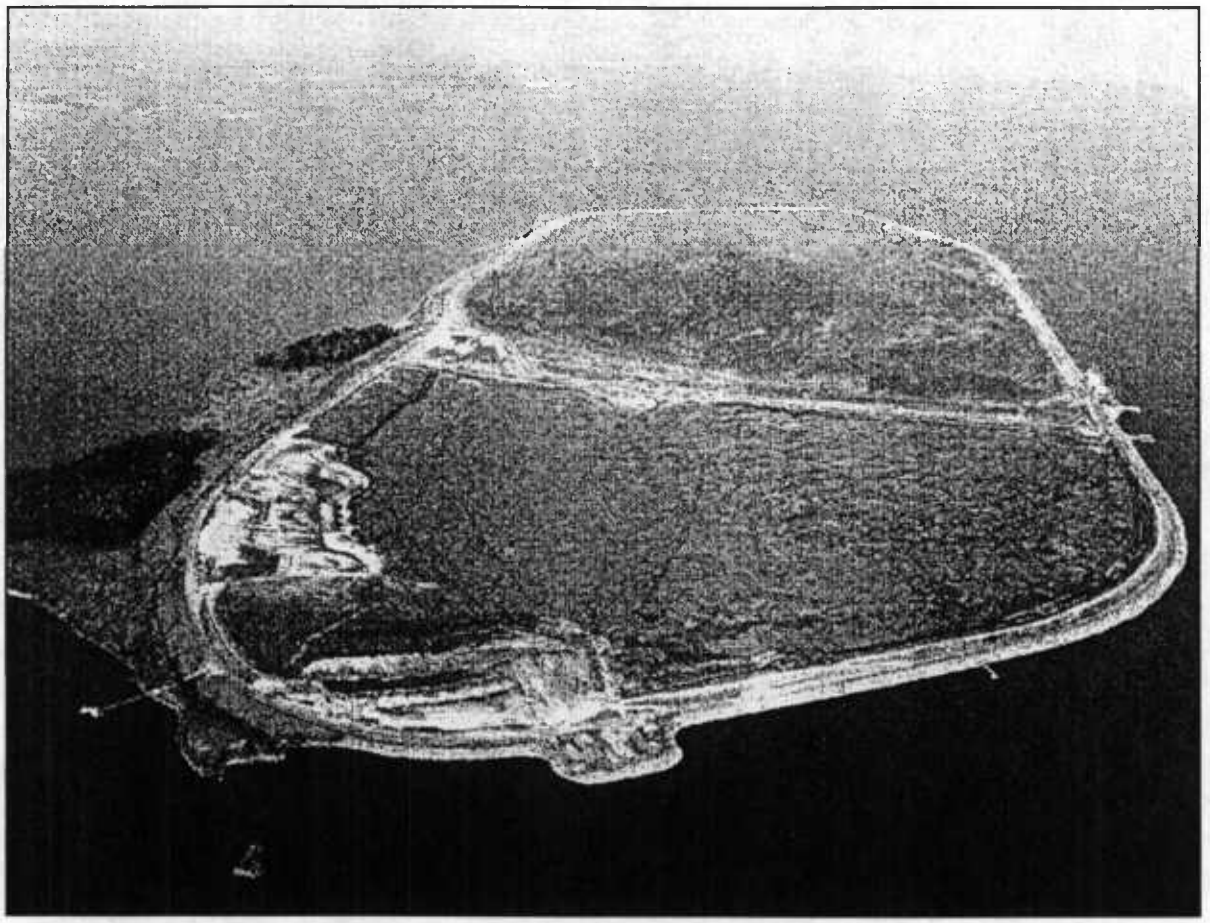
file HMI exterior monitoring

Assessment of the Environmental Impacts of the Hart-Miller Island Confined Disposal Facility, Maryland

Year 16 Exterior Monitoring Data Report (July 1997-April 1999)



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MDE

Prepared For
Maryland Port Administration
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PORT OF BALTIMORE 1706

DRAFT DATA

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Project II/IV: Analysis of Contaminants in Benthic Organisms and Sediments

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CONVERSIONS[2]

WEIGHT:

1Kg = 1000g = 2.205 lbs.
1g = 1000mg = 2.205 x 10^{-3}lbs
1mg = 1000µg = 2.205 x 10^{-3}lbs

1 lb = 16oz = 0.454Kg

LENGTH:

1m = 100cm = 3.281ft = 39.370in
1cm = 10mm = 0.394in
1mm = 1000µm = 0.039in

1ft = 12in = 0.348m

CONCENTRATION:

1ppm = 1mg/L = 1mg/Kg = 1µg/g = 1mL/m^3
1g/cc = 1Kg/L = 8.345 lbs/gallon
1g/m^3 = 1mg/L = 6.243 x 10^{-5}lbs/ft^3

1 lb/gal = 7.481 lbs/ft^3 = 0.120g/cc = 119.826g/L = 119.826Kg/m^3
1oz/gal = 7.489Kg/m^3

VOLUME:

1L = 1000mL
1mL = 1000µL
1cc = 10^{-6} m^3

1yd^3 = 27ft^3 = 764.560L = 0.764m^3
1acre-ft = 1233.482m^3
1 gallon = 3785cc
1ft^3 = 0.028m^3 = 28.317L

FLOW:

1m/s = 196.850ft/min = 3.281ft/s
1m^3/s = 35.320ft^3/s

1ft^3/s = 1699.011L/min = 28.317L/s
1ft^2/hr = 2.778 x $10^{-4}$$ft^2$/s = 2.581 x $10^{-5}$$m^2$/s
1ft/s = 0.031m/s
1yd^3/min = 0.45ft^3/s
1yd^3/s = 202gal/s = 764.560L/s

AREA:

1m^2 = 10.764ft^2
1hectare = 10000m^2 = 2.471acres

1ft^2 = 0.093m^2
1acre = 4046.856m^2 = 0.405 hectares

[2] Modified from the June 1994 Draft "Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual" published by the U.S. Environmental Protection Agency and the U.S. Army Corp of Engineers.

LIST OF ACRONYMS

AAS - Atomic Absorption Spectrometry

AVS - Acid Volatile Sulfide

BAF - Bioaccumulation Factor

BCF - Bioconcentration Factor

CBL - Chesapeake Biological Laboratory

CDF - Confined Disposal Facility

COC - Citizens' Oversight Committee

COMAR - Code of Maryland Regulations

CWA - Clean Water Act

DCAD - Dredging Coordination and Assessment Division

DGPS - Differential Global Positioning System

EF - Enrichment Factor

EMP - Hart-Miller Island Exterior Monitoring Program

EPA - Environmental Protection Agency

ERL - Effects Range Low

ERM - Effects Range Median

GC - Gas Chromatography

GFAAS - Graphite Furnace Atomic Absorption Spectrometry

HMI - Hart -Miller Island Confined Disposal Facility

ICAP- Inductively Coupled Argon Plasma

LBP - Lipid Bioaccumulation Potential

MDE - Maryland Department of the Environment

MGS - Maryland Geological Survey

MLW - Mean Low Water

MS - Mass Spectrometry

NBS - National Bureau of Standards

NIST - National Institute of Standards and Technology

NOAA - National Oceanic and Atmospheric Administration

NRC - National Research Council of Canada

PAH - Polynuclear Aromatic Hydrocarbons

PCB - Polychlorinated Biphenyl

ppb - Parts per billion

ppm - Parts per million

ppt - Parts per thousand

QA - Quality Assurance

QC - Quality Control

SOP - Standard Operating Procedure

SRM - Standard Reference Material

TARSA - Technical and Regulatory Services Administration

TBP - Theoretical Bioaccumulation Potential

TDL - Target Detection Limit

TOC - Total Organic Carbon

TRC - Technical Review Committee

UMCES - University of Maryland Center for Environmental Science

USACE - U.S. Army Corps of Engineers

WQC - Water Quality Certification

WQS - Water Quality Standards

ACKNOWLEDGMENTS

The Hart-Miller Island Exterior Monitoring Program (EMP) for Year 16 would not have been successful without the help of several Technical and Regulatory Services Administration (TARSA) staff members, including: Mr. Visty P. Dalal, Chairman; Mr. Matthew Rowe, Technical Coordinator; Mr. Nathaniel Brown, Budget Manager; and, Ms. Ellen Lathrop-Davis, Environmental Specialist. The Chairman was responsible for making sure that the project work was done efficiently, in a coordinated manner, and met all the technical goals set by the Technical Review Committee for Year 16. The Technical Coordinator wrote the Project I sections of the HMI reports, standardized the data and technical reports among projects, conducted data management, and facilitated the peer review process. The Budget Manager was responsible for ensuring that all project related budgetary products, services, and activities had been implemented from each PI and accounted for through a budgetary tracking system. The Environmental Specialist provided insightful comments on and scientific review of the data and technical reports.

The Maryland Department of the Environment would like to thank all the members of the HMI Exterior Monitoring Program's Technical Review Committee and the HMI Citizens Oversight Committee for their useful comments and suggestions throughout the project year. Special thanks to the Maryland Port Administration, under the auspices of the Maryland Department of Transportation, for their continued commitment to and financial support of the EMP. The efforts and cooperation of the Principal Investigators for each project in the Year 16 monitoring effort were greatly appreciated. A thank you also goes out to Dr. Steve Storms and Shane Moore of the Maryland Environmental Service (MES) for providing information on the dredged material inputs to HMI for Year 16.

Lastly, thanks to Dr. Robert Summers, Director, Mr. Narendra Panday and Dr. Rich Eskin, of TARSA, for their guidance , suggestions, and commitment to the Hart-Miller Island EMP.

INTRODUCTION

The Hart-Miller Island Exterior Monitoring Program is a long-term compliance monitoring program designed to detect adverse environmental impacts resulting from dredged material disposal at the Hart-Miller Island Confined Disposal Facility (HMI) in Northern Chesapeake Bay. Completed in 1983, HMI consists of a 29,000-foot long perimeter dike and a 4,300-foot long interior cross-dike, which divides the facility into North and South Cells. Five spillways are located around the perimeter dike, three in the North Cell and two in the South Cell. Sediments dredged from the Inner Harbor and the Federal approach channels to the Port of Baltimore are hydraulically pumped into HMI from barges or scows in a slurry form, a mixture of water and sediment. The heavier sediment particles settle out, leaving supernatant water at the surface to be discharged through the HMI spillways.

In compliance with Section 404 (b&c) of the Clean Water Act and as a special condition of State Wetlands License 72-127[R], sediments and biota in the vicinity of HMI are monitored for adverse effects from dredged material disposal and effluent discharge at HMI. The Exterior Monitoring Program (EMP) began in 1981, two years before construction of the facility was completed, and continues to the present. The data presented in this report are a supplement to the *Year 16 Technical Report*, which includes detailed discussions and conclusions based upon these data.

Environmental Monitoring

Throughout the history of the EMP, many different studies have been undertaken, including: fish studies, submerged aquatic vegetation surveys, hydrodynamic studies, bathymetric surveys, beach erosion and epifaunal macroinvertebrate surveys. However, after a few years of data collection, some of these studies did not show adverse effects and were temporarily dropped. The following four projects, however, have been consistently monitored since 1981.

Project I: ***Project Management and Scientific/Technical Coordination*** – Maryland Department of the Environment (MDE)

The Dredging Coordination and Assessment Division (DCAD) within the Technical and Regulatory Services Administration (TARSA) of MDE is responsible for coordinating field sampling, reviewing project proposals, technical and scientific peer review of the EMP Reports, facilitating HMI Technical Review Committee (TRC) meetings, and data and budget management.

Among MDE's top priorities are quality assurance through standardization among the reports for each project, promoting rigorous standards of scientific/technical review, meeting the expectations of the public, and ensuring that the newest technological and analytical methods are used for laboratory and data analysis. Because Project I does not entail the collection of data, no separate chapter for Project I is included in this data report.

Project II/IV: ***Analysis of Contaminants in Benthic Organisms and Sediments*** – University of Maryland Center for Environmental Science/Chesapeake Biological Laboratory (UMCES/CBL)

In Year 16, Projects II (sediments) and IV (benthic invertebrate tissues) were combined into one project since they were conducted by the same group. The goal of Project II/IV is to detect trends in metal concentrations for both sediments and clams in the vicinity of the facility to determine if toxic metals are accumulating in the local ecosystem.

Both sediments and clams were analyzed (in μg/g) for ten trace metals, including: lead (Pb), cadmium (Cd), nickel (Ni), chromium (Cr), copper (Cu), zinc (Zn), silver (Ag), arsenic (As), mercury (Hg), and methyl mercury (MMHg). Raw data values are provided on a dry weight basis for metals in sediments and clam tissues. Detailed descriptions of the analytical methodology are also given in the report.

Project III: ***Benthic Community Ecology*** – University of Maryland Center for Environmental Studies

The University of Maryland Center for Environmental Science (UMCES) has been involved with the HMI Exterior Monitoring Program since its inception. The goal of the Benthic Studies at HMI is to detect any shifts in populations or densities of benthic macroinvertebrates surrounding the facility. Benthic stations in the vicinity of HMI (nearfield) are compared to baseline and reference stations removed from the influence of the facility. The *Year 16 Data Report* for Project III presents the raw benthic community data at stations surrounding HMI. Also included are a graphic representation of the Year 16 monitoring stations, abiotic factors (depth, temperature and salinity) recorded at each station, and benthic biomass measurements.

CHAPTER 1: ANALYSIS OF CONTAMINANTS IN BENTHIC ORGANISMS AND SEDIMENTS NEAR HART-MILLER ISLAND (PROJECTS II/IV)

DRAFT

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OBJECTIVES

The objective of this study was to characterize contaminant levels in a resident benthic organism (the clam *Rangia cuneata)* and sediments surrounding the Hart-Miller Island Confined Disposal Facility (HMI) as part of a long-term exterior monitoring program. Sampling for the Exterior Monitoring Program (EMP) has been conducted since 1981 and the current effort was initiated in concert with the 16th consecutive year of monitoring. The objective of the current effort was to measure contaminant levels in sediments and biota in the vicinity of HMI, and to reference these to historic data. Comparison of the Year 16 data with that of other nearby locations, as well as with historic HMI data, will assist in determining both the extent of contamination and trends in contaminant concentrations.

METHODS AND MATERIALS

Sampling Procedures

Samples of clams and sediments were collected for trace metal analysis and for ancillary parameters (Acid Volatile Sulfide, Total Organic Material, %Carbon, %Nitrogen and %Phosphorus). In addition to collecting samples from the "traditional" HMI sites, samples were also collected on a transect down the Back River and across the northern side of HMI (Figure 2/4-1). Clam (*Rangia cuneata*) samples were taken from all sites where clams were found around HMI using a modified dredge. Up to six pulls of the dredge were taken at each site to provide enough clams for contaminant analysis. A total of 14 sites had clams. Clams were placed in zip-lock bags and stored on ice until they were returned to the laboratory. Nine sites had enough clams so that a separate comparison of small and large clams could be made (Table 2/4-2).

Back at the laboratory, the clam samples were cataloged and divided into subsamples for trace metals and other parameters. For metals analysis, clams were removed whole from their shells with a Teflon-coated spatula. Most of the water and body fluids were allowed to drain. The spatula was acid rinsed between samples of the clams at each site to avoid cross contamination. The clam bodies were homogenized in a plastic blender with a stainless steel blade. Unused samples were returned to their respective bags and stored in the freezer until further analysis.

Sediment samples were taken at all sites using a Ponar grab sampler. Surficial sediments were collected from each Ponar grab. A single composite sample for each site was stored in a pre-acid-cleaned plastic jar and transported on ice back to the laboratory.

Analytical Procedures for Metals and Ancillary Parameters

Methods used for metals are similar to those described in detail in Dalal et al. (in press) and in Baker et al. (1997). For metals, a subsample of each trace metal sample (sediments and clams) was used for dry weight determination. Weighed samples were placed in a VWR Scientific Forced Air Oven at 60^{0}C and left overnight. The next day, samples were reweighed and a dry/wet ratio was

calculated. After determining the water content of the sediment, the samples were heated to 550^0 C overnight. The samples were then reweighed and the percent organic matter (TOM in Table 2/4-1) in the sediment was determined by the percent loss on ignition (LOI).

Another subsample of clam tissue (5 g wet weight) was placed in acid-cleaned flasks for further digestion, using EPA Methods (Keith 1991). Ten mL of 1:1 HNO_3 was added and the slurry was mixed and covered with a watch glass. The sample was heated to 95^{0}C and allowed to reflux for 15 minutes without boiling. The samples were cooled, 5 mL of concentrated HNO_3 was added, and then they were allowed to reflux for another 30 minutes. This step was repeated to ensure complete oxidation. The watch glasses were removed and the resulting solution was allowed to evaporate to 5 mL without boiling. When evaporation was complete and the samples cooled, 2 mL of 30% H_2O_2 were added. The flasks were then covered and returned to the hot plate for warming. The samples were heated until effervescence subsided. We continually added 30% H_2O_2 in 1 mL aliquots with warming until the effervescence was minimal. No more than a total of 10 mL of H_2O_2 was added to each sample. Lastly, 5 mL of concentrated HCl and 10 mL of deionized water were added and the samples refluxed for 15 minutes. The samples were then cooled and filtered through Whatman No. 41 filter paper by suction filtration and diluted to 100 mL with deionized water. Sediments were digested in a similar fashion.

The clam and sediment homogenates were then analyzed using a Perkin-Elmer Zeeman 5000 HGA-400 Graphite Furnace Atomic Absorption Spectrophometer (GF-AAS) for copper (Cu), cadmium (Cd), lead (Pb), chromium (Cr), nickel (Ni), zinc (Zn) and silver (Ag) concentration (EPA Methods, 7000 Series). Standards were prepared according to the Perkin-Elmer Analytical Methods manual. Spectral interferences, associated with lead, were minimized using a $Mg(NO_3)_2$ and PO_4 matrix. Martix modifiers were not needed for copper and cadmium analysis. For enhanced sensitivity, pyrolytically coated graphite tubes with platforms were used. For arsenic (As), samples were analyzed by hydride generation techniques using a PSA analyzer. These techniques are similar to EPA Method 1632.

Samples for mercury [(Hg)1-3 g wet weight] were digested in a solution of 70% sulfuric/30% nitric acid in Teflon vials and heated overnight in a 60^{0}C oven (Mason et al. 1995). The digestate was then diluted to 10 mLs with distilled-deionized water. Prior to analysis, the samples were oxidized for 30 minutes with 2 mLs of bromine monochloride solution. The excess oxidant was neutralized with 10% hydroxylamine solution and the concentration of mercury in an aliquot of the solution was determined by tin chloride reduction cold vapor atomic fluorescence detection in accordance with protocols outlined in EPA Method 1631 (Mason et al. 1993).

Samples for methylmercury (MMHg) were distilled after adding a 50% sulfuric acid solution and a 20% potassium chloride solution (Horvat et al. 1993, Bloom 1989). The distillate was reacted with a sodium tetraethylborate solution to convert the nonvolatile MMHg to gaseous MMHg. The volatile adduct was purged from solution and recollected on a graphitic carbon column at room temperature. The methylethylmercury was then thermally desorbed from the column and analyzed by cryogenic gas chromatography with CVAFS. Detection limits for Hg and MMHg were based on

three standard deviations of the blank measurement. Detection limits on a dry weight basis were 2.6 ng/g Hg and 0.04 ng/g MMHg for sediment samples, and 0.66 ng/g Hg and 0.2 ng/g MMHg for biota.

Acid-volatile sulfide (AVS) analysis was performed using a modified version of the EPA method (Cornwell and Morse 1997). Wet sediments (2.0g $\pm$ 0.2) were digested in a system flushed with nitrogen using degassed cold 6N HCl. The evolved H_2S was collected in a deaerated solution of zinc acetate and sodium acetate buffer. The precipitated sulfide was then measured using a sulfide probe with a Pb titration. Detection limits for AVS were 0.01 µmol/g (dry weight). Total carbon, nitrogen and phosphorous of sediments were determined by CBL Analytical Services using standard techniques.

Quality Assurance/Quality Control

Metals

For the samples processed, two blanks were carried throughout the entire sample preparation and analytical process for both metals and for mercury. One field replicate was taken and a lab duplicate (sample split) was prepared to measure reproducibility of replicate samples. The lab replicate consisted of a split homogenized sample that was digested and then analyzed separately. Digestates were often analyzed twice, in addition to the replicates described above. The comparison of duplicates is shown in Figure 2/4-2. Overall, agreement among samples is excellent. Reported values in tables are the average if duplicate analyses were performed. Laboratory measured values were compared to certified values for target metals in SRM 1566a oyster tissue and in a sediment SRM 1646a. Our measured values agree with the SRM certified values for both sediment and tissue (Figure 2/4-3). There is little systematic difference between measured and certified concentrations across metals and media for sediments or tissue.

Data

Metals

The concentrations of each metal at the sampling sites are gathered in Table 2/4-1 for clams and in Table 2/4-2 for sediments. The data quality is discussed above. Interpretation of the data is contained in the corresponding *Year 16 Interpretive Report.*

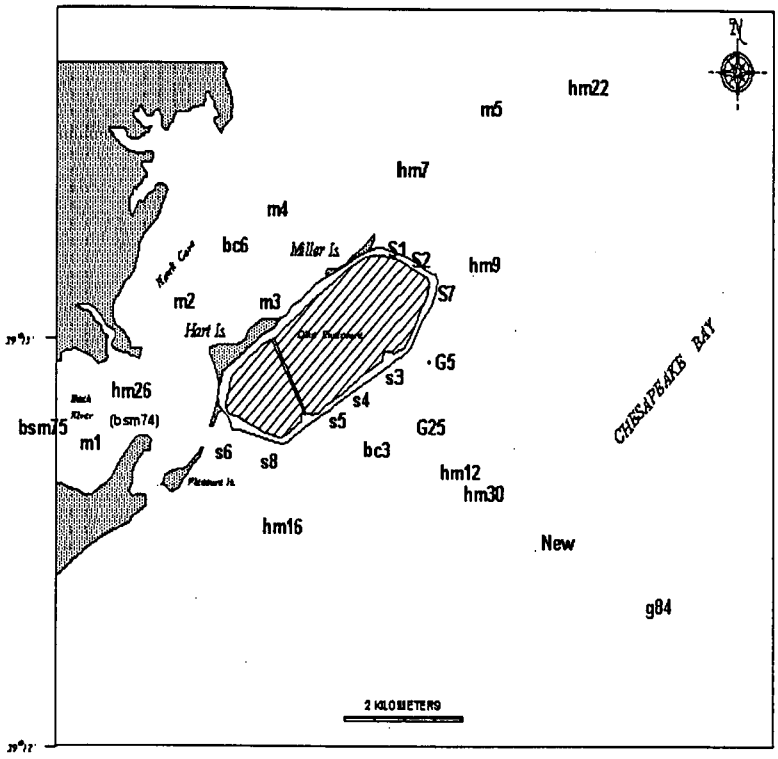

Figure 2/4-1: Project 2/4 Site Locations for Year 16 of monitoring.

Fig. 2: Comparison of duplicate values for tissue and sediment analysis for all metals

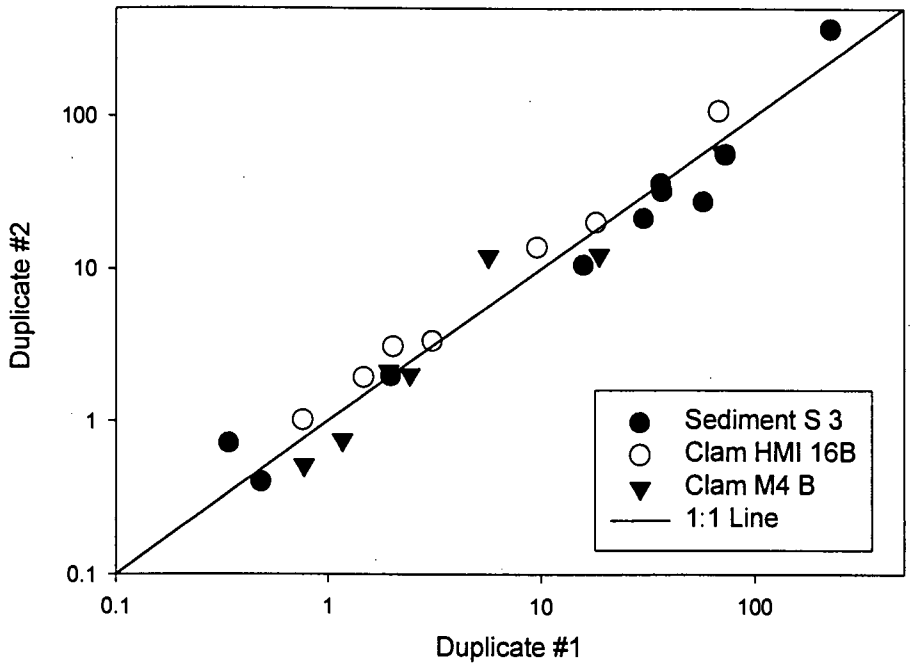

Figure 2/4-2: Comparison of duplicate values for tissue and sediment analyses for all metals

Figure 3: Comparison of the measured values for the metals in standard reference materials compared to the certified values

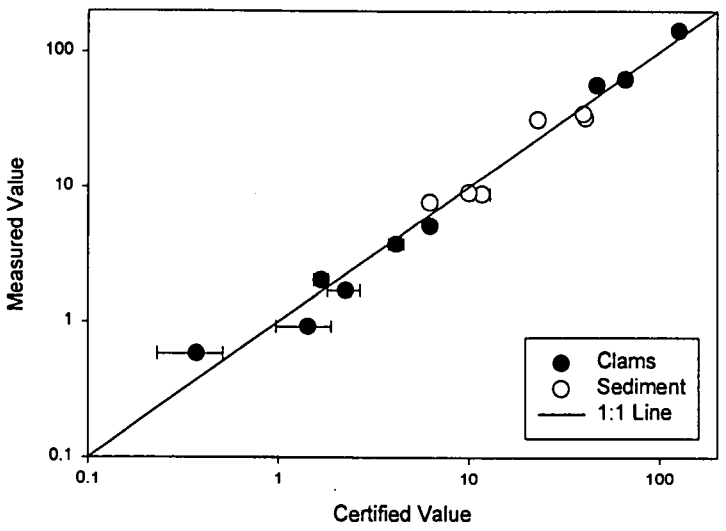

Figure 2/4-3: Comparison of the measured values for the metals in standard reference materials compared to certified values.

Table 2/4-1: Sediment data for collections in August 1997 for metals and for ancillary data.

HMI Sediment Totals			Summer 1997												
Site	Cd	Pb	Ni	Cr	Cu	Zn	Ag	As	Hg	MMHg	AVS	TOM	%C	%N	%P
	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ng/g)	(ng/g)	(umol/g)	LOI			
New	0.38	31.64	52.25	53.21	27.66	79.70	0.50	7.29	194.54	1.95	0.30	11.11	4.80	0.27	0.09
30	0.49	38.02	62.81	131.28	34.04	79.48	0.67	8.53	256.58	2.26	0.70	10.78	4.26	0.29	0.10
G-5	0.51	58.40	54.42	164.87	39.34	104.45	0.64	25.44	466.21	3.10	3.00	10.84	3.39	0.30	0.11
G-25	0.57	60.43	80.56	120.40	39.95	126.53	0.81	7.87	189.16	3.08	3.20	10.84	3.47	0.28	0.11
G84	0.38	30.86	48.19	107.01	30.51	78.64	0.57	7.46	165.11	2.71	6.00	10.92	4.72	0.24	0.10
B-C 3	0.38	45.97	46.51	99.14	29.40	81.73	0.51	13.01	141.26	1.63	4.20	8.92	2.59	0.25	0.10
BC 6	0.95	86.33	61.20	56.08	45.90	114.07	0.77	16.58	450.34	3.72	8.60	11.96	3.20	0.33	0.11
HMI 7	0.97	49.31	52.45	24.28	28.35	81.36	0.52	15.30	263.07	2.43	2.00	12.50	3.18	0.28	0.11
HM-9	0.28	32.17	45.54	48.95	23.94	64.29	0.38	25.44	118.79	1.28	0.00	9.09	2.59	0.22	0.08
HM-12	0.48	37.71	68.17	112.66	33.65	86.21	0.59	4.62	140.75	2.06		12.00	4.08	0.29	0.11
HM-16	0.52	52.05	77.70	172.74	44.02	115.99	0.75	9.88	220.68	2.62	0.00	12.04	3.73	0.31	0.12
HMI 22	0.49	44.62	49.97	36.42	31.36	94.56	0.53	14.22	208.62	2.74	11.30	11.21	3.42	0.28	0.11
HMI 26(BSM 74)	1.22	69.81	46.08	37.72	53.63	88.98	2.51	10.89	460.81	6.70	13.30	10.43	3.49	0.37	0.13
BSM 75	2.87	182.11	84.45	208.22	133.11	199.03	2.41	13.30	1296.3	10.55	30.65	11.69	4.22	0.46	0.17
S-1	0.17	5.58	25.34	6.78	3.82	14.80	0.04	0.46	83.23	0.02	0.00	0.66	0.11	0.02	0.00
S-2	0.13	11.69	21.13	19.74	9.16	31.98	0.16	1.17	269.10	0.29	0.80	5.04	0.77	0.07	0.02
S-3	0.34	36.61	36.18	57.15	30.33	72.46	0.48	15.80	226.28	1.97	0.40	8.15	2.53	0.22	0.10
S 3	0.72	32.39	36.18	27.87	21.74	56.10	0.40	10.61	367.00	1.97	0.40	8.15			
S-5	0.38	46.89	51.68	113.74	39.66	83.98	0.55	9.51	174.88	2.26	0.00	3.31	2.55	0.24	0.11
S-6	0.35	29.40	34.17	62.19	23.88	59.71	0.45	7.16	103.62	1.36	3.35	7.53	2.16	0.20	0.10
M 1	1.41	88.21	40.07	56.60	53.11	99.63	1.33	14.78	475.62	2.98	6.10	9.56	4.05	0.30	0.12
M 2	1.33	91.34	62.88	101.66	59.01	140.67	1.28	16.65	490.57	5.58	13.80	12.22	3.48	0.38	0.13
M 3	0.59	4.94	3.62	8.45	2.02	6.96	0.07	0.58	147.65	0.20	0.00	1.95	0.15	0.02	0.01
M 4	1.26	75.55	77.28	34.83	48.70	130.57	0.79	23.36	698.78	2.91	5.20	10.81	2.82	0.32	0.12
M 5	1.48	59.23	61.84	26.41	42.23	115.89	6.19	83.33	655.71	2.45	1.20	10.58	3.52	0.31	0.13
Values reported on a dry weight basis.															
Average	0.75	52.05	51.23	75.54	37.14	88.31	0.96	14.53	330.59	2.75	4.77	9.29	3.05	0.26	0.10
StDev	0.60	35.89	19.29	54.75	24.67	40.36	1.24	15.87	264.28	2.18	6.97	3.27	1.26	0.10	0.04

Table 2/4-2: Data for clam metal concentrations for samples collected in August 1997. Note S=small sized clams; B= large clams. X= analysis not performed as insufficient sample available.

1997 Clams												
All values reported as dry weight												
	Cd	Pb	Ni	Cr	Cu	Zn	Ag	As	MMHg	Hg	%MeHg	
Sample	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ng/g)	(ng/g)		Dry/wet
New S	1.43	4.55	23.67	19.82	10.82	79.37	2.66	3.56	4.99	53.74	9.29	0.074
G5-S	2.31	9.4	60.97	42.88	14.18	102.83	3.73	6.71	3.43	100.58	3.41	0.070
G5 B	1.44	6.78	102.45	40.8	15.93	81.36	2.24	10.34	7.15	49.36	14.49	0.056
BC 6S	5.28	15.55	67.11	49.32	15.96	201.90	5.63	5.62	14.47	131.30	11.02	0.032
BC-6 B	0.95	1.35	93.36	12.08	8.38	57.00	1.28	1.19	6.63	102.10	6.50	0.071
HMI-7 S	2.54	8.93	92.23	31.16	10.16	87.51	5.69	10.27	9.81	199.72	4.91	0.030
HMI-7B	0.54	0.90	28.91	4.28	16.78	42.45	2.57	1.14	6.97	32.82	21.23	0.11
HMI-9S	2.42	6.58	71.15	90.08	13.13	103.72	4.67	4.54	12.49	95.61	13.06	0.045
HMI-16B	0.76	2.03	67.42	18.07	9.57	59.08	1.47	3.09	6.54	30.74	21.29	0.089
HMI-16B (dup)	1.01	3.05	107.97	20.26	13.91	x	1.92	3.36	x	x	x	0.073
HMI-16S	1.41	5.9	37.21	17.62	7.54	80.2	2.08	3.96	4.63	129.06	3.59	0.077
HMI-22B	0.74	1.00	40.59	13.32	19.3	41.51	6.03	4.90	7.18	55.31	12.98	0.096
HM-22S	1.99	8.78	47.11	58.25	11.51	73.47	8.42	8.03	13.52	169.22	7.99	0.044
HMI-26 B	x	x	x	x	x	x	x	x	28.55	66.32	43.05	0.11
HMI-26 S	x	x	x	x	x	x	x	x	67.69	176.14	38.43	0.043
S1 S	0.79	5.99	60.14	48.17	8.58	91.39	1.69	3.24	6.79	98.29	6.92	0.083
M1 B	0.9	4.78	78.78	18.22	11.47	81.15	2.7	0.26	33.78	85.13	39.68	0.088
M2 B	0.51	2.07	56.59	5.11	23.36	42.08	1.7	2.64	16.14	76.50	21.09	0.13
M2 S	3.37	18.95	113.17	75.01	25.19	141.1	11.59	6.95	42.18	211.88	19.91	0.040
M3 S	1.04	7.88	48.21	43.16	12.43	64.22	3.08	4.05	12.02	188.99	6.36	0.059
M3 B	x	x	x	x	x	x	x	x	4.97	144.98	3.43	0.13
M4 B	0.77	1.17	70.13	5.66	18.72	45.17	2.43	1.93	17.64	26.75	65.94	0.10
M4 B (dup)	0.51	0.75	58.26	12.12	12.34	x	2.01	2.11	x	x	x	0.13
M4 S	3.69	11.88	94.25	42.99	19.25	133.49	4.15	13.93	8.57	189.43	4.52	0.035971
M5 S	2.09	2.77	34.51	6.39	3.97	70.74	3.52	2.82	4.22	280.81	1.50	0.053571
M5 B	1.35	0.85	62.99	20.5	15.96	33.74	4.12	2.12	6.52	39.51	16.50	0.11
Average	1.65	5.73	65.96	30.23	13.85	81.59	3.71	4.64	14.45	113.93	16.55	0.076
Std Dev	1.20	4.90	25.48	23.19	5.12	39.81	2.47	3.38	14.98	68.47	15.79	0.031

CHAPTER 2: BENTHIC COMMUNITY STUDIES (PROJECT III)

Submitted To:

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INTRODUCTION

This report contains data collected under Year 16 of Benthic Community for the Hart-Miller Island Exterior Monitoring Program. A two day cruise was conducted aboard the University of Maryland research vessel *R/V Aquarius* on August 18 & 19, 1997. Sampling for all projects (benthic, sediments and metals) was conducted at a single time at each station.

All of the stations illustrated in Figure 3-1 were sampled during the two-day cruise. Twenty-four stations were selected and sampled this year. Five stations with the HM prefix (HM7, HM9, HM16, HM22, and HM26) are benthic infaunal reference sites and have been sampled since the inception of the project. The five stations with the S prefix (S1, S2, S3, S5, and S6) positioned around the perimeter of the island represent the nearfield experimental infaunal stations. Four additional benthic infaunal stations (G5, G25, G84, and HM12) were added successively over the course of Year 9 in response to findings of the sedimentary group from Maryland Geological Survey that an enrichment in zinc had occurred in the sediments at these stations. The four new stations that were added last year (BC6, BC3, 30, and NEW) were sampled again this year. Station BC6 is northwest of the island and station BC3 is south of the island. Stations 30 and NEW were added to complete a transect leading in a southeast direction away from the facility. Six other stations were sampled this year by request of Dr. Rob Mason. Dr. Mason wanted to see what the effects of the Back River were on the surrounding community. The Back River transect stations sampled were M1, M2, M3, M4, M5 and a Baltimore Sediment Mapping (Baker et al. 1997) station BSM75.

All benthic samples were obtained with a 0.05 m^2 Ponar grab. Three replicate samples were obtained at each station. These samples were individually washed on a 0.7 mm mesh-opening screen. Samples were preserved in a solution of 10% seawater/formalin with rose bengal stain. The samples were rinsed back at the laboratory on a 0.5 mm sieve and stored in 70% ethyl alcohol until the organisms could be picked, sorted and identified.

Individual specimens in the samples were identified to the lowest taxonomic level practical. The actual number of individuals were recorded for each of the three replicate samples at the quantitative reference (HM7, HM9, HM16, HM22, HM6, BC6, 30, New), nearfield (S1, S2, S3, S5, S6, BC3), zinc-enriched (HM12, G5, G25, G84) stations, and the Back River transect stations (M1, M2, M3, M4, M5, 75). Data for each station is presented in the accompanying tables.

Additional ecological data recorded for each station includes sampling depth (recorded from the ships fathometer), tidal state, weather conditions, temperature and salinity. Both temperature and salinity were measured on the surface and the bottom with Hydrolab's Surveyor 3 system and are presented in Table 3-1. Table 3-1 also lists the State of Maryland designations for each of the sampling stations.

After identification and enumeration of the samples, they were analyzed for dry weight.

All species for each sample were individually dried to a constant weight in a 60°C oven. The clams were shucked and the shells were discarded before they were dried. Total dry weight of each sample was determined on an analytical balance. The total dry weights of the three replicates for each station were averaged and the data are presented in Table 3-2.

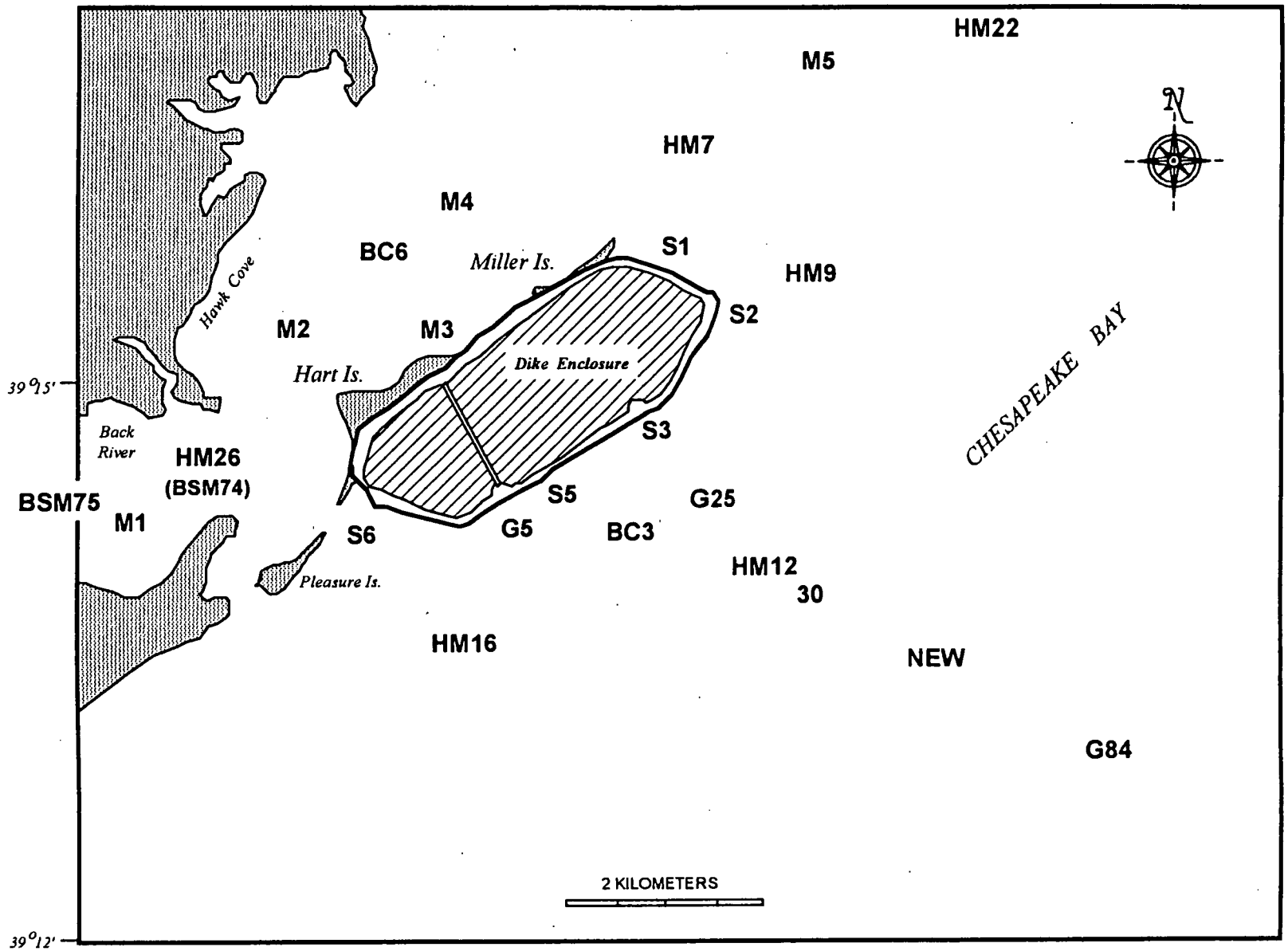

Figure 3-1. Benthic sampling station locations for the 16th year of benthic monitoring at HMI. University of Maryland, Chesapeake Biological Laboratory designations.

Table 3-1: YEAR 16 HMI BENTHIC DATA-PHYSICAL PARAMETERS

CBL STATION	DNR STATIO	DATE	TIME	DEPTH	LAT.	LONG.	TIDE	WEATHER
S1	XIF5710	97-8-18	1600	5	391539	762057	NOT RECORDED	PARTLY CLOUDY
S2	XIF5406	97-8-18	1536	10	391525	762035	NOT RECORDED	PARTLY CLOUDY
S3	XIF4811	97-8-18	1514	12	391450	762107	NOT RECORDED	PARTLY CLOUDY
S5	XIF4420	97-8-18	1139	17	391423	762200	NOT RECORDED	PARTLY CLOUDY
S6	XIF4327	97-8-18	1040	10	391417	762241	NOT RECORDED	PARTLY CLOUDY
HM7	XIF6388	97-8-19	945	10	391615	762050	NOT RECORDED	PARTLY CLOUDY
HM9	XIF5297	97-8-18	1622	14	391553	761953	NOT RECORDED	PARTLY CLOUDY
HM12	XIF5805	97-8-18	1348	14	391405	762021	NOT RECORDED	PARTLY CLOUDY
HM16	XIF3325	97-8-18	1001	16	391317	762230	NOT RECORDED	PARTLY CLOUDY
HM22	XIG7689	97-8-19	845	12	391658	761851	NOT RECORDED	PARTLY CLOUDY
HM26	XIF5145	97-8-19	1139	14	391439	762355	NOT RECORDED	PARTLY CLOUDY
G5	XIF4221	97-8-18	1111	15	391411	762208	NOT RECORDED	PARTLY CLOUDY
G25	XIF4405	97-8-18	1325	15	391423	762048	NOT RECORDED	PARTLY CLOUDY
G84	XIF2964	97-8-18	1655	17	391251	761623	NOT RECORDED	PARTLY CLOUDY
BC6	XIF5925	97-8-19	1028	9	391551	762232	NOT RECORDED	PARTLY CLOUDY
NEW	?	97-8-18	1435	16	391325	761827	NOT RECORDED	PARTLY CLOUDY
30	XIF4000	97-8-18	1407	15	391359	761960	NOT RECORDED	PARTLY CLOUDY
BC3	XIF4615	97-8-18	1212	12	391433	762126	NOT RECORDED	PARTLY CLOUDY
M1	?	97-8-19	1208	7	391459	762463	NOT RECORDED	PARTLY CLOUDY
M2	?	97-8-19	1116	8	391529	762334	NOT RECORDED	PARTLY CLOUDY
M3	?	97-8-19	1050	6	391538	762237	NOT RECORDED	PARTLY CLOUDY
M4	?	97-8-19	1008	10	392155	762155	NOT RECORDED	PARTLY CLOUDY
M5	?	97-8-19	918	13	391658	761978	NOT RECORDED	PARTLY CLOUDY
BSM75	?	97-8-19	1231	6	391464	762550	NOT RECORDED	PARTLY CLOUDY

Table 3-2: Biomass for the Year 16 at HMI.
(average dry weight per station)

Station	Dry wts (grams)
S1	0.7478
S2	0.0810
S3	1.4246
S5	0.5594
S6	3.4108
HM7	2.4241
HM9	1.9093
HM16	0.3969
HM22	1.8411
HM26	2.0422
G5	0.5217
G25	1.4675
G84	1.9886
30	0.8936
NEW	0.8182
HM12	0.7096
BC3	1.8634
BC6	0.5036
BSM75	0.0271
M1	0.1502
M2	0.8358
M3	1.9788
M4	0.7690
M5	1.0968

TABLE 3-3: Salinity (in parts/thousand-0/00), temperature (in degrees centigrade-oC), and d for the benthic sampling stations on the 3 collection dates during the Year 16 of studies at HMI (August 1997).

CBL STATIO ID	STATE STATION #	DEPTH	TEMPERATURE	SALINIT
S1	X1F5710	0	27.27	6.4
S1	X1F5710	5	27.24	6.4
S2	X1F5406	0	27.21	6.3
S2	X1F5406	10	27.08	6.4
S3	X1F4811	0	27.06	6.6
S3	X1F4811	12	27.16	7.2
S5	X1F4420	0	27.11	4.2
S5	X1F4420	17	27.26	7.8
S6	X1F4327	0	27.19	7.0
S6	X1F4327	10	27.32	8.4
HM7	X1F6388	0	26.14	6.8
HM7	X1F6388	10	26.14	6.8
HM9	X1F5297	0	27.29	6.9
HM9	X1F5297	14	26.94	7.7
HM12	X1F5805	0	26.81	7.8
HM12	X1F5805	14	26.97	7.8
HM16	X1F3325	0	27.07	5.4
HM16	X1F3325	16	27.05	9.5
HM22	X1G7689	0	25.96	7.8
HM22	X1G7689	12	25.99	7.8
HM26	X1F5145	0	25.96	6.9
HM26	X1F5145	14	25.76	7.5
G5	X1F4221	0	27.20	7.0
G5	X1F4221	15	27.22	8.3
G25	X1F4405	0	26.97	7.2
G25	X1F4405	15	27.01	7.2
G84	X1G2964	0	26.67	7.8
G84	X1G2964	17	26.65	8.6
30	X1F4000	0	26.93	8.0
30	X1F4000	15	26.93	8.0
NEW		0	26.74	8.6
NEW		16	26.86	8.6
BC3	X1F4615	0	26.83	6.5
BC3	X1F4615	12	27.06	6.8
BC6	X1F5925	0	26.10	6.3
BC6	X1F5925	9	26.10	6.3
BSM75		0	26.37	5.4
BSM75		6	26.30	5.5
M1		0	26.02	6.8
M1		7	25.86	7.1
M2		0	26.18	6.5
M2		8	26.15	6.6
M3		0	25.78	6.4
M3		5	25.78	6.4
M4		0	25.92	6.5
M4		10	25.90	6.5
M5		0	26.01	7.2
M5		13	26.05	7.2

Table 3-3: Benthic community data collected for all stations during Year 16 of sampling at HMI.

DATE	CBL STATION	SAMPLING METHOD	MEDIA	PARAMETER	METHOD	UNITS	SPECIES CODE	GRAB REP	NUMBER CAPTURE
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	4
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	5
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	3
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	17
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	67
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	62
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	1
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	5
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	0
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	0
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	5
97-08-18	S1	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	10
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	12
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	1

97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	22
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	16
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	4
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	1
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	1	4
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	2	7
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	3	9
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	28	1	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	28	2	1
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	28	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	1
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	5
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	31	1	1
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	31	2	0

97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	31	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	1	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	2	1
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	0
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	7
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	16
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	2
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	40
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	55
97-08-18	S2	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	15
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	2
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	2
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	55
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	72
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	53
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	0
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	2
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	6
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	0
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	1
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	2
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	0

97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	3
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	0
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	1
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	1
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	131
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	128
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	169
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	13
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	11
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	15
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	1
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	3
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	9
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	5
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	4
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	4
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	2
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	0
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	1
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	2
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	0
97-08-18	S3	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	2
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	2
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	2

97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	2
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	113
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	67
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	111
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	7
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	7
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	12
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	4
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	3
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	45
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	65
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	43
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	13
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	22
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	8
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0

97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	9
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	23
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	20
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	3
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	5
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	1
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	2
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	8
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	0
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	6
97-08-18	S5	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	6
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	22

97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	16
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	16
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	8
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	36
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	12
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	9
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	3
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	154
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	101
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	81
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	10
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	34
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	6
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	2

97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	20
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	21
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	6
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	1
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	2
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	0
97-08-18	S6	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	2
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	5
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	2
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	25
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	21
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	24
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	0

97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	4
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	7
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	4
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	2
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	916
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	1059
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	432
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	12
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	8
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	10
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	2
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	3
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	0
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	3
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	0

97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	1
97-08-19	HM7	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	6
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	4
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	1	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	2	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	2
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	4
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	69
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	51
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	41
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	3
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	2
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	2
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	3
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	3

97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	5
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	7
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	3
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	2
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	637
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	483
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	538
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	1	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	2	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	21
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	20
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	33
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	3
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	1

97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	0
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	3
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	3
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	1
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	13
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	16
97-08-18	HM9	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	23
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	3
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	5
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	4
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	3
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	4
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	2
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	2
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	45
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	78
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	59
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	2
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	3
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	1

97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	4
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	57
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	78
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	53
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	12
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	14
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	6
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	2
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	5
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	5
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	1	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	2	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	3	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	1

97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	0
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	1
97-08-18	HM12	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	0
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	3
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	3
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	3
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	1
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	0
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	16
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	19
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	11
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	3
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	6
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	2
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	10
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	12
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	25
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	4
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	2
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	2
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	10
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	17
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	9
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	8
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	7

97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	5
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	33
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	21
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	28
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	8
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	4
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	4
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	0
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	0
97-08-18	HM16	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	4
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	4
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	7
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	3
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	6
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	14
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	19
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	25
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	229

97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	222
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	324
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	8
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	5
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	3
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	2
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	1
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	0
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	3
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	14
97-08-19	HM22	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	5
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	2
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	3
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	2
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	0

97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	8
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	13
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	7
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	6
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	11
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	33
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	33
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	11
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	5
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	9
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	2
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	4
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	486
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	676
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	400
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	23	1	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	23	2	6
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	23	3	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	14
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	12

97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	13
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	10
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	6
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	4
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	3
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	15
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	1	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	2	2
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	3	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	2
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	0
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	1
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	7
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	7
97-08-19	HM26	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	5
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	2
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	2
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	0

97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	29
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	63
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	25
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	13
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	6
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	2
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	8
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	5
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	7
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	25
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	66
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	21
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	10
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	8
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	36
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	2
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	0

97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	24
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	22
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	30
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	5
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	4
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	3
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	3
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	1
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	0
97-08-18	G5	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	1
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	5
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	4
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	4
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	6
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	1
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	5
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	1
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	1
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	5
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	3

97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	45
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	48
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	27
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	4
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	3
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	2
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	2
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	1
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	2
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	24
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	22
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	30
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	1	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	2	2
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	3	4
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	7
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	8
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	15
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	1

97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	2
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	1
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	3
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	0
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	6
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	34
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	34
97-08-18	G25	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	18
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	7
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	6
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	4
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	1	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	2	3
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	3	4
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	48
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	35
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	10

97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	3
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	19	1	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	19	2	6
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	19	3	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	4
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	3
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	15
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	15
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	44
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	17
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	18
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	21
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	3
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	1

97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	1
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	2
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	0
97-08-18	G84	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	2
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	2
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	2
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	11
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	3
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	4
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	3
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	63
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	67
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	49
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	6
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	7
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	17
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	0

97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	4
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	3
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	32
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	3
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	282
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	273
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	380
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	2	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	27	3	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	20
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	36
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	29
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	5
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	2
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	0

97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	2	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	3	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	1
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	0
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	3
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	7
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	20
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	10
97-08-18	BC3	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	16
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	2
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	7
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	9
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	3
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	55
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	46

97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	30
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	3
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	7
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	4
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	15
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	12
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	22
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	1
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	4
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	5
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	10
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	1
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	0
97-08-19	BC6	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	6
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	5
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	7
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	2
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	49

97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	30
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	23
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	3
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	9
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	11
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	15	1	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	15	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	15	3	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	6
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	45
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	21
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	46
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	10
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	6
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	5
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	0

97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	5
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	7
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	8
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	1	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	3	1
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	3
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	0
97-08-18	30	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	2
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	6
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	1	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	2	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	3	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	3
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	2
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	1	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	2	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	8	3	2
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	56
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	41

97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	16
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	2
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	4
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	19	1	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	19	2	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	19	3	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	2
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	77
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	57
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	61
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	6
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	5
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	18
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	1

97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	4
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	1
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	0
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	1	8
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	2	9
97-08-18	NEW	GRAB	BIOTA	NO-OF-IND	64	COUNT	49	3	29
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	1
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	4
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	3
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	6
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	0
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	1
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	9
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	3
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	3
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	2
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	0
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	0
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	4
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	8
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	6
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	1
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	0
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	0

97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	51
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	28
97-08-19	75	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	52
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	1
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	3
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	2
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	1	0
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	2	1
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	3	1
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	20
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	10
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	15
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	29
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	24
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	17
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	33
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	33
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	7
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	11
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	9
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	5
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	10
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	10
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	20
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	2
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	1

97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	2
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	19
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	20
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	22
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	3
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	1
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	2
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	1
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	0
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	1
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	19
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	15
97-08-19	M1	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	16
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	2
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	3
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	11
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	4
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	12
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	5
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	4
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	3
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	2

97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	1	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	2	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	18	3	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	100
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	101
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	74
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	4
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	4
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	7
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	69
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	50
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	62
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	1	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	2	2
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	37	3	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	3
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	0

97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	13
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	16
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	27
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	1
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	0
97-08-19	M2	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	0
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	2
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	14
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	13
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	12
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	3
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	5
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	7
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	7
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	3
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	7
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	440
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	493
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	234
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	26
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	13
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	14
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	1	1
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	2	0

97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	33	3	0
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	1	1
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	2	1
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	41	3	1
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	22
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	1
97-08-19	M3	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	1
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	1
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	4
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	5
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	13
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	5
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	1
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	1	7
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	2	1
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	12	3	5
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	88
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	85
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	73
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	6

97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	8
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	5
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	9
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	7
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	4
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	1
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	2
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	2
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	2
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	7
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	5
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	1	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	2	0
97-08-19	M4	GRAB	BIOTA	NO-OF-IND	64	COUNT	44	3	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	1	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	2	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	2	3	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	1	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	2	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	3	3	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	1	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	2	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	5	3	0

97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	1	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	2	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	9	3	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	1	24
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	2	20
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	10	3	26
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	1	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	2	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	11	3	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	1	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	2	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	14	3	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	1	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	2	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	17	3	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	1	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	2	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	20	3	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	1	41
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	2	50
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	21	3	65
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	1	9
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	2	5
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	30	3	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	1	8
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	2	21

97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	36	3	9
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	1	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	2	6
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	40	3	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	1	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	2	1
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	42	3	0
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	1	2
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	2	5
97-08-19	M5	GRAB	BIOTA	NO-OF-IND	64	COUNT	43	3	2

GLOSSARY

Accuracy: The ability to obtain a true value; determined by the degree of agreement between an observed value and an accepted reference value.

Acid volatile sulfide (AVS): The sulfides removed from sediment by cold acid extraction, consisting mainly of H2S and FeS. AVS is a possible predictive tool for divalent metal sediment toxicity.

Acute: Having a sudden onset, lasting a short time.

Acute toxicity: Short-term toxicity to organism(s) that have been affected by the properties of a substance, such as contaminated sediment. The acute toxicity of a sediment is generally determined by quantifying the mortality of appropriately sensitive organisms that are put into contact with the sediment, under either field or laboratory conditions, for a specified period.

Adjacent: Bordering, contiguous or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands".

Amphipod: A large group usually - an order of crustaceans - comprising the beach fleas and related forms - being mainly of small size with laterally compressed body, four anterior pairs of thoracic limbs directed forward - and three posterior pairs directed backward - and upward - the thoracic limbs bearing gills-aquatic in fresh or salt water.

Application factor (AF): A numerical, unitless value, calculated as the threshold chronically toxic concentration of a test substance divided by its acutely toxic concentration. The AF is usually reported as a range and is multiplied by the median lethal concentration as determined in a short-term (acute) toxicity test to estimate an expected no- effect concentration under chronic exposure.

Benchmark organism: Test organism designated by USACE and EPA as appropriately sensitive and useful for determining biological data applicable to the real world. Test protocols with such organisms are published, reproducible and standardized.

Bioaccumulation: The accumulation of contaminants in the tissue of organisms through any route, including respiration, ingestion, or direct contact with contaminated water, sediment, pore water or dredged material. [The regulations require that bioaccumulation be considered as part of the environmental evaluation of dredged material proposed for disposal. This consideration involves predicting whether there will be a cause-and-effect relationship between an organism's presence in the area influenced by the dredged material and an environmentally important elevation of its tissue content or body burden of contaminants above that in similar animals not influenced by the disposal of the dredged material].

Bioaccumulation factor: The degree to which an organism accumulates a chemical compared to the source. It is a dimensionless number or factor derived by dividing the concentration in the organism by that in the source.

Bioassay: A bioassay is a test using a biological system. It involves exposing an organism to a test material and determining a response. There are two major types of bioassays differentiated by response: toxicity tests which measure an effect (e.g., acute toxicity, sublethal/chronic toxicity) and bioaccumulation tests which measure a phenomenon (e.g., the uptake of contaminants into tissues).

Bioavailable: Can affect organisms.

Bioconcentration: Uptake of a substance from water.

Biomagnification: Bioaccumulation up the food chain, e.g., the route of accumulation is solely through food. Organisms at higher trophic levels will have higher body burdens than those at lower trophic levels.

Biota sediment accumulation factor: Relative concentration of a substance in the tissues of an organism compared to the concentration of the same substance in the sediment.

Bryozoan: A small phylum of aquatic animals that reproduce by budding - that usually form branching, flat or mosslike colonies -permanently attached on stones or seaweed and enclosed by an external cuticle soft and gelatinous or rigid and chitinous or calcareous - that consist of complex zooids (polyps) each having alimentary canal with separate mouth and anus.

Bulk sediment chemistry: Results of chemical analyses of whole sediments (in terms of wet or dry weight), without normalization (e.g., to organic carbon, grain-size, acid volatile sulfide).

Chronic: Involving a stimulus that is lingering or which continues for a long time.

Chronic toxicity: See sublethal/chronic toxicity.

Comparability: The confidence with which one data set can be compared to others and the expression of results consistent with other organizations reporting similar data. Comparability of procedures also implies using methodologies that produce results comparable in terms of precision and bias.

Completeness: A measure of the amount of valid data obtained versus the amount of data originally intended to be collected.

Confined disposal: A disposal method that isolates the dredged material from the environment. Confined disposal is placement of dredged material within diked confined disposal facilities via pipeline or other means.

Confined disposal facility (CDF): A diked area, either in-water or upland, used to contain dredged material. The terms confined disposal facility (CDF), dredged material containment area, diked disposal facility, and confined disposal area are used interchangeably.

Constituents: Chemical substances, solids, liquids, organic matter, and organisms associated with or contained in or on dredged material.

Contaminant: A chemical or biological substance in a form that can be incorporated into, onto or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment, and includes but is not limited to the substances on the 307(a)(1) list of toxic pollutants promulgated on January 31, 1978 (43 FR 4109). [Note: A contaminant that causes actual harm is technically referred to as a pollutant, but the regulatory definition of a "pollutant" in the Guidelines is different, reflecting the intent of the CWA.]

Contaminant of concern: A contaminant present in a given sediment thought to have the potential for unacceptable adverse environmental impact due to a proposed discharge.

Control sediment: A sediment essentially free of contaminants and which is used routinely to assess the acceptability of a test. Control sediment may be the sediment from which the test organisms are collected or a laboratory sediment, provided the organisms meet control standards. Test procedures are conducted with the control sediment in the same way as the reference sediment and dredged material. The purpose of the control sediment is to confirm the biological acceptability of the test conditions and to help verify the health of the organisms during the test. Excessive mortality in the control sediment indicates a problem with the test conditions or organisms, and can invalidate the results of the corresponding dredged material test.

Data quality indicators: Quantitative statistics and qualitative descriptors which are used to interpret the degree of acceptability or utility of data to the user; include bias (systematic error), precision, accuracy, comparability, completeness, representativeness, detectability and statistical confidence.

Data quality objectives (DQOs): Qualitative and quantitative statements of the overall uncertainty that a decision maker is willing to accept in results or decisions derived from environmental data. DQOs provide the framework for planning environmental data operations consistent with the data user's needs.

Dendrogram: A branching diagrammatic representation of the interrelations of a group of items sharing some common factors (as of natural groups connected by ancestral forms).

Discharge of dredged material: Any addition of dredged material into waters of the United States. [Dredged material discharges include: open water discharges; discharges resulting from unconfined disposal operations (such as beach nourishment or other beneficial uses); discharges from confined disposal facilities which enter waters of the United States (such as effluent, surface runoff, or leachate); and, overflow from dredge hoppers, scows, or other transport vessels]. Material resuspended during normal dredging operations is considered "de minimus" and is not regulated under Section 404 as a dredged material discharge. See 33 CFR 323.2 for a detailed definition. The potential impact of resuspension due to dredging can be addressed under NEPA.

Disposal site: That portion of the "waters of the United States" where specific disposal activities are permitted and consist of a bottom surface area and any overlying volume of water. In the case of wetlands on which surface water is not present, the disposal site consists of the wetland surface area. [Note: upland locations, although not mentioned in this definition in the Regulations, can also be disposal sites].

District: A USACE administrative area.

Dredged material: Material that is excavated or dredged from waters of the United States.

EC50: The median effective concentration. The concentration of a substance that causes a specified effect (generally sublethal rather than acutely lethal) in 50% of the organisms tested in a laboratory toxicity test of specified duration.

Elutriate: Material prepared from the sediment dilution water and used for chemical analyses and toxicity testing. Different types of elutriates are prepared for two different procedures as noted in this manual.

Evaluation: The process of judging data in order to reach a decision.

Factual determination: A determination in writing of the potential short-term or long-term effects of a proposed discharge of dredged or fill material on the physical, chemical and biological components of the aquatic environment in light of Subparts C-F of the Guidelines.

Federal Standard: The dredged material disposal alternative(s) identified by the U.S. Army Corps of Engineers that represent the least costly, environmentally acceptable alternative(s) consistent with sound engineering practices and which meet the environmental standards established by the 404(b)(1) evaluation process. [See Engler et al. (1988) and 33 CFR 335-338].

Fill material: Any material used for the primary purpose of replacing an aquatic area with dry land or changing the bottom elevation of a water body for any purpose. The term does not include any pollutant discharged into the water primarily to dispose of waste, as that activity is regulated under Section 402 of the Clean Water Act. [Note: dredged material can be used as fill material].

Grain-size effects: Mortality or other effects in laboratory toxicity tests due to sediment granulometry, not chemical toxicity. [It is clearly best to use test organisms which are not likely to react to grain-size but, if this is not reasonably possible, then testing must account for any grain-size effects.]

Guidelines: Substantive environmental criteria by which proposed discharges of dredged material are evaluated. CWA Section 404(b)(1) final rule (40 CFR 230) promulgated December 24, 1980.

Hydroid: An order of Hydrozoan coelenterates - comprising forms that alternate a well developed asexual polyp generation with a generation of free medusa or of an abortive medusoid reproductive structure on the polyps - resembling a polyp.

LC50: The median lethal concentration. The concentration of a substance that kills 50% of the organisms tested in a laboratory toxicity test of specified duration.

Leachate: Water or any other liquid that may contain dissolved (leached) soluble materials, such as organic salts and mineral salts, derived from a solid material.

Lethal: Causing death.

Loading density: The ratio of organism biomass or numbers to the volume of test solution in an exposure chamber.

Management actions: Those actions considered necessary to rapidly render harmless the material proposed for discharge (e.g., non-toxic, non-bioaccumulative) and which may include containment in or out of the waters of the U.S. (see 40 CFR Subpart H). Management actions are employed to reduce adverse impacts of proposed discharges of dredged material.

Management unit: A manageable, dredgeable unit of sediment which can be differentiated by sampling and which can be separately dredged and disposed within a larger dredging area. Management units are not differentiated solely on physical or other measures or tests but are also based on site- and project-specific considerations.

Method detection limit (MDL): The minimum concentration of a substance which can be identified, measured, and reported with 99% confidence that the analyte concentration is greater than zero.

Mixing zone: A limited volume of water serving as a zone of initial dilution in the immediate vicinity of a discharge point where receiving water quality may not meet quality standards or other requirements otherwise applicable to the receiving water. [The mixing zone may be defined by the volume and/or the surface area of the disposal site or specific mixing zone definitions in State water quality standards].

Open water disposal: Placement of dredged material in rivers, lakes or estuaries via pipeline or surface release from hopper dredges or barges.

Pathway: In the case of bioavailable contaminants, the route of exposure (e.g., water, food).

Pollution: The man-made or man-induced alteration of the chemical, physical, biological or radiological integrity of an aquatic ecosystem. [See definition of contaminant].

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Practical quantitation limit (PQL): The lowest concentration that can be reliably quantified with specified limits of precision and accuracy during routine laboratory operating conditions.

Precision: The ability to replicate a value; the degree to which observations or measurements of the same property, usually obtained under similar conditions, conform to themselves. Usually expressed as standard deviation, variance or range.

QA: Quality assurance, the total integrated program for assuring the reliability of data. A system for integrating the quality planning, quality control, quality assessment, and quality improvement efforts to meet user requirements and defined standards of quality with a stated level of confidence.

QC: Quality control, the overall system of technical activities for obtaining prescribed standards of performance in the monitoring and measurement process to meet user requirements.

Reason to believe: Subpart G of the 404(b) (1) guidelines requires the use of available information to make a preliminary determination concerning the need for testing of the material proposed for dredging. This principle is commonly known as "reason to believe", and is contained in Tier I of the tiered testing framework. The decision to not perform additional testing based on prior information must be documented, in order to provide a "reasonable assurance that the proposed discharge material is not a carrier of contaminants" (230.60(b)).

Reference sediment: Point of comparison for evaluating test sediment. Testing requirements in the Section 404(b)(1) Guidelines regarding the point of comparison for evaluating proposed discharges of dredged material are being updated to provide for comparison to a "reference sediment" as opposed to sediment from the disposal site. Because subsequent discharges at a disposal site could adversely impact the point of comparison, adoption of a reference sediment that is unimpacted by previous discharges of dredged material will result in a more scientifically sound evaluation of potential individual and cumulative contaminant-related impacts. This change to the Guidelines was proposed in the Federal Register in January 1995, public comments have been received, and a final rule Notice is being prepared. It is expected that the final rule will be published prior to July 1, 1998, and as a result the reference sediment approach will be implemented in the ITM.

Reference site: The location from which reference sediment is obtained.

Region: An EPA administrative area.

region: A geographical area.

Regulations: Procedures and concepts published in the Code of Federal Regulations for evaluating the discharge of dredged material into waters of the United States.

Representativeness: The degree to which sample data depict an existing environmental condition; a measure of the total variability associated with sampling and measuring that includes the two major error components: systematic error (bias) and random error. Sampling representativeness is accomplished through proper selection of sampling locations and sampling techniques, collection of sufficient number of samples, and use of appropriate subsampling and handling techniques.

Sediment: Material, such as sand, silt, or clay, suspended in or settled on the bottom of a water body.

Should: Is used to state that the specified condition is recommended and ought to be met unless there are clear and definite reasons not to do so.

Standard operating procedure (SOP): A written document which details an operation, analysis, or action whose mechanisms are thoroughly prescribed and which is commonly accepted as the method for performing certain routine or repetitive tasks.

Standardized: In the case of methodology, a published procedure which has been peer reviewed (e.g., journal, technical report), and generally accepted by the relevant technical community of experts.

Sublethal: Not directly causing death; producing less obvious effects on behavior, biochemical and/or physiological function, histology of organisms.

Sublethal/chronic toxicity: Biological tests which use such factors as abnormal development, growth and reproduction, rather than solely lethality, as end-points. These tests involve all or at least an important, sensitive portion of an organism's life-history. A sublethal endpoint may result either from short-term or long-term (chronic) exposures.

Target detection limit: A performance goal set by consensus between the lowest, technically feasible, detection limit for routine analytical methods and available regulatory criteria or guidelines for evaluating dredged material. The target detection limit is, therefore, equal to or greater than the lowest amount of a chemical that can be reliably detected based on the variability of the blank response of routine analytical methods. However, the reliability of a chemical measurement generally increases as the concentration increases. Analytical costs may also be lower at higher detection limits. For these reasons, a target detection limit is typically set at not less than 10 times lower than available dredged material guidelines.

Tests/testing: Specific procedures which generate biological, chemical, and/or physical data to be used in evaluations. The data are usually quantitative but may be qualitative (e.g., taste, odor, organism behavior). Testing for discharges of dredged material in waters of the United States is specified at 40 CFR 230.60 and 230.61 and is implemented through the procedures in this manual.

Tiered approach: A structured, hierarchical procedure for determining data needs relative to decision-making, which involves a series of tiers or levels of intensity of investigation. Typically, tiered testing involves decreased uncertainty and increased available information with increasing tiers. This approach is intended to ensure the maintenance and protection of environmental quality, as well as the optimal use of resources. Specifically, least effort is required in situations where clear determinations can be made of whether (or not unacceptable adverse impacts are likely to occur based on available information. Most effort is required where clear determinations cannot be made with available information.

Toxicity: see Acute toxicity; Sublethal/chronic toxicity, Toxicity test.

Toxicity test: A bioassay which measures an effect (e.g., acute toxicity, sublethal/chronic toxicity). Not a bioaccumulation test (see definition of bioassay).

Water Quality Certification: A state certification, pursuant to Section 401 of the Clean Water Act, that the proposed discharge of dredged material will comply with the applicable provisions of Sections 301, 303, 306 and 307 of the Clean Water Act and relevant State laws. Typically this certification is provided by the affected State. In instances where the State lacks jurisdiction (e.g., Tribal Lands), such certification is provided by EPA or the Tribe (with an approved certification program).

Water Quality Standard (Code of Maryland Regulations - COMAR): A law or regulation that consists of the beneficial designated use or uses of a water body, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular water body, and an anti- degradation statement.

Waters of the U.S.: In general, all waters landward of the baseline of the territorial sea and the territorial sea. Specifically, all waters defined in Section 230.3 (s) of the Guidelines. [See Appendix A].

Whole sediment: The sediment and interstitial waters of the proposed dredged material or reference sediment that have had minimal manipulation. For purposes of this manual, press-sieving to remove organisms from test sediments, homogenization of test sediments, compositing of sediment samples, and additions of small amounts of water to facilitate homogenizing or compositing sediments may be necessary to conducting bioassay tests. These procedures are considered unlikely to substantially alter chemical or toxicological properties of the respective whole sediments except in the case of AVS (acid volatile sulfide) measurements (EPA, 1991a) which are not presently required. Alternatively, wet sieving, elutriation, or freezing and thawing of sediments may alter chemical and/or toxicological properties, and sediment so processed should not be considered as whole sediment for bioassay purposes.

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