RESEARCH SUMMARY CRUISE FR 9/93

Sailed Sydney 2000 Thursday 9 December 1993 Arrived Sydney 2130 Friday 17 December 1993

SYDNEY OUTFALLS INTERDISCIPLINARY STUDIES

Principal Investigators

Peter Nichols, George Cresswell, Rhys Leeming CSIRO Division of Oceanography

Nick Ashbolt, Philip Gibbs
AWT-Science and Environment, Water Board, Sydney

-000-

DISTRIBUTION OF METALLIC AND ORGANIC CONTAMINANTS IN SHELFAL SEDIMENTS, CENTRAL NSW

Principal Investigator

Gavin Birch
Department of Geology and Geophysics
University of Sydney

March 1994

SYDNEY OUTFALLS INTERDISCIPLINARY STUDIES

Scientific Objectives

- Use chemical methods to "fingerprint" and trace sewage in coastal waters adjacent to Sydney.
- Undertake biodegradation experiments of sewage effluent material to determine the relative stability and persistence of specific marker compounds in the marine environment.
- Develop further indices using organic markers to accurately quantify and monitor sewage input in the marine environment. These data will be compared to data from techniques currently used for monitoring sewage outfalls (faecal coliform and other viral and bacterial viral sewage microorganisms).
- To determine the physical oceanographic features in coastal waters off Sydney through the measurement of vertical and horizontal profiles of S, T, currents, transmissivity and fluorescence.
- Assess re suspension of marker compounds and faecal microorganisms (viral, protozoa and bacteria) from sediments off Malabar and at a reference site near south of the Sydney region.
- Determine the prevalence of heavy metal- and antibiotic resistant bacteria in marine sediments.
- Collect zoo plankton and determine, by major group, their heavy metal content.
- To map the distribution, fate and impact of Sydney's sewage effluent using the combined chemical, micro biological, biological and physical oceanographic data.

Cruise objectives

- Conduct regular CTD stations and underway ADCP measurements along the cruise track.
- Deploy and recover chemistry moorings; one at site of DOOM and one at DOOB.
- Collect water, sediments and plankton at stations along the NSW coast, including in the Sydney region.
- Collect underway surface water temperature, salinity, and fluorescence data.
- Conduct underway ADCP transects to the 1000 m contour in addition to the continuous ADCP measurements routinely performed. Transects will be perpendicular to the coast.
- Provide appropriate sample collection and preparation facilities for external organisations (AWT-Science and Environment, Sydney Water Board and University of Sydney) undertaking collaborative studies with the Division of Oceanography.

DISTRIBUTION OF METALLIC AND ORGANIC CONTAMINANTS IN SHELFAL SEDIMENTS, CENTRAL NSW, AUSTRALIA

Scientific Objectives

- To delineate the nature, concentration and provenance of organic and metallic contaminants in surficial shelf sediments located adjacent to the urban and industrial centres of Wollongong, Sydney and Newcastle.
- To establish present baseline and historical background data sets and construct a contaminant stratigraphy for the midshelf sediments.
- To study the nature and mechanisms of fixation and release of contaminants from marine sediments.
- To use assemblages of contaminants to identify sources and dispersal pathways for suspended sediments on the open shelf.
- To provide a regional framework for other, more restricted environmental studies.
- To map contemporary sediments on the shelf and determine sedimentological and hydrologic controls of sediment/contaminant dispersal.

Cruise objective

 Collect sediments at stations along the NSW coast in the Wollongong, Sydney and Newcastle regions.

Cruise Summary

The commencement of the cruise was delayed due to problems with the ships bow thruster. During dockside testing of the bow thruster after the dry dock work period, further new problems were encountered with the electric motor of the bow thruster. As it would not have been possible to complete repairs to the bow thruster motor within a reasonable period, the cruise was commenced without the use of the bow thruster. The cruise finally commenced at 2000 December 9, (original scheduled, departure 2200 December 7).

The planned deployment of the chemistry moorings near the deep ocean outfalls was not conducted, as their recovery may not have been possible without the ships bow thruster. Apart from the loss of this minor component of the scientific schedule, the cruise proceeded largely as according to the original cruise plan. No further loss of planned activities from the scientific program occurred, due largely to the skill of the master and officers of *Franklin*.

On departing Sydney harbour, we steamed south to commence section T1 off Kiama. Twenty four sections were then occupied perpendicular to the coast between Kiama in the south and Broken Bay in the north. Sections T1-T19 were occupied from south to north. Upon

completion of section T19, we steamed north to section T25 and conducted sections T25 to T20 from north to south.

A total of 155 stations were occupied with surface sediment collected at all sites. Complete details on station locations and sampling details [CTD, chemistry (chemical biomarkers, metals, toxicants), microbiology, zoo plankton] are provided in Table 1 (see also Figure 1). Note that the station number differs from the CTD number as CTD profiles were only performed at approximately half the stations (Table 1). In addition, acquisition of ADCP data was performed for the entire cruise.

Station sampling generally proceeded as follows:

- (i) CTD profile and water (hydrology, microbiology and other chemistry) sampling (not all stations),
- (ii) sediment grab (all stations),
- (iii) zoo plankton tow (sections T1, T2, T3, T10, T12, T14, T16, T23, T24, T25; 0.5, 5 and 20 nm),
- (iv) sediment coring (stations #5, #43 and #116 only, multiple cores were taken at these sites).

CTD profiling was conducted and water column sampling (hydrology, chemistry, microbiology) was performed for 13 of the twenty four sections (sections T1, T6, T8, T9, T10, T11, T12, T13, T15, T18, T19, T23 and T25). Representative CTD profiles of temperature, fluorescence, salinity and transmission for station #78 (CTD#47, adjacent to Malabar deep ocean outfall) are shown in Figure 2. A strong transmissometer signal was observed at 35-50 m at station #78. The change in transmissometer signal was not accompanied by an increase in fluorescence, indicating that the signal was not due to increased algal biomass. This signal can be attributed to the rising plume from the deep ocean outfall (see also Figure 3), as it is also accompanied by a decrease in salinity associated with the input the sewage plume.

A decrease in the CTD transmissometer signal was observed in bottom waters at many inner shelf stations, indicating that under the current conditions present during the cruise that sedimentary material is being mobilised in bottom waters. This feature is illustrated in Figure 3 which shows a plot of transmission versus water depth for transect T12 (Malabar transect). Visual examination of particulate matter obtained by filtering bottom waters where there was a decrease in transmission showed a higher density of fine particles present. These observations are consistent with the mobilisation of sedimentary material under the sea conditions experienced during the cruise.

Data are available on sediment transport in the Sydney region. For example, a seabed flux model for the inner shelf region off Sydney has been developed (Gordon and Hoffman 1985). Those authors reported that whilst the dominant steady current is to the south (East Australian Current), seabed shear induced during these southerly events is seldom sufficient to entrain sediment. Rather, transport occurs during short-lived periods of northerly currents resulting from the strong wind gradient produced by intense weather systems in the Tasman Sea.

The observation of sedimentary material (predominately fine particles) in bottom waters in the prevailing weather conditions (mainly fine, wind speeds less than 20 knots) and sea conditions

encountered during December 1993 indicates that transport, at least of fine particles, also occurs during periods of less intensity than suggested by Gordon and Hoffman (1985). As flux measurements were not made during this cruise aboard *Franklin*, the importance of this type of sediment transport relative to that encountered under more extreme conditions cannot be estimated. Particle size measurements of material present in bottom waters during both intense and milder weather conditions would provide further information on sediment transport in the region.

For the CTD sampling, water was collected at 3-5 depths for stations up to 100 m water depth (0, 25, 50, 75, bottom). At stations between 100-1000 m water depth, additional sampling was performed at 200, 500, 750 and 1000 m. Sampling depth was modified based on observation of the transmissivity and fluorescence signals.

Sediment cores (both gravity and box) were collected at three sites (section T1, station #5, section T8, station #43; section T18, station #116). The gravity corer used during the cruise had been recently purchased by *Franklin*. Around 10 cores of up to 1.5 m in length were obtained and the corer is certainly suitable for the type of near-shore, shallow water (up to 100 m) coring performed during this cruise. Extra weight (100 lb)was added to the corer to maximise penetration into the sediment. It is recommended that extra weight be purchased.

To distinguish sources of input to the coastal zone, the isotopic composition of methane within sea water is to be determined from samples collected during the cruise. Samples were collected in two ways; firstly, using a gas extractor (AGSO developed) connected to the *Franklin* thermosalinograph sea water line, and secondly, sea water was collected from Niskin bottles fired just below the surface during CTD casts. Gas samples collected by the two methods were obtained at two locations (stations #34 and #111) for comparative purposes. Station #34 was selected as a site remote from the Sydney region and was located in approximately 700 m water depth. Station #111 was an inshore site (section T17, mouth of Sydney Harbour) in 60 m water that may be impacted by anthropogenic inputs.

Sediment samples were collected from muddy sites (stations #5, #43 #118) using a Soutar type box corer. Sub-cores were obtained from the box cores using 8 cm diameter acrylic tubes. The sampling protocol is shown in Figure 4. Additionally one sub-core was collected at each site, sectioned under nitrogen, the pore waters extracted by centrifugation, and the supernatant and sediment was frozen for the analysis of metals. Laboratory flux measurements of nutrients (nitrogen and phosphorous) and oxygen were conducted on sub-cores from stations #5 and #43 aboard Franklin. The flux experiments were undertaken in a laboratory incubator, generally over a12 hour period on three consecutive days. Oxygen consumption rates at station #5 and #43, were 280 mg/m²/day; these results are within the range of data previously observed for sediments in the Sydney region. Following the nutrient flux experiments, cores were sectioned under nitrogen and centrifuged to separate the pore waters. The pore water and solid phase were frozen for subsequent analyses (nutrients, organic carbon, total nitrogen and total phosphate).

Oxygen micro-profiles for sediments (e.g. Figure 5) showed that oxygen is depleted within the top 3 mm at stations #5 and #118, whereas sediment from station #43 is depleted of oxygen by 6

mm. These results are within the range of other results for the Sydney region. In addition to the box core sampling, gravity cores were collected to ascertain sedimentation rates and particle mixing rates within these fine grain sediments. Down-core dating will be conducted using ¹⁴C and ²¹⁰Pb. To compliment these data, samples from the box core will be dated to examine the bioturbation zone (to depths of approximately 25 cm).

Sites additional to those in the original cruise plan were sampled as part of a research contract performed by the Division of Oceanography for the Sutherland Shire Council: Providential Head sites: #45, 46, 47; Cape Banks sites: #57, 58, 66 (circles at mouth of Botany Bay and second innermost site on section from northern headland of entrance to Botany Bay). These sites were within the boundaries of the proposed sand mining zones in these two regions.

Zoo plankton were collected at 30 sites during the cruise. Collection details were as follows: ship speed 2-2.5 knots, wind on starboard side, towing time 10-15 minutes, towing used the ships bow boom and was generally done at night. To accommodate this requirement, location of zoo plankton stations was changed during the cruise, and slight detours between sections were required, particularly in the Sydney region. Many of the zoo plankton samples collected contained large numbers of salps; the reasons for this observation await further data analysis.

Bacteriology on water and sediment samples was undertaken on board *Franklin*. In addition, 100 L samples were concentrated to 1 L and preserved together with 10 L parasite samples at 4 °C on board. The container laboratory was most satisfactory for the level of microbiology performed.

Franklin docked at the CSR wharf in White Bay at 2130 December 17. Visitors from the Sydney Water Board, Sutherland Shire Council and others were provided with brief tours of the vessel.

General Comment

The temperature and salinity data from the CTD casts and the current data from the ADCP have been examined in a preliminary manner. The oceanographic features that the data revealed indicated that over the 9 days that *Franklin* was in the Sydney region, currents were extremely variable; currents ranged from 1 knot southward, to weaker on-shore currents, then turned to northward at up to 0.7 knots during the final days of the cruise (Figure 6). The precise implications of these observations with respect to sediment transport on the inner shelf are beyond the scope of this report.

It will be some time before all the data and samples collected during the cruise are analysed in detail. Together the data from this multidisciplinary study will provide a wealth of information on the complex interaction of physics, chemistry and biology (including microbiology) in Sydney's coastal waters. The results will be of use in future management strategies and decisions to be made on the disposal of Sydney's sewerage effluent.

Scientific Personnel

Peter Nichols

CSIRO Oceanography

Chief Scientist

Rhys Leeming

Val Latham

Jan Peterson

Ron Plascke

Dave Edwards

Jeff Dunn

Nick Ashbolt

Philip Gibbs Louise Backhouse

Gary Bickford

Penjai Sompongchaiyakul

CSIRO ORV

11

CSIRO ORV

Master

AWT-Science and Environment, Sydney Water Board

AWT-Science and Environment, Sydney Water Board AWT-Science and Environment, Sydney Water Board

AWT-Science and Environment, Sydney Water Board/AGSO

University of Sydney

Ships Crew

Dick Dougal

Ian Menzies

Bryce Bathe

Max Cameron

Ian Hayward-Bryant

Don Roberts

Janick Hansen

Kris Hallen

Bluey Hughes

Norm Marsh

Phil French

Reg Purcell

Garry Hall

Bob Clayton

Acknowledgement

We extend our sincere thanks to the master and crew of Franklin and to our fellow CSIRO colleagues and external collaborators for their cooperation and assistance before and throughout the cruise and during preparation of the cruise summary. Val Latham, Dave Vaudrey, Gary Bickford and Jan Peterson kindly assisted with the preparation of Figures. The Division of Oceanography workshop manufactured the Smith-MacIntyre grab that enabled surface sediment to be collected during the cruise.

Peter D Nichols

Rhys Leeming

George Cresswell

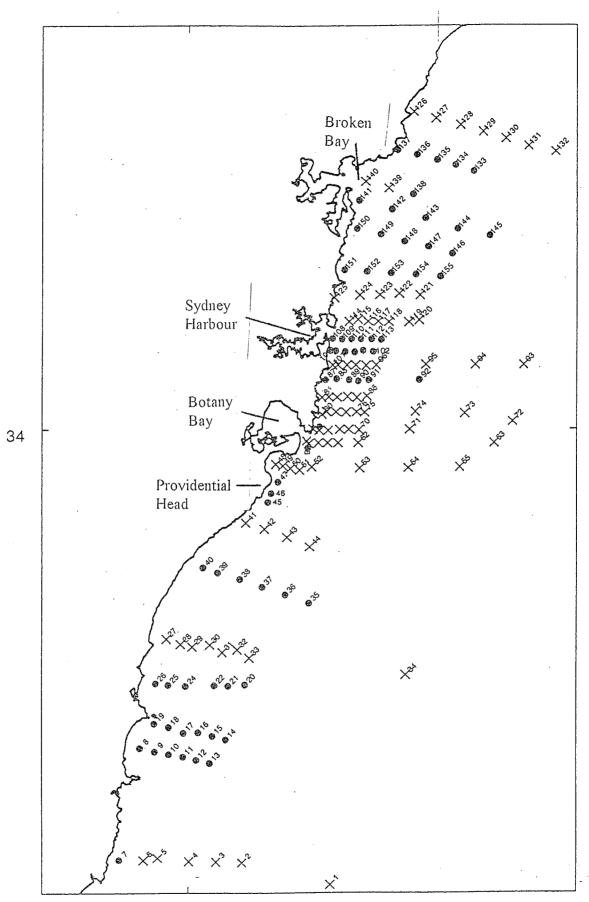


Figure 1. Station locations for *RV Franklin* cruise FR9/93. Station numbers for start and end of sections are indicated. See also Table 1. Crosses denote CTD profiles and sediment collection; circles indicate sediment collection only. Sites additional to those in the original cruise plan were sampled as part of a research contract performed by the Division of Oceanography for the Sutherland Shire Council: Providential Head sites: #45, 46, 47; Cape Banks sites: #57, 58, 66 (circles at mouth of Botany Bay and second innermost site on section from northern headland of entrance to Botany Bay).

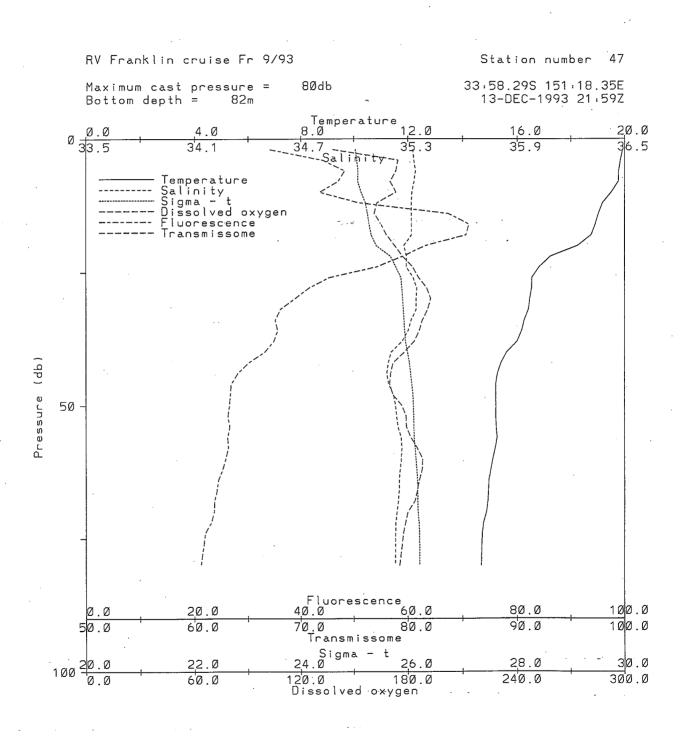


Figure 2. CTD profiles of temperature, fluorescence, salinity and transmission for station #78 (CTD #47).

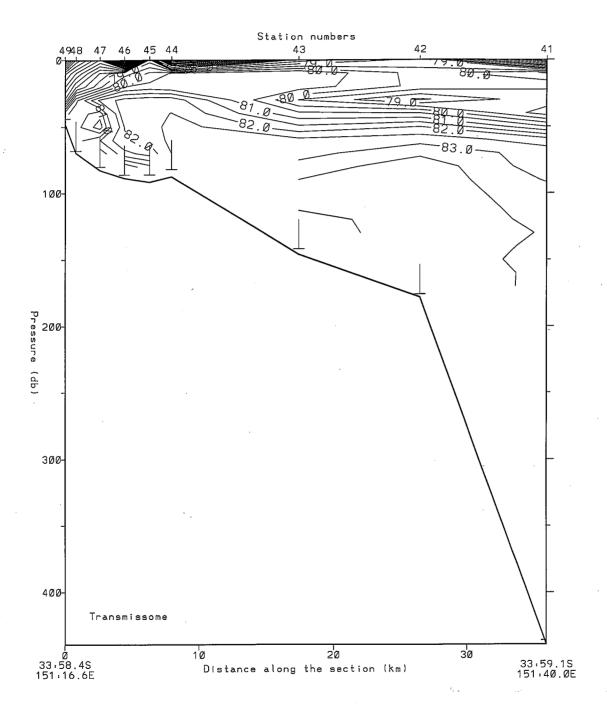


Figure 3. Section T12 off Malabar. Plot of transmissometer signal versus water depth.

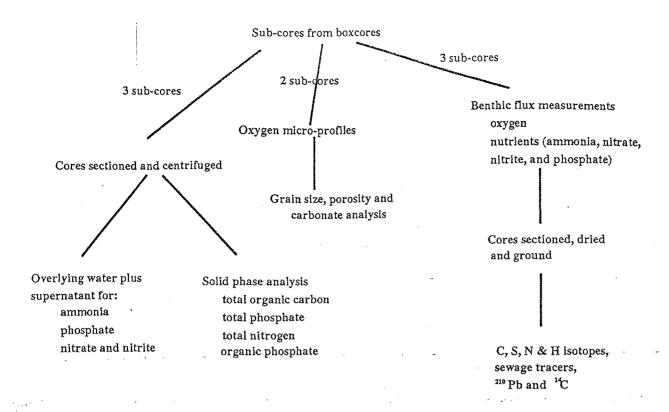


Figure 4. Sampling protocol for subcores collected from box cores. (AGSO).

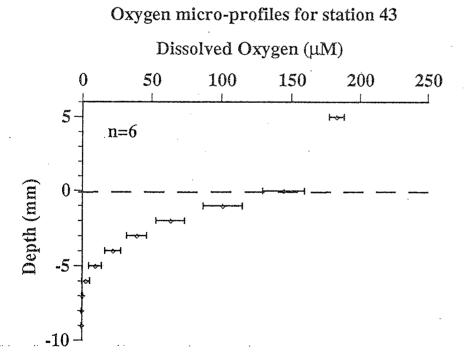


Figure 5. Oxygen micro-profile for sediment at station #43.

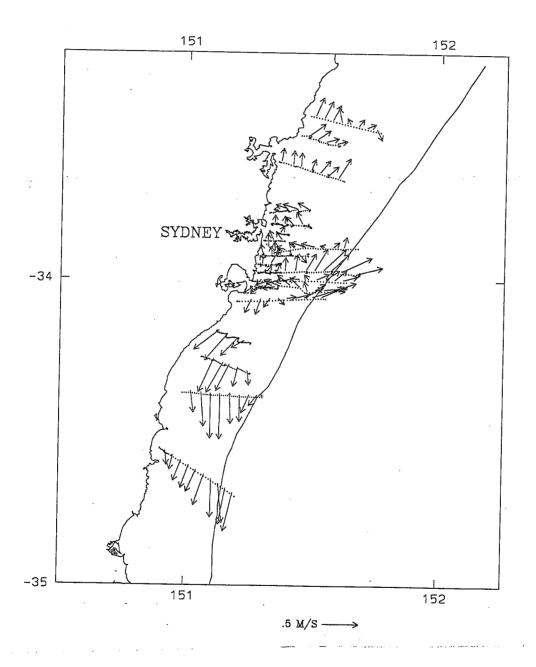


Figure 6. Near-surface current vectors for 18 of the 24 sections completed during RV Franklin cruise FR9/93.

Table 1: FR9/93 station locations and sampling details

	March Marc	CTD No	Latitude Longitude	Date	Time	Water	Hydrology		Lipids		Zoology		Microbiology	λb		Box	Gravity
44.71.03 151 17.56 91 20.03 14:22 12.05 X 25, 12.02 X X Set 4.71.03 151 17.56 91 20.03 14:22 12.05 X X Set 4.71.03 151 17.56 91 20.03 14:22 12.05 X X Set 4.71.03 151 10.04 17.20 20.03 14:22 12.05 X X Set 4.71.03 151 10.04 17.20 20.03 14:20 17.20 X X X X X X X X X X X X X X X X X X X	44.7135 151 7.569 187.289 14.22 1205 X 25.1202 X X S 44.4555 151 0.046 181 0		•	UTC			ampling	Sampling Depths	Water	Sediment	Plankton net tow	Bacto	Virus	Parasite	Total	coring	coring
44,47,18 19, 17, 60 91,288 1442 199 X 25,102 X	44.47.58 16.17.69 44.27.28 18.17.69 44.27.28 18.17.69 44.47.88 18.17.69																
44,4428 10 646 9 112493 20 64 6 18	44,44,482 150 total	-			14:22	1205	×		×	×							
3444748 51 00.04 31/283 21.350 137 X 25, 133 X X X X X X X X X	444,448 16 10 64 41 91 7393 20 20 9 12 7 X 25 133 X X X X X X X X X X X X X X X X X X	7			18:46	188	×		×	×							
34 44.438 160 66.10 107,1293 1736 124	34 44.488 1610,028 17138 124 X 56 121 X X X X X X X X X	က			20:09	137	×		×	×							
3444-568 100 100 34 100 34 100 34 34 34 34 34 34 34	94 420 58 100 51.38 101/289 3.35 58 X 5.2 85 X X X X X X X X X X X X X X X X X X	4			21:36	124	× :		×	×	:						
34 44568 160 61-30 10/1289 3:33 36	44 33 08 150 151 01 101 101 101 101 101 101 101	Ω			1:18	06	×	25, 85	×	×	×					7	
34 33.3 VS 150 64.00 10/1283 9.00 39 X X X X X X X 34.3 37.5 150 65.80 10/1283 9.5 10.3 1 79 X X X X X 34.3 37.5 150 65.80 10/1283 11.0 10.3 1 79 X X X X X 34.3 S1 15 15 0.0 10/1283 11.0 10.3 11.0 10.3 11.0 10.3 11.0 10.3 11.0 10.3 11.0 10.3 11.0 10/1283 11.0 10.3 11.0 10/1283	34 33.37 150 Get No. 100 Get No.	9			3:33	35	×		×	< ×	×	×	×	×	×		
34 33 008 150 64,00 101/1293 9:00 39 X X X X X 44 33 35 18 160 64,00 101/1293 10:31 59 X <td>34 33 008 150 E4.00 100 10/12/93 9-60 39 X X X 34 33 008 150 E6.00 10/12/93 10-61 50 39 X X X 34 32 581 150 E6.07 10/12/93 11-30 110 X X X 34 34 22 151 0.03+1 10/12/93 11-30 10 X X X 34 34 22 151 0.03+1 10/12/93 11-30 10 X X X 34 34 22 151 0.03+1 10/12/93 14-64 1128 X X X 34 31 25 151 0.12-0 10/12/93 16-62 170 X X X 34 31 40S 151 0.12-0 10/12/93 16-62 170 X X X 34 31 40S 151 0.12-0 10/12/93 16-62 170 X X X 34 30 40S 150 6.07-1 10/12/93 16-64 40 X X X 34 30 40S 150 6.05-1 10/12/93 16-64 40 X X X 34 30 6.05 15 10 1.07-1 10/12/93 16-64 40 X</td> <td></td>	34 33 008 150 E4.00 100 10/12/93 9-60 39 X X X 34 33 008 150 E6.00 10/12/93 10-61 50 39 X X X 34 32 581 150 E6.07 10/12/93 11-30 110 X X X 34 34 22 151 0.03+1 10/12/93 11-30 10 X X X 34 34 22 151 0.03+1 10/12/93 11-30 10 X X X 34 34 22 151 0.03+1 10/12/93 14-64 1128 X X X 34 31 25 151 0.12-0 10/12/93 16-62 170 X X X 34 31 40S 151 0.12-0 10/12/93 16-62 170 X X X 34 31 40S 151 0.12-0 10/12/93 16-62 170 X X X 34 30 40S 150 6.07-1 10/12/93 16-64 40 X X X 34 30 40S 150 6.05-1 10/12/93 16-64 40 X X X 34 30 6.05 15 10 1.07-1 10/12/93 16-64 40 X																
34 33.078 is Ge 64.00 34 30.08 38 X X 34 33.078 is Ge 66.00 10/12/93 9-61 39 X X 34 33.378 is Ge 68.00 10/12/93 11-08 120 X X 34 33.378 is Ge 68.00 11-08 11-08 120 X X 34 33.488 is Ge 53.38 10/12/93 11-17 1128 X X 34 32.188 is Ge 53.81 is Ge 58.00 10/12/93 14-00 132 X X 34 31.488 is Ge 53.81 is Ge 58.38 10/12/93 14-64 128 X X 34 31.488 is Ge 52.81 is Ge 58.38 10/12/93 16-24 40 X X 34 30.488 is Ge 57.61 is Ge 56.77 is Ge 10/12/93 16-24 40 X X X 34 26.568 is 10 op 56.77 is Ge 10/12/93 16-24 40 X X X 34 26.568 is 10 op 56.77 is Ge 10/12/93 18-71 11/12/93 18-74 X X 34 26.568 is 10 op 56.77 is Ge 10/12/93 18-71 11/12/93 18-74 X X 34 26.568 is 10 op 57.77 is Ge 57.77 is G	44 33.378 is 06 64.00 19 9 X X 44 33.378 is 06 64.00 10/12/93 8-60 39 X X 44 33.378 is 06 65.00 10/12/93 11-03 79 X X 34 33.378 is 06 65.00 10/12/93 11-03 17-04 X X 34 33.378 is 06 65.00 10/12/93 11-09 17-04 X X 34 32.138 is 10 0.02 10/12/93 11-10 12.0 X X 34 32.138 is 10 0.02 10/12/93 14-00 13.2 X X 34 31.408 is 10 0.02 10/12/93 16-24 17.0 X X 34 31.408 is 10 0.02 10/12/93 16-24 17.0 X X 34 31.408 is 10 0.02 10/12/93 16-24 40 X X 34 31.408 is 10 0.02 10/12/93 16-24 40 X X 34 31.408 is 10 0.02 10/12/93 16-24 40 X X 34 32.65 15 10 0.02 10/12/93 16-2																
34 33.451 to 0 65.00 10 10 10 10 3 10 3 1	34.33.35 Is 100 GR.90 10.10 1/293 10.31 59 X 34.33.45 Is 100 GR.90 10.10 10.10 10.31 10.31 10.30 10.31 X X 34.32.15 Is 10.26 Is 10/12/93 11.29 10.31 11.30 12.30 11.30 12.31 12.17 128 X X X 34.32.15 Is 10.26 Is 10.10 203 14.56 10.32 12.31 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 12.30 14.50 14.		33,00S		9:00	39				×	×	×			×		
34.3.3.645 150.5 Je 10.21 79 34.3.3.645 150.5 Je 10.10233 11.03 124 34.3.2.135 150.034 101/293 11.139 12.17 129 34.3.1.735 151.0249 101/293 14.600 132 132 34.3.1.735 150.239 101/293 16.54 128 128 34.3.1.485 150.129 101/293 16.54 128 128 34.3.1.485 150.129 101/293 16.54 128 128 34.3.1.485 150.129 101/293 16.54 128 128 34.3.0.485 150.129 101/293 16.54 128 128 34.5.56 151.029 101/293 16.54 128 128 34.5.56 151.029 101/293 16.54 128 128 34.5.56 151.029 101/293 18.11 117 34.5.56 151.029 101/293 18.11 117 34.5.56 151.029 101/293 18.11 117 34.5.56 151.029 101/293 18.11 117 34.5.56 151.029 101/293 18.11 117 34.5.57 151.029 101/293 18.11 117 34.5.58 151.029 111/293 111/2	34.33.645 150.05.56 10/12/93 11:39 120		33.378		9:51	29				×							
34 33-315 150 56.3 1710/1938 11:08 104	34 3.3 81 15 0.6 8.3 10 1.0 8 104 X 34 3.3 81 15 0.6 8.3 10 1/2 93 11:39 104 X X 34 3.4 82 15 0.2 81 10 1/2 93 11:39 10.4 X X X 34 3.1 AS 15 0.2 89 10 1/2 93 14:50 132 X X X 34 3.1 AS 15 0.2 89 10 1/2 93 16:24 110 X X X 34 3.1 AS 15 0.2 89 10 1/2 93 16:24 10 X X X 34 3.0 AS 15 0.5 16 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2		33.648		10:31	79				×							
34 32.135 151 02.62 101/2193 12:17 129	34 34 258 151 0.04 1017/283 11:39 120 X X 34 34 258 151 0.04 1017/283 14:00 132 X X 34 31 778 150 0.04 101 7283 14:50 128 X X 34 31 778 150 0.03 101 7283 16:54 128 X X 34 31 788 150 0.06 101 7283 16:54 40 X X 34 30 48 150 0.06 101 7283 16:24 40 X X 34 26 58 150 0.06 101 7283 16:24 40 X X 34 26 58 150 0.06 101 7283 18:36 91 X X 34 26 58 150 0.06 101 7283 18:36 91 X X 34 26 58 150 0.07 101 7283 18:36 91 X X 34 26 58 150 0.07 101 7283 18:36 48 X X X 34 26 58 150 0.07 101 7283 21:32 48 X X X 34 26 38 150 0.04 101 7283 22:32 34 X X X 34 25 38 150 0.05<		33.918		11:08	104				×							
34 32.138 15 0.262 10/12/93 14:00 12:17 128 X 34 32.138 15 0.468 10/12/93 14:00 13.2 X X 34 31.765 15 0.299 10/12/93 16:24 110 X X 34 31.765 15 0.299 10/12/93 16:24 110 X X 34 30.485 150 5.38 10/12/93 16:24 10 X X 34 30.485 150 5.57 10/12/93 16:24 40 X X 34 26.585 15 10.70 6 10/12/93 16:14 117 X X 34 26.585 15 10.72 93 19:10 117 11.72 10/12/93 19:10 117 X 34 26.585 15 10.72 93 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93 10:10 10/12/93	34 32.138 151 04.68 10/12/93 14:70 122 X X 34 32.138 151 04.68 10/12/93 14:54 128 X X 34 31.758 151 02.99 10/12/93 14:54 128 X X 34 31.758 151 02.99 10/12/93 16:24 77 X X 34 30.485 190 58.38 10/12/93 16:24 65 77 X X 34 30.485 190 58.77 10/12/93 18:24 134 X X X 34 20.485 190 58.77 10/12/93 18:24 134 X X X 34 20.485 190 58.71 10/12/93 18:24 134 X X X 34 20.485 190 58.71 10/12/93 18:24 148 X X X 34 20.485 190 58.71 10/12/93 21:32 44 X X X 34 20.385 180 58.71 10/12/93 21:32 45 X X X 34 20.385 180 58.71 10/12/93 21:32 46 X X X 34 20.385 180 58.71 10/12/93		34.735		11:39	120				×							
34 32,138 151 04,68 10/12/93 14:00 132 34 31,758 151 04,68 10/12/93 14:00 132 34 31,758 151 02,99 10/12/93 16:24 10 34 31,405 151 01,20 10/12/93 16:24 10 34 26,558 150 02,56 10/12/93 16:54 40 34 26,568 151 03,57 10/12/93 18:14 134 34 26,568 151 03,57 10/12/93 18:17 11 34 26,568 151 03,57 10/12/93 18:17 11 34 26,568 151 03,57 10/12/93 18:17 11 34 26,568 151 03,57 10/12/93 18:17 14 34 26,568 151 03,57 10/12/93 18:17 14 34 26,568 151 03,57 10/12/93 18:18 18:18 34 26,578 10/12/93 10/12/93 18:18 18:18 34 26,58 151 03,57 10/12/93 18:18 18:18 34 26,58 151 03,57 10/12/93 18:18 18:18 34 26,58 151 03,57 10/12/93 21:32 34 34 26,58 151 03,57 10/12/93 21:32 34 34 26,58 151 03,57 10/12/93 21:32 34 34 26,37 151 00,48 22:44 36 36 37	34 31.75 15 16 04.68 10/12/93 14:00 132 X X X X X 34 31.75 15 02.99 10/12/93 16:24 128 X <td></td> <td>34.558</td> <td></td> <td>12:17</td> <td>128</td> <td></td> <td></td> <td></td> <td>×</td> <td></td> <td>×</td> <td></td> <td></td> <td>×</td> <td></td> <td></td>		34.558		12:17	128				×		×			×		
34 32.135 151 04.68 10/12/93 14.00 132 34 31.755 151 02.99 10/12/93 15.24 14.00 132 34 31.455 150 02.90 10/12/93 15.24 110 X 34 31.455 150 02.00 10/12/93 16.24 16.24 66 34 30.495 150 07.50 10/12/93 16.24 16.24 40 34 26.565 151 07.00 10/12/93 19.24 18.24 134 177 34 26.565 151 07.00 10/12/93 19.25 10/12/93 19.57 18.24 134 18.24 134 34 26.565 151 07.00 10/12/93 19.57 70/12/93 19.57 75 X X 34 26.565 151 07.00 10/12/93 19.57 70/12/93 19.57 75 X X 34 26.565 151 07.00 10/12/93 20.45 48 X X 34 26.57 11 00/12/93 20.45 48 X X 34 26.57 11 00/12/93 20.44 36 X X 34 26.57 11 00/12/93 20.44 36 X X 34 26.57 11 00/12/93 20.44 36 X X 34 26.35 11 00.40 30 20.40 46 X X X 34 22.30 11 10/12/93 20.44 36 X X X 34 22.30 11 10/12/93 30.04 46 X X X 34 22.30 11 10/12/93 30.04 46 X X X 34 22.40 15 16 10.45 11/12/93 30.04 46 X X X 34 22.40 15 16 10.45 11/12/93 30.04 47 X X X 34 17.25 15 16 10.44 11/12	44 32 135 151 04,68 10/12/93 14:00 132 132 X X 44 31.785 151 02,98 10/12/93 14:54 128 128 X X 34 31.485 150 29.38 10/12/93 16:24 66 77 X X 34 30.485 150 59.38 10/12/93 16:24 66 77 X X 34 30.485 150 57.56 10/12/93 16:24 66 77 X X 34 26.56 151 07 06 10/12/93 18:24 11 174 X X 34 26.56 151 07 06 10/12/93 19:11 11/17 117 X X 34 26.56 151 07 06 10/12/93 19:11 11/17 117 X X 34 26.56 151 07 06 10/12/93 19:11 11/17 117 X X 34 26.56 151 07 06 10/12/93 19:11 11/17 117 X X 34 26.66 151 10 06 05.77 10/12/93 19:17 17 X X X 34 26.67 15 10 06 05.77 10/12/93 21:32 25.41 35 X X X 34 26.75 15 10 00.48 11/12/93 21:32 36 X X X X 34 27.75 15 16 04.27 11/12/93 21:34 70 X X X X X 34 2																
34 3.7.75	44 3.775 510.286 10/12/93 14:00 132 X X 34 3.175 510.286 10/12/93 16:24 110 128 X X 34 3.1405 151.02.99 10/12/93 16:24 110 17 X X 34 3.1405 151.02.99 10/12/93 16:24 124 X X X 34 3.0485 150.67.66 10/12/93 16:24 134 X X X 34 2.6565 151.02.06 10/12/93 16:14 117 117 X X 34 2.6565 151.02.06 10/12/93 19:36 91 91 X X 34 2.6565 151.02.29 10/12/93 19:36 91 91 X X 34 2.6565 151.02.29 10/12/93 19:36 91 48 X X X 34 2.6575 10/12/93 10/12/93 19:36 46 X X X X 34 2.675 10/12/93 10/12/93 21:32 46 X X X X 34 2.675 10/12/93 10/12/93 21:32 46 X X X X 34 2.675 151.00.48 11/12/93 21:32 46 X X X X 34 2.675 151.00.48 11/12/93 23:36 46 X X X X 34 2.775 150.04.11/12/93 23:36 11/12/93 23:36 11/12/93 23:36 11/12/9																
34 31.75 10 2.99 10 12.99 15.24 110 11	34 31.755 150 2.99 (1)12.93 15-54 110		34 32.135 151 04.		14:00	132				×		×			×		
34 31,438 150 51,30 10/12/93 16:24 110	34 31,435 150 59.38 10/12/93 16:54 110		34 31.755 151 02.		14:54	128				×							
34 31.435 150 59.38 10/12/93 15:62 77 34 30.485 150 59.38 10/12/93 16:62 77 34 30.485 150 57 10/12/93 16:64 40 34 26.565 151 03.29 10/12/93 16:74 40 34 26.565 151 03.29 10/12/93 19:36 91 34 26.565 151 03.29 10/12/93 19:36 91 34 26.565 150 03.91 10/12/93 19:37 75 34 26.565 150 05.57 10/12/93 21:32 48 34 26.565 150 05.57 10/12/93 21:32 34 34 26.575 150 05.57 10/12/93 21:32 34 34 21.775 150 57.57 10/12/93 22:41 35 X 0.31 X X X X 34 22.305 150 05.41 10/12/93 23:35 45 X 25.44 X X X X X X X X X X X X X X X X X X	34 31.438 50 59.38 10/12/93 16:62 77 34 30.488 50 59.38 10/12/93 16:64 40 34 30.488 50 57.76 10/12/93 16:64 40 34 26.565 16 0.706 10/12/93 16:74 134 X 34 26.565 16 0.323 10/12/93 16:74 134 X 34 26.658 16 0.323 10/12/93 16:77		34 31 40S 151 Ot		15.24	110				×			•				
34 26.565 15 05 75 0 10 12 93 16 24 40	34 26.555 151 07.06 10/12/93 16:24 65 34 26.555 151 07.06 10/12/93 16:24 65 34 26.555 151 07.06 10/12/93 19:77 10/12/93 19:78 89 34 26.555 151 07.06 10/12/93 19:77 10/12/93 19:78 89 34 26.555 151 03.29 10/12/93 19:77 75 34 26.555 151 03.29 10/12/93 20:46 45 34 26.555 151 03.29 10/12/93 20:46 45 34 26.555 150 03.67 10/12/93 20:46 45 34 26.555 150 03.67 10/12/93 20:47 35 34 26.575 10/12/93 20:47 35 34 26.575 10/12/93 20:47 35 34 26.575 10/12/93 20:47 35 34 26.575 10/12/93 20:47 35 34 26.575 10/12/93 20:47 35 34 26.575 151 04.29 11/12/93 20:47 35 34 27.575 150 02.66 11/12/93 20:47 35 34 27.575 150 02.66 11/12/93 20:47 35 34 27.575 150 02.67 11/12/93 20:47 35 34 27.575 150 02.67 11/12/93 20:47 35 34 27.575 150 02.67 11/12/93 10:47 35 34 27.575 150 02.67 11/12/93 10:47 35 34 27.575 150 02.67 11/12/93 10:47 35 34 18.085 151 14.99 11/12/93 10:47 35 34 18.25 151 12.07 11/12/93 10:47 35 34 18.25		31 435		15.52	7.7				< >							
34 26.565 16 107.06 10/12/93 18:24 134	34 26.56S 15 07.06 10/12/93 16:24 40 X X 34 26.56S 15 08.577 10/12/93 18:24 134 X X 34 26.56S 15 07.06 10/12/93 19:36 91:37 177 X X 34 26.56S 15 01.24S 19:36 19:36 45 X X X 34 26.58S 15 01.24S3 10:36 10:36 45 X X X 34 26.58S 15 06.57.71 10/12/93 21:32 34 X X X 34 26.58S 15 06.57.72 10/12/93 21:32 34 X X X 34 26.34S 150 65.77 10/12/93 22:34 45 X 25,44 X X 34 27.78S 150 65.77 10/12/93 23:35 46 X 25,44 X X 34 22.48S 150 02.66 11/12/93 23:36 46 X 25,44 X X <th< td=""><td></td><td>2000</td><td></td><td>20.01</td><td>7 2 2</td><td></td><td></td><td></td><td>< ></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		2000		20.01	7 2 2				< >							
34.26.555 151 07.06 10/12/93 18:24 134	34.26.555 161 07.06 10/12/93 18:24 134 34.26.555 161 07.06 10/12/93 18:11 117 34.26.645 161 04.97 10/12/93 19:11 117 34.26.645 161 04.97 10/12/93 19:36 91 34.26.655 161 01.35 10/12/93 19:36 91 34.26.655 160 05.37 10/12/93 20:46 48 34.26.655 160 05.47 10/12/93 21:32 34 34.26.555 160 05.47 10/12/93 21:32 34 34.27.75 160 05.77 10/12/93 22:41 36 X 34.22.355 160 05.60 11/12/93 23:35 46 X 26, 70 34.22.405 161 02.60 11/12/93 23:32 14 X X 34.22.405 161 02.60 11/12/93 3:30 114 X 37 34.22.405 161 02.00 11/12/93 3:30 114 X 37 34.12.256 161 02.00 11/12/93 13:30 14 X 46, 118				16:24	6 5				< >		>			>		
34 26 565 151 07.06 10/12/93 18:24 134	34 26.565 151 07.06 10/12/93 18:24 134 34 26.565 151 07.09 10/12/93 19:31 117 34 26.565 151 03.23 10/12/93 19:36 91 34 26.565 151 03.24 10/12/93 19:36 91 34 26.555 160 57.51 10/12/93 21:32 34 34 26.557 160 57.51 10/12/93 21:32 34 34 26.558 160 57.57 10/12/93 21:32 34 34 26.557 160 67.27 10/12/93 21:32 34 34 27.775 160 67.27 10/12/93 22:41 35 X 34 22.575 161 60.48 11/12/93 23:34 45 X 25,44 X 34 22.575 161 60.48 11/12/93 13:34 70 X 25,51 X 34 22.575 161 60.48 11/12/93 13:34 70 X 25,61 X 34 22.575 161 60.48 11/12/93 13:34 70 X 25,61 X 34 22.575 161 60.48 11/12/93 13:34 70 X 25,70 X 34 22.575 161 60.48 11/12/93 13:34 70 X 25,70 X 34 22.575 161 60.58 11/12/93 13:30 14 X 37,110 X <				0.54	1				<		<			<		
34 26.565 161 07.06 10/12/93 18:24 134 134 X X 34 26.564 161 04.37 10/12/93 19:11 117 X X 34 26.565 161 03.26 10/12/93 19:57 76 X X 30 26.565 161 01.29 10/12/93 20:46 48 X X 34 26.565 160 57.51 10/12/93 20:46 46 X X 34 26.565 160 67.51 10/12/93 21:32 34 X X 34 26.565 160 67.27 10/12/93 22:41 35 X 0,31 X X 34 22.33 160 69.04 10/12/93 22:41 36 X 26,51 X X 34 22.45 161 02.64 11/12/93 23:36 45 X 26,51 X X 34 22.45 161 02.66 11/12/93 23:3 61 X 26,51 X X 34 22.45 161 02.66 11/12/93 23:2 14 X 27,89 X X 34 22.65 161 02.60 11/12/93 23:2 12 X 48,940 X <t< td=""><td>34 26.565 161 0.06 10/12/93 18:24 134 134 X X X X X 34.66.68 161 0.49 171 0.49 3 36.648 161 0.49 171 0.49 3 36.648 161 0.49 171 0.49 3 19:11 117 X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	34 26.565 161 0.06 10/12/93 18:24 134 134 X X X X X 34.66.68 161 0.49 171 0.49 3 36.648 161 0.49 171 0.49 3 36.648 161 0.49 171 0.49 3 19:11 117 X																
34 26.64S 151 04.97 10/12/93 19:11 177 X 34 26.64S 151 04.97 10/12/93 19:36 91 34 26.64S 151 04.97 10/12/93 19:36 91 34 26.56S 151 04.93 10/12/93 19:36 91 34 26.55S 151 04.93 10/12/93 20:46 48 34 26.55S 150 05.57 10/12/93 21:32 34 34 26.34S 150 55.04 10/12/93 22:41 35 X 0, 31 X X 34 21.77S 150 59.04 10/12/93 22:41 35 X 0, 31 X X X 34 22.33S 150 59.04 10/12/93 23:35 45 X 0, 31 X X X 34 22.33S 150 59.04 10/12/93 23:35 45 X 0, 31 X X X X 34 22.57S 151 00.48 11/12/93 23:35 45 X 0, 31 X X X X X X X X X X X X X X X X X X	34 26.64S 16 04.97 10/12/93 19:11 17 34 26.64S 16 10.49 10/12/93 19:11 117 34 26.65S 16 10.32 10/12/93 19:36 91 34 26.65S 16 04.97 10/12/93 20:45 48 34 26.65S 16 05.67 10/12/93 20:45 48 34 26.65S 16 05.67 10/12/93 21:32 44 34 26.34S 160 59.67 10/12/93 22:41 35 X 34 22.33S 160 59.04 10/12/93 23:35 45 X 25,44 X X 34 22.35S 160 69.04 10/12/93 23:36 45 X 25,44 X X 34 22.35S 160 69.04 10/12/93 23:36 45 X 25,44 X X 34 22.35S 160 69.04 10/12/93 23:36 45 X 25,44 X X 34 22.35S 160 69.04 11/12/93 0.34 X 25,70 X X 34 22.40S 161 00.26 11/12/93 23:2 92 X 25,70 X X 34 22.40S 161 00.26 11/12/93 23:3		26 555		18.24	134		,		×		×			. ×		
34 26.66S 151 03.23 10/12/93 19:36 91	34 26.68 15 03.23 10/12/93 19:36 91 34 26.68 15 10 03.23 10/12/93 19:36 91 30 26.68 15 10 13.26 10/12/93 21:09 46 34 26.58 160 55.71 10/12/93 21:02 46 34 26.58 160 55.71 10/12/93 22:41 36 X 34 26.58 160 55.77 10/12/93 22:41 36 X X 34 21.77 160 55.77 10/12/93 22:41 36 X X X 34 22.38 16 50.49 10/12/93 23:36 45 X 25,44 X X 34 22.40s 16 10.26 11/12/93 1:34 70 X X X 34 22.40s 15 10.26 11/12/93 2:32 92 X 25,61 X X 34 22.40s 16 04.23 11/12/93 2:32 92 X 27,89 X X 34 22.40s 16 04.11 11/12/93 3:30 114 X 37,110 X X 34		26 645		19:11	117				< ×		(:		
34 26.558 151 0.35 10.12/93 20.45 48 X X X X X X X X X X X X X X X X X X	30 26.568 161 0.36 10/12/93 19-57 75 30 26.568 161 0.36 10/12/93 19-57 76 34 26.568 160 10.36 10/12/93 20-45 48 34 26.568 160 67.51 10/12/93 21:32 34 34 26.348 160 67.27 10/12/93 22:41 36 X 0,31 X 34 22.338 160 69.04 10/12/93 23:36 46 X 26,44 X X 34 22.578 160 60.04 10/12/93 23:36 46 X 26,44 X X 34 22.78 160 60.04 10/12/93 23:36 46 X 26,44 X X 34 22.78 160 60.04 10/12/93 23:36 45 X 26,70 X X 34 22.78 161 02.66 11/12/93 3:30 114 X X X 34 23.78 161 02.66 11/12/93 3:30 114 X X X 34 22.68 161 02.66 11/12/93 7:33 861 X				10.36	. 6				* *							
34 26.565 150 57.51 10/12/93 20:45 48	34 26.568 150 10.38 19:57 76 34 26.568 150 10.38 19:19.3 19:19.4 X 34 26.568 150 10.1293 21:09 45 X 34 26.568 160 5.97 10/12/93 21:32 34 X 34 21.778 150 5.07 10/12/93 22:41 35 X 0,31 X 34 22.38 150 6.04 11/12/93 23:36 45 X 25,44 X X 34 22.40s 151 0.0.66 11/12/93 11/12/93 1:34 70 X 25,70 X X 34 22.40s 151 0.0.45 11/12/93 1:34 70 X 25,70 X X 34 22.40s 151 0.6.17 11/12/93 1:34 70 X 25,70 X X 34 22.40s 151 0.6.17 11/12/93 1:34 70 X 25,70 X X 34 22.40s 151 0.6.11 11/12/93 1:34 X 37,110 X X 34 25.48s 151 26.86 11/12/93 11/12/93 1:35 851 X 48,840 X 34 18.08S 151 14.99 11/12/93 16:51 14 X X X 34 14.92S 151 0.0.75 11/12/93				9.50	- L				< >							
34 26.345 150 55.07 10/12/93 20:49 48 X X X 34 26.345 150 55.07 10/12/93 21:30 448 X X X X 34 26.345 150 55.07 10/12/93 21:32 34 X X X X X X X X X X X X X X X X X X	34 26.545 150 55.51 10/12/93 21:32 44 5				10:61	6/				< >							
34 26.355 150 5.51 10/12/93 21:32 34 X X X X X X X X X X X X X 26.345 150 55.77 10/12/93 21:32 34 X X X X X X X X X X X X X X X X X X	34 26.355 100 J., 51 10/12/93 21:09 45 X				20:45	χ 4 .				≺ ;							
34 21.775 150 57.27 10/12/93 22:41 35 X 0,31 X X 34 22.335 150 59.04 10/12/93 23:35 45 X 25,44 X X X 34 22.355 150 00.48 11/12/93 23:35 45 X 25,51 X X X 34 22.455 151 00.48 11/12/93 2:32 92 X 25,70 X X X 34 22.905 151 04.23 11/12/93 3:30 114 X 37,110 X X X 34 22.905 151 06.11 11/12/93 3:30 114 X 37,110 X X X X 34 22.905 151 06.11 11/12/93 3:30 114 X 37,110 X X X X 34 22.905 151 06.11 11/12/93 1:34 48.840 X X X X 34 25.485 151 26.85 11/12/93 16:51 14.3	34 21.775 150 57.27 10/12/93 22:41 35 X 0,31 X X X 34 22.385 150 0.48 11/12/93 23:35 45 X 25,44 X X X 34 22.385 150 0.48 11/12/93 23:35 45 X 25,51 X X X 34 22.405 151 0.0.48 11/12/93 2:32 92 X 27,89 X X 34 22.905 151 0.6.11 11/12/93 3:30 114 X 37,110 X X X X 34 23.765 151 0.6.11 11/12/93 3:30 114 X 37,110 X X X X X X X X X X X X X X X X X X		20.02		21:09	45				< ×		>			>		
34 21.775 150 57.27 10/12/93 22:41 35 X 0, 31 X X 34 22.335 150 59.04 10/12/93 23:35 45 X 25, 44 X X 34 22.335 150 59.04 11/12/93 23:35 45 X 25, 51 X X 34 22.405 151 00.48 11/12/93 1:34 70 X 25, 70 X X 34 23.175 151 00.423 11/12/93 2:32 92 X 27, 89 X X 34 22.405 151 06.11 11/12/93 3:30 114 X 37, 110 X X 34 23.765 151 07.60 11/12/93 4:32 126 X 46, 118 X X 34 25.485 151 26.85 11/12/93 7:33 851 X 48, 840 X X 34 18.085 151 14.99 11/12/93 17:26 134 X X X 34 16.435 151 06.42 11/12/93 17:26 134 X X 34 16.435 151 06.42 11/12/93 18:46 79 X X 34 14.4958 151 07.40 </td <td>34 21.775 150 57.27 10/12/93 22:41 35 X 0,31 X X 34 22.335 150 59.04 10/12/93 23:35 45 X 25,44 X X 34 22.357 151 00.48 11/12/93 23:35 45 X 25,51 X X 34 22.405 151 00.48 11/12/93 1:34 70 X 25,70 X X 34 22.405 151 00.41 11/12/93 2:32 92 X 27,89 X X 34 22.905 151 00.41 11/12/93 3:30 114 X 37,110 X X 34 25.485 151 06.85 11/12/93 7:33 851 X 46,118 X X 34 17.225 151 12.07 11/12/93 7:33 861 X 48,840 X X 34 16.615 12.07 11/12/93 18:03 121 X 48,840 X X 34 16.615 12.07 11/12/93 18:03 121 X X X 34 16.615 151 06.42 11/12/93 18:46 79 X X</td> <td></td> <td>240.04</td> <td></td> <td>70.12</td> <td>† 5</td> <td></td> <td></td> <td></td> <td><</td> <td></td> <td><</td> <td></td> <td></td> <td><</td> <td></td> <td></td>	34 21.775 150 57.27 10/12/93 22:41 35 X 0,31 X X 34 22.335 150 59.04 10/12/93 23:35 45 X 25,44 X X 34 22.357 151 00.48 11/12/93 23:35 45 X 25,51 X X 34 22.405 151 00.48 11/12/93 1:34 70 X 25,70 X X 34 22.405 151 00.41 11/12/93 2:32 92 X 27,89 X X 34 22.905 151 00.41 11/12/93 3:30 114 X 37,110 X X 34 25.485 151 06.85 11/12/93 7:33 851 X 46,118 X X 34 17.225 151 12.07 11/12/93 7:33 861 X 48,840 X X 34 16.615 12.07 11/12/93 18:03 121 X 48,840 X X 34 16.615 12.07 11/12/93 18:03 121 X X X 34 16.615 151 06.42 11/12/93 18:46 79 X X		240.04		70.12	† 5				<		<			<		
34 21.775 150 67.27 10/12/93 22:41 35 X 0, 31 X 34 22.335 150 59.04 10/12/93 23:35 45 X 25, 44 X X 34 22.575 151 00.48 11/12/93 0:34 51 X 25, 51 X X 34 22.405 151 02.65 11/12/93 1:34 70 X 25, 51 X X 34 22.405 151 02.65 11/12/93 2:32 92 X 27, 89 X X 34 22.405 151 06.11 11/12/93 3:30 114 X 37, 110 X X 34 22.405 151 06.61 11/12/93 4:32 126 X 46, 118 X X 34 22.46 151 06.61 11/12/93 7:33 851 X 48, 840 X X 34 18.08 151 14.99 11/12/93 16:51 143 X X X 34 16.43 151 12.07 11/12/93 18:03 121 X X X 34 16.61 151 16.61 11/12/93 18:46 79 X X <td>34 21.775 150 57.27 10/12/93 22:41 35 X 0,31 X X 34 22.335 150 59.04 10/12/93 23:35 45 X 25,44 X X 34 22.35 151 00.48 11/12/93 1:34 70 X 25,70 X X 34 22.40s 151 00.48 11/12/93 3:30 114 X 27,89 X X 34 22.40s 151 00.43 11/12/93 3:30 114 X 27,89 X X 34 22.40s 151 00.43 11/12/93 4:32 126 X 46,118 X X 34 22.40s 151 00.41 11/12/93 4:32 126 X 46,118 X X 34 22.48s 151 26.85 11/12/93 16:51 14 X 48,840 X X 34 17.22s 151 12.07 11/12/93 16:51 143 X X X 34 16.61s 151 06.42 11/12/93 18:03 121 X X X 34 16.51s 151 06.35 11/12/93 18:03 121 X X X</td> <td></td>	34 21.775 150 57.27 10/12/93 22:41 35 X 0,31 X X 34 22.335 150 59.04 10/12/93 23:35 45 X 25,44 X X 34 22.35 151 00.48 11/12/93 1:34 70 X 25,70 X X 34 22.40s 151 00.48 11/12/93 3:30 114 X 27,89 X X 34 22.40s 151 00.43 11/12/93 3:30 114 X 27,89 X X 34 22.40s 151 00.43 11/12/93 4:32 126 X 46,118 X X 34 22.40s 151 00.41 11/12/93 4:32 126 X 46,118 X X 34 22.48s 151 26.85 11/12/93 16:51 14 X 48,840 X X 34 17.22s 151 12.07 11/12/93 16:51 143 X X X 34 16.61s 151 06.42 11/12/93 18:03 121 X X X 34 16.51s 151 06.35 11/12/93 18:03 121 X X X																
34 22.335 150 59.04 10/12/93 23:35 45 X 25,44 X X 34 22.575 151 00.48 11/12/93 0:34 51 X 25,51 X X X 34 22.575 151 00.48 11/12/93 0:34 51 X 25,51 X X X X 34 22.40S 151 02.65 11/12/93 2:32 92 X 27,89 X X X 34 22.90S 151 06.11 11/12/93 3:30 11/4 X 37,110 X X X 34 23.76S 151 07.60 11/12/93 3:30 11/4 X 37,110 X X X 34 25.48S 151 26.85 11/12/93 7:33 851 X 48,840 X X X X X X X X X X X X X X X X X X X	34 22.33	7			22:41	35	×		×	×							
34 22.575 151 00.48 11/12/93 0:34 51 X 25, 51 X X 34 22.40S 151 02.65 11/12/93 1:34 70 X 25, 70 X X X 34 22.40S 151 02.65 11/12/93 2:32 92 X 27, 89 X X X 34 22.90S 151 06.11 11/12/93 3:30 114 X 37, 110 X X X 34 23.76S 151 07.60 11/12/93 4:32 12.6 X 46, 118 X X X 34 25.48S 151 26.85 11/12/93 7:33 851 X 48, 840 X X X X X X X X X X X X X X X X X X X	34 22.57S 151 00.48 11/12/93 0:34 51 X 25, 51 X X 34 22.40S 151 02.65 11/12/93 1:34 70 X 25, 70 X X 34 22.40S 151 04.23 11/12/93 2:32 92 X 27, 89 X X 34 22.90S 151 06.11 11/12/93 3:30 114 X 37, 110 X X 34 22.90S 151 06.17 11/12/93 4:32 126 X 46, 118 X X 34 25.48S 151 26.85 11/12/93 7:33 851 X 48, 840 X X 34 18.08S 151 14.99 11/12/93 16:51 143 X X X 34 16.48S 151 09.17 11/12/93 18:03 121 X X X 34 16.48S 151 06.42 11/12/93 18:46 79 X X X 34 16.48S 151 06.17 11/12/93 18:46 79 X X X 34 14.92S 151 03.76 11/12/93 19:15 55 X X X 34 14.39S 151 01.76 <t< td=""><td>ω</td><td></td><td></td><td>23:35</td><td>45</td><td>×</td><td>25. 44</td><td>×</td><td>×</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	ω			23:35	45	×	25. 44	×	×							
34 22.40S 151 02.65 11/12/93 1:34 70 X 25, 70 X X 34 22.40S 151 02.65 11/12/93 2:32 92 X 27, 89 X X X 34 22.90S 151 06.11 11/12/93 3:30 114 X 37, 110 X X X 34 22.90S 151 06.11 11/12/93 4:32 12.6 X 46, 118 X X X 34 25.48S 151 26.85 11/12/93 7:33 851 X 48, 840 X X X X X X X X X X X X X X X X X X X	34 22.40S 151 02.65 11/12/93 2:32 92 X 27, 89 X X X 34 22.40S 151 02.65 11/12/93 2:32 92 X 27, 89 X X X X 34 22.90S 151 06.11 11/12/93 3:30 114 X 37, 110 X X X X 34 22.90S 151 06.11 11/12/93 4:32 12.6 X 46, 118 X X X X X X X X X X X X X X X X X X	o.			0:34	51	×	25, 51	×	×							
34 22.75 151 04.23 177 172 193 2:32 92 X 27,89 X X 34 22.305 151 04.23 174 172 193 3:30 114 X 37,110 X X X 34 22.905 151 06.11 171 2/93 3:30 114 X 37,110 X X X 34 22.905 151 06.11 171 2/93 4:32 126 X 46,118 X X X 34 25.485 151 26.85 11/12/93 7:33 851 X 48,840 X X X X X X X X X X X X X X X X X X X	34 23.765 151 05.23 11/12/93 3:30 114 X 37, 110 X X X 34 23.765 151 05.61 11/12/93 3:30 114 X 37, 110 X X X X X X X X X X X X X X X X X X	5			1.34	2	: ×	25 70	>	: ×							
34 25.485 151 26.85 11/12/93 3:30 114 X 37,110 X X X 34 22.505 151 07.60 11/12/93 3:30 114 X 37,110 X X X 34 25.485 151 26.85 11/12/93 7:33 851 X 48,840 X X X X X X X X X X X X X X X X X X X	34 22.005 151 05.00 11/2/93 2.32 114			•	3.33	000	< >	27, 29	< >	< >							
34 23.765 151 00.11 11/12/93 3.30 114	34 23.765 151 00.11 11/12/93 5.330 114		•	•	2.02	7 7	< >	27, 03	< >	< >							
34 25.485 151 26.85	34 25.485 151 26.85 11/12/93 7:33 861 X 48,840 X X X X X 34 25.485 151 26.85 11/12/93 7:33 861 X 48,840 X X X X X X X X X X X X X X X X X X X	7 (00:00	4 6 6	< >	37, 110	< ;	< >							
34 25.485 151 26.85 11/12/93 7:33 851 X 48,840 X X X 34 18.08S 151 14.99 11/12/93 16:51 143 X X X 34 16.43S 151 109.17 11/12/93 18:03 121 X X X X X 34 16.43S 151 09.17 11/12/93 18:03 121 X X X X 34 16.43S 151 03.58 11/12/93 19:15 55 X X X X X X X X X X X X X X X X X	34 25.485 151 26.85 11/12/93 7:33 851 X 48,840 X X X 34 18.08S 151 14.99 11/12/93 16:51 143 X X X X 34 18.08S 151 14.99 11/12/93 17:25 134 X X X X X X X X 34 16.43S 151 09.17 11/12/93 18:03 121 X X X X X X X 34 15.51S 151 06.42 11/12/93 18:46 79 X X X X X X X X X X X X X X X X X X	2 :			4:32	971	< :	40, 118	<	< 1							
151 14.99 11/12/93 16:51 143 X 151 12.07 11/12/93 17:25 134 X 151 09.17 11/12/93 18:03 121 X 151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 65 X 151 01.76 11/12/93 20:17 43 X X	151 14.99 11/12/93 16:51 143 X X 151 12.07 11/12/93 17:25 134 X 151 09.17 11/12/93 18:03 121 X 151 06.42 11/12/93 18:46 79 X 161 03.58 11/12/93 19:15 55 X 161 01.76 11/12/93 20:17 43 X X	14			7:33	851	×		×	×					×		
151 14.99 11/12/93 16:51 143 X X 151 12.07 11/12/93 17:25 134 X 151 09.17 11/12/93 18:03 121 X 151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 65 X 151 01.76 11/12/93 20:17 43 X	151 14.39 11/12/93 16:51 143 X X 151 12.07 11/12/93 17:25 134 X 151 09.17 11/12/93 18:03 121 X 151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 55 X 151 01.76 11/12/93 20:17 43 X X																
15 14.39 11/12/93 16:51 14.3 X	15 14.39 11/12/93 16:51 14.3				i	,				;		;			;		
151 12.07 11/12/93 17:25 134 X 151 09.17 11/12/93 18:46 79 X 151 06.42 11/12/93 19:15 55 X X X 151 01.378 11/12/93 20:17 43 X X	151 12.07 11/12/93 17:25 134 X 151 09.17 11/12/93 18:03 12.1 X 151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 20:17 43 X X				16:51	143				× ;		×			×		
151 09.17 11/12/93 18:03 121 X 151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 55 X 151 01.76 11/12/93 20:17 43	151 09.17 11/12/93 18:03 121 X 151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 55 X 151 01.76 11/12/93 20:17 43 X				17:25	134				×							
151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 55 X 151 01.76 11/12/93 20:17 43 X	151 06.42 11/12/93 18:46 79 X 151 03.58 11/12/93 19:15 55 X 151 01.76 11/12/93 20:17 43 X X				18:03	121				×							
151 03.58 11/12/93 19:15 55 X X 151 01.76 11/12/93 20:17 43 X X X	151 03.58 11/12/93 19:15 65 151 01.76 11/12/93 20:17 43			•	18:46	79				×							
151 01 76 11/12/93 20:17 43 x x	151 01.76 11/12/93 20:17 43 X X			•	19:15	55				×							
					20.17	43				: >		>			>		

Table 1 (continued)

Gravity coring			4																																								
Box coring			ო																																								
Total	>	<		×					;	×	;	<		>	< >	< ×	(;	×		>	<	>	< ×	×	;	×	×	×			×	×		×	×	×			×	×		×
gy Parasite									;	×	>	<						;	×		>	<				;	×					×									×		×
Microbiology Virus F									;	×	;	≺ .						;	×		>	<				;	×					×									×		×
Bacto	>	<		×					;	×	>	<		>	< >	×	;	;	×		>	<	>	< ×	×	;	×	×	< ×	:		×	×		×	×	×			×	×		×
Zoology Plankton																		;	×;	<				-	×										×								
Sediment	>	××	×	×		×	××	<		× ;	× >	< >	< >	< >	< >	×	;	;	×	< >	< >	< >	< >	< ×	×	•	×	<	×	×	×	×	×		×	×	×	×	×	×	×	×	×
Lipids Water	>	××	×	×					;	× :	×	< >	< >	< >	< >	×		;	< >	<	>	< >	< >	< ×	×	;	× >	<	×	×	×	×	×		×	×	×	×	×	×	×	×	×
Sampling	25 AC	50,	0, 25, 115	0, 25, 130					,	o, 18	10, 25	15, 30, 51	0, 10, 73	0, 30, 33	0, 31, 130	25,	ì	1	0, 25, 50	72,		0, 25, 77	, ŭ	2,5	35,	0	30, 38	o, 30, 45	0.35.77		0, 35, 92	0, 35, 100	30, 130		20,	0, 30, 175	0, 30, 142	0, 25, 80	25,	<u>1</u> 2	46,	25,	0, 25, 45
Hydrology sampling	>	< ×	×	×					>	× :	× >	< >	< >	< >	< >	< ×	:	;	×	<	>	< >	< >	< ×	×	;	× ×	<	×	: ×	×	×	×		×	×	×	×	×	×	×	×	×
Water Depth	97	95	118	132		48	33	3	ć	23	32	9 <u>9</u>	- 5	<u> </u>	148	300)	ì	22	ດ <u>ເ</u>		- L	2 2 2 1	137	400	9	4 <u>.</u>	3 2 3 3	32	92	102	111	139		434	179	145	80	91	88	82	89	48
Time UTC	7.	22:18	23:32	1:02		4:38	4:57 5:24	t 7	Ç	80:9 1	7:05	8:01 6:50	9.00	11:13	12:35	14:08		0	19:04	20:05	21:19	23:00	23:00	1.1	3:22	0	6:36	7:40	8:37	9:47	10:33	11:23	12:48		14:59	16:35	17:54	19:00	19:54	21:00	22:00	23:03	23:57
Date UTC	11719/03	11/12/93	11/12/93	12/12/93		12/12/93	12/12/93	00/71/71		12/12/93	12/12/93	12/12/93	12/12/33	12/12/93	12/12/93	12/12/93	i i	410	12/12/93	12/12/93	12/12/93	12/12/93	12/12/93	13/12/93	13/12/93		13/12/93	13/12/93	13/12/93	13/12/93	13/12/93	13/12/93	13/12/93		13/12/93	13/12/93	13/12/93	13/12/93	13/12/93	13/12/93	13/12/93	13/12/93	13/12/93
Longitude	34 00 735 151 07 16	34 10.40S 151 09.50	34 11.26S 151 12.27	34 12.245 151 15.09			34 06.71S 151 10.33 34 05 53S 151 11 14	-	ŗ	15,	151	151 12.72	2 12		ָ קַ	151		,	2	בן ה	151 14.83		5 7	7		1	151 15.54	151 16.27	151	151	151	151	151 27.32		151	151	151	151	151	151			151 16.61
Latitude	24 00 736	34 10.40S	34 11.26S	34 12.24S		34 07.63S	34 06.71S			34 03.685	34 03.84S	34 04.103	24 00 60 60	34 03.933	34 04 015	34 03.925			34 01.225	34 01.503	34 01.955	34 01.403	34 01.423	34 01 425	34 01.415	. 6	33 59.99S	33 59 755	34 00.115	34 00.018	33 59.99S	34 00.05S	33 59.998		33 59.16S	33 58.328	33 58.18S	33 58,258	33 58.208	33 58.218	33 58.205	33 58.18S	33 58.425
CTD No	<u>, , , , , , , , , , , , , , , , , , , </u>	91	17	18								73	7 66	2 5	۲4 کا بڑ	26	ì	7	27	87	Č	67 6		33	33	3	34 T	ဂ္ဂ	36	37	38	39	40		41	42	43	44	45	46	47	48	49
Station No	Section T8	42	43	44	Metromix	45	46	÷	Section T9	48	49	50		52 53	55 74	22	.	Section T10	20	57 (Metromix)	58 (Metromix)	60	9 6	. 62	63	Section T11	64	65 (Metromix)	67	89	69	70	71	Section T12	72	73	74	75	76	77	78	79	80

Station No	CTD No	CTD No Latitude Longitude	Date	Time	Water	Hydrology		Lipids		Zoology		Microbiology			Box	Gravity
			UTC	UTC	Depth	sampling	Sampling Depths	Water	Sediment	Plankton net tow	Bacto	Virus	Parasite	Total	coring	coring
Section T13																
81	20	33 56.70S 151 16.61		2:17	37	×	, 35	×	×		×	×	×	×		
82	51			3:31	64	×	8	×	×		×	;	;	×		
83	52	151		4:30	0/	×	30	×	×		×	×	×	× :		
84	23			5:34	75	×	30,	×	×		×			×		
82 0	ζ. 4 Γ	33 56./35 151 20.91	14/12/93	6:45	84	×	0, 36, 75	< >	×	>	>			>		
80	ရှင	33 56.565 151 22.10		65:/		<	4,	<	<	<	<			<		
Section T14																
87		51	E 14/12/93	9:10	38				×	×	×			×		
88		33 54.82S 51 18.37E		9:44	49				×		×			×		
68		51	•	10:21	74				×		×			×		
06				10:50	83				×							
91		33 54.90S 51 22.31E		11:09	91				×							
92		33 54.92S 51 28.45E	E 14/12/93	11:58	126				×		×			×		
C. 1410																
Section 1 15	Ü	22 E2 24C E1 41 20E	14/12/02	19:50	000	. >	40. 202	>	>	>	>			>		
200	52	22 E2 20C E1 2E 24E		15.30	300	< >	<u>}</u> {	< >	< >	<	< >			< >		
† LO	, C	5 1	•	0.00	- 6	< >	<u>}</u>	< >	< >		< >			< >		
90	0 0	<u>.</u> .		17.48	0. 1. 10. 17.	< >	, ř	< >	< >		< >			< >		
200	6 6	2 12	•	10.40	8	< >	0, 23, 103	< >	< >		< >			< >		
60	3 6	2 12		19:30	92 75	< >	, c	< >	< >		< >			< >		
000	- 6	. L		19:30	. 7	< >	, 0	< >	< >	>	< >			< >		
100	7 6	, r	-	20.44	- 19	< >		< >	< >	<	< >	>	>	< >		
	8 8			22:10) i	< >	<u>,</u>	< >	< >		< >	<`>	< >	< >		
101	64	33 53.385 51 17.92E	E 14/12/93	23:16	29	×	0, 15, 52	×	×		×	×	×	×		
Section T16																
102		33 52 005 151 22 85	15/12/93	3.44	92				×		×			×		
103				4:01	74				×		:			:		
104		151		4:17	72				×							
105		151		4:41	99				×							
106				4:58	52				×		×			×		
107		33 51.865 151 17.65	15/12/93	5:25	38				×		×			×		
Section T17																
108		33 50.66S 151 17.85	15/12/93	5:49	35				×		×			×		
109		151	_	6:38	20				×		×			×		
110				7:12	28				×							
111				7:29	70				×							
112		151	•	8:37	79				×							
113		33 50.765 151 23.83	15/12/93	8:59	.103				×							
Section T18																
114	92	33 48.885 .151 19.88	3 15/12/93	9:51	54	×	0.44	×	×	×	×	×	×	×		
115	99	33 48.675 151 21.02		11:00	67	< ×	0, 25, 56	×	×	< ×	×	×	×	×		
116	67			12:03	67	×	25,	: ×	×	:	: ×			×		
117	89			13:12	83	×	32,	×	×							
118	69	151		14:20	106	×		×	×						က	9
119	70	151	•	18:26	118	×		×	×		×			×		
120	71	33 48.72S 151 28.40	15/12/93	19:14	125	×	0, 35, 122	×	×	×						

120 200			כ		20000			Water					1			
in 726 72				ם כ	Deptn	Sunding.			Sediment	Plankton net tow	Dack	í : :	rarasite	- Cra	coring	coring
72 23.46.18 15 12 15 15 15 15 15 15														•		
73 33 44, 64 15 15 15 18 17 19 17 14 15 15 14 17 18 18		151		20:49	120	×	30,	×	×							
77 33 46.158 161 226 161 266 266		151		21:45	109	×	32,	×	×							
To 33 46-28 161 2018 161/283		151		22:32	75	×		×	×		×			×		
To 33 46.386 15 13.08 16 12.993 1:14 35		151		0:05	43	×	25,	×	×		×			×		
Total		151		1:14	35	×	25,	×	×		×			×		
77 332 7008 515 7024 617 208 3.26 4.4 5.5 7.0 617 208 7.0 7.0 617 208 7.0 7.0 617 208 7.0 7.0 617 208 7.0	ection T25															
To 30 20 20 20 20 20 20 20 20 20 20 20 20 20		151		3:26	34	×		×	×	×	×			×		
17 23 23 23 23 23 23 23 2		5		4:21	49	×	34	: ×	×	×	< ×			: ×		
10 1724 33 33 246 161 361 7 161 1283 161 261 2 161 263 161 2		7		7.17	2 0	< >		< >	< >	'	<			<		
ion T24 813 33.248 161 3617 161/283 151 361 1				7136	800	< >	0, 35, 60	< >	< >							
State Stat		2		90:9	86	×	¥3,	×	×							
101 124 33 30 45/5 16 14 146 1617/293 7:56 126 X 0,45,117 X X X X X X X X X		151		6:57	118	×	45,	×	×							
14 15 15 15 15 15 15 15		151		7:56	126	×	45,	×	×		×			×		
10		151		9:43	140	×	44,	×	×	×	×			×		
March Marc	i															
33.32.605 161 22.70 161/293 13:33 104 X 33.32.605 161 22.70 161/293 14:42 65 33.31.605 161 22.70 161/293 14:42 65 33.31.605 161 261 161/293 16:46 36 33.34.265 161 26.78 161/293 16:46 60 33.34.265 161 21.90 161/293 16:46 60 33.34.265 161 21.90 161/293 16:49 60 33.34.265 161 21.90 161/293 20:06 32 33.37.175 161 22.13 161/293 20:06 32 33.37.175 161 22.13 161/293 20:06 32 33.37.175 161 22.35 161/293 20:06 83 33.34.265 161 20.89 161/293 20:06 83 33.34.265 161 20.89 161/293 20:06 83 33.34.265 161 20.89 161/293 20:06 83 33.34.355 161 20.89 17/1293 10:04 39 33.34.355 161 10.28 17/1293 10:04 39 33.34.355 161 10.28 17/1293 10:04 39 33.34.355 161 10.28 17/1293 20:06 56 33.34.355	ection 124															
38 22.002 15 15 2.07 16 16 12 93 14.42 81	33	151		13:33	104				×							
ion T22 33 34.565 161 20.93 1614293 16.46 63 84 33 45.565 161 20.91 161293 16.46 63 86 33 34.265 161 27.96 161293 16.48 60 87	4,	151		14:18	81				×							
in T23 33 31,485 151 2812 1617 283 15:06 52 84 33 34,035 151 28.78 1617 293 16:48 60 85 33 34,285 151 21.09 1617 293 16:48 60 33 36, 245 151 21.09 1617 293 20:06 54 33 37,75 151 28.11 1617 293 20:05 54 33 38, 38, 38 135 151 28.34 1617 293 20:05 64 33 38, 38, 38 151 28.13 1617 293 20:05 64 33 38, 38, 38 151 28.13 1617 293 20:05 64 33 38, 38, 38 151 28.13 1617 293 20:05 64 33 38, 38, 38 151 28.13 1617 293 20:05 64 33 38, 38, 38 151 28.13 1617 293 20:05 82 34 41,075 151 28.04 1617 293 20:05 82 34 44, 075 151 28.04 1617 293 20:05 82 34 38, 38, 38, 38, 38 151 28.14 171 293 20:05 82 34 38, 38, 38, 38, 38, 38, 38, 38, 38, 38,	ιΩ	151		14:42	63				×							
10 m T22 33 36.585 15 1 26.78 16 14.89 16 48 60 84 33 34.985 15 14.89 16 48 60 84 33 34.985 15 14.99 16 14.89 1		į		15.05	2 2				: >	>	>			>		
ion T23 33 36,568 161 27.66 16/12/93 16:48 60 84 33 34,975 151 27.66 16/12/93 16:48 60 85 33 36,248 151 27.06 16/12/93 16:48 60 33 36,248 151 27.09 16/12/93 20:06 32 33 36,248 151 27.09 16/12/93 20:06 32 33 37 37 37 37 37 37 37 37 37 37 37 37 3		5		15:48	35.				×	<	×			< ×		
Fig. 12 Fig. 12 Fig. 12 Fig. 12 Fig. 13 Fig. 14 Fig. 15 Fig.	•				}				:					:		
ion T22 33 36.585 161 27.66 16/12/93 16:48 60 34 33 34.95 161 24.74 16/12/93 17:38 47 × 0, 35, 44 × × × × × × × × × × × × × × × × × ×	ection T23			•												
10 12 13 14 15 12 17 16 12 13 15 15	œ.	7		16.48	S				×							
Sec. 245 15 21 21 21 22 23 24 265 15 21 23 24 265 15 21 24 24 24 24 24 24 24		, r		17.38	47	>	0 35 44	>	< >	>	>	*	>	>		
ion T22 33.36.24S 161 21:00 16/12/93 20:06 32 X X X X X X X X X X X X X X X X X X		2 1		0.70	÷ c	< >	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	< >	< >	< >	< >	< >	< >	< >	·	
ion T21 33 36.245 151 21.09 16712/93 20:06 32 33 36.245 151 21.09 16712/93 20:06 32 33 37.175 151 25.11 16712/93 21:06 83 33 39.235 151 32.97 16/12/93 21:37 123 33 39.235 151 37.02 16/12/93 22:11 130 33 40.525 151 29.46 16/12/93 23:50 114 33 40.525 151 20.48 17/12/93 23:50 82 33 43.525 151 19.28 17/12/93 23:50 82 33 43.525 151 19.28 17/12/93 1:39 30 33 43.845 151 29.0 17/12/93 2:42 87 33 43.845 151 29.0 17/12/93 2:42 87 33 43.845 151 29.0 17/12/93 2:42 87 33 43.845 151 29.0 17/12/93 2:42 87 33 43.845 151 29.0 17/12/93 3:10 17/12		2		0.00	9	<	, o	<	<	<	<	<	<	<	-	
33 36.245 151 21.09 16/12/93 20:06 32 33 37.175 151 25.11 16/12/93 20:35 54 33 39.255 151 32.97 151 32.97 123 33 39.955 151 37.02 16/12/93 22:11 130 33 41.825 151 29.45 16/12/93 22:59 125 33 41.075 151 29.46 16/12/93 23:30 114 33 41.075 151 29.46 16/12/93 23:50 82 33 39.775 151 29.47 17/12/93 23:50 82 33 34.525 151 19.28 17/12/93 1:39 30 33 43.525 151 20.83 17/12/93 1:39 30 33 43.885 151 22.10 17/12/93 2:06 56 33 43.885 151 22.10 17/12/93 2:06 56 33 43.885 151 22.10 17/12/93 2:06 56 33 43.885 151 22.10 17/12/93 2:06 56 33 43.885 151 22.10 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 33 43.885 151 28.01 17/12/93 2:06 56 34 43.885 151 28.01 17/12/93 2:06 56 35 44.885 151 28.01 17/12/93 2:06 56	ection T22															
33 37.175 151 25.11 16/12/93 20:35 54 X 33 38.185 151 29.13 16/12/93 21:06 83 X 33 39.285 151 29.13 16/12/93 22:11 130 X 33 39.585 151 32.35 16/12/93 22:11 130 X 33 41.825 151 32.35 16/12/93 23:30 114 X 33 40.52 151 20.83 17/12/93 23:50 82 X 33 39.775 151 20.83 17/12/93 1:04 39 X 33 43.585 151 20.81 17/12/93 2:06 56 56 33 43.685 151 20.10 17/12/93 2:06 56 56 33 44.085 151 20.00 17/12/93 2:06 56 50 50 50 50 50 50 50 50 50 50 50 50 50	7	151		20:06	32				×							
33 39.235 151 29.13 16/12/93 21:06 83 X 33 39.235 151 22.97 16/12/93 22:11 130 X 33 39.555 151 32.35 16/12/93 22:11 130 X 33 41.825 151 23.45 16/12/93 22:59 125 X 33 44.025 151 20.83 17/12/93 1:39 30 X 33 43.555 151 20.10 17/12/93 1:39 30 X 33 43.655 151 20.10 17/12/93 2:06 56 56 34 34.655 151 20.10 17/12/93 2:06 56 56 34 34.655 151 20.10 17/12/93 2:06 56 56 34 34.655 151 20.10 17/12/93 2:06 56 56 34 34.655 151 20.10 17/12/93 2:06 56 56 34 34.655 151 20.10 17/12/93 2:06 56 56 56 56 56 56 56 56 56 56 56 56 56	53	151		20:35	54				×							
ion T21 33 39.285 151 32.97 1512.93 21:37 123 X 33 39.985 151 32.02 16/12/93 21:37 123 X 33 39.985 151 32.02 16/12/93 22:11 130 X 33 41.075 151 29.45 16/12/93 23:50 125 X 33 40.525 151 20.64 16/12/93 23:50 82 X 33 39.775 151 23.74 17/12/93 0:16 57 X 33 39.205 151 20.83 17/12/93 1:39 30 X 33 43.525 151 19.28 17/12/93 1:39 30 X 33 43.685 151 20.10 17/12/93 2:06 56 56 X 33 43.845 151 20.91 17/12/93 2:06 56 56 X 33 43.845 151 20.91 17/12/93 2:06 56 56 X 33 43.845 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 56 X 33 44.025 151 20.91 17/12/93 2:06 56 X 33 44.025 151 20.01 17/12/93 2:06 56 X 33 44.025 151 20.01 17/12/93 2:06 56 X 34 44.025 151 20.01 17/12/93 2:06 X 34 44.025 151 20.01 17/12/9		7		21.06	č				*							
ion T21 33 41.825 151 37.02 16/12/93 22:11 130 33 41.825 151 32.35 16/12/93 22:59 125 33 40.525 151 29.45 16/12/93 23:50 114 33 40.525 151 20.83 17/12/93 0:16 57 33 43.525 151 19.28 17/12/93 1:39 30 33 43.525 151 20.10 17/12/93 2:42 87 33 44.025 151 20.01 17/12/93 2:42 87 33 44.025 151 20.01 17/12/93 2:42 87 33 44.025 151 20.01 17/12/93 2:42 87 33 44.025 151 20.01 17/12/93 2:42 87	2 4	7 5	٠	21.37	123				××							
ion T21 33 41.825 151 32.35	. .	151	•	22:11	130				×							
ion T21 33 41.825 151 32.35 16/12/93 22:59 125 33 41.075 151 29.45 16/12/93 23:30 114 33 40.525 151 20.63 17/12/93 1:39 30 33 43.525 151 19.28 17/12/93 1:39 30 33 43.625 151 20.10 17/12/93 1:39 30 33 43.625 151 20.10 17/12/93 2:06 56 33 43.625 151 20.10 17/12/93 2:06 56 33 44.025 151 20.03 17/12/93 2:06 56 33 44.025 151 20.03 17/12/93 2:06 56 33 43.625 151 20.03 17/12/93 2:06 56 33 43.625 151 20.03 17/12/93 2:06 56 34 40.025 151 20.01 17/12/93 2:06 56 35 45.025 151 20.01							٠									
State	ection T21														•	
ion T20 33 41.075 151 29.45 16/12/93 23:30 114 33 40.525 151 26.64 16/12/93 23:50 82 33 39.775 151 23.74 17/12/93 0:16 57 33 39.205 151 20.83 17/12/93 1:04 39 33 43.525 151 19.28 17/12/93 1:39 30 33 43.525 151 19.28 17/12/93 2:06 56 33 43.845 151 22.10 17/12/93 2:06 56 33 44.025 151 20.03 17/12/93 2:06 56 33 44.025 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 33 43.655 151 20.03 17/12/93 2:06 50 34 40.025 151 20.03 17/12/93 2:06 50 35 40.025 151 20.03	91	151		22:59	125				×							
ion T20 33 40.525 151 26.64 16/12/93 23:50 82 33 39.775 151 23.74 17/12/93 0:16 57 33 39.205 151 20.83 17/12/93 1:04 39 33 43.525 151 19.28 17/12/93 1:39 30 33 43.525 151 19.28 17/12/93 2:06 56 33 43.845 151 22.10 17/12/93 2:06 56 33 44.025 151 20.03 17/12/93 2:42 87 33 44.025 151 20.03 17/12/93 3:10 120 34 40.025 151 20.03 17/12/93 3:10 120	17	151		23:30	114				×		,					
33 39.775 151 23.74 17/12/93 0:16 57 X X X X 33 39.205 151 20.83 17/12/93 1:04 39 X X X X X X X X X X X X X X X X X X	8	151		23:50	82				×							
33 39.20S 151 20.83 17/12/93 1:04 39 X X X X X X X X X X X X X X X X X X	ō,	151		0:16	22				×		×			×		
ion T20 33 43.525 151 19.28 17/12/93 1:39 30 33 43.685 151 22.10 17/12/93 2:06 56 33 43.845 151 24.98 17/12/93 2:42 87 33 44.025 151 28.01 17/12/93 3:10 120	00	151	-	1:04	39				×		×			×		
ion T20 33 43.52S 151 19.28 17/12/93 1:39 30 33 43.68S 151 22.10 17/12/93 2:06 56 33 43.84S 151 24.98 17/12/93 2:42 87 33 44.02S 151 28.01 17/12/93 3:10 120																
33 43.525 151 19.28 17/12/93 1:39 30 33 43.685 151 22.10 17/12/93 2:06 56 33 43.845 151 24.98 17/12/93 2:42 87 33 44.025 151 28.01 17/12/93 3:10 120	ection T20															
33 43.685 151 22.10 17/12/93 2:06 56 33 43.845 151 24.98 17/12/93 2:42 87 33 44.025 151 28.01 17/12/93 3:10 120	51	151	•	1:39	30				×							
33 43.845 151 24.98 17/12/93 2:42 87 33 44.025 151 28.01 17/12/93 3:10 120	52	151		2:06	56				×						-	
33 44.025 151 28.01 17/12/93 3:10 120	53	151		2:42	87				×							
0.00	4.5	7		. 6	130				: >							
	· L	, L		2 6	7 .				< >							