2 3 3 Collumbella gercatoria Linne Conus daucus  
Mass. GLaspideus Gel in ET[uNae clencl Deillia interpleura Dall and Simpson 1121 B\_panciana  
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"Conoidea Kurtz and Stimpson 1 Siplaelio bites! Tectn ' 'Latics marochiensis Kiener 1 Latinas  
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barbadensis all Marginella hematite Kiener i denticulata Conrad Hitrella fenesteata C. 8. Adams  
Modulus Godulus Line Nassarius albus Sa Persicula pulcherrina Gaskoin Pyrene ovulata Lanark  
Aissoina multi C. 8. Adams multicostata, '\$Lsancelata Philip! 1 'Skronbus gigas Linne Sx taninus |  
Gnet in Telcolia affinis "C. 8. Adams Teiphora ornata deshayes Trivia pediculve Line 1 Vexium  
sp0A 3 Vexitium haley Dohra won 6 Class Pelecypoda Arco Inbircata Bruguiere 1 Areopsis adamsi  
Dall 1 ---Page Break--- Appendix 17 (continued) Barbstia tenera Cc. 8. Adams 'sencelata Line  
Godakia nectinella C. 8. Adans 1 beanaio bana "0b ony Musculus lateralis "Say Eaaycides  
semisulcata "Gray Pododesmus cudis Broderip, Class Cephalopoda Octopus spp. Phylum  
Arthropoda Class Pyenogonida Pyenogan ida spp. Class Crustacea Subclass Hoplocarida Order  
Stomatopoda Gonodactylus gerstedii Hansen Subclass Malacostraca Order Tanaidacea  
Tanaidacea sp. Tan Order tsopoda Alsiconia inswlaris Hansen Apanthued Signata Menzies and  
Glynn 'arthur anche ise 5p. lae 5p. ' c Cirolana parva Hansen 'Dyanenet la Ericheonela Fil  
iieeats"Henzies "dionge Henzies and Glynn Nesanthuria decorata Menzies and a weidens Styna.  
Menzies and Glynn Parscerels caudata Say Ste neg ar 1974 18 K(s) mais ont 1974 " ne16 1s  
1974 K(s) meth 12/5, 1374 K nets 722 1375 K(s) ot5 423 1975, ---Page Break--- Appendix 17  
(continued) kok) Rts) Rls) p19 ne15 nsl6 elk nmtS net5, 8/21 9/11 tar 12/5 b/a2 4/23 197 1974  
1974 197% 1975 1975 Order Amphipoda Order Decopoda Suborder Natantia Section Caridea  
'Rebaharmensis Rathbun KxFormosus Cibbes Wrachyearpus blunguiculatus Lucas Lysnata sp.  
Ogyride® yaquiensis Armstrong er ielinenaesus sp. A 2 1 Ferlelinsnes amerTeanus Kingsley 3 1  
P\_pedersont "those Pontonta miserabilis Holthuis 1 rontonta sp. A 4 Processa sph 1

Synalpheus spp. (Tjuveni les) Synalpheus bousfieldi Chace 231928 toutl 'Thor sanningl Chace 1  
Trachyearis restrictus A. Min Edwards Suborder Reptantia Section Anomura Dardaous. He  
Milne-Edwards 1 Peaurus spp, ttfuvent les) 2 12 Pagurus misnensis Provenzano 4 30 6S  
Petrolisthes anoenis Guerin Section Brachyura 'Acanthonyx petiverii H. Kilne~ 1 Edwards Actaea  
sulcata Rathbun' ro4 17.6 ---Page Break--- Appendix 17 (continued) Kk K(s) KK(s) kK (s) 19 ne1S  
n=t6 eth nets nel5, B21 9/11 tayh 12/5 4722 4723, 1974 1974 1974 1974 1975 1975 Calapea  
flames Herbst Eucinetops blakiana Rathbun 1 Eurypanopeus sp. & 2 Herbeite depresia "Seinpson 1  
Hexopanopeus caribbaeus Stimpson 4 Lissa bicartnata Aurivil ius ' UithodTa granulosa A.  
Hilne-Edwards 1 Henaethiops portoricensis Rathbun 1 rophrys bieornates Ani Ine 3 Edwards HM.  
antillensis Rathbun fitrax forceps A. Hilne-Edwards 'oval pes 'guadulpensissavssure  
Frtunnus:retfeuTatas "Rathbun Fodochels grossipes Stimpson tenorynchus seticornis Herbst  
Testers 'Bstroides Rathbun 1 1 Phylum Bryozoa Bryozoan type A + + 5 5 Bryozoan type 0 hoe Tg  
Phylum Echinodermata Class Asteroidea Aefropectin duplicitatus Gray : Class Ophiuroidea 2 204  
Aaphiuridae sp. 23 'Qphiocona echinata Lanark 'Q. pulmita Lutken B34 O.riiser Lutken 2  
'DphocnTda scabrivscula Lutken 1 a 4 2 0, phoenium WL. Clark 1 'Gsauanosissieun" Lutken  
Ophiopsis paucispina Say roao4 Opniomyxa flaccida Say 1 Gphionereis reticulata Say 1 2 2  
Ophiostigna isacanthun Say now 8 ob 17.7 ---Page Break--- Appendix 17 (continued) K kG) K(s)  
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orstedti~ Lutken 31 OcrsuensonTi Lutken " Class Echinoidea Euci dar tribuloides Lanark 5 5 4 2  
Phylum Chordata Subphylum Urachor Class Ascidiacea Didennidae type A + + 6 5 7 8 Herdnania  
moaus. Sevigny Hicrocosmus heleri Herdnan 1 17.8 ---Page Break--- APPENDIX 18 LIST OF  
FISHES OBSERVED IN THE ISLOTE AREA Scientific Wane ORECTOLOBIDAE Ginglynostona  
eirratunt CARCHARHINI DAE Rhizoprienedon porosus DOASYATI DAE

Dasyatis americana or INcutDAE Moringa eduardsi ENOCONGRIDAE Koupichthys nuchal  
Kaupichthys Fodens -MURAENDAE Enchelycore sp. 'Symothorat Fonebris Gynnothorax maringa  
Tymothorax sp- Gynnothorax vicinuss 'OPHICHTHI DAE Myrichthys oculatus Hyrophis punctatus  
Sphagebranchus ophioneus LUPE 1 OAE Horengula hureralis Jenkinsia Temprotacnia®  
Opisthonens og! imum SYNODONTIDAE Saurida suspicion Synodus Fostens Synodus Saurus  
Synodus synodus ANTENNARIDAE Antennarlus mul tiocellatus 'oPH 11 1 DAE Lepophidium  
profundorum Ogitbia sp. Parophidion schmidtii exocoeTi OnE Cypselurus heterurus BELONOIDAE  
Tylosurus acus Conon English Name nurse shark Atlantic sharpnose shark southern stingray  
spaghetti ee! false moray false moray chestnut moray 'green moray spotted moray moray ec!  
urplenouth moray goldspotted ee! Speckled worm eel surf ee! Fedear sardine dwarf herring Atlantic  
thread herring suspicious lizardfish inshore lizardfish bluestripe lizardfish red lizardfish longlure  
Frogtist cusk-eel brotula dusky cusk-eel Atlantic flyingfish agujon 18.1 'Connon Spanish Name gata  
tiburén raya congre culebra de mar culebra de mar culebra de mar rmachuelo nijua ploniiiia Iguana  
iguana iguana iguana zapo volador sgujon ---Page Break--- 'Appendix 18 (continued) Scientific  
Name HOLOCENTRIDAE Holocentrus ascensionis Holocentrus rufus Holocentrus vexillarius  
Hyeloristis Jacobus Plactevpops retrospinis [AULOSTOMIDAE Aulostonus maculatus  
FISTULARIIDAE Fistularia tabacur: SYNGNATHIDAE Hippocampus reidi Hicrognathus erialts  
Hicrognathus ensenad: Rieregnathus vit Syngnathus dunkert SERRANIDAE Alpinestes a  
Cephalopholis fulva Epinephelus adscensionis\* Epinephelus guttatus 'Serranus tigrinus  
GRAMMISTIDAE Pseudogrammus gregory Rypiticus bistrispinus Rypiticus saponaceus ifrenatue  
Aypticus su! GRAMMOIDAE Gramma loreto PRIACANTHIDAE Priacanthus arenatus Friscanchus  
eruentatus Apocow 1 oae Apogon inscutatus Apogon quadrisquama tus 'Apogon sp.

BRANCHIOSTEGIDAE Malacanthus plusieri ECHENEIDAE Echeneis naucrates: Common English Name squirrelfish longspine

squirrelfish dusky squirrelfish blackbar soldierfish cardinal soldierfish trumpet fish bluespotted cornetfish Jongsnout insular harlequin pipefish banded pipefish pugnose pipetish mutton hantet 'coney Fock hind Fed hing nassau grouper Tantern boss, two spot bass harlequin bass reef bass freckled soapfish greater soapfish Spotted soapfish fairy basstet bigeye glasseye snapper Flamefish sawcheek cardinal fish cardinal fish sand titefish sharksucker 18.2 Common Spanish Name gallo, candil, candeter gallo, candil, candelero gallo, candil, candelero gallo 0j6n,candil, gal to gallo, candit corneta flauta caballo de mar caballo de mar caballo de mar caballo de mar caballo de mar cabritia mantequit 13 fmero chesno, juagi? cordovsin cordovan gut locho renora pega ---Page Break--- Appendix 18 (continued) Scientific Name 'CARANG 10RE Caranx bartholomaei\* Earanx erysos Caranx ruber Decapterus macarel1us Decapterus sp. Elagatis bipinnulata\* Seriola dunert Teachinotus sp. LUTVANIORE Lutjanus analis\* Curjanus apodus Lutjanus eyanopterus\* Lutjanus Jocu LutJanus mahogani Locjanus synageis Ocyurus chrysurus honbop ites a GERREIOAE Eucinostomus. jonesii Eccinostonus meTaropterus POMADASY IDAE Anisotremus, surinensis Anisotrenus virginteus snulon auroTineatun Haenulon Haenulon Haenulon Haenulon plunteri Haenlon. sclurus SPARIOAE Colonus bajonado jane pena SCIAENIDAE Equetus ocuninatus Odontoscion dentex 'Unorina cordides MULLIDAE Mulloidichthys martinicus Pseudupeneus maculatus PENPHERI DRE Pempher is: schomburgki\* 18 Common English Name yellow jack Blue runner bar jack mackerel scad sead Faintow runner greater anberjack Pompano nutton snapper schoolmaster cubera dog snapper manogany snapper Tane snapper yellouta'l snapper Vermilion snapper Slender mojarra Flagfin mojarra black margate orkfish tomtate Caesar grunt smallmouth grunt French grunt cottonwick white grunt Bluestriped grunt Jolthead porsy 'Sheepshead poray Feet croaker 'sand drum yellow goatfish Spotted goatfish glassy sweeper 3 Common Spanish Name edregal co} inua gira

negra caballa caballa cobia chonpanta pompano, paloneta parse argo argo manchego fmancheso colirabia besugo. rojarra vieja vieja mula cachicata prieta cachiqui t cachieata arrayado cachieata cachicata salmonete Salmonete ---Page Break--- Appendix 18 (continued) Scientific Name EPHIPPLOAE Chaetodipteus faber [CHAETONDONT DAE Chaetodon sedentarius® Thaetodon striatus Holacanthus ciliaris Holacanthus tricolor Fomacanthus arcuatus\* Fonacanthus paru PORACENTRIOAE Abudefduf saxatilis Chraais cyaneus Chronis muleTTineatust Hlerospathoden erysutus Fonacentrus fu: Ponocentras partite Fonacentrus praniFrons\* CcuRRHIT DAE Aoblycirehitus pines LABRIOAE Doratonctus aegalepis Halichoeres Bivictatus\* Halichoeres garnott Tehoeres macuTipiona hoeres pictus hoetes pory! Fes radtatus\* Weniapteronotus martintcensis Heniapteronotus novacula® Hemipteronotus splendens Thatessons bifascigtuy ScARIOAE Searus coeruleus Searus crotcens! SparTscaa sorotrenatunt SBSreoSS Shtyeapeeran SPHYRAENIDAE Sphyraena POLYHEM!OAE Polydactylus virginieus DACTYLOSCOPIOAE Dactyloscopus tridigitatus Eillelios rubrocinetus Common English Name Atlantic spadefish reef butterflyfish banded butterflyfish queen angel fish rock beauty gray angel fish French angelfish sergeant major blue chromis brown chromis yellowtail damselfish dusky damselfish bicolor damselfish threespot damselfish redspotted hogfish Spanish hogfish creole wrasse dwarf wrasse Slippery dick yellowhead wrasse Clown wrasse rainbow wrasse blackear wrasse puddingwife rosy razorfish pearly razorfish Green razorfish bluehead blue parrotfish striped parrotfish redband parrotfish restail parrotfish 'great barracuda barbu sand stargazer Common Spanish Name ariposa cagona nariposa cagona cagona prieta chopa chopa chopo, 'chopa 'chopa: cchopa cchopa capitén doncel la once! la doncel la once! la Soncella once! a once! Ta donee! la doncella doncel la ---Page

Break--- Appendix 18 (continued) Scientific Name OPISTHOGNATINDAE Opisthognathus aurifrons\* Opisthognathus whitehurst cuntae Labrisomus

buceiferus ree alate RaTacoetenus "auroT meatus Halacoetenus erdeant RaTocoetenus friswglotus HaTacoetenus varsTeoTor Faraelinas grandieonis Paraclings nigripinis 'Starksla Tepiesetio BLEW IDRE Hypteurochitus aequipinnis OphtoblennTus "aetantieas CALL IONYAI DAE Call ionyaus oss tone Barbulifer antennatus lathyaobius. soporator 'Goblosona. evelynae™— ACANTHURIOAE Acanthurus bahianus Reanthurus ehtrarguss Keanthurus coeruTeus 'ScOMBALIDAE Sconberonorus regalis SCORPAENIOAE Neonerinthe beanorum Sees eS corne 'Scorpaens grandicornis: Seorpaena. pluslert eortioae Bothus Tunatus Bortus acuTiFerus 'Sysco wlerurar BALISTIOAE Aluterus schoeptis Balistes capriscus Tstes vetvTa Taatharhines Tacrocerus Contherhines pulls yellownead jawfish dusky jawfish poffeheck blenny Tongfiin' blenny hairy blenny goldline blenny tation blenny dled blenny barfin blenny banded blenny horned blenny blackfin blenny blackcheek blenny oyster blenny redlip blenny lancer dragonet barful fer Frilitin goby sharknose goby 'ocean surgeon doctorfish blue tang scorpionfish goosehead scorpionfish pluned scorpionfish spotted scorpionfish Peacock Flounder paculates Flounder eyed flounder chanre! Flounder orange filefish sray triggerfish Queen triggerfish white spotted filefish orange spotted filefish 18.5 Spanish Common Name cchupa piedra chupa pledra cchupa pleara chupa pledra chupa piedra 'chupa Piedra cchupa pledra chupa piedra chupa piedra chupa pleara 'chupa piedra chupa pledra 'chupa piedra chupa pledra chupa piedra barvero barbero 'nédico, barbero raseasio cote coro cone. cone, pele puerco Beje pueree azul o verde peje puereo azul ele puereo pele puereo ---Page Break--- Aepndix 18 (continued) Scientific Name Melichthys niger Ponacanthus ci OSTRACIIDAE Lactophrys bicaudalis Tactophrys potygenta~ (Setophrys triquster 'TeTRADONTIOAE Canthigaster rostrata Sphosroides spenglert® Unicentities DtODONTI DAE. Diodon holocenthus\* Diodon hystrix Conon Engl ish Name black durgon Fringe Filefish spotted trunkfish honeycomb cowfish smooth trunk ish sharpnose

puffer bendtail puffer balloonfish poreup inet ish Common Spanish Name peje puerco negro peje puereo caja de muerto cafa de muerto cafe de puerto, tambor tanbort! ---Page Break--- APPENDIX. 19 FIs COLLECTED MONTHLY TALLY OF SPECIES CAUGHT (#)! 'WIZO PRFONODON POROSUS MORINGUA EDRARDSI OLOCENTRUS VEXILLARIUS HOLOCENTRUS ASCENSIONIS KAUPICHTHYS DORODONTIS. KAUPLCHTHYS NUCHALIS. Species ---Page Break--- 19.2 ---Page Break--- Appendix 19 (continued) 27 EHS MARTINICUS TETET Sng Re enone g—emeancaan a gea--adeanann AMBLYCIRRETUS PINOS ACANTHURUS BAKIANUS 'ACANTHURUS COERULEUS ---Page Break--- cur? sBHStz 40 # WaCL 61 asungava sarozes 20 wren wap Mae xleisa KoaoLa VEVULSON SISYOTILNY aNaalNa avazLNodOVaLsi 'MALANDTML SANHEOLIT SYIVONVOIG SAYKAOLIVT 'VINODXI0a SAMLdOLIVI SMLYITL9 SOHLXVOYROR STN S3NIHEZHLSS SOMSDONoyR SGNIHESHINYO 'MON SANLHOLTEA 'vlnign SaLSTTVa S00sT4avo SaUST VE IMMNOTH RATOVAS 'snuvriaoo sanuae SVUEETIOWA SOLO SALYNAT SaNLOG SYWoaw ST¥OKOWAERDS ser t L e oeoscccesesecessce 2 a @ 2 @ 2 (panuyauos) 61 xrpueddy 19.4 ---Page Break--- 'Sosaxo xlva¥ i a 8 8 5 a 3 2 a a e 2 a 3 e 8 € > a 2 2 2 a 3 Lo} oof oF a et Poon BVA 254 twP 930 AON 130 ais ony es ave ony (auisaTie0 usie 40 HAMANN ALVOTORT SUMMA) LHR WWOTY NO ANON sal9aas 40 ATIVE AtHNOR oz xtaxaaav ---Page Break--- Appendix 20 (continued) ---Page Break--- po eangsonnn sO «wes, 8 asunddvo 5: 1510385 40 waSKAN viniaa saisriva SvEUTTOWA SHALE SOLVAATT SaROR 20 ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- ---Page Break--- sazoaas (GaigsT 109 fst 40 HAMANN IVOTONT S¥SBANY) GAVS MO LHOAVD SAIIBES JO KTIVS XIHINOR zz xnaxsaav ---Page Break--- ---Page Break--- "This paper



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