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NOAA Data Report ERL MESA-36



DISTRIBUTION AND ABUNDANCE OF BENTHIC MACROFAUNA IN THE SEWAGE SLUDGE DISPOSAL AREA, NEW YORK BIGHT APEX, FEBRUARY 1975

John Pearce Janice Caracciolo Martha Halsey Leslie Rogers

Marine Ecosystems Analysis Program Boulder, Colorado November 1977

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Division of Environmental Assessment National Marine Fisheries Service Northeast Fisheries Center Sandy Hook Laboratory Highlands, New Jersey JUL 1978

N.C.A.A. U. S. Dept of Commerce

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UNITED STATES
DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION Richard A. Frank, Administrator Environmental Research Laboratories Wilmot N. Hess. Director

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Distribution and Abundance of Benthic Macrofauna in the Sewage Sludge Disposal Area, New York Bight Apex, February 1975*

> John Pearce, Janice Caracciolo, Martha Halsey and Leslie Rogers

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Northeast Fisheries Center
Sandy Hook Laboratory
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November 1977

* These data were generated by personnel of the Division of Environmental Assessment, Northeast Fisheries Center, NMFS, with partial financial support from the NOAA-MESA-New York Bight Project. The data are being made available in the present form for timely assistance to user groups. The data are being further analyzed by staff members of the Northeast Fisheries Center, and will form the basis for future publications.

Introduction

Sandy Hook Laboratory has been examining the impact of ocean waste disposal on the ecosystem of the New York Bight apex since 1968 (Pearce et al., 1976a). The benthic community in the apex has been used to indicate impacts because certain bottom-dwelling organisms are often the first to be demonstrably affected by pollutants. The study has had three phases: 1) reconnaissance, 2) seasonal quarterly sampling: five cruises, August 1973 through September 1974 (Pearce et al., 1976b, 1976c, 1977), and 3) intensive grid sampling in areas shown to be affected by sewage sludge and dredging spoils disposal (dredging spoils grid samples are still being analyzed at Sandy Hook Laboratory).

The present data report was prepared in order to provide machine listed data and certain statistical calculations, diversity and equitability (Shannon and Weaver, 1963; Pielou, 1969), concerned with the distribution and abundance of benthic organisms found at 24 stations "nested" within the sewage sludge disposal area of the standard N. Y. Bight, MESA sampling grid (Figs. 1, 2).

These "nested" samples will yield additional information on the impact of dumping in the New York Bight by providing a better distributional statistical base and will be used in comparisons with earlier data collected from the same area.

Materials and Methods

The "nested" benthic sampling area consists of 25 stations (901 through 925) located within the sewage sludge disposal area of the standard MESA, N. Y. Bight sampling grid (Figs. 1, 2). The site is bounded by latitudes 40°23' and 40°27' and longitudes 73°46' and 73°50'.

In February 1975, two 0.1 m² Smith-McIntyre benthic grab samples were taken at each of 24 sampling sites from the NOAA ship Delaware II (no grab samples were obtained at station 902). These stations (Fig. 2) were located by Raydist¹ precision navigation. At each station, two sediment cores (3.4 cm inside diameter) were removed from each grab sample, one for standard geological analyses and the other for heavy metals analyses. These cores were frozen for future analyses. The remainder of each grab sample was washed through a standard geological sieve with a 1.00 mm mesh size. All macrofauna collected in grab samples was fixed in 10% buffered formalin and later transferred to and preserved in 70% ethanol containing 5% glycerol.

In the laboratory, dissecting microscopes were used as an aid in sorting out organisms from preserved macrofauna samples. All organisms were identified to the species level, whenever possible, using standard keys and descriptions and consultations with recognized taxonomists.

¹ Use of trade name does not imply endorsement by NOAA.

Station positions and counts of organisms per species in each grab were machine listed and coded. The community found at each station was analyzed for total number of individuals per grab (N), total number of species (S), equitability (J' = H'/H' max = H'/ln S) and diversity (H' $\stackrel{\sim}{=}$ $\stackrel{\sim}{\sim}$ $\stackrel{\sim}{n_i}$ $\stackrel{\sim}{n_i}$ $\stackrel{\sim}{n_i}$ $\stackrel{\sim}{n_i}$ $\stackrel{\sim}{n_i}$ $\stackrel{\sim}{n_i}$ where n_i = number in the i^{th} species).

Results

Machine listed species lists and counts, with diversity and equitability calculations for each of 24 stations, are presented as Table 1.

No detailed interpretations of these data are made at this time, but these data, with numerous other data sets, are being analyzed to yield information on the impacts of ocean dumping, riverine runoff, low dissolved oxygen and other maninduced and natural factors on marine bottom-dwelling populations and community structure.

Literature Cited

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 Distribution and abundance of benthic organisms in the

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 through September 1974. (In press).
- Pielou, E. 1969. An introduction to mathematical ecology.

 Wiley Interscience, N. Y. 286 p.
- Shannon, C. and W. Weaver. 1963. The mathematical theory of communication. Univ. of Ill. Press, Urbana. 117 p

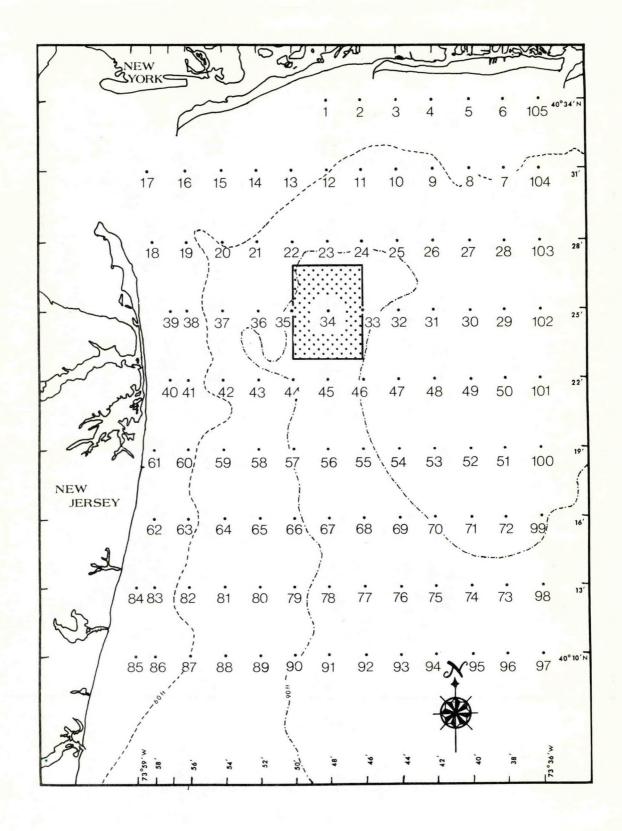


Figure 1. Shaded area shows location of nested stations in the sewage sludge disposal area of the standard N. Y. Bight sampling grid.

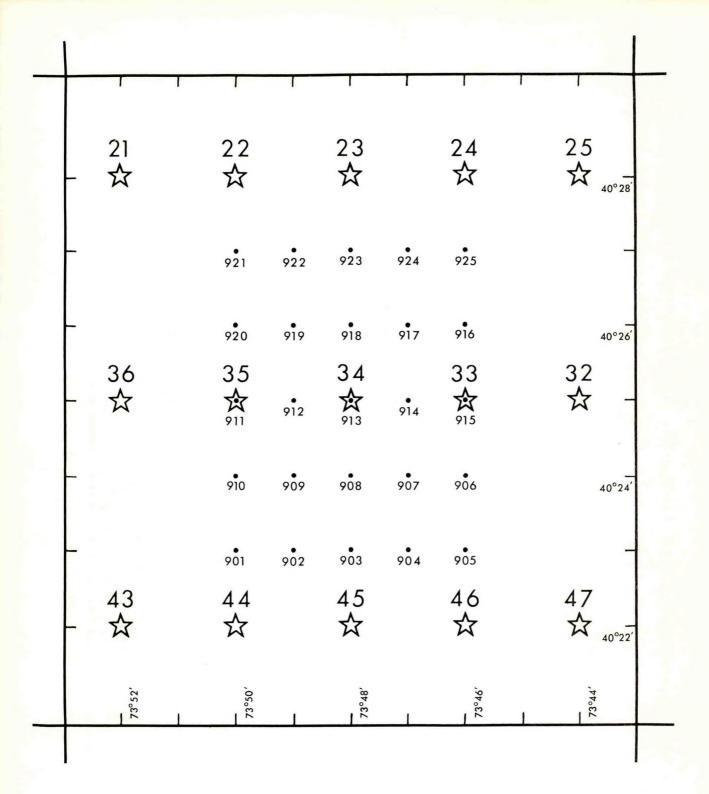


Figure 2. Closeup of locations of 25 nested stations in relation to surrounding standard MESA stations. Stations referred to in Table 1 can be located on this figure

Table 1. Machine listing of benthic data collected at nested stations in the sewage sludge disposal area, N. Y. Bight, February 1975.

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DEPTH METERS 31.0	EQUITABILITY 0.8402		DEPTH METERS 31.0	EQUITABILITY 0.2528	
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DEPTH METERS 32.5
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LAT 1TUDE 40230N
GRAB 01
NUMBER SYMAP 902
STATION CRUISE 902
DATE 15/02/75
CRUISE 07502

NO ANALYZED DATA

- S	10
DEPTH METERS	32.5
LONGITUDE	73490W
LATITUDE	40230N
GRAB	02
NUMBER	200
STATION NUMBER CRUISE SYMAP	902
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NO ANALYZED DATA

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		YOLDIA MYALTS	-15					
		VOLDIA LIMATULA	STULA		1			
***	***	* * * * * * * * * * * * * * * * * * * *	***	***	计计算机 计计算计算计算计算计算计算计算计算计算计计计算计算计计算计算计算计算计	***	*****	***
CPUISE	DATE	STATION	NUMBER	GRAB	LATITUBE	LONGITUDE	DEPTH	
07502	16/92/75		912	20	40250N	MC6782	31.6	
NO. SPE	SPECIES 10	NO. INDIVIDUALS	VIDUALS	14	DIVERSITY 1.9641		EQUITABLLITY 0.8530	0.8530
		SPEC 1E	SPECIES LISTING		COUNT			
		NUCULA PPOXIMA	XIMA		rv w			
		TELLINA AGILIS	ILIS					
		HARMOTHOE IMBRICATA	TMBRICATA		-			
		MEDIOMASTUS		I.E.	2			
		LUMBRINERIS T	STENUIS		12			
		NINDE NIGRIPES	TO F.C.		10			
		DRILONEREIS	S MAGNA		-			
		THARYX ANNULUSUS	ULOSUS		6			

	0*64.0	* * * * * * * * * * * * * * * * * * *		0.5618	
DEPTH METERS 34.0	EQUITABILITY 0.4940		DEPTH METERS 34.0	EQUITABILITY	
LONGITUDE 73480W		***************************************	LONGITUDE 73480M		
LATITUDE 49259N	DIVERSITY 1.5040	SPECIES LISTING EDWARDSIA SIPUNCULUIDES CERIANTHUS AMERICANUS PHORONIS ARCHITECTA UNID BIVALVE #2 NUCULA PROXIMA UNID BIVALVE #2 PITAR MORRHUANA YOLDIA LIMATULA COPEDDA NEDHTYS INCTSA HEDIOMASTUS AMEISETAE COSSURA LONGOCIRRATA PHERUSA AFFINIS COSSURA LONGOCIRRATA SABELLIOES OCULATA ANDHARETE ARCIICA LUMBRINERIS TENUIS LUMBRINERIS TENUIS NINOE NIGRIPES PARADNIS GRACILIS 3 COLIGOCHAETA ANDHARETE ARCIICA AN	LATITUDE 40250N	DIVERSITY 1.6830	COUNT 2 2 9 2 2 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
GRAB 01	842	TAE TAE TAE TAE	GRAB 02	944	NUS RUPI TA OTDES
NUMBER SYMAP 913	VIDUALS	SPECIES LISTING RDSIA SIPUNCULOIDE ANTHUS AMERICANUS ONIS ARCHITECTA INA AGILIS LA PROXIMA BIVALVE #2 R MORRHUANA IL IMATULA PODA PODA TYS INCTSA OMASTUS AMBISETAE URA LONGOCIRRATA USA AFFINIS ONE RUBROCINCTA ELLIDES OCULATA ARFTE ARCTICA RINERIS TENUIS F NIGRIPES TYX ACUTUS OCHAETA ***********************************	NUMBER SYMAP 913	INDIVIDUALS	SPECIES LISTING ANTHUS AMERICANUS ONE PROXIMA TONE RUBROCINCTA ANOLOSUS NOSPIO STEENSTRUP URA LONGOCIRRATA RINERIS TENUIS E NIGRIPES YX ACUTUS USA AFFINIS TYS INCISA ELLIDES OCULATA RDSIA STPUNCULOTO ONIS ARCHITECTA RINA AGILIS IN AGILIS IN AGILIS IN AMYALIS IN LIMATULA
STATION CRUISE 913	NO. INDIVIDUALS	SPECIES LISTING EDWARDSIA SIPUNCULOID CERIANTHUS AMERICANUS PHORONIS ARCHITECTA TELLINA AGILIS NUCULA PROXIMA UNID BIVALVE #2 PITAR MORRHUANA YOLDIA LIMATULA COPEPDOA NEDHTYS INCTSA MEDIOMASTUS AMBISETAE COSSURA LONGOCIRRATA PHERUSA AFFINIS EUCHONE RUBROCINCTA ASABELLIDES OCULATA ANPHARETE ARCTICA LUMBRINERIS TENUIS NINDE NIGRIPES THARYX ACUTUS OLIGOCHAETA	STATION CRUISE 913	NO. INDI	SPECIES LISTING CERIANTHUS AMERICANUS NUCCULA PROXIMA EUCHONE RUBROCINCTA THARYX ANNULOSUS PRIONOSPIO STEENSTRUPI COSSURA LONGOCIRRATA LUMBRINERIS TENUIS NINGE NIGRIPES NINGE NIGRIPES NINGE NIGRIPES NINGE NIGRIPES PHERUSA AFFINIS NEPHTYS INCISA EDWARDSIA SIPUNCULOTOES PHORONIS ARCHITECTA THYONE SP. UNID BIVALVE #2 PITAR MORRHUANA TELLINA AGILIS YOLDIA MYALIS
0ATE 16/02/75	1ES 21		DATE 16/02/75	:IES 20	
CRU1SE 07502	NO. SPECIES		CRUISE 07502	NO. SPECIES	

	0.8591		***		0.8733	
DEPTH METERS 33.4	EQUITABILITY 0.8591		****	DEPTH METERS 33.4	EQUITABILITY 0.8733	
LONGITUDE 73470W		4	****	LONGITUDE 73470W		F
LAT 17UDE 40250N	DIVERSITY 1.8876	C C C UNT	计解析法律 计计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计	LATITUDE 40250N	DIVERSITY 2.0108	COUNT 1 1 1 1 1 1 1 1 1 1 1 1 4 4
GRAB 01	31	S1 1 d1	***	GRAB 02	11	14n
NUMBER SYMAP 914	VIDUALS	SPECIES LISTING ANTHUS AMERICANL ONIS ARCHITECTA LA PROXIMA TYS INCISA NOSPIO STEENSTRU E NIGRIPES CHOCOFLA	***	NUMBER SYMAP 914	VIDUALS	SPECIES LISTING PHORONIS ARCHITECTA NUCULA PROXIMA UNCIDLA IRRORATA NINDE MIGRIPES NEPHTYS INCISA PHERUSA AFFINIS PRIONOSPIO STEENSTRUPI AS ABELLIDES OCULATA RHYNCHOCOELA
STATION CRUISE 914	NO. INCIVIDUALS	SPECIES LISTING CERIANTHUS AMERICANUS PHORONIS ARCHITECTA NUCULA PROXIMA PITAR MORRHUANA NEPHTYS INCISA PRIONOSPIO STEENSTRUPI NINGE NIGRIPES ASABELLIDES OCULATA	**	STATION CRUISE 914	NO. INDIVIDUALS	SPECIES LISTING PHORONIS ARCHITECTA NUCULA PROXIMA UNCIDLA IRRORATA NINGE NIGRIPES NEPHTYS INCISA PHERUSA AFFINIS PRIONOSPIO STEENSTR ASABELLIDES OCULATA RHYNCHOCOELA
0ATE 16/02/75	9 SEI		***	DATE 16/02/75	11ES 10	
CRUI SE 07502	NO. SPECIES		****	CRUISE 07502	NO. SPECIES 1	

	1.4717																								
DEPTH METERS 30.7	EQUITABILITY 0.4717																								
TUDE	EQU																								
LONGITUDE 73460W	1664.	-													-1										
LATITUDE 47253N	DIVERSITY 1.4991	COUNT	4 n		1	2	•	1	-	~	1	~	4	-	-	Α.	31	34	9	31	2	325	225	2	4
GR A B	069		<u>ار</u>	UPI					4		ATUM										AE				
NUMBER SYMAP 915	VIDUALS	SPECIES LISTING	LAAMFRICAN	STEFNSTR	FINIS	٨		RCHITECTA	PHINDONI	PROXIMA	MA PININUL	AGILIS	IRRDRATA		CAPITATA	IPES	TUS	UPREA	CISA	SUCCINEA	S AMBISET	CAPITATA	S OCULATA	RACILIS	SOMBVX
STATION CRUISE 915	NO. INDIVIDUALS	SPECIE	RHYNCHOCOELA	PRIONOSPIO STEFNSTRUPI	PHERUSA AFFINIS	OLIGOCHAFTA	NEMATODA	PHORONIS ARCHITECTA	NUCULA DELPHINGDONTA	NUCULA PRO	CERASTODERMA PINNULATUM	TELLINA AG		COPEPUDA	CAPITELLA CAPITATA	NINGE NIGRIPES	THARYX ACUTUS	DIOPATRA CUPRFA	NEPHTYS INCISA	NEREIS SUC	MEDIUMASTUS AMBISETAE	CAPITELLA CAPITATA	ASABELLIDES OCULATA	PARADNIS GRACILIS	SPINDHANES BOMBYX
0ATE 16/12/75	IES 24		α L	۵	Ġ.	0	Z	۵	Z	2	O	-	<u> </u>	J	J	Z	_	0	Z	2	2.	U	٩	۵.	\$
CRUISE 07572	NO. SPECIES 24																								

DEPTH JDE METERS M 30.7	FQUITABILITY 0.5220		
LATITUDE LONGITUDE 40256N 73460W	DIVERSITY 1.5893	COUNT 8 10 10 105 11 105	
NUMBER SYMAP GRAB 915 @2	VIDUALS 165	SPECIES LISTING RHYNCHOCOELA CERIANTHUS AMFRICANUS DIOPATRA CUPREA ETECNE LACTEA MEDIOMASTUS AMBISETAE CAPITELLA CAPITATA NEPHTYS INCISA SPIOPHANES BOMBYX PRIONOSPIO STEENSTRUPI NINNE NIGRIPES GLYCERA DIBRANCHIATA GLYCERA SP. ASABELLIDES OCULATA PHERUSA AFFINIS CERASTODERMA PINNULATUM NASSARIUS TRIVITTATUS UNCIOLA IRRORATA DLIGOCHAETA NEREIS SUCCINEA	
STATION NUMBER CRUISE SYMAP 16/02/75 915 915	CIES 21 NO. INDIVIDUALS		
CRUISE 07502	NO. SPECIES 21		

			*		
	0.7775		* * * * *	0.6818	
DEPTH METERS - 29.2	EQUITABILITY		DEPTH METERS 29.2	EQUITABILITY	
LONGITUDE 73460W	2.2473 EQ		**************************************	2.1076 EQ	
LAT ITUDE 40260N	DIVERSITY 2.2	COUNT 19 19 21 31 31 31 32 34 48 54 54 55	**************************************	DIVERSITY 2.1	CDUNT 10 10 10 10 10 10 10 10 10 10 10 10 10
GRAB 01	192	ATA RUP I	GRAB 02	142	VUS A A E ENSTS TAE RUP I
N NUMBER SYMAP 916	MO. INDIVIDUALS	SPECIES LISTING CEPIANTHUS AMERICANUS PHYLLODOCE ARENAE NINOE NIGRIPES SPIOPHANES ROMBYX SPIO FILICORNIS ASABELLIDES OCULATA PHERUSA AFFINIS NEMATODA NUCULA PRONTIMA UNCIOLA IRRORATA AGLAOPHAMUS CIRCINATA NEPHTYS INCISA PRIONOSPIO STEENSTRUP THARYX ACUTUS ETEONE LACTEA GLYCERA SP.	********* NUMBER SYMAP 916	NO. INDIVIDUALS	SPECIES LISTING NEMATODA RHYNCHOCOELA CERIANTHUS AMERICANUS ASABELLIDES OCULATA PARANAITIS KOSTERIENSIS GLYCERA SP. OLIGOCHAETA OLIGOCHAETA ONCIOLA PRONIMA UNCIOLA PRONIMA UNCIOLA PRONIS SPIO FILICORNIS SPIO FILICORNIS AGLADPHAMUS CIRCINATA NEPRIS FRAGILIS NEREIS GRAYI ONINGENIGRIPES THARYX ACUTUS GLYCERA DIBRANCHIATA
STATION CRUISE 916	ONI GN	SPECIES LISTICE PHYLLODOCE ARENAE NINGENIGRIPES SPIOPHANES ROMBYX SPIO FILICORNIS ASABELLIDES OCULA PHERUS AFINIS NEMATODA AFINIS NUCIOLA PROXIMA UNCIOLA PROXIMA COLUS PRIONOSPIO STEENSTHARYX ACUTUS GLYCERA DIBRANCHI	********* STATION CRUISE 916	NO. IND	SPECIES LISTING NEMATODA RHYNCHOCOELA CERIANTHUS AMERICAN ASABELLIDES DCULATA BARANATIS KOSTERIE GLYCERA SP. OLIGOCHAETA OUCIOLA PROXIMA UNCIOLA PROXIMA UNCIOLA PROXIMA UNCIOLA PROXIMA UNCIOLA PROXIMA UNCIOLA PROXIMA UNCIOLA PROXIMA LUMBRINERIS FRAGILI NEPHTYS INCISA LUMBRINERIS FRAGILI NEREIS GRAVI SPIONOSPIO STEENSTR NINOE NIGRIPES THARYX ACUTUS GLYCERA DIBRANCHIAT
DATE 16/02/75	TES 18		.******** DATE 16/02/75	IES 22	
CRUTSE 07502	NO. SPECTES		******** CRUI SE D7502	NO. SPECIES	

S	FOUITABILITY 0.4935				**************************************	TY 0.5222		
DEPTH METERS 29.5	UITABIL			,	******* DEPTH METERS 29.5	EQUITABILITY		
LONGITUDE 73470W					******** LONGITUDE 73470W			
	DIVERSITY 1.5254	CGUNT 10 67 67 12 12 1	123 583 1 10 10	1 9 1	****** 0E LO	Y 1.479	COUNT 23 1 14 17 7	2 19 11 10 10 11 11 11 11 11 11 11 11 11 11
LATITUDE 40260N	DIVERSI				******** LATITUDE 40260N	DIVERSITY 1.4796		
GRAB A1	972	SUNA	TAE TA SUPI		GRAB 02	392	TIDES AUS A A A A A A A A A A A A A A A A A	S
NUMBER SYMAP 917	VIDUAL S	PECTES LISTING WINDERFICAN WINDERFICAN WANTER AND	LONGOCTRATA LONGOCTRATA CUTUS IES BOMBYX TO STEENSTF TNCISA DES OCULAT REFINIS AFFINIS	. 4	NUMBER SYMAP 917	TOUALS	LISTING LISA LISA SIPUNCULOID AMERICANUS RRANCHIATA IPES STEENSTRUP GOCIRRATA	AFFINIS CUTUS CUTUS DES DCULATA ARCHITECTA AGILIS RROXIMA IRRORATA QUADRICUSPIS
STATION CRUISE 917	NO. INDIVIDUALS	SPECIES LISTING CERIANTHUS AMERICANUS PHORDNIS ARCHITECTA TELLINA AGILIS NUCULA PRINTIMA PITAR MORRHUANA LACUNA VINCTA LACUNA VINCTA UNCIGLA IRRIRATA ETEONE LONSA ARICIDEA JEFFREYSIT	MEDIOMASTUS AMBISETAE CAPITELLA CAPITATA COSSURA LONGOCIPRATA THARYX ACUTUS SPIOPHANES BOMBYX PRIONOSPIO STEENSTRUPI NEPHTYS INCISA ASABELLIDES OCULATA EUCHONE RUBROCINCTA PHERUSA AFFINIS	NEMATODA RHYNCHOCOEL A	STATION CRUISE 917	NO. INDIVIDUALS	SPECIES LISTING NEPHTYS INCISA EDWARDSIA SIPUNCULOIDES CERIANTHUS AMERICANUS GLYCERA DIRRANCHIATA NINDE NIGRIPES PRIGNOSPIO STEENSTRUPI COSSURA LONGOCIRRATA	ETEONE LONGA PHERUSA AFFINIS THARYX ACUTUS ASABELLIDES OCULATA PHORONIS ARCHITECTA TELLINA AGILIS NUCULA PROXIMA UNCIOLA IRRORATA ONUPHIS QUADRICUSPI
DATE 16/02/75	STES 22	RELEASE	A 2 2 E 2 K A A B F	E E	DATE 16/02/75	1ES 17	S S S S S S S S S S S S S S S S S S S	THE SET OF SET
CRUISE D7502	NO. SPECIES				CRUI SE 0 7502	NO. SPECIES 17		

,	Y 0.6342																												
DEPTH METERS 31.3	EQUITABILITY 0.6342																												
LONGITUDE 73480W		-																											
LAT 1 TUDE 40260N	DIVERSITY 2.1355	COUNT	1	20	13	1	90	° -	7	4	74	-	-	4	13	14	159	19	3	2		287	3	1	-	52	3	116	•
GRAB 01	833		IDES	NUS NUP I	AE		*					_		ATUM															
STATION NUMBER CRUISE SYMAP 918 918	NO. INDIVIDUALS	SPECIES LISTING	SIPUNCUL	STEENSTR	IS AMBISET	RUBROCINCTA	IONCOLIDBATA	NORVEGICA		LA	RCHITECTA	PISINUATA	11.15	MA PINNUL	ILIS	VE #2	MIXIMA	HUANA	INUTA	RORATA	A	ITUS	IPES	GA	PACILIS	CISA	S TENUIS	S OCULATA	A A GMC G
STATION CRUISE 918	NO. INDI	SPEC 16	EDWARDSIA SIPUNCULNIDES	PRIONOSPIO STEENSTRUPI	MEDIOMASTUS AMBISETAE	EUCHONE RU			NEMATODA	RHYNCHOCOELA	PHORINIS ARCHITECTA	THY ASIRA TRISINUATA	YOLDIA MYALIS	CERASTODERMA PINNULATUM	FELLINA AGILIS	JNID BIVALVE #2	VUCULA PROXIMA	PITAR MORRHUANA	HYDROBIA MINUTA	JNC I OLA IRRORATA	OL I GUCHAETA	THARYX ACUTUS	NINDE NIGRIPES	ETENNE LUNGA	PARACILIS GRACILIS	NEPHTYS INCI SA	LUMBRINERIS TENUIS	ASABELL I DE	YAMANES BOMBYY
DATE 16/02/75	1ES 29		- (- 0	-	•	_					_		-	-	_	_		~	_	•	•	_	-	_
CRUI SE 07502	NO. SPECIES 29																												

	0.6484																					
DEPTH METERS 31.3	EQUITABILITY 0.6484																					
LONGITUDE 73480W																						
LATITUDE 40260N	DIVERSITY 1.9424	COUNT	15		2	-	-	9	41	3	76	10	-	3	2	16	9	80		2	19.00	2
GR AB	288		SN	JPI	AE								NSIS	Δ	IDES							
CRUISE SYMAP	NO. INDIVIDUALS	SPECIES LISTING	CEPTANTHUS AMERICANUS	PRIGNOSPIO STEENSTRUPI	MEDIOMASTUS AMBISETAE	LUMBRINERIS TENUIS	SPIOPHANES BOMBYX	PHERUSA AFFINIS	NEPHTYS INCISA	NINDE NIGRIPES	THARYX ACUTUS	ASABELLIDES OCULATA	PARANAITIS KOSTERIENSIS	COSSURA LONGOCIRRATA	EDWARDSIA SIPUNCUL NIDES	PHORONIS ARCHITECTA	PITAK MOFRHUANA	NUCULA PROXIMA	TELLINA AGILIS	UNID BIVALVE #2	YALDIA LIMATULA	EUCHONE PUBROCINCTA
DATE 16/02/75	IES 20		_						-	_				•			7					
CRUISE 07572	NO. SPECIES 2																					

	0.2600			0.0756	
DEPTH METERS 31.6	EQUITABILITY		DE PTH METERS 31.6	EQUITABILITY 0.0756	
LONGI TUDE 73490W			LONGITUDE 73490W		
LATITUDE 40269N	DIVERSITY 0.8154	COUNT 19 19 19 27 43 43 43 43 43 43 43 43 43 43 43 43 43	CRUISE DATE CRUISE SYMAP GRAB LATITUDE LONGITUDE METERS D7502 16/02/75 919 919 02 40260N 73490W 31.6	DIVERSITY 0.1939	COUNT 2 3 3 5 7 7 7 7 7 7 7 7 7 7 7 7
GRAB 01	1094	OIDES ATUM ATUM TUS TAE TAE TAE AUPT	GRAB 02	2222	NUS A A SI
SYMAP 919	VIDUALS	SPECIES LISTING ANTHUS AMERICANUS ONIS GRACILIS RINERIS TENUIS E NICRIPES TVS INCISA TVS INCISA TVX ACUTUS TVX	NUMBER SYMAP 919	NO. INDIVIDUALS	SPECIES LISTING ANTHUS AMERICANU DNIS ARCHITECTA R MORRHUANA INA AGILIS IA MYALIS LA DELPHINODONTA LA PROXIMA E NIGRIPES YX ACUTUS RINERIS FRAGILIS USA AFFINIS
STATION CRUISE 919	NO. INDIVIDUALS	SPECIES LISTING CERIANTHUS AMERICANUS PARAONIS GRACILIS LUMBRINERIS TENUIS NINDE NIGRIPES NEPHTYS INCISA THARYX ACUTUS THARYX ACUTUS THARYX ANNULOSUS RHYNCHOCOELA EDWARDSIA SIPUNCULOIDES PHORONIS ARCHITECTA CERASTODERMA PINNULATUM PITAR MORRHUANA MYA ARENARIA TELLINA AGILIS UNID BIVALVE #2 NUCULA PROXIMA MASSARIUS TRIVITTATUS OLIGOCHAETA MEDIOMASTUS AMBISETAE COSSURA LONGOCIRRATA PRIONOSPIO STEENSTRUPI PHERUSA AFFINIS ASABELLIDES OCULATA	STATION CRUISE 919	NO. IND	SPECTES LISTING GLYCERA DIBRANCHIATA CERIANTHUS AMERICANUS PHORONIS ARCHITECTA PITAR MORRHUANA TELLINA AGILIS YNLOIA MYALIS NUCULA DELPHINODONTA NUCULA PROXIMA NINDE NIGRIPES THARY ACUTUS LUMBRINERIS FRAGILIS PHERUSA AFFINIS
0ATE 16/92/75	IES 23		DA TE 16/02/75	SPECIES 13	334477227942
CRUISE 07502	NO. SPECIES		CRUISE D7502	NO. SPEC	

	944														
	0.8														
DEPTH METERS 26.4	EQUITABILITY 0.8644														
LONGITUDE 73500W				•		10				•		2		3	2
LAT I TUDE 40260N	DIVERSITY 2.2813	COUNT		Pi		•	-	1				•			
GRAB 01	64		A						AE			UPI			
SYMAP 920	TOUALS	SPECIES LISTING	PES	SINI	LONGA	S TENUIS	RCHI TECTA	KIMA	S AMBISET	SA	CISA	STEENSTR	rus	JUSUS	S OCULATA
STATION NUMBER CRUISE SYMAP 920 920	NO. INDIVIDUALS	SPEC 1E	NINGE NIGRIPES	PHERUSA AFFINIS	DRILONERFIS LONGA	LUMBRINERIS TENUIS	PHORONIS ARCHITECTA	NUCULA PROXIMA	MEDIOMASTUS AMBISETAE	ETEONE LONGA	NEPHTYS INCISA	PRIONOSPIO STEENSTRUPI	THARYX ACUTUS	THARYX ANNUL USUS	ASABELLIDES OCULATA
DATE 16/02/75	CIES 14				_				_						
CRUISE D7502	NO. SPECIES 14														

EQUITABILITY 0.7542 DEPTH METERS 26.4 LONGITUDE 73500W DIVERSITY 2.1368 LAT ITUDE 40260N GRAB 02 133 STATION NUMBER CRUISE SYMAP 920 920 NO. INDIVIDUALS DATE 16/02/75 NO. SPECIES 17 CRUISE D7502

	+14.00	
SPECIES LISTING	COOL	
NINDE NIGRIPES	16	
NEMATODA		
CERTANTHUS AMERICANUS	20	
	1	
PHERUSA AFFINIS	3	
LUMBRINERIS TENUIS	43	
DRILONEREIS LONGA	9	
PHORONIS ARCHITECTA	-	
ENSIS DIRECTUS	1	
NUCULA PROXIMA	61	
PHOXOC EPHALUS HOLBOLLI		
UNCIOLA SERRATA	4	
CANCER IRRORATUS	1	
THARYX ANNULUSUS	17	
ASABELLIDES OCULATA	1	
AMPHARETE ARCTICA	2	
THARYX ACUTUS	. 5	

LONGITUDE METERS 73500W 27.3	3.4485 EQUITABILITY 0.1617	SPECIES LISTING	DEPTH LONGITUDE METERS 73500W 27.3	EQUITA
LATITUDE 40270N	DIVERSITY 0.4485	COUNT 25 21 22 22 22 36 11 11 12 18 18 18 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10	LATITUDE 40270N	> 0 4
GRAB 01	3117	4US 1S 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A	GRAB 02	2600 6 11 S 11 S 01 D E S
STATION NUMBER CRUISE SYMAP 921 921	NO. INDIVIDUALS	SPECIES LISTING CERIANTHUS AFFINIS CUMBRINERIS FRAGILIS LUMBRINERIS TENUIS DRILONFREIS LONGA NEPHTYS INCISA PHORONIS ARCHITECTA NUCULA PROXIMA PITAR MORRHUANA UNID BIVALVE #2 TELLIMA AGILIS YOLDIA MYALIS COSSURA LONGOCIRRATA THARYX ACUTUS THARYX ANNULOSUS	STATION NUMBER CRUISE SYMAP 921 921	DIVID TES L RRIS T RRIS T RRIS T RRIS T RRIS T RRIS T RRIC T ARCH IMATU
CRUISE DATE 07502 16/02/75	NO. SPECIES 16		CRUISE DATE 07592 16/02/75	PECIES 16

LONGITUDE METERS 73490W 27.6	EQUITABILITY 0.2235	· · · · · · · · · · · · · · · · · · ·	DEPTH LONGITUDE METERS 73490W 27.6	EQUITABILITY 0.4168
LATITUDE LONGITUDE 402 TON 73490W	DIVERSITY 9.6459	CCUNT 32 32 25 1795 11 11 11 11 12 13 11 11 12 13 13 13 13 13 13 14 15 16 17 17 18 18 19 19 10 10 10 10 10 10 10 10 10 10	LATITUDE LONGITU 40270N 73490W	DIVERSITY 1.1000 COUNT 1 3 3 3 5 5 7 1 1 3 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
STATION NUMBER DATE CRUISE SYMAP GRAB 16/02/75 922 922 01	SPECIES 18 ND. INDIVIDUALS 1962	SPECIFS LISTING	DATE CRUISE SYMAP GRAB 16/02/75 922 922 02	SPECIES 14 NO. INDIVIDUALS 712 SPECIES LISTING DRILONEREIS LONGA ASABELLIDES COULATA EDWARDSIA ELEGANS CFRIANTHUS AMERICANUS NUCULA PROXIMA NUCULA PROXIMA LUMBRINERIS TENUIS NEPHTYS INCISA PHERUSA AFINIS THARYX ANNULOSUS THARYX ACUTUS PHORONIS ARCHITECTA VOLDIA LIMATULA
CRUISE 07502	NO. SPECT		CRUISE 07502	NO. SPECI

07502 16/	DATE 16/02/75	CRUISE SYMAP 923 923	SYMAP 923	GRAR O1	LATITUDE 47272N	LUNGITUDE 73480W	WETERS	
NO. SPECIES 13	13	NO. INDI	NO. INDIVIDUALS	210	DIVERSITY 1.8731		EQUITABILITY 0.7303	0.7303
		SPECIE	SPECIES LISTING	47	COUNT			
	ď	PITAR MORRHUANA	HUANA		3			
	Z	NUCULA PROXIMA	AMIX		78			
	ວັ	ERIANTHUS	CERIANTHUS AMERICANUS	IUS	54			
	ā	HORONIS A	PHORONIS ARCHITECTA		16			
	ັ	ERASTODER	CERASTODERMA PINNULATUM	ATUM	-			
	*	YOLDIA LIMATULA	ATULA		-			
	Z	NINDE NIGRIPES	IPES		-			
		UMBRINER	UMARINERIS FRAGILIS	S	9			
	_	LUMBRINERIS TENUIS	S TENUIS		6			
	Z	NEPHTYS INCISA	CISA		44			
	-	THARYX ANNULOSUS	ULOSUS		3			
	=	THARYX ACUTUS	TUS		52			
	ā	PHERUSA AFFINIS	FINIS		4			

EQUITABILITY 0.6772 DEPTH METERS 28.2 LONGITUDE 73480W DIVERSITY 2.0288 COUNT 10 LATITUDE 49270N GRAB 20 269 EDWARDSIA SIPUNCULOIDES CERASTODERMA PINNULATUM CERTANTHUS AMERICANUS NOHINGLYCERA GIGANTEA MEDIOMASTUS AMBISETAE LUMBRINERIS FRAGILIS COSSURA LONGOCIPRATA ASARELLIDES OCULATA SPECIFS LISTING PHPRONIS ARCHITECTA LUMBRINERIS TENUIS STATION NUMBER CRUISE SYMAP NO. INDIVIDUALS THARYX ACUTUS
THARYX ANNULUSUS PHERUSA AFFINIS PITAR MORRHUANA UNID BIVALVE #2 NEPHTYS INCISA NUCULA PROXIMA OL TGOCHAETA 923 16/02/75 DATE NO. SPECIES 20

CRUISE 07502

DEPTH METERS. 28.2	EQUITABILITY 0.6258	SPECIES LISTING AWPHARETE ARCTICA PITAE MORRHUJANA CEPASTODERMA PINNULATUM PHORONIS ARCHITECTA NUCULA PROXIMA TELLINA AGILIS UNID BIVALVE #? COPEDODA PHERUSA AFFINIS NEPHTYS INCISA ASABELLIDES OCULATA NEPHTYS INCISA ASABELLIDES OCULATA NEWATODA CERIANHAUS AMERICANUS AND SPIOPHANES BOMBRY DRILONERIS LONGA THARYX ANNULOSUS LUMBRINERIS TENUIS LUMB	DEPTH 28.2 28.2 EQUITABILITY 0.7085	
LONGITUDE 73470W		** ** ** ** ** ** **	6 IT UD 4 70W	
LAT 1TUDE 40270N	DIVERSITY 1.9345	COUNT 2	LATITUDE LON 40270N 73 DIVERSITY 2.0072 COUNT 3 3 1	11 12 13 15 15 15 15 17 17 17 17 17 17 17 17 17 17 17 17 17
GRAB 01	493	A TUM US UP I	GRAB 02 366 366	IDES
SYMAP 924	DUALS	SPECIES LISTING ARETE ARCTICA P. MORRHUANA STODERMA PINNULATU ONIS ARCHITECTA LA PROXIMA INA AGILIS BIVALVE #2 PODA INA AGILIS BIVALVE #2 PODA AFFINIS ELLIDES OCULATA OCHAETA ANTHUS AMERICANUS NOSPIO STEENSTPUPI PHANES BOMBYX ONEREIS LONGA ONEREIS LONGA ONEREIS LONGA ONEREIS TENUIS E NIGRIPES ************************************	NUMBER SYMAP 924 TIDUALS LLISTING HIANA ILOSUS AMERICANI TENUIS	IORVEGICA DES OCULATA SE BOMBYX NCISA SRIPES CUTUS TA ARCHITECTA GILIS OXIMA
STATION NUMBER CRUISE SYMAP 924 924	NO. INDIVIDUALS	SPECTES LISTING AWPHARETE ARCTICA PITAR MORRHUANA CERASTODERMA PINNULATUM PHORONIS ARCHITECTA NUCULA PROXIMA TELLINA AGILIS UNID BIVALVE #2 COPEPODA TELLINA AGILIS UNID BIVALVE #2 COPEPODA AFFINIS NEPHTYS INCISA NEPHTYS INCISA NEWATODA CERIANTHUS AMERICANUS PRIONOSPIO STEENSTPUPI SPIOPHANES BOMBYX DRILONERIS LONGA MFDIOMASTUS AMRISETAE THARYX ANULOSUS LUMBRINERIS TENUIS LUMBRINERIS TENUIS LUMBRINERIS TENUIS LUMBRINERIS TENUIS	STATION NUMBER CRUISE SYMAP 924 924 NO. INDIVIDUALS 3 SPECIES LISTING PITAR MORRHUANA THARYX ANNULOSUS CERIANTHUS AMERICANUS LUMBRINERIS TENUIS	GONIADA NORVEGICA ASABELLIDES OCULATA SPIOPHANES BOMBYX NEPHTYS INCISA NINGE NIGRIPES THARYX ACUTUS CLIGOCHAETA NEMATODA EDWARDSIA SIPUNCULOIDES PHORONIS ARCHITECTA TELLINA AGILIS NUCULA PROXIMA
9ATE 16/02/75	SPECIES 22	***	£ 7	
CRUISE 07502	NO. SPEC	* * * * * * * * * * * * * * * * * * *	CRUISE DAT 07502 16/02 NO. SPECIES 17	

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DEPTH METERS 28.5	EQUITABILITY 0.6101																	
LONGITUDE 73463W																		
LATITUDE 40273N	DIVERSITY 1.7285	COUNT	1 0	20	2	-	7	6	115	18	5	2	34	1	1	3	0	-
GR AB 01	225				AF		Idn						ns					
NUMBER SYMAP 925	TOUALS	SPECIES LISTING	VEGICA	ISA	AMBISET	FFREYSII	STEENSTR	BOMBYX	ns	OCULATA	INIS		AMERICAN	DRATA		PES	CHITECTA	IUANA
STATION NUMBER CRUISE SYMAP 925 925	NO. INDIVIDUALS	SPEC 1ES	GONTADA NORVEGICA	VEPHTYS INCISA	MEDIOMASTUS AMBISETAF	ARICIDEA JEFFREYSII	PRIONOSPIO STEENSTRUP	SPIOPHANES BOMBYX	THARYX ACUTUS	ASABFLLIDES OCULATA	PHERUSA AFFINIS	VEMATODA	CERTANTHUS AMERICANUS	INCIOLA TRRORATA	OL I GOCHAETA	NINDE NIGRIPES	PHORONIS ARCHITECTA	PITAR MORRHUANA
DATE 16/02/75	1ES 17		٠.	: 2	7	A	۵	S	-	A	۵.	7	U	\supset	C	2	•	۵
CRUISE D7502	NO. SPECIES 17										7.							

EQUITABILITY 0.7379 DEPTH METERS 28.5 LONGITUDE 73460W DIVERSITY 1.9983 CCUNT S 19 LATITUDE 40270N GRAB 32 196 PRIONGSPIN STEENSTRUPI LUMBRINERIS TENUIS NEMATODA CERIANTHUS AMERICANUS NINDE NIGRIPES MEDIOMASTUS AMBISETAE SPIOPHANES BOMBYX ASABELLIDES OCULATA THARYX ACUTUS SPECIES LISTING STATION NUMBER CRUISE SYMAP 925 925 NO. INDIVIDUALS PHERUSA AFFINIS NEPHTYS INCISA OL I GOCHAETA DATE 16/02/75 NO. SPECIES 15

PHORONIS APCHITECTA

PITAR MORRHUANA

CRUTSE 07502