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PUERTO RICO NUCLEAR CENTER

ENVIRONMENTAL STUDIES OF THE PROPOSED

NORTH COAST NUCLEAR PLANT UNIT NO. 1 SITE

FINAL REPORT

June 1975

volume wt

OPERATED BY UNIVERSITY OF FUERTO RICO UNDER CONTRACT

NO, 8 {40-1}1833 FOR US ENERGY RESEARCH AND DEVELOPMHNT ADMINISTRATION

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ENVIRONMENTAL STUDIES OF THE PROPOSED

WORTH COAST NUCLEAR PLANT UNIT NO. 1 SITE

FINAL REPORT

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VOLUME Two

Prepared for the Puerto Rico Water Resources Authority by

the staff of the Puerto Rico Nuclear Center of the Univer:

?of Puerto Rico

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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

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APPENDIX

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intensive Measurenent and Analysis of tstote

Nearshore Currents,

1. January-February 1974

2. May-June 1974

5 August-September 1974

Results of Orogue Study

Aerial Dye Orops Study

Sedinent Transport at Islote

Salinity and Sigma-T versus Depth Plots

?Arranged Chronologically by are

Te1ote, Punta Manati, Tortuguero Bay

Relative Abundance of Forbs, Grasses and Trees Found

in the 36-Rcre Area of tslote

List of Trees and Shrubs, Forbs and Grasses Found in

the One-Mile Exclusion Zone of Istote

Fruit Trees Found in the One Square Mile Exclusion Zone

Hedicinal Properties, Poisonous and/or Toxic Properties, of

Toxic Proper? e 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

Lets Effect of Plont Density as Influenced by

Moisture 197H75

Average Number of Individuals per Plot:

Let: Plot No. E-2

Lc}: East, Center and West Transects

Ich: Species Composition, East, Center and West

Transects

L+5: Composition by Slope Aspect:

North Facing, Ridge and South Facing Slopes

Le6: Frequency of Plant Species

Sunmary of Number of Spec

of the Quarterly Periods

Found by Sampling Plot for each

Total Phytoplankton Abundance (Cyanophyceae not included)

61

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10.5,

10.5.

10.32

10.36

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10.44

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(£205 Of Total Nunbers of oiatone, Pinot tage? ates,

ropterse ged Other Spectes by nasty ee ah

vanonpecee t2tt9ns.(1:2,3) and Ort shore eae tony

(6'5)- Cranohyeese noe tncraaca?gioBQt OtFE

imeerdial Values, Means, Variances, and Confidence

Intervals for Zooplankton Groups st? seng ee 2, Islote

TN Lae for Zooplankton Groups ae stations 142.3, and 4,

Organisms Collected in Preliminary Hard Botton Somples

Organisms Collected fram Permanent. Sanphi

List Of Fishes Observed in the Islote Area

Monthly Tally of Species Caught

onthly Tally of Species Caught on Algol at

onthly Tally of Species Caught on Rock Outerops

Monthly Tally of Species cought on Sand

ui

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ant

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APPENDIX |

SECTION 1

INTENSIVE MEASUREMENT AND ANALYSIS. OF

ISLOTE NEARSHORE CURRENTS, JAN-FEB 1974

Puerto Rico Nuclear Center

Mayaguez, Puerto Rico

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SISSEELY offshore fron the proposed NORCO Plant site during Janvary-

February, 197%, Ten current meters Fecorded speed and direction over ?petted of « month, supplemented by drogue Peasurenent on 3 separate aye,

Results indicate « strong tida1 dostnance on flow, essentiatly paralled £0 che const, vith peak tidal veloctties of around 30 ea/sec,

ateernately vestward and eastuard. Ave

was found to be 3 ca/sec westvard,

aprear to accelerate the net westvard flow,

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Inraonvetron

Coastal currents were measured off Tslote during the pertod 15 Jenvary thru 27 February, 1974, Ten current meters were located in 5 stations positioned auch that the stations form a cross peryendicular

to the coastline (see Figure 1).

During the above tine period, on 3 seperate days surface drift

currents were measured with 10 drogues deployed by ship and 19 expendable

anchored drogues deployed by aircraft. The rhodamine dye petch diffusion

observations which vere sade concurrently will be reporte:

elsewhere.

Data were recorded by aerial photographs.

Hydrographic data were taken offshore during late Janvary for the

purpose of relating with nearshore current seasurenents. Intermittent

sea level neasurenents were a

recorded.

INsTRINENTS

?The 5 current seter stations were laid out in the form of a cross

An order that 4 adjacent triangles could provide Flow continutty tnforna-

ton, each triangle being self-suffictent, The CENTER station vas a taut=

wire installation consisting of @ large concrete block (approximately 500 ke),

2 ductes

Ampeller type Bendix Q-15 current meters, @ subsurface buoy (about

250 kg net buoyancy) and a surface marker buoy. The Bendix current neters

vere at depths of 5 mand 13 m, and the sea floor was at 20m

?The EAST station co

ated of an automobile engine block on the botton

at 20m, # tilt-type,(ftlmrecording) General Oceantes current meter at 16 m,

4 Savontus-rotor type Hydro Products current meter at 6 m, two 9-liter poly

urethane foan subsurface floats, and a surface marker float. The WEST

---Page Break---

Station consisted of @ enall Danforth anchor and chain and

a

Wetghe on the bottom at 20 , a General Oceantcs current seter at

17m deoth, and a surface marker float, The SOUTH station consist

of am automobile engine bieck on the botton at 13 a, a Ceneral Oceantcs

Current meter at 11 depth, an identical instrument at 6 m depth, and

4 surface marker buoy,

?The NORTH station consisted of an autosobile engine block on the

Hotton at 54s, General Oceanics current meters at 48m, 32m and 15 o:

* SlMter polyurethane subsurtace float at 10 5, and « surface marker float

Ten sea surface drogues vere constructed of 1.2 = plywood squares.

Galvantzed ire connected the plywood to the al:

le of four 0.6 m square

vertical vanes wade of galvantzed sheet metal, hanging at a depth of 3 a,

The 19 aireratt expendable anchored surface current probes (éropues) vere

manufactured by EOTECH,

EQUIPPENT LOSSES & MALFUNCTIONS

Puc to ambient winter veather typical of the north coast of Puerto

Rico, a number of the anall surface buoys at

the one Large (6* high)

?menvtype surface buoy at the CENTER station broke thelr Lines and/or chains

and were lost. Two current meters sank to the bottom due to loss of surface

ané ssbsoctace buoys at the EAST station but were recovered, The tiyéro

?rofets énetrument was renoved from service; the General Oceantcs inetrus

ment was put back down, although tn need of repair,

?Te 2 Hendix current meters were only operattonal shout SOt of the

?ine due £0 loss of and danage to direction vanes and electrical cables,

and fo snadequate battery charges, The vanes were modified and repatred

4 bear possible in the FLeld, During the final recovery of one Bendix

meter, the recorder untt opened up and became flood

teaew

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?The General Oceantes current meter at 15 = depth at the NO TH

ton vas lost due to a eaterial failure of its swivel.

Of the 10 total current meters set out, 6 provided data, 3 fatled

to operate under the prevailing winter conditions, and 1 wae lost.

cries

A Weather Measure type F552 water level recorder was installed on

the pler inside the jetty at Arecibo, after installation at Palmas Alt

proved inpractical

Ducing the flrst veek of operation, the recorder was lost for reasons

unknown. A second recorder was ordered and instal le«

several weeks Later.

Limited results indicate that sea level at Arecibo ts tn good agree

ment with predictions for San Juan, Phase at Arecibo appears to lag San

juan by 0 to 0.4 hours (Pigures 3 and 6). Dietrich (1957, plates 6 and

7) tn his cotidal charte {ndicates that the diurnal tide wave pas

essentially fron vest to east along the north shore of Puerto Rico, and

that the semidiurnal tide vave passes in the opposite direction.

cunnewts

Measurements indicate that tidal forces dominate the flow along the

coast with maxinum velocities of about 30 cn/sec, alternately westward and

ware, The net flov averaged over month and several current meters

indicates a value of about 3 cn/sec weatverd, oF about an order of magni

tude less than maximon daily tidal velocities. Qualitatively observed

surge velocities from 1 to 2 svells of around 5-6 seconds period over «

bottom depth of 20 m anpeared to be an order of sagaitude larger than sax-

Amun E1dal velocities during average vinter conditions.

Figures 2 through 6 contain graphs of measur

current speed versus

?time for the CENTER and the NORTH stations. Speeds are given

positive

ries

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OO

Ker westward flow and an negative for castvard flow, Ax can be seen from

?he direction versus tine data in Figures ? and 8, the How i es

snetally

sastrwese parallel to the shore, Predicted sea level at San Juan versus

eine te pr

ented ext £0 measured speed tn Figures 2 through 6. tt

?Shpeers SAE eaatvard flow follows flood tide and westward flow follows

<H Cle, with aaxtoun speed lagging mtd-flood tide oF mt

ebb tide by

19F 2 hours, The complex nature of the Eidendontnated flow require

further analyste

TlMsre 7 presente seasured current opeed veraue tine for curvent

?Stee 46 the WEST, SOUTH, and EAST stations, There ts notable asreenent

m the fluctuation of all these current meters. westvard only flow from

20 Janwary theovgh 1 February at the SOUTH station te proba ty actribucable

Se wave-induced alongshore flow. This station 1s in

?slong the coastline vith « net tendency to progre

slovly westward at WEST,

SOvTH and EAST statdons (Figure 10 through 13). Aw a enue of strong

Seeniy wiede (Figure 9) évetng 29 taouary chrough 1 Febeuaty, the flow

moves consistently westward

THe prosressive vector diagram for the CENTER station te presented

in Figure 14 with x.

svatton, On 19 February at 1100 hours, the tnetrunent

---Page Break---

was observed undervater. Its direction vanes indicated « current covard

the vest. Current speed vas estinated at 25 cn/aec. The speed e: timate

As i good agreesent with seasurenent (Figure 6), but the directi:a

easuranent of 340° (

Figure 14) is definitely not in agreement. Also,

fon 25 February at 1035 hours, instrument vanes were observed indicating «

current toward the east as contrasted with meagurenent indicating south-

st. Furthermore, intermittent fatlure of electrical connectors caused

readings to go off scale tovard 360°. The nature of the direction sensor

{a such that high electrical resistance indicates high direction number.

In addition, the electronte adjustaent for direction scale ts such that

error magnitude tacrens

nearly with direction number fron 0° to 360°.

?There could be an error of +20° at east and one of +60° at west. Drozue

Weagurenenta indicated east-west flow. The northward net flow indteat ion

of the CENTER station ie inconstatent with other observations.

We progressive vector for the NORTH station in sonevhat deeper

water indicates net flow tovard the east (eee Figure 15), During the

windy period of 29 January through 1 February, eastward progress vas nearly

arreated. This effect 16 in agreenent with the effects of vind action shown

in Figures 10 ehrough 13.

piscussrow

?The situation for the CENTER station requires that the measurenents

be repeated. If in fact flow at this station 1s northward and flow at the

NORTH «

tion at all depths in the vater column 1s eastward, then there is

an eddy crevlating clockwise off Islote, Such an eddy could seriously

affect the renoval of heated vater.

Tm any case, it appears chat a cooling water intake located ubs

ne sally

Seavard of the heated water discharge (perhaps twice the distance from inteke

fo shore) vould involve minimum risk of reentrainnent, If the intake were

hae7

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PuE nearer shore than the discharge, the former would be Likely 2 ingest heated water for # good part of each tidal cycle. Drogue meanuronents indicate a gradual drift tovard shore during both weatvard and castward tidal excursion (Figure 16), Drogue weasurenents will be done sore

sntensively and with better instrusents during the epring sampling pertod.

DATA srowny

?The data for winter 1974 off Tslote are summarized as follows:

WEST station

net flow 5.8 cn/see tovard 237° (vestward)

waxinun hour averaged velocity exeurston (etéal):

35.0 en/eec westward

35.1 cm/sec eastward

net flow 3.7 cm/sec touard 298° (westward):

(op)

2.2 ea/see toward 280° (westward)

Gotten)

aximm hour averaged velocity excursion (tidal)

westward

33.3 c/s

(cop)

23.1 ea/sec

(bottom)

eastward

25.8 cm/sec

(eop)

20.9 en/sec

(botton)

ton

net flow 2.1 cm/sec tovard 217° (westward)

maximum hour averaged velocity excurston (tidal)

11-8

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net flow 4.2

feaxinun hoor

net flow 4.6

paximus hour

26.0 ea/aec westward

23.6 en/sec eastward

en/sec touard 342° (northward)

averaged velocity excursion (tidal)

30.8 ex/sec westward

23.1 en/sec eastward

sec toward 101° (eastward)

averaged velocity excursion (tidal)

35.0 en/sec vestward

35.1 en/eee eastward

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[APPENDIX 1

SECTION 2

MEASUREMENT AND ANALYSIS OF ISLOTE

NEARSHORE CURRENTS, HAY ~ JUNE 1974

Puerto Rico Nuclear Center

Mayaguez, Puerto Rico

28 June 1974

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erRoDuCTION

Coastal currents were measured off Islote during the period 1- June 76
(igs 1 & 2); Five Coneral Oceanics current meters vere located at 3 oret gin
Fredetons weteh had been previously measured during January = Feburary 1906
Teeee ikattons are referred to as the NORTH, CENTER, and EAST stations. Ooo
festrument at the NORTH station failed to record. bate from the siigis (onrue
Meer as the EAST station vill be presented in a later report, with resales thee
Easr epected Bet to be stgntticantly different fron earlier weasurerence at tne
EAST station,

Discussrow

Earlier reported measurements at the CENTER station for winter 1974 had
Strereton data that vere suspected of being not representative dee to lestnte
Brent ture and calibration error. The related data results for tie Is ee
Frere? Period and the presently reported period, 1-6 Jun, are tabulaeed ia

1s principally

Be nat Tron aerece io (ose Pig, 3). The apparent 180° difference ?Table 7)

Tretat {lov dtrection at around 1s seter depth fe arciftetal; the pemeeaice

PES"gE cissran (Pig. 3) clearly {livstrates the doninaat west~enstr csene,

Ure EEE Rearsbotton velocities during June correlate with the dieieecrnice

of a welloatxed surface layer found (from hydrographic data) ducing. deecres 1976,

* See, topical report ?Intensive Measurement and Analysts of Islote Nearshore

Currents, Jan-Feb 1974", dated vay 1974.

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APPENDIX

SECTION 3

MEASUREMENT AND ANALYSIS. OF

ISLOTE NEARSHORE CURRENTS, AUG-SEPT 1974

Puerto Rico Nuclear Center

Mayaguez, Puerto Rico

10 Decenber 1974

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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 Oceanies current meters
Were positioned at the Center and East stations, Also, currents were measured
Curing the period 17-27 September 1974 with two General Oceanics current nerere
at the East station in conjunction wi
measures velocity average over a 5 meter thick surface layer of water and io

Orift-poles (en improved type of drogue that

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,
Derailed bathymetry of the nearshore area off Islote and hydrology of the ocean
Gu ine north coast of Puerto Rico, encompassing the Islote ares, including
Sstalleg temperature and salinity structure for Jan 1973 through Mey 1974 were

reported in

?Environmental Report for Nuclear Power Plant,

?Section 2.5.2 submitted 2 August 1974,

Ba wesated version of the Environmental Report section 2. 5.2 concurrently being completed will include additional hydrology data,

Discussion

Gurrent measurements off Isiote indicate @ net flow eastward during August-September 1974 (see Table 1). A reterence station to the east of lelote ona

Furthermore, drift-pole (drogue) measurements indicate eastward flog (Figures 1,2 and 3). This net eastward flow is in contrast to net westward flog uring vanuary-February 1974 and May-June 1974,

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to mask any long term net flow whenever measurements are IImited to a few days or less (all previously reported measurements of currents around Puerto Rico by other groups), The North station measurements during Jenuary-February and dune 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 s

sons because it is probably the sum of alongshore eastward flow and an annual net eastward flow.

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APPENDIX 2

RESULTS OF DROGUE STUDY

Puerto Rico Nuclear Center

?Mayaguez, Puerto Rico

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Figure 2.1

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FIGURE Lecenos

Current Speed (cm/sec) eastward and westward along North Coast

gf Puerto Rico and San Juan predicted sea level Auguste

September 1974

Current Speed (cn/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 Oatobere

Novenber 1974

Current Speed (cm/sec) eastward and westward along North Coost

of Puerto Rico and San Juan predicted sea level Noveaber gh

Current Speed (cm/sec) eastwo:

of Puerto Rico and San Juan py

nd westward along North Coast

ted sea level Decenber 1974

Curcent Speed (cm/sec) eastward and westward along North Coast

of Puerto Rico and San Juan predicted sea level Deceober

January 1975

Drogue Study 18 September 1974

Orogue Study 19 Septenber 197%

Drogue Study 19 September 174

Drogue Study 6 Decenber 197%

Drogue Study 6 Decenber 1974

Brosue Study 6 December 1974

Drogue Study 6 December 197%

Drogue Study 19 December 1974

Drogue Study 19 December 1974

Drogue Study 20 December 1974

Drogue Study 20 December 1974

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Fig. 2.7

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APPENDIX 3

AERIAL DYE DROPS STUDY

Puerto Rico Nuclear Center

Mayaguez, Puerto Rico

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Aerial Dye Drops 12/4/24

?The first run began at 0924; the area was observed from the air and drops Bone made 26.0930. | The spacing wes too close with only ine outermost bas beyond the 20m contour. Standard Navy sea markers wore used ie ation? partially inflated toy ballons were tied to insure flotation, Three obsercation puns were made at an altitude of 1, 200 feet at about 20 minute Intervale, AG

6 dye packets remained in view throughout the period, Curcente were to thu east at all points with a slight shoreward component toward the ene of the gpservation period, ?When observation was resumed at 1220 PM {Orop 2),

{our of the six packets were still streaming and were seen in the acc crf Punta Palma Altas (Barceloneta

The second drop was made at 1225. Initial movement of
as apparently to the east. The patch closest to shore (A) entered ihe curt zone slightly to the east of its original position and the dye Gissanated In

the surf (1235), Patch B appeared to reverse direction, moving westwned 2nd entered the surtzone near Punta de las tunas after approximately | four,

Patch C moved eastward generally parallel to the coast fer about 40 mimes
eng then moved towards the west and shoreward, Patch D moved east henge
[Het to the coast with shoreward movement increasing at the end of ihe hoon,
Patches E and F moved parallel to the coast in an easterly motion for the rirst
hour and then exhibited more motion shoreward,

As [i gppeand that a current reversal might be starting, an additfonal drop
Wag made at 1340 (due to scheduling requirements the helicopter was ommecicy
in San Juan at 1830), At the startingot this run dye patches © end Fae
Crop 2 were clearly discernible, Patch D was highly diffuse in tne arce of
the awash rocks and A, 8 and C were gone or dissapating in the sent wo ane
west of the drop lin 1s B moved westward, patch © was essen=
Nally stationary and patches D,E and F moved westward toward the souenct

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DYE STUDY COMMENTS 12/9/74

Drop 1 ~

Drop 3 -

All parallel to coast and westward - Patch A dispersed in

eye between T3 and Ty.

Three offshore patches to west (0.E.F). Inshore patches

moved west then east.

ANI patches moved west patch A entered surf zone near

headland and dispersed at T;

33

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Drop 1 -

Drop 2 -

Drop 3 =

y2sia/74

Tnitial notion eastward. fastuard motion

per uit tine showed a mar.ed jacrease between

Tz and Ts . Sone onshore noveriont but senorally

Parallel to coast.

One packet (innernost) cai

vat 01 holicopter float

and deployed at end of and west of drop line.

Eastward motion initially by all patches with a

Strong shoreward motion. Patch i reversed direction.

All patches moved west and shorevard. Package A

entered surf and dispersed at T; - At tine Ts

packet B was lifted onto the cliffs of the first

headland.

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DYE STUDY COMMENTS 12/19/74

Drop 1 -

Drop 2 -

Drop 3 -

A really mixed bag - The drop went at 0918 -
buoy CH was straddied-a slight easterly motion
was apparent at Ty, ALL patches except patch D
had moved eastward - patch D moved westward at
T. Tatches 4,C,D,E § F had moved eastward and
shoreward to varying degrecs. 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 arca of the N-s line
from CH buoy and met tower - for this reason the

drop was made on a N-s line p:

fing thru the
westernmost awash rock. Initial motion was west-
ward, 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

noved approximately westward during the observation

period.

?The drop was not made on a N-s line due to high

velocity winds - Motion was generally paratlel

to the coast - Patch A entered the "eye" between

Tz and T3.

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APPENDIX &

SEDIMENT TRANSPORT AT ISLOTE

by

Hounir T. Moussa, Ph.0.

Associate Professor of Geology

University of Puerto Rico, and

Scientist, Environmental Studies

Project, Puerto Rico Nuclear

Center, Mayaguez, Puerto Rico

March 1975

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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 es described in Ingie (1966). The dye solution consisted of 17.69 of anthracene dissolved in 1.0 liters of chloroform.

SCUBA divers released 2.5 kilograms of dyed sand at the center of @ steel grid which had been placed on the seabottom (5 meter depth)

at the study location with one a:

oriented North-South. The dyed
Sediment was then subjected to normal sediment transport forces for @ 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.

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[APPENDIX 5,

SALINITY AND SIGHA-T VERSUS DEPTH PLOTS

Arranged chronologically by area:

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Puerto Rico Nuclear Center

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APPENDIX 6.

RELATIVE ABUNDANCE OF FORBS, GRASSES AND

TREES FOUND IN THE 36 ACRE AREA

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FORBS AND GRASSES

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fa - widespread; b - large patches; - small patches; d - one oF

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Appendix 6 (continued)

Estimated Abundance

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orb #3 unidentified afafalafele

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Ricinus communis ?Higuereta, Ricino | ©

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sorus praccatortus Peronta clafe

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?Teidax procunbens ?Tridax | a

Dlerenexa occidentalis edtonda efafalale

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duaranthus spinosus Mero tspinoso c} fale

datacnea capitana vatva c} fe

Salvia serotioa Voradttta Azul ?

uphovbia hypertetfolta Lechecttta alelelefale

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Appendix 6 (continued)

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Portulaca oleracea Verdolaga cle '

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Conphrena dpersa Steapreviva suvestre | fe

Pluchen purpurascens Satvia Claarrona ?

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Appendix 6 (continued)

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Appendix 6 (continued)

Estimated Rundance

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Panteus paxieun Yerba de Guinea

Eleocharis incerstincta Juco

Paspalus stlleprana Yerba cortadora

Digitaria decurbens Fangola Crass

Shorts inflata Paragutta

Teteholaens repens Yerba Rosada

Digicarta sanguinalts Pendejuelo

Panicus purpurascens Katojitt0

Bromelia pingutn raya

Anaranthus dubius Blero Blanco

Bandta sitis Tiaestio

Calophyliun brasitiense Marta

Casuarina equisetifoiia Casuarina 1fe

Gitrus aurantifolia ison, Line 1

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Appendix 6 (continued)

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APPENDIX 7

LIST OF TREES AND SHRUBS, FORBS AND Grasses

FOUND IN THE ONE MILE EXCLUSION ZONE

TREES ANO_SHRUBS

Scientific Name

English

Conpon_ Name

?Spank

Common Kame

Albieta Lebek

Anacardive occidentale

Andira soernis

?Annona suricata

Annona rettevlata

Bronelta pinguin

Bursers stearub

Byrsontea coriacca

Gactus sp.

Calophylius brastlicase

Garica papaya

Casuarina equisectfolia

Gecropia peltata

Chaleas exotica

Ghrysobatanus icaco

Citharenytue 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 avatiable

Papaw tree

Australian bee fvood

Trumpet tree

Coco pun

Florida f1adiewood

Line

Tangerine

Grapefruit

Orange

Wild manne

Acacia anarilla

Pajuil |

Moca

Guanabana |

corazon

Maya

Alnacigo

Maricas

Arbol de dedo

Maria del pais

Papaya

Pino, Cesuarina

Yagruno henbra

Cate de 1a india

Teaco prieto

Pendula

Lizon

Mandarina

Toronja

China

Cupey det rio

---Page Break---

Aopendix 7 (continued)

Pithecellobium dulce

PichocelLobius saman

Punica granatun

Peidive guajava

Randia aculeata

Roystonea boringuena

Sabal caustarum

Sesbania grandiflora

Spachodea campanulata

Spondias soabin

Tabebuta heterophylla

Tanarindss indica

Torainal

catapa

Thespesia populnes

Teichtita hirca

Mot available

Not available

Unidentified citrus ike

tree

Unidentified dark leaf

Raintree

Pomegranate

Guava

Boxbriar

Puerto Rico

royal pale.

Puerto Rico palmetto

Agatt

African eulip tree

Wogplun

nite cedar

?Tamarind

Indian almond

Portiatree

Broomstick

?Not available

Not

lable

oe available

English Spanish

Scientific Nane Coron Kane _|_Gosmon Name

Phyllanchus actdus Gooseberry cree Grosella

Pimenta racenosa Bay-rum tree Malagueta

Guana azericano

Sanan

Granada

cusyaba

Tineélle

Paina real

Paine de sombrero

culo

Tolipan afrtcano

obo

Robe

?Tamarindo

Alvendro

Peajagutlla

Tinaeto

Teaco blanco

Jobo efenarron

Maria agericano

12

---Page Break---

Appendix 7 (continued)

English

Schentific Nave onsen Nase

Soccotobs wifers Seagrape vas de playa

Cocos auci fers

Golvorina reclinaea

Cardia alsiodos

Croscentis cujote

?Elasodendrur sylocarpua

Exithrina posppiziana

Flows elastica

SUixtetdia sepiue

Hibiscus

AMaceus

Hipponane sancinelta

Malpighia puntclfolta

Mone:

vangifors indica

Mani

a sp.

MeLicoous bijugatue

200

sp.

Opuntia diltenntt

Persea anericana

Paehirues bicolor

Coconut tree

Soldierwood

capa

Calabash treo

Flasboyane tree

Marble tree

Mountain imortelle

India rubber

Shortest fi

Mother of cocos

Sea hibiscus

Manchineel

West Indian cheery

Manmee apple

Mango

Bullet wood

Ginep

Avocado

Patna de coco

navi

capa prieto

Higuero

Flasboyan

Coscorron

Bucare giginte

ona

Jaguey blanco

Mata de raton

Majogua

Manzanillo de playa

Acerola

Navey

range

Ausubo

Quenepa

Laurel ep.

Aguacate

Teagutito

7.3

---Page Break---

Aopendix 7 (continued)

srasses

=

[stasis sn | a |

axonopus comressus Carpet grass | verbs atsonbra

Ghorts inflata | Yerba paraguica

Qmodon gactylon

|

Berouda grass

Pangota grass Yerba pangota

Yerba berouda

Yerba de guinea

Bospatus coo'ugatun

Sporobotus vireinicus

cons, Yerba malojiilo

Sour paspatue Yerba horquees tia

Yerbs cortadora

Dropseed Cerrito

Seashore dropsecd

grass

Yerba natose de

burro

|

Tricholacna repens Yerba rosada

Not available Yerba de

saya Now

Hot avatiak

Yerba de Playa Xo. 2

Migiearis sunguinatts Crabgrass Pendejueto

Gygorus rocundus Nucgrase cous

Eleocharis iscorsttnts Rush once

equinatus Sandbure sorojo

7h

---Page Break---

Appendix 7 (continued)

Fores

Engst | _ Shanta

Scleneifte Same common Kane | __connon Sam

Abrus pragcatorius

Achyranthes indica

| Aderonoptum gossipifoliun

?Agalinis fascteu!

Agave snertcans

Aloe vulgaris

Amaranthus dubius

Amaranthus sp{noeus

Argeaone aexicana

Asclepias ai

Batis sariting

Bidens pilosa

chum pyeamidatum

Bohertaaves diffusa

yrreria vertict lata

Bryophyllum pfonatun

Cenavalia moritina

casgalia odorata

Catharanthus roseus

Centrosena pubescens

Black night shade

Century plant

Aloe

Avaranth

Spiny anaranth

Mexican poppy

Bastard ipecac

Acamasco 1ily

Saltwort

Shoppera's needle

Life plant

ay bean

Water Luly

Periwinkle

Butterfly pea

abo de raton

tautua

Yerba veronica

Maguey

Sabila

Biero blanco

Biero espinoso

cardo santo

Algodoncitio

duende

Planca de sal

Margarita silvestre

Yerba de papagayo

Yerba de puerco

Boton blanco

Bewje,

Haba de playa

Lirte de agua

Playera

Flor de ptto

---Page Break---

Aependix 7 (continued)

Fores

English Spanien

Scientific Name Comms. Kame Coamon Kane -

Chamecrisea aeschynonene

Ghenopodiue anbrosiotdes

Cissus sicyotdes

Goleus anbotnicus

Gometing diftusa

Gordie corymbosa

Crascina elegans

Crotalaria striata

Desmodiue

Desmodtun sp.

Ditremexa occidentalis

Dolicholus aintous

Dryopteris sprengelis

Eichornta crassipes

Eleocharis {aterstincta

Raeltsta tora

Entlia sonchifolia

Eupatortus odoratua

Euphorbia hirta

Euphorbia hypertet folta

Gonphrens dtepersa

Wornseed

Pinakoop,

Spanish sarjoran

French weed

Zinnsa

Stinking weed

Fern

Water hyactnth

Butrush

Norivivs bobo

Pazote

Bejueo de caro

Oregano brujo

contere

Cordia rugosa

Zinta

Cascabelitio

Pega pega pequeno

Salsabacoa, pega-peps

Meatonda

Frtjoltiio,

Helecho de tana

Jacinto

Junco

Doraidera

ttuye que t6 cojo

Santa marta

echectiia

techeciiia

Stenpre viva

stivestre

7.6

---Page Break---

Aopendix 7 (continued)

ones

Scientific Name

English

common Kame

Spanish

Gorm Kame

Hypeis pecetnaea

Indigofera endecaptylla

Ipomoea pos capras

Agonoea 41

Jatrogha cure

?Lantana {nvolucrata

Leonatis nepetaefoiia

Lepidive viegtntcun

Lepetion pusttiua

Lippia nodiflora

Macroptiliue 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

Fevew fev?

Passion frutt

Maruvio

Anil de pasto

Bejuco de playa

Besuco de vaca

Tartago

Certaqutiio amarillo

Cariaguillo Ula

Boton de cadete

Mastuerso

ctaron

Mabichuela

Malva

Bretonia piranidal

aretonia afelpada

Mortvivt

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

Phyltanthos 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 carpinttolta Wire weed Bacoba bianca

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 avatlabie

lable Bejuco de pendeja

Not available ab

Bejuco trepador

Not _avatlable

Not_availabte Malva cémarrona

2.9

---Page Break---

---Page Break---

APPENDIX 8

[FRUIT TREES FOUND IN ONE SQUARE MILE

EXCLUSION ZONE

|

| Gieass paradisi

Encotoa aviter

Soeoloba ueifere

faiptab

Fontes

ein

English Spanish

Scientific Nane Common Name Common Name

Anacardium occi cashew Pajuil

innona moricats Soursop Guanabana

Annona retTeulata Custard apple Corazon

Cartes Papaw tree Papaya

Thryscbetanus icaco 1eaeo prieto

Chrysobalenus $9. leaco blanco

?Cheras aurantl Limon (Ime)

Tierus $9. Tangerine Mandarina

?Terus paradisi Grapefruit Toronja

Citrus sinensis Orange China

Gocoleba uvifera Seagrape vas. playeras

Tocos nucifera

pighia puntcifolia

anes aperteans

etfeocs briogses

Punies granatun

Spondus ?monbin

fanarindus Tdi

Terminalia catappa

Coconut tree

West Indian cherry

amee apple

Mango

Ginep

Avocado

Gooseberry tree

Not Available

Guava

Pomegranate

Hogplun

Tamarind

Indian almond

Palma de coco

Aeerol

Homey

Mango

Quenepa

Aguacate

Grose! la

Granada

Jobe

Tamar indo

Alnendro

---Page Break---

---Page Break---

APPENDIX 9

MEDICINAL PROPERTIES, POISONOUS ANO/OR TOXIC

PROPERTIES OF TREES, "FORBS AND GRASSES FOUND

IN THE ONE SQUARE MILE EXCLUSION ZONE

TREES

?Spantah/Engtish

| Scientific Name Medicinal use Common Name

Albizia lebbeck Use not available. Acacia anaritia

t Tibet, Lebbek

Anacardium occidentale | Fruit coot is used as o vermifuge Pajuil

?and for healing warts and callouses. Cashew

Andira enermis Bark and seeds have been enployed as Hoca

vermifuge, purgative, and narcotic. Cabbage angel in

Annona puricata Insecticide for lice has been made Guanabana

from the leaves. Soursop

Annona reticulata fa. The pulp is used in home remedies. | Corazon

BL The powered seeds serve as an
insecticide to kill Vice.
Bursera simaruba in has been employed in

cines.

Cecropia pelrata 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 medicines

Concoct ions made from the bitter bark
and leaves have been used in local
medicines.

altiodora ?Seeds and leaves have been used in

hone medicines.

Crescentia cujete Fruit pulp, although poisonous, has

been employed in local medicines.

Custard apple

Atmaciso

Turpentine tree

Yagruno henbra

Trumpet tree

cupey

Mamee

vas de plays

Seagrape

Mavi

Soldierwoo

Copa prieto

Copa

Higuera

Calabash tree

---Page Break---

Appendix 9 (cont inued)

TREES,

Spanish/English

Scientific Name Medicinal Use Common Name

Some parts of the plant, such as Aguacata

leaves, seeds, fruit rind, and Avocado

bork have been employed in folk.

medicine,

Pimenta racemosa Myrcia oll, which is used in Malagueta

medicines, is extracted from the Bay-run tree

Pithece!lobiun dulce

Punica granatun

Sesbania grandiftora

Tamarindus indica

Thespesia popuinen

leronopiun goss pi-

ASTTSg ee sessink

Agave anericana

Aloe vulgaris

Bark is an ingredient in hone

remedies.

®. Bark extract has anti-

heimintic effect.

b. Fruit is used as an astrine

gent 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 @ laxative. It has antiscorbutic properties.

Fruit is employed medicinally for the treatnent of i

FORBS AND GRASSES

Leaf extract used to treat gastric ulcers, colds, and as diuretic.

2, Root extract used as blood de-

purative,

b. Dried leaves used as anti-

inflanatory agent.

2, Leaf extract used as cathartic

and as emenagogue.

b. Low dose acts as expectorent.

Guama aver icano

Granada

Pomegranate

culo

Agati

Tamarindo

Enajagui tia

Portia tree

Toutua

Maguey

Century plant

Aloe

9.2

---Page Break---

Appendix (continued)

FORBS AND GRASSES

Scientific Name

Nedicinal Use

Spanish/English

Connon Name

Argemore moxicana

Bidens pilosa

Bryophy! lum pinnatun

Chenopodivm anbrosii

Cissus steyoides

Gyperus rotundus

remexa occidental

Jatrogha curces

Lantana canara

Lepidiue virginicum

Matachra capitate

a, Vegetative parts used to treat warts and external uleers. In= Fusions 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 vonitive.

Used as emmenagugue in infus as expectorant against colds.

ns and

Leaves used as denulcent and as ?expectorant.

Leaves and Flowers used In extract as antinelmintic particularly against intestinal worms.

Use not available.

Used as diuretic and to dissolve
kidney stones.

a, Root infusion used as ant!
spasmodic.

b. Leaves have anti-inflanmatory
effects.

Use not avai tabl

Leaves in infusion are used to
Stimulate digestion and food
assinilation.

Leaves used to treat scurvy and
as diuretic.

Leaves and Flowers in infusion are
Used as enulcent. Crushed leaves
fare used to treat inflamed areas.

Cardo santo

Nexiean Poppy

Margarita

silvestre

Shepperd's

needle

Bruja

Life Plane

Pazote

Worm seed

juco de caro

Pinokodp

Coqui

Nutgrass

Hedionda

Stinking

woe

Physic nut

Yellow sage

Mas tuerz0

Not avai lable

Halva

Mal low

---Page Break---

Appendix 9 (continued)

FORBS ANO GRASSES

Scientific Mane

Medici

Spanish/éngiis

Common Mane

Mosordica charantia

Ossia odors

Pepe moschata

Phyltanthus niruck

Scorpia dulcis

si

Solanum

Stachytarpheta

iamat censts

Leaves have hypoglicenic effect.

Leaves and flowers used to prepare

aromatic baths to alleviate colds

and rheumatisn

Seeds used as anti-heimintic

particularly against tenia,

Roots, leaves and branches are

Used as diuretic, stomachic, and

fortifying tonic.

2. Leaves and stem extracts are

used as refreshing drink.

medicinal tea, denulcent,

diuretic, emollient, and? in

salad as'an antisscurvy agent.

Crushed seeds have a verm fuge

effect

Seeds contain cathartic ols.

Use not available.

a, Leaves In Infusion are used

fo suppress body secretions

Vike gastric aetdity

?and urine. They are

5 an antiasthmatic

b. Fruits have a purgative effect.

Leaves have an enetic-cathartic

effect.

nd sedative.

Cundeasor

Wild Bolsan-

apple

Santa maria

Not available

Calabar

Not available

Quinine de

pobre

Gale of the

Wing

Verdolaga

Higuereta

Castor of!

plant

Culantel tio

Yerba nora

Night shade

Verbena

Not availabl

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. ane Toxicity

[mees

Albicia lebek Aeacia amarilla Inner bark only dangerous,

i Tibet,Lebbek

anaes gccidentale Pajuil Resin, seeds, and pee!

Cashew toxie!

Andira Moca Bark, limbs and seeds

Cabbage Angelin toxic.

onona muri Guanabana Leaves only toxic.

Soursop

Annona reticulata corazon Bark, limbs and seeds

Custard apple toxic.

Byrsonina coriacea Mar iacao Inner bark only dangerous]

Locust berry

Calophy tum brasit Maria Inner bark only dangerous|

Not aval lable

Carica papaya Papaya si

and juice of 9)

Papaw tree Fruit toxic.

Gecropia peltata Yasrumo henbra Inner bark only dangerous|

?Trumpet tree

Clusia rosea Cupey det rio Inner bark only dangerous|

Wild monnee

Movi Inner bark only dangerous}

Soldierwood

Higuero Inner bark, fruit pulp

Calabash tree toxic.

Erithrina poeppigiar Bucare gigante Inner bark only dangerous}

Mountain Inmorte!le

Hippomane mancine

Monzanilto de playa | Deadly fruit. Sap irri-

Manchinee! tating. Wood smoke toxic

to eyes.

---Page Break---

Appendix 9-8 (cont inued)

Spanish/English

Comreon ame Toxicity

Maney Seeds toxle to poultry

Manmee apple and fish. Peel of frult

Hongifera indica Mango Sap and juice of green

ange Fruit toxic

Mani ikare sp ausubo Inner bark onty

Bul Tetwood dangerous

?Aguacate Seeds and bark toxic

?Avocado to animals.

Malagueta Inner bark only

Bay=rum tree dangerous.

Pithecel lobiun dulce Guana americono Inner bark only

Nor av. dangerous.

Pltheceltobium aman Seman

Paintree Inner bark only

dangerous.

Ps idium guajava Guayabe Inner bark onty

Guava dangerous.

Sesbania grandiflora Baculo Inner bark only

Agatl dangerous.

Spathodea canpanuiata Tulipan africano Inner bark only

Afriean tulip tree dangerous,

Tobebuia heterophyia foble Inner bark only

White cedar dargerous.

Tomarindus indica Tamarindo Inner bark only

Tamarind dangerous.

Terminalia catappa, Inner bark only

dangerous,

Teich tia hires Tinacio Inner bark only

Broomstick dangerous.

BUSHES AND _FoRaS

Abrus praccatorious Peroni Seeds only ton

NOt avaitable

---Page Break---

Appendix 9A (continued)

Spantsh/Engl tah

Scientific Mane Comion Name Toxicity

Adenorop iva gossipi- Tautua Sap irritating.

?Sate Not available

Agave americana

Asaranthus sp.

Argeno

Canavalia maritima

Capsicun Frutescens

Cathoranthue roseau

Cenchrus cistioides

Chenopodium anbros iotdes

crotal

sp.

Ditromexa occidentalis

Indigofera endecaphy ia

Iponces pes-caprae

Jatropha

Lantana sp.

Raguey

Century Plant

Cardo santo

Mexican poppy

Phayera

Pertwinkle

Abrojo

Senddure

Pazote

Wormseed

Cascabel ito

Not available

edionda

Stinking weed

Anil de pasto

Trailing indigo

Bejuco de playa

Bay hops

Tartago

Physic nut

Cariaqui tio

Yellow or Violet sage

Toxic to cattle.

Toxic to catt

Seeds fatal to pigs.

Medicinal sap dangerous

in overdose.

Toxic to cat

Can be lethal If n=

gested in large

quantities.

Inhaling snoke From
burning petals can
Produce hallucinogenic
effects.

Toxic to cattle and
poultry.

Can be lethal if n=
gested pure in large
quantities.

Toxic to cattle ane
poultry,

Toxic to cattle.

Toxle 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 Wane Common Name Toxicity

Honordica charantia Cundeanor i, Seed, leaves

Phaseolus adenanthus

Portulaca pilosa

Ricinus omnis

Sida carpinifolia

Grasses

Cynodon dacty lon

Panicum maximum

Solanum caribaeun

OTHER

Manihoe manthot

Wild balsam apple

Habichuela cimarrone

Witd bean

Don Diego silvestre

?Not available

Higuereta

Castor of] plant

Escoba blanca

Wire weed

Berenjena cimarrona

Turkey berry

Verbena

Bermuda

Not avai

Guinea

Yerba mo

Night shade

Yue

Cassava

toxic!

Ingestion of beans

toxic. Pollen causes

allergies.

Toxic to cattle.

AIL parts except of!

toxie.

Toxic to cattle.

Fralt and seeds toxic.

Juices can be toxic

Toxic to farm animals.

Causes photosensi~

tization in cattle

Fruits or erroneous

medication can be

fatal.

Lethal If eaten row.

---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 ttmber of Individuals per plot in Plot No, 2-2

of the WACO RP-1 Site for 197-1975.

Average Individuals p:

SCTENITYTE MAE

(waa) 50

Digitaria tecuivens .

Digitaria sanguinalis Scop. - = | = fos | es

Hleusine insica t. Guerta.

Panicus faseiculatue - | os} - Joa | es

Panieus saxizus Jacq.

Faniew purpurascens

Paspalun con jugatam Berg.

Sporobolus virzinteue (

Stenotankrs secundatun (walt) Kuntee

Fetebolaens repens Willa.) Hitch.

?WasuiArts Kees.

Fam. Cyperacese

Cyperus rotundue b 5 | 53.5 [1280.5] 555.5 [sre.5 | 100

Grpenus =p:

Pan, Comelinaceae

Commelina aiffuse Burm £.

Pas. Acanthaceas

Blechur yyrantdatun (Lam,) Urban

fuellie tteroea L-

Fan. Aizoacese

HeLiugo berterians L.

Pan. Anaranthacene

Achyrantes sndiea NOI,

Alternanticra seseiie (L.) RB. - - fost = [on | 2s

daarenthus dbl

Gomphrera disperse Standley

Pan, Apocinaene

Catharansius roseus (I) Dow

---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 RAE

Fan, Boraginaceas

cortia coryebose 0. Don

Fan. Caparidacese

?Cleome gmandra (L.)

Fas. Caréunceae

Senecioides cinerea (L.} Kuntze

Synedrelin nodiflora (i.) Gaertn.

Tridex procumbens t-

dedelia tritcbare (L.) Hoten,

Fan. Cesalpinacene

Characcrista aeschmanene (0c) Green

Ditrenewa occidentalis (L.) Britton & Rose

Beelists tore (L.) Britton & Rose

Misoee padica L.

Fen, Cigofilacese

Kalistroente naxine (I.) P&C

Tribulus cistotdes 1

Pas. Cucurbttarene

Luffa cylindrica (L.) Roemer

Hworaica ?harant!

Fen. Euphorbiaceae

Adenoropiun gorsigifoliun L. (Pott)

Euphorbis Eirea (1.) titisp,

Ewhorbia hyperics folie

Rupborbia nutans: (07 Polak

part

Poinsettia hetorophyiia (L) Ki Garoke

Pan. Esterculincese

Melochia pyremidata (L) Britten

Selookia

Average Individuals per plot

---Page Break---

ScrEMrrere wes

Fae. Fabaceae

Sontrosenss p.vescens Benth

Fev. Heyer

xylose 2) Teubert

Fephrosie i

setnasinaces

Fam. Rubiaceae

Borreria ccteoldes (Burn f.) Te

feitiats <1.)

jenidiedia ceinifolir (Witte)

Fes. Verbenacene

sopia noliftere (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

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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

Fanily Poaceae

Axonopus conpressus

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- Gaertn - [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 ¢.

Pas. Acanthaccee

Blestue gyre

Rueitie tuber,

Fen. Attoncene

tam.) Urban

35} 2 | 65] 155] 6.9 {200

Wotiuge Rertertana 1,

&

10

Achyrantes tngtea Mi21,

else (L.) 8.3.

Aleeroanthera =

dearantrs dibiee - fas os

Gemphrena slepersa Stantcy = fs 26

Fan. Apootnacae

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|

ScOIe 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

Chazaccrists aeachynanene (5c) Green

Ditrerenn cccldentalis (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%

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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

SCIENITFIC NNEE

Fas. Frbaceae

Densin

Snelus intaus (1) siedie,

Tnligsfers erdecapyla

Tdigofers surfrutieose Mil.

2) vrban

95]23 | 209 Joes fassu frco

Fics, Wictaginagscacear

Beerhaaver giftuse asfs Jas} - | 2s |r

Pan, Poiigelascar

Eosote virsate (54) Kuntoe

Fan. Portulacacese

Portulace Scosandra

Forualuce oleracea?. frst | - | 06 | so

Portulaca pilose 1. spa] es [es

Pea. Rubiaceae

Borrerte cetmoides (Burn £.) De.

Eorreria vareiettiase !.) ?yer -|- :

Henidiotia seinifolie (viuna?

Fes. Verbenacene

Hippie noaiftorn (1) sich. cs 5

achytarphe!a Janaicensis Vahl. bese} - |» za | se

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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. Gaertn.

palus coh Usatin Berg.

Fasgelun 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 saxmtese 0. Den

Yes, capritacne

?Gleome mmandra (L.)

an, cergaceue

-]-]- | 2 bose

o| 29] %

chymenene (0c) Green -] + fos

Sdentaris TE.) Settton'& 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, Euphorbiacese

Menoropin gosespifolina 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 heterophyiia (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°1 Site for 197

Fes. Fabaceae

Gontrogera pubescens Benth

Grotolaris Febuen

striate

BErTehetes aisime (:) vette.

Todigofere enicasiyla

Indigofera sul?rcticoze M:

Hasropeii si 1athyroties (E.) Urbs.

Fnseclus secant .

er. Poiigaiaceas

Fao. Portulacacoue

Fem. Rubiacene

Boreerin gctanites (Sura ¢.) De

L,Y Heyer

Tas. Verbenacons

Lippi nodétiore (2) Mich.

?Staghytargheta: fanascensie Vat.

Sheet 9 01

er plot in Plot No. Et

peneity|

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pages

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2

100

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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, Apooinaene 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°1955

Average Individvais per plot

seurwenrze mate [ie Lowy vam [ave | one

an, Roragtoncene

ordie conmmosa 0. Den

aa, caparidacese i

Gleome gynandra (L.)

Fam, Carduncene

gens pitoen 1

Bettie SSFeciue 2.) oo

AS intze -|-] -]e fe

2 (1 caer, fpr} tye

Chanaccrista aesckynonene (OC) Green = f= fe fos] ro]

Bisson -Scliaialie (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

gulinarica (L.) seense

Fas, Bughorbiacnse

Adenoropiun goseipifeliua L, (Pokt) ;

Euphorbia bibte (e-tatiiien, a fa fas

2.2 | r00

Balers Waerictioe

sterorbylia (L) <1 4 Garoke

Fes. Esterculinceae

Melochie zyrantéata (1) Britcen foe foe} - foca

Meloenie =

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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¢19950

Fem. Fabaceae

Ceutrosera pbescene Berth

Grotslarie Fetize

Ge celaria strsata

Doctbelue minsms (1) Medic.

Tpligotere endecapay a

Indigofera suftrsticose Ws

Masropet isi Lathyrsides (1) Urban

Paseolue adenasthar C-F\. lever

feleeeniey aetig (0) Tonert,

Coteus sabeinieus Leurs - | os

Ejeets sertiata ce

20.5 | te J276.5 | 109.5]309.6 |200

Brees trefobata Vout

Fac, Sictagineginaces.s |

Beerhaaves giftusn 2

Pex, Poligataceas

aft. |] -]- | cele

osfus| - | 7 | ee} :

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potifiors

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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 tnflate 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) Kuntee

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

300

50

50

100

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APPENDIX 10 (1-2) °

Average Number of Individuals per plot in Plot Mo. ¢-3

ff the NORCO WP=1 Site for 1974-1995,

Individuals por plot

SCIETIFTC WE oct. | an. | ave.

Peosttr

Pex. Boraginacete

Gordie conmbose G. Don

Fas, Capariaacene

Cegae gymandra (L.)

Fes. Carduacene

Bidens pilose &

Eeitie fon

Synedrelis sodifiora (L.) Gaertn.

Triax procimbens L.

Wedelie triiceate (L.) Hoven.

Pan, Cesaipinacene

Chanaecrista seschynmene (0¢) Green

Steysaeee caclaeseie 72.) srivtoe & Rose

cc) Britton & Rose

Bee

8...

Fen. Cigofilacene

Fes, Cucurbitercae

Ioffe eylinarice (L.) Roemer

Adenaropius gossipitoliua L, (Fob)

Eughorete biree (L.) Willep,

EESSHE ipericise

Euphorbia moters (L-) Totak

Puillentius sirari 1,

Poinsettia heterophyita (L) 1 4 Garoke

Fan, Esterculiacene

Melochta qyremidats (I) Britton

Helochia =p

(ios)

---Page Break---

APPENDIX 10 (L-2) Sheet 15 of 27 pages

Average Number

(OF the NORCO MF

f individuals per plot in Plot to.

1 "Sie for 199801575 ve

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ScrUETeTe WA

Fax, Pasaceae

ubescens Benth

fale

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ais fes |e fo Fed

Figisgantes 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, Portulacacene

wy | - | es] - fers foo

Rorreria coinolae

& ereict i 2 t-|-]- foo fe

Hen Motsa ceintrotie (Willa)

Pen. Verbenacene

Lygpta noatflore (2) Miche.

Feachytarmhets jazateensie Vahl.

---Page Break---

Sheet 16 of 27 pages

APPENDIX 10 (L-2)

Mviduats per plot in Plot Ho,

te tor 1ik-agts.

Averace thmber 02

of the WORCO WP=I §

n

scronTie mee

Fastly Poaceae

?uonogus compressue

fpod. 3

osf i]t 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 lt) Tanten

Hee aera spas ft ef e fou des

ear ees

va, crperncene

carer rotuntue se f= fa | sets

wat = Dy fot ye pag]

Pen, Comelinaceee

Comeline diffuse Burm £,

Fas, Acenthacene

Blectus pyremidatiz (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 Nunber 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 slot

oot.

Jen.

Fam. Boraginaceae

sormbosa @, 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

Tpeteropiyiia (L) #1 Garoke

Fen. Estercutiacene

Melochte pyrantéata (L) Britton

Ketosnis ©

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APPENDIX 10 (L-2) Sheet 18 of 27 pages

Average Murber of Individvals per plot in Plot Wo. 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 -

fuaigelers sureties wi.

ge lattyroides (L.) Urban

Phaseolus alesanthus G.F-x. Veyer .

SV réunere a | - tes

eaimenre capitate

SHy cercreron he | oot 2

Brena iobete

Srenm Griiobata ve

Pax. tietaginass

Boerhaaves aifiuss © - fos} =] - Joa fas

Fan, Polisataceac

(SH) munte

-fa]- - [oe [os

- | ss 3 %

- fous ae | 7

Lippie noditttore (L) Miche. . -

?Einslyearpheta jenatcenste Vahl. vs [os |r 32

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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?

Fantly Poaceae

Axonogus comprensus

sion daciyion L. (Pers.)

Sigicctsste seapttue i (vinta)

Digitaria teeusbens

aris fanguinalis Scop.

Eleusine indica L- caertn.

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 secundatue (Walt) Kuntze

Telepolaene repens (Willd,) Hiten,

?elchachne ?nsularis Nees,

Fan. Cyperacene

Cyperse rotuntus 1.

Spee e

Fax. Coonelinacese

Gemnelina 4iffuea Burm f.

Fas. Acanthacene

Blectus_pyramtdatus (Lax.) Urban

fieliie beroea 1.

Fan. Aizoacene

Hediuge dertertane L.

Fea, Anaranthaceae

Actyrantes indies vsti.

Gh) Ra,

6

%

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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 sorysbosa 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

100

Fan, Buphorbiacese

50

%

3

3

Adenoropiue 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

Eeinsettia}

fin heterophyiia (L) 1 & caroke

Fan. Esterculiacene

Melochia ryranidata (L) Britten af-] -] - | ce] 2

Eeloenie

oa

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perenoix 10 (L-2)

?Average Nunber of Individuals per plot in Plot Mo. W-2

lof the NORCO NP-t Site for 19741

Fes. Fataccue

ibecene Beth,

Far. Mictaginaginacese

Boerhaaves difnuse

Pax, Poligalacese

E,gote virgata (Sw) Kuntze

Fem. Portulacaccne

Fortulace scosandre

Lippte nodttiore (L) Michx.

Etaehytarshets fenascensie Vahl.

os

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sheet 21 of 27 pages

2 | os

20.5] 6

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3.5] 9.8

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2

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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 geniaiiete (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. Acanthacene

Blechun pyrasidatue (Lam.) Urban

Iuellie tuterose =.

Pan, Alzoaceae

Hotiuge bertertana L,

Pen. Amaranthacene

Fen. Apooinaese

Gatnaranciue yoteus (L.) Dow

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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.

ScrmTrIc NOE

Fea. Boraginacese

Sordi conrsbess 0. Don

Fas, Ceparidaceae

leone gmmantra (L.)

Fan. Cartuacene

aah. | 200

Bidens pilose b.

Euilia Sonchifoiia (L.) D0

Eipateriis odorata ©.

Farthenios Hysterosborue L.

Senesteaee Glace (7 Kintee

?Bpoeirelia poditiore (.) Gaertn.

Frlgax procumbens 2.

Gedelie eritobate (L.) Hoten.

oa} 25

Fam. Cesalpinacene

Channecrista ses (00) Gre

Ditreseya cecidentalis (C.) Britton & Rose

Geelista tore (L.) Britton & Rose

patica 1.

Fan, Cigoftlacese

9.2] 59

us| 50

Katietroenta saxina (L.) 7 &C

Frivglus cistota

Fan, Cucurbttarcae

os} 2

Lefte eytinarion (L.) Roemer

Sewordice sharentia L.

Fea. Buphorbinceae

AMeporepton goestpiteiug L. (Pohl) os

Euphorbia tira (.) Millsp,

3

50

ok

Esphorbie 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 208

?Binims (t) Medic.

Indigorers snéscephyla : s |e

fetuses aurracicore us -f-] - fo

gerepualtiin Latgroties (1) ureen

Huceolus alenanthas C.F, Weyer

?Stylosanthes heaata (L.) Touber® 65 | feos | 295] 232 | 200

aes 7 05 | as fas? | ur | 22:8 | 100

Fem, Halvacear

- Jas] - |e | 29] %

- | - fas] - | ov] es

. - | o- Los | - | oa] as

Bortulece . abs | 75 fe9.5 | es | 157-9 | x00

Fan, Rublacene

forsee cestas ups ¢.) Do.

rrer:a verticiiiexs (L.) seyer

Hemidiodia

is osiaiforia (vita)

Fes,

rerbenaceae

?Hippta noatflore (1) Miche.

?Euachytarphete fenslcensis Vahl.

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APPENDIX 10 (L-2)

Average Nuaber of Individuals per plot in Plot Ho, Wo!

of the WORD HP-] Gite for 1976-1975.

Sheet 25 of 27

SCOTT NRE

Average Individuale

Peatly Poaceae

deonopue conpresous

Genchrus echinatus t.

Skior

sJo5 dactyion L. (Pere.

Pactylecrentum aegyptsur C. (Wi21d)

Digitaria tec.

Digieerie sanevinalie Scop.

5 2 Siles \ Kae

Stenotaghrs secundatue (Walt) Kantse

fcholaene repens (Willé,) Hitch.

Frishachne ihsularle Mees:

Pan, Cyperacene

Cyperus rotundus L.

?Sperus =p

Fea. Conmelinaceae

Somraline

sftues Bam £.

Fan. Acanthacone

Blechus pyranidatun (Laz.) Urban

Bueilie tuberess L.

Fan, Atzoacese

Nottuge bertertana L.

?Geaphrens aispersa Standley

Fan. Apocinene

Cacharanttie roseus (L.) Dow

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Average Number of Individuals par plot in Plot Mo. 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. Cucuritaresc

Ulta eyiindricn (1) Romer

Mosordica sharantie 1.

Pen, Euphorbiaceae

Adenoroptun 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

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APPENDIX 10 (L-2)

Average Nunber of Individuals per plot In Plot No. =H

fof the NORCO Not Site for 137

SCrENEIFIC wwe

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Sheet 27 of 27 pages

Average Indtvsduale

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Fan. Fabacene

Dictebetue

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Tuligoters sur

Teiroede cineres

Fac, tantacoas

scscors cerisaca L.

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Fes, Portulacacese

Portulaca Scosantra

Fortuince gleracra

Hortaiecs poloss L

Fan. Rubsaceae

Borrorin coimattes (Bum t.) De

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Puachyeariets feraicensis Vahl.

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APPENDIX 11

SUNMARY OF NUMBER OF SPECIES FOUND BY SAMPLING PLOT

FOR EACH OF THE QUARTERLY PERIODS.

Grasses

ry Season" "Wet Season"

1974 1974 1975

Teansect 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

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Appendix 11. (cont inued)

NUMBER OF INDIVIDUALS AND SPECIES

ONPOSIT ION OF ONE SQUARE METER QUADRATS

Plot No. &-2,1

May, July, October, 1974 NO DATA

JANUARY, 1975

Individuals/

Plat No. Species Plot

E21 Cyperus rotundus 13 30.2

Dactyloctaeniun segyptivm 82 143.

Thanaesyce hirta 8 119

?Sida carpinifolia 2 10.

?aphorbia nirea 40 1.0

Stachytarpheta Jonaicensis 33 68

Gellite tara Tata fore By 5:4

Paspalum conjuoatum 2 us

a 15 26

?pilosa 10 "7

Poinsettia heteropt 10 u7

thioris ina 7 42

Gentrosema pub 6 1.0,

Ghanieeriste-seschyronene 6 vo

Tephrosia einer? 4 0:7

Desmodium $9 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 dactyon 2 138

?ypets capitate a 0.46

ittarta sanguioalis 3 0:36

?Talgefera sul frutleosa 1 on

Total 366

---Page Break---

Appendix 11 (continued)

JAKUARY, 1975

Individuals/

Plot No. Species Plot Percent

2,2 Cyperus rotundus 938 89.5

Paspalun conjugatum 71

Bidens pilosa 10

Euphorota Kieva 7

7

°

°

Poinsettia heterophylla 7 0.67

a

0

o

0

?Stachytarpheta jonateensis

Tentrosena pubescens

Gyndon dactylon

Eupatorivn odoratum

Tora 1048

MAY, JULY, OCTOBER, 1974

£31 Paspalum conjugatum 169

Ruel ia tuberosa

?Sida carpinifolia

Enelista fora

02

6

?64

"60

Tok

Tok

ven S

Total 192

JANUARY, 1975

3,1 Sida carpinifolia an

Paspalum conjuqatum wy

Relochia pyranidata

Achyranthes Indica

RuelTa tuberosa

Parthesiom nysterophorus

Stachytorphets jamsicensis

Forcutsca priosa

Borrerta vertiei lata

Thanaesyce nutans

Eleustne Tadic

Thanaesyce HTrta

Dactyrotaentum Seqyotiue

Euphorbia Reta

Tonphrena dTspersa

jenoroptun gossypifol ium

Total 667

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Appendix 11. (continued)

MAY, JULY, OCTOBER, 1974

Individuals/

Plot No. Species Plot Percent

Sida carpinifolia

asa conjugatum a

FepthesTea rsterthorus 3

Rages atta 3

Pena seta 5

Tinodan dactviow 3

Raranthus aebias :

FatsetiTS Retevophy! ta :

?Seachptarphete jonatcers 1

Terai 32

uawuaay, 1975

£-3,2. Paspalum conjugatun 200 4B.

Saree erste 165 35.

Highest blrta 22 a

mbites tubers 7 3

?benptotpRSCs ona consis i 3

Pattataen 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 hanate 165 Be

Sida carptat ta 130 263

Faspeloet const 5 5:2

aalsania pyraanints % ae

2 40

i 32

consis 12 ah

3 us

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Appendix 11 (continued)

JANUARY, 1975

ees

Individuals/

Plot No. Species Plot

Chamesyce nutans

Paspatan Finbriaton

Sporoboras sirginteus

fephersta hires

Trichachie Tas laris

Parthentun Rysteraporus

Bidens pilose

Borreris vertici iota

hanoesyce RiFES

Uppia nodiFiors

eeessssssssS???? CR

Tore ist

$ret

MAY, JULY, OCTOBER, 1974

E42 Moja Menuda'* 235

Chloris inflate 32

conju com 23

= 27

Beinn bastTicum

Portulaca piles

wel Tin tubeross

Stachytarpheta jansicensis

Toleut anbotnicus

Grotataria striate :

eS

Total 38

ANUARY, 1975

42 Emelista tora 85

Sida carpiniFolio 3

Stylosanthus hamsta 59

Paspalum coniugatun 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

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---Page Break---

?Appendix 11 (continued)

JANUARY, 1975

Indiv tauata/

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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 Stenotaphrunsecundatun 251

Ei i

ests 37

musica x

Tse Erste seschynonn 3

Senecloldes 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 conjugatun 69 26.43,

Sporobolus virginicus 35 13.40

Eres 2h a9

Sida carpinifo! 21 oi

Tephrosia cine: 4 1.53

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Appendix 11. (continued)

MAY, JULY, OCTOBER, 1974 (cont.)

Pot mo soectes lee percent

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?Saute op : oe

Fiber virgnta ; ore

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Tigiterts SeepetnatS ' 8338

Potala Se ' O38

Fert geptectaea ! 038

ty lgReSs 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

Seoeetae 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

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?ilose ; te

Digitaria Songatatis i 133

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Seterin verier tata 2 ote

tome Tina at rae : sae

Hae piste ? 0:23

hana T5ts seschynonene ' OB

Tait 3 =

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Appendix 11 (continued)

JANUARY, 1975

Plot No.

3,

Species

Paspalum conjugatun

rena dispersa

Stenotaphrun Secundatun

Typerus sp.

Desmodium 5

Sporobolus virginicus

Himosa pudica

Digitaria sanguinal is

Euphorbia hirta

Tynadon dactyTon

Enilia sonchifolia

Senecioides cinerea

ThananerTsts aeschynonene

Bact letpenTon seaypeiun

Hypets sp:

striata

Synedretia nodiflora

Individuals/

Plot

105

53

Percent

22.7

3

12.3

TTT 8B

nav, sULY, ocToReR, 1974

3,2 Sporobolus vieginicus 58

eyperus rotund 51

spate conta tue, 2

tofews meine 3

Wiases padleg é

3B: 5

frrens: di spensa 5

Sa smarts SSrpintferiae 8

5 corynbosa 1

pasar 1

hasae? Tote aevehynonene 1

ConneTina d¥fTasa 1

Portulaca pilose 1

Total 35

sawuany, 1975

63,2 Sypedrelia nodif ora 199 2

stan carpintfotta = 154 2.8

Typerus =~ @ 10.3

Beimodtun 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

Hinosa pudiea 23 37

Sporobolus virginicus 23 37

Paspalum conjugatun 7 2D

?Ghansecr sta seschynonene 5 0:80

Stylosanthus hanate 5 0.80

thanseayee Ritts 2 9.32

?ynodon asctyTor 1 0.16

Enetista tora 1 016

Hyptis $61 1 on6

Total 2

Phot Mo. C-441

May, July, October, 1974 No DATA

JANUARY, 1975

cay Paspalum conjugatun 181

se caine 146

ines: pudiea 55

Syredreta edi flora 4g

Thanaeerista acschynomene 35

Enelista tor: 7

RuelTia tubeross 4

jorreria vertici! lata 3

Desmodium sp. 3

ittatges ple 5

Tentrosene: pubes

Chloris infistg

Beir eguinatus

Stachytarpheta. [ar icensis

Cyperve rocunds

[hetyTotaenTay degyptium

?SenecToidey cTnere

beeen Biipersa

Seyforsnthay Reaata

fateches spe

PeapsTes Fiebriatun

Satie rttans

7

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Total 572

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Appendix 11. (continued)

MAY, JULY, OCTOBER, 1974

Tndividuots/

Plot Wo. Species Plot Percent

42 Paspalur conjugatun 22 42.58

Thioja nenuda? 78 33.84

farpini fol ia 4 15.96

fa tuberosa 20 380

Stachytarpheta jamaiconsis 15 2:85

poste 2 0.38

Eymodon dactylon ' 0.19

Portulaca pilosa 1 0119

?Sporobolus virgintcus 1 0.19

Tota 526

JANUARY, 1975

cue Sida carpinifolia 135 3h

Stylosanthus hamata 53 wg

aspalun conjugatun 30 16

Thatorts Tattsee 2 5:6

17 «3

6 wg

DactyTotaenTin segyptiue 5 3

Desmodium sp. 5 38

Stachytarphets jamaicens is 1% 35

Tentrosena pubescens 10 25

uel tuberosa 7 13

robalus virginicus 7 1

Zenchras equinstus 2 ost

Syrodon dactylon 2 0:5;

Borrerte verttet ata 1 0.25

Sonphrens dispersa 1 0.25

TuetTie tuberoer 1 0:25

a |

MAY, JULY, OCTOBER, 1974

(2, Paspalun conjugatum 20 67.

wen Geers tnd 3 20.78

is pliosa 36 8.49

Euphorbia hirto 6 var

Helochta pyranidata 2 ou

Desnodtun =p. 2 0.47

Sida carpini fo! 2 0.47

Trichotaena repens 2 0.47

Boerheaven aTPhase 1 0:23

Total wae

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Appendix 11. (continued)

JANUARY, 1975

Tndividuais/

Plot No. Species Plot Percent

eacarnnnnnnnsepervesseseeeeemmmmmmeese

way Paspalue conjugatum 315 56.1

dens pilosa 13 20.1

Rimosa pudica x 6.6

?Sida carpinifolia 2 5

Besnodun sp. 2 3.7

Ghanaesyee hirta i 25

Rebyranthes ?Tndice 7 1

feet tete Tore 5 0189

Euphorbia hirta 4 o.71

saguinal 3 53

un aegyptiun 1 ai

EleueTne Taates 1 0:18

id eTspersa 1 0:18

Total 561

MAY, JULY, OCTOBER, 1974

wa, Paspalum conjusatun 12 73.93

Cyperus rotundus 6 ¥

Bidens pilosa 2 7:27

ThomsecrT=ts ?seschynonene 7 Ae

?Sida earpinifolia 6 3.63

Desmadiun sp. 1 0.60

Hinosa pudica 1 0:60

Tora 165

JAWUARY, 1975

2,2 Paspalum conjugatum 255 53.2

40 16.7

48 1010

Himoss budles 25 5.2

Enelista tora 2 6

Desmodium sp. 20 a2

DactyTotaenium aeqyp' 8 Nn

posthasves ai frase ? en

?Bubescens 0

Espnorei ce 4 0:84

?Thansesyee"hieta 2 ona2

?éenorosTan goseypifol tun 1 o.2t

Chamaesyce nutans 1 0.21

Fonordits charantla 1 o.z1

?Tenphrosta- cinerea? 1 0.21

Total 473

wat

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?Appendix 11 (continued)

MAY, JULY, OCTOBER, 1974

Tnaiviavois/

Pot No species lot Percent

Th Sonteu maxim 3 ra

Faapetae eonfunatum B 185

Fae pitas 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 pias 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

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?Appendix 11 (continued)

JANUARY, 1975

Tndivid

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 con ugatun 25 63

cnibrts inflate ri 33

?Stylosanthus hamata 3 3

Sida carpinitotia 3 24

Faspatan FlabrTatun 3 ng

?Sporabolus vieginicus 7 ur

Cenchrus equinatus 5 12

Tephrosia cIneren, 5 12

Eipherbre Reto ~ 4 0.35

jerus rotundus 3 oni

eeeacsentor segyptive 3 or

portelacs prioss 2 0:48

Eentrosems pubescens 1 0.24

Total 420

MAY, JULY, OCTOBER, 1974

Wid Paspalum conjugate 107 60.79

Cyperus rr 38 29.59

?Trilobate 16 3.08

jesmodiun sp. 3 170

Bidens pilosa 2 113

Cenchrus echTnatus 2 13.

?Thanaeer!sta deschynonene 2 a3.

Gonphrena dispersa 2 iB

Rxonopus ?conpressus 1 °

Euphorsia hirta 1 0.56

Dijrtaria decumbens 1 0.56

Urene triloba' 1 0156

Total 176

---Page Break---

Appendix 11. (continued)

JANUARY, 1975

Individuals/

Plot No, Species Plot Percent

wat Paspalum conjugatun 24g 373

tyeere 187 28.0

Digttaria sanguinal is 8 33

Gonphrens dispersa 51 716

Eaphorets Ales 30 us

DetmodTa tp 21 31

Portulaca pilose 2 Br

Hinosa pudiea 16 as

Seneclotdes cToerea u Le

rena Tabata? 5 os

Sporobolus virginicus 3 2

dens pilosa 2 0.3

Dactylotaenium aegyptium 2 o4

ype: 2 o3

Stachytarpheta Jamaicensis 2 03

Centrosena. pubescens 1 0.15

Tonmetina diffusa 1 0.15

Tynodon dactyTon 1 og

Total 667

wen fazpaies conjgn 3

ees 3

Grameen wsennnere i

Total 186

aa

---Page Break---

Appendix 11 (continued)

JANUARY, 1575

Tndividuols/

Flot No. species Plot Percent

wae Peapalun conjugatun 70 BT

. Gomphrena dispersa 9 .

pertutsea prose 38 36

Digtearte fangutnalis 50 a3

ightaris 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

Sporobotus virginicus 5 0:83

Secrerts vereettians 3 95

iw ni 7 3 0.5

neg ofdes cinerea 2 933

Stoo corpiniforis : ot

Stachytarphets Jamal censis ' ony

Total 606

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ase one's 65 t ozgo «

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ozeth 43 t 5E60 fH

tnt £3 S460 tH

65/9 18 ? 0560 Inr'6 A-#

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fer 6 Z19'h u 9540 z

as sect 9E1'9 48 2540 z

one sot 95L'5 le oso ines 1

978 ter 864° ze sn60 5

9th 46" 96Lte 69 zn60 5

Len 861 dyutz zz E60 ?

266°C 58 S260 ?

forn TF 950'5 se oz60 ?

09'? ze: zistc & 5060 z

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fn 161 n5l'e 89 ooo! unr"eL 1

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APPENDIX 13

MEANS OF TOTAL MUMBERS OF DIATONS, DINOFLAGELLATES. COCCOL ITHOPHORES,

?iO OTHER SPECTES BY MONTH FOR

GN; IWSHORE STATTONS CT

TNO OFFSHORE STATIONS. (8). ~ CYRNOPHYCERE WOT TNCLUDES-CISTSIE

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a | 250 288 83 we |

2 829 439 | a0 384

a] oa 89 199 0 |

3 | ay san 264 ws |

a} a 231 193 159

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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 continu

Diatons Dinoflag. Coccolth. orher

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

Diatons Dinoflag. coccoith, 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 alt stations

X~ wean

= standard deviation

13.3

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APPENDIX 14

INDIVIDUAL VALUES, MEANS, VARIAN

ICES, AND CONFIDENCE INTERVALS

?FOR ZOOPLANKTON GROUPS AT STATION S-?TSCOTE? PUERTO NGS

AER SOOPLANKTON GROUPS AT STATION 2.? TSLOTE, PUERTO RICO.

thes

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APPENDIX 1H

sheet 1 of 15

arownss i700 #? Station 2. Istote, Puerto Rico

pate Tow! Tow? Tow 3 Wan Variance $5 CsI

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

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& 10

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x 0

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Date 1 Tow? Tow3 Mean Variance «95 6.1

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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 amaemmememeeeessseee

date Tow! Tow? Tow Mean 95.1

weg ee

3

200

5 57 9 * 308 aie

2 1 3 2 . ots 5

a? 8 %

3 1 " ? 8 ow 29

2 ° 0 : 1 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

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2 2 : owe

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6 5 cy owh

° : 3 ot 5

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° 3 5 Oto 6

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2 : 2 ote §

3 5 6 Oto 38

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i ? 2% tot

4 2 4 ow

° 5 8 oto

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3 1 3 Ot 5

---Page Break---

sheet § of 15

Stotion 2. Islote, Puerto Rico

ate Tow! Tow 2 Tow 3 Moan Variance 95 Cu!

2

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° 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

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i 2 & ? ny oto at

° 8 & ' 4 owe

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6 ° ° ° ° bio 0

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at 2 5 i" * 0038

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5 0 a 7 8 ots

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2 8 é 3 "

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" é % to 5

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2 8 8 : :

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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. Istote, Puerto Rico

a

Date Tow! Tou2 Tow 3 Hoan 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 ote 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 ° ° ? : ? ote 6

10 ° ° ° ° 3 te 8

2 ° ° ° 8 ° be 8

5 6 ° ° ° ° Oto 8

3 5 4 8 2 3 to >

3 ° ° ° 6 a ote 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

Tou? Tow3 Ween Variance 95 ?.1

8 ot 10

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87 2 0 50

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sheet 7 of 15

Station 2. Islote, Puerto Rico

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" i 6 3 owe i7

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ECHINODERH LARVAE per

SPUN Sermme sere

Date: Tow! Tow? Tow3 ean 95 6.1.

Be

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17 bor Ih 6 ° : ° vw 2

Thay 24 ° ° 3 : be 6

15 hay 7h é 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 ean 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 Varlance 9 Cul

7

3

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2 : 3 2 ?

3 5 3 i ?4

3 3 2 2 3 ws

u 3 5 é % Sas

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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 °

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sheet 9 of 15

ASTAOPOD VELIGERS per n3 Statton 2. Istote, Puerto Rico

???????S?? eee

Date Tow! Tow? Tow 3 aan 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 Snes

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 aI 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 ° 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 Jon 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 Ih 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 Ie tee

Ea 238 228 3 Me

Clevioealanes furcstes, Recynocers sTeeatsnus spe RET aT 5

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---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.

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° 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

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5 2 i i 2 ot 8

a i 2 4 2 ot 7

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---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

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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

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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

---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

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3 a sr 5

Pa 5 it 3

3 % % 8

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ie 6 6 3

2 ? 0 1B

° 3 0 ?

2 8 5 °

2 5 6

8 20 2

; 2 3

a 3 ie

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ie ie S

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Station 1 Station 2 Station 3 station 4

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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 Aico

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

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sheet 3 of 15

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Sheet 4 of 15

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Sheet 6 of 15

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lua! Stations Islote, Puerto Rico

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3 Jul 74

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20 Aug 74

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sheet 9 of 15

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Fish e995 per 0

station 3

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5 Nov 7

13 now 78

3 dec 74

18 dee 76

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103

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Individual Stations

Station 2

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28

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sheet 11 of 15

Islote, Puerto Rico

Station 4

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---Page Break---

sheet 12 of 15

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665 633 ie 450

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---Page Break---

Sheet 15 of 15

Dlunons spp. pee mB Individual Stations stote, ruerto Rico

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Sen Bg 8

---Page Break---

APPENDIX 16

ORGAN ISHS COLLECTED Im

PRELIMINARY NARD BOTTOM SAMPLES

Pear KINGOOm

Poylum Chlorophyts

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---Page Break---

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?Galasaure mainats,

Geligtella acerose

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Appendix 16 continued

Phylum Spermatophyta

Prytun Porifera

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---Page Break---

Appendix 16 continues

Class Cephalopoda

Betopus sp.

Phylum Arthropods

Gonodsctylus cerstedii

Order Aaphipoda

Fenty gamarides

Order Tansidaces

Order tsopode

Faracersts $5"

order ecapods

Suborder Natantia

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---Page Break---

Suborder Reptantia

Section Anon

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Appendix 16 continues

---Page Break---

APPENDIX 17

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8/21 9/11 task Tavs 722 4723

ALGAE® 197% 197 1974 197% 1975 1975,

Phylum Chlorophyta

Anadyonene stellate

Aerainvi lea 3p.

Taulerpa alerophyso 4

Ghapaedoris penice um 1

ladophora sp. +

aiscaldea 2

Phylum Phaeophyta

Dictyopteris Je 2

Ou jvstert 2

Dplagiograma io.

3

0

Diophus atternans, 1

Pocokiella variegata 22

Sargessun sp. 2h

Phylua Rhodophyta

Agardhiella tenera

Bmensta mt

?Baghiroa sp.

Ke rigigs

BoEryacladto occidentalis

Bryothennion seatorth

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thondriasp.

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Thryssnents' enteromorphe

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Gorattina spp. 380 W112 15

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Eryptonenta benary? 233

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axaure marginata 3 : ;

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23

13.9 125.4 71.6

*Values represent dry weight

A

---Page Break---

Appendix 17 (continued)

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n=19 aF15 nat6 noth nets nel5,

8/21 9/11 12/4 12/5/22 4/23

1974 197% 1974 197 1975 1975

Phylum Mollusca

Class Anphineurs

Acanthanochitena sp. A 1

Class Scaphopode

Dentaliun antitiarum Orbigry BOA

Class Gastropoda

6

A_puchel la Blainv: 2

Salis congidea Kurtz and Stimpson 1

Gerithiopsis grystallinun Dal? 1 1

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Collunbella gercatoria Linne

Conus daucus Mass.

GLaspideus Gel in

ET[uNae clench

Deillia interpleura Dall and Simpson 1121

B_panciana Dal and Simpson 1

fajinia Lurbinella Kiener 1

?conoidea Kurtz and Stimpson 1

Siplaelio bites! tct'n '

?Latics marochiensis Kiener 1

Latinas straints abbots 12

Hangelia CB, Adams roa

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reletti Dali

Mathi Ida 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

Vexiium 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

?senceLlata 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

Alsicona inswlaris Hansen

Apanthued Signata Menzies and Glynn

?arthur

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Cirolana parva Hansen

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---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 ielinenaeus sp. A 2 1

Ferlelinsnes amerTeanus Kingsley 3 1

P_pedersont ?those

Pontonta miserabilis Holthuis 1

rontonta sp. A 4

Processa sph 1

PeberROdGRaTS Rankin wood

Tinonevs ormanni Rankin 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-Edvards 1

Peaurus spp, ttfuvent les) 2 12

Pagurus misnensis Provenzano 4 30 6S

Petrolisthes anoenis Guerin

Section Brachyura

?Acanthonyx petiverii H. KiIne~ 1

Edwards

Actaea sulcata Rathbun? ro4

17.6

---Page Break---

Aopendix 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-Edwords 1

Henaethiops portoricensis Rathbun 1

rophrys bieornates Ani Ine 3

Edwards

HM. antillensis Rathbun

fitrax forceps A. Hilne-Edvards

?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 Asteroides

Aefropectin dupticatus Gray :

Class Ophiuroidea

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

Ophiolepis 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) KK K(s)

e193 aelS mel6 noth netS nel5

8/21 9/1 Vath 12/5 hae 23,

Ophiothrix angutata Say 5

O. orstedti~ Lutken 31

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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 Foden s

-MURAEN DAE

Enchelycore sp.

?Symothorat Fonebris

Gynnothorax mar inga

Tymothorax sp-

Gynnothorax vicinuss

?OPHICHTHI DAE

Myrichthys oculatus

Hyrophis. punctatus

Sphagebranchus ophioneus

LUPE 1 OAE

Horengula hureralis

Jenkinsia Temprotacnia®

Opisthonens og! imum

SYNODONTrDAE

Saurida suspicion

Synodus Fostens

Synodus Saurus

Synodus. synodus

ANTENNARL DAE

Antennarlus mul tioce!latus

?oPH 11 1 DAE

Lepophidium profundorum

Ogitbia sp.

Parophidion schmidti

exocoeTi OnE

Cypselurus heterurus

BELONIOAE.

Tylosurus acus

Conon English Name

nurse shark

Atlantic sharpnose shark

southern stingray

spaghetti ee!

false moray

false moray

chesnut moray

?green moray

spotted moray

moray ec!

urplenouth moray

goldspottes ee!

Speckled worm eel

surf ee!

Fedear sardine

dwarf herring

Atlantic thread herring

suspicious lizardfish

inshore lizardFish

bluestripe lizardfish

red lizardfish

longlure Frogtist

cusk-ee!

brotuia

dusky cusk-eet

Atlantic flyingfish

agujon

18.1

?Connon Spanish Name

gata

tiburén

raya

congre

culebra de mar

culebra de mar

culebra de mar

rmachuelo

nijua

ploniiia

Iguana

iguana

iguana

iguana

zapo

volador

sgujon

---Page Break---

?Appendix 18 (continued)

Scientific Name

HOLOCENTRIOAE

Holocentrus ascens ionis

Holocenteys rufus

Holocentrus vexillarius

Hyeloristis Jacobus

Plactevpops retrospinis

[AULOSTOM1OAE

Aulostonus maculatus

FISTULARI DAE

Fistularia tabacar:

SYNGNATHIDAE

Hippocampus reidi

Hicrognathus erialts

Hicrognathus ensenad:

Rieregnathus vit

Syngnathus dunkert

SSERRAN DAE

Alpnestes a

Eephalopholis fulva

Epinephelus adscensionis*

Epinephelus guttatus

?Serranus tigrinuss

GRAMMISTIDAE

Pseudogranmus gregory

Rypticus bistrtspinus

Rypticus saponaceus

ifrenatue

Aypticus su!

GRAMM OAE

Grasma lorete

PRIACANTHIDAE

Priacanthus arenatus

Friscanthus eruentatus

Apocow 1 oae

Apogon nscutatus

Apogon quadrisquanatus

?Apogon sp.

BRANCHIOSTEGIDAE

Malacanthus plusieri

ECHENEIOAE

Echeneis nouerate:

Common English Name

squirrelfish

longspine squirrelfish

dusky squirrelfish

blackbar soldierfish

cardinal soldierfish

trumpet fish

bluespotted cornetfish

Jongsnout s

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

Flamef ish

sawcheek cardinal fish

cardinal fish

sand titefish

sharksucker

18.2

Connon Spanish Nane

gallo, candil, candeter

gallo, candil, candelero

gallo, candi! 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

mantequt 13

fmero chesno, juagi?

cordovsin

cordovan

gut locho

renora pega

---Page Break---

Appendix 18 (continued)

Scientific Name

?CARANG 10RE

Caranx bartholonaei*

Earanx erysos

Caranx ruber

Decapterus macare!1us

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, surinanensis

Anisotrenus virginteus

snulon auroTineatun

Haenulon

Haenulon

HaenuTon

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

mmanchego

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*

Wenipteronotus martintcensis

Henipteronotus 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 ourterflyfish

banded butter lyfish

queen ancel fish

rock beauty

gray angel fish

French angelfish

sergeant major

blue chronis

brown chromis

yellowtail danselfish

dusky danse] fish

bicolor danselfish

threespot danselfish

redspotted haukFish

Spanish hogfish

creole wrasse

owarf wrasse

Slippery dick

yel lowhead wrasse

Clown wrasse

rainbow wrasse

Dlackear wrasse

puddingwi fe

rosy razorfish

pearly razorfish

Green razorfish

bluehead

blue parrotfish

striped parrotfish

redband parrotfish

restail parrotfish

?great barracuda

barbu

sand stargazer

Connon Spanish Name

ariposa

cagona

nar iposa

ccagona

cagona prieta

chopa

chopa

chopa,

?chopa

?chopa:

cchopa

cchopa

capitén

doncel la

once! la

doncel la

once! la

Soncella

once! a

once! Ta

donee! 1a

doncella

doncel la

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Appendix 18 (continued)

Selentific Mane

OPISTHOGNATINDAE

Opis thograthus aurifrons*

Opisthognathue whitehurs

cunt ae

Labrisomus buceiferus

ree alate

RaTacoetenus"auroT meatus

Halacoetenus erdeant

RaTococtenus friswgvlotus

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

?ScOMBAIDAE

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

poffeheek 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 scorpiontish

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

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Aependix 18 (continued)

Sclentific 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

bal loonfish

poreup inet ish

Comnon Spanish Name

peje puerco negro

peje puereo

caja de muerto

cafa de muerto

cafe de puerto,

tanbor

tanbort!

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APPENDIX. 19

FIs coxLEctED)

MONTHLY TALLY OF SPECIES cAUGHT(#!

?wLIZ0PRFONODON PoROSUS

MORINGUA EDRARDSI

OLOCENTRUS. VEXILLARIUS

HOLOCENTRUS ASCENSIONIS

KAUPICHTIYS DroDONTTS.

KAUPLCHTHYS NUCHALIS.

Species

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19.2

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Appendix 19 (continued)

27

EHS MARTINTCUS

TETET Sng Re enone g?emeancaan a gea~-adeanann

AMBLYCIRREITUS.PINOS

ACANTHURUS. BAKIANUS

?ACANTHURUS COERULEUS

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cur? sBHStz 40 # WaCL 61 asungava sarozes 20 wren

wap Mae

xIeisa KoaoLa

VEVULSON SISYOTILNY

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?MALANDTML SANHEOLIT

SYIVONVOIG SAYKAOLIVT

?VINODXI0a SAMLdOLIVI

SMLYITL9 SOHLXVOYROR

STN S3NIHEZHLSS

SOMSDONOYR SGNIHESHINYO

?MON SANLHOLTEA

?vInign SaLSTTVa

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Appendix 20 (continued)

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SvEUTTOWA SHALE

SOLVAATT SaROR

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sazoaas

(GaigsT 109 fst 40 HAMANN IVOTONT S¥SBANY) GAVS MO LHOAVD SAIIBES JO KTIVS XIHINOR

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