

UNIVERSITY OF RHODE ISLAND
GRADUATE SCHOOL OF OCEANOGRAPHY

CRUISE REPORT-R/V TRIDENT
CRUISE TR-083

Schedule

Depart Narragansett, May 26, 1970 at 1455
Rendezvous off Jamestown with BILLIE II, June 3, 1970 at 1428-1438
Arrive Newport, June 10, 1970 at 1400

Region Investigated

Continental shelf off New Jersey between 38°00'N and 39°50'N (depth 10-100 fm).

Total days of cruise

15 days

Scientific Party

Both weeks - May 26-June 10, 1970

C.E. McClennen, Chief Scientist, GSO
R.L. McMaster, Co-investigator, GSO
A.B. Buddington, Marine Technician, GSO
J. Sammons, Oceanographic Specialist, GSO
C. Ciccarella, student, Northeastern University
R. England, student, Northeastern University
P. Pizzaruso, student, Northeastern University
T. Townsend, student, Northeastern University

Week I only - May 26-June 3, 1970

W. Hahn, Marine Technician, GSO
J.J. Fisher, Geologist, URI
A.W. Prichard, Electrical Engineer, Raytheon
J. Jackerson, student, Case Western Reserve

Week II only - June 3-June 10, 1970

F. Rose, Marine Technician, GSO
W. Davis, graduate student, URI

Scientific Objectives

1. Check the bathymetry on the continental shelf
2. Measure the near bottom current velocity with anchored recording meters
3. Determine the structure of the near bottom sediments (first 30 meters)
4. Determine the present sedimentary environment on the shelf

Station List

See attached

Continuous Observations

See attached

TR-083

Preliminary Results

Textural lineations in bottom photographs, ship drift experience, and tidal rips indicate the presence of significant currents. In some cases the flow is parallel to the elongate topographic highs and lows which cover much of the New Jersey Shelf. The BTs indicate thermal stratification of the water column into two layers on the inner shelf and three layers on the outer shelf where there is a warmer layer at the bottom. Some of the grab samples and box cores indicate sediment layering in the top inch down to a foot or more based on color and sorting differences and the sharp contrast of well sorted sand and blue clay. Other grab samples appeared homogeneous and well sorted to a depth of five inches. Gravity coring proved to be an ineffective approach to sampling due to the sandy nature of the surface sediments.

The preliminary impression of the seismic reflection survey carried on at 3.5 kc and around 1 kc over most of the New Jersey shelf is an absence of strong acoustic layering in the near surface sediments (~ top 30 meters). Exceptions to this occur below the Franklin Shore from Baltimore Canyon to Hudson Canyon, with the layering most clearly seen to the northeast of Tom's Canyon. Also certain of the elongate topographic highs appear to rest on continuous acoustic reflectors. Further study of the records is expected to bring out additional finer structures.

N.M.L. SUMMARY CRUISE REPORT STATION LIST

SHIP TRIDENT CRUISE NO. TR-083 PAGE 1

| STATION No. | DATE | STATION TYPE | LAT. | | LONG. | | DEPTH | | PHYSIOG. AREA |
|-------------|---------|----------------------|-----------|-----------|-----------|-----------|-------|------|---------------|
| | | | START | END | START | END | START | END | |
| 1 | 5/28/70 | Launch current meter | 39°29'N | - | 72°59'W | - | 56 m | - | N.J. Shelf |
| | | Bottom photos | " | - | " | - | 56 m | 59 m | " |
| | | <u>Gravity core</u> | " | - | " | - | 59 m | - | " |
| 2 | 5/28/70 | Launch current meter | 39°34.4'N | - | 73°26.0'W | - | 35 m | - | " |
| | | Bottom photos | " | 39°34.5'N | " | 73°26.1'W | 35 m | 32 m | " |
| 3 | 5/28/70 | Launch current meter | 38°50.7'N | - | 73°09.5'W | - | 70 m | - | " |
| | | Bottom photos | " | 38°49.7'N | " | 73°10.4'W | 70 m | 70 m | " |
| | | BT | 38°49.7'N | - | 73°10.4'W | - | 70 m | - | " |
| 4 | 5/29/70 | Bottom photos | 38°45.5'N | - | 73°03.3'W | - | 173 m | - | " |
| 5 | " | " | 39°02.0'N | - | 73°05.1'W | - | 81 m | - | " |
| 6 | " | " | 39°04.0'N | - | 73°07.0'W | - | 67 m | - | " |
| 7 | 5/31/70 | " | 38°46'N | - | 73°15'W | - | 76 m | 76 m | " |
| 8 | 6/1/70 | " | 38°50.9'N | - | 73°09'W | - | 74 m | 70 m | " |
| 9 | 6/5/70 | <u>Box core -1</u> | 38°53.4'N | - | 73°12.7'W | - | 81 m | - | " |
| 10 | " | <u>" -2</u> | 39°03.0'N | - | 73°08.0'W | - | 65 m | - | " |
| 11 | " | <u>" -3</u> | 39°18.9'N | - | 73°29.0'W | - | 47 m | - | " |

N.M.L. SUMMARY CRUISE REPORT STATION LIST

SHIP TRIDENT CRUISE NO. TR-083 PAGE 2

| STATION No. | DATE | STATION TYPE | LAT. | | LONG. | | DEPTH | | PHYSIOG. AREA |
|-------------|--------|----------------|-----------|-----------|-----------|-----------|-------|------|---------------|
| | | | START | END | START | END | START | END | |
| 12 | 6/5/70 | Box core -4 | 39°37.9'N | - | 73°49.9'W | - | 32 m | - | N.J. Shelf |
| 13 | " | " -5 | 39°34'N | - | 73°25.5'W | - | 32 m | - | " |
| 14 | " | " -6 | 39°30.7'N | - | 73°06.5'W | - | 49 m | - | " |
| 15 | " | " -7 | 39°29.5'N | - | 73°02.5'W | - | 67 m | - | " |
| 6/6/70 | | Bottom photos | 39°29.9'N | 39°30.4'N | 73°01.5'W | 73°00.0'N | 68 m | 63 m | " |
| 16 | " | " | 39°08.0'N | 39°08.3'N | 73°03.8'W | 73°03.2'W | 70 m | - | " |
| | | Grab sample -1 | 39°08.3'N | - | 73°03.2'W | - | 70 m | - | " |
| 17 | " | Bottom photos | 39°02.6'N | 39°03.2'N | 73°08'W | 73°08'W | 70 m | 68 m | " |
| | | Grab sample -2 | 39°02.8'N | - | 73°08'W | - | 70 m | - | " |
| 18 | " | Bottom photos | 39°05.4'N | - | 73°13.5'W | - | 78 m | 80 m | " |
| 19 | " | " | 38°57.2'N | 38°56.6'N | 73°14.5'W | 73°14.4'W | 75 m | 66 m | " |
| | | Grab sample -3 | 38°56.6'N | - | 73°14.4'W | - | 65 m | - | " |
| 20 | " | Bottom photos | 39°18.9'N | - | 73°28.8'W | - | 40 m | 40 m | " |
| 21 | " | " | 39°19.5'N | 39°19.2'N | 73°26.2'W | 73°25.8'W | 39 m | 38 m | " |
| | | Grab sample -3 | 39°19.2'N | - | 73°25.8'W | - | 38 m | - | " |
| 22 | " | Bottom photos | 39°37.5'N | - | 73°50'W | - | 28 m | 28 m | " |

N.M.L. SUMMARY CRUISE REPORT STATION LIST

SHIP TRIDENT CRUISE NO. TR-083 PAGE 3

| STATION No. | DATE | STATION TYPE | LAT. | | LONG. | | DEPTH | | PHYSIOG. AREA |
|-------------|--------|-------------------|-----------|---------|-----------|-----------|-------|-------|---------------|
| | | | START | END | START | END | START | END | |
| 23 | 6/6/70 | Bottom photos | 39°36.2'N | 39°36'N | 73°47'W | 73°46.8'W | 17 m | 18 m | N.J. Shelf |
| | | Grab sample - 4 | 39°36'N | - | 73°46.8'W | - | 18 m | - | " |
| 24 | 6/7/70 | Bottom photos | 39°03'N | - | 73°57.5'W | - | 27 m | 30 m | " |
| 25 | " | " | 38°54.5'N | - | 74°08.0'W | - | 35 m | 35 m | " |
| 26 | " | " | 38°50'N | - | 74°15'W | - | 35 m | 35 m | " |
| 27 | " | " | 38°33'N | - | 74°10.5'W | - | 50 m | 50 m | " |
| 28 | " | " | 38°52'N | - | 74°32'W | - | 21 m | 18 m | " |
| | | Grab sample - 5 | " | - | " | - | 18 m | - | " |
| 29 | " | " - 26 | 38°21.8'N | - | 73°45'W | - | 85 m | - | " |
| | | Bottom photos | " | - | " | - | 85 m | 87 m | " |
| 30 | " | " | 38°12'N | - | 73°48'W | - | 117 m | 118 m | " |
| | | Grab sample - 2 | " | - | " | - | 118 m | - | " |
| | | Gravity core | 38°11.3'N | - | 73°48.5'W | - | 118 m | - | " |
| 31 | " | Bottom photo | 38°30.2'N | - | 73°29.2'W | - | 113 m | 98 m | " |
| | | Grab sample - 608 | " | - | " | - | 95 m | - | " |
| 32 | 6/8/70 | Bottom photos | 38°44.4'N | - | 73°23.5'W | - | 75 m | 72 m | " |

N.M.L. SUMMARY CRUISE REPORT STATION LIST

SHIP TRIDENT CRUISE NO. TR-083 PAGE 4

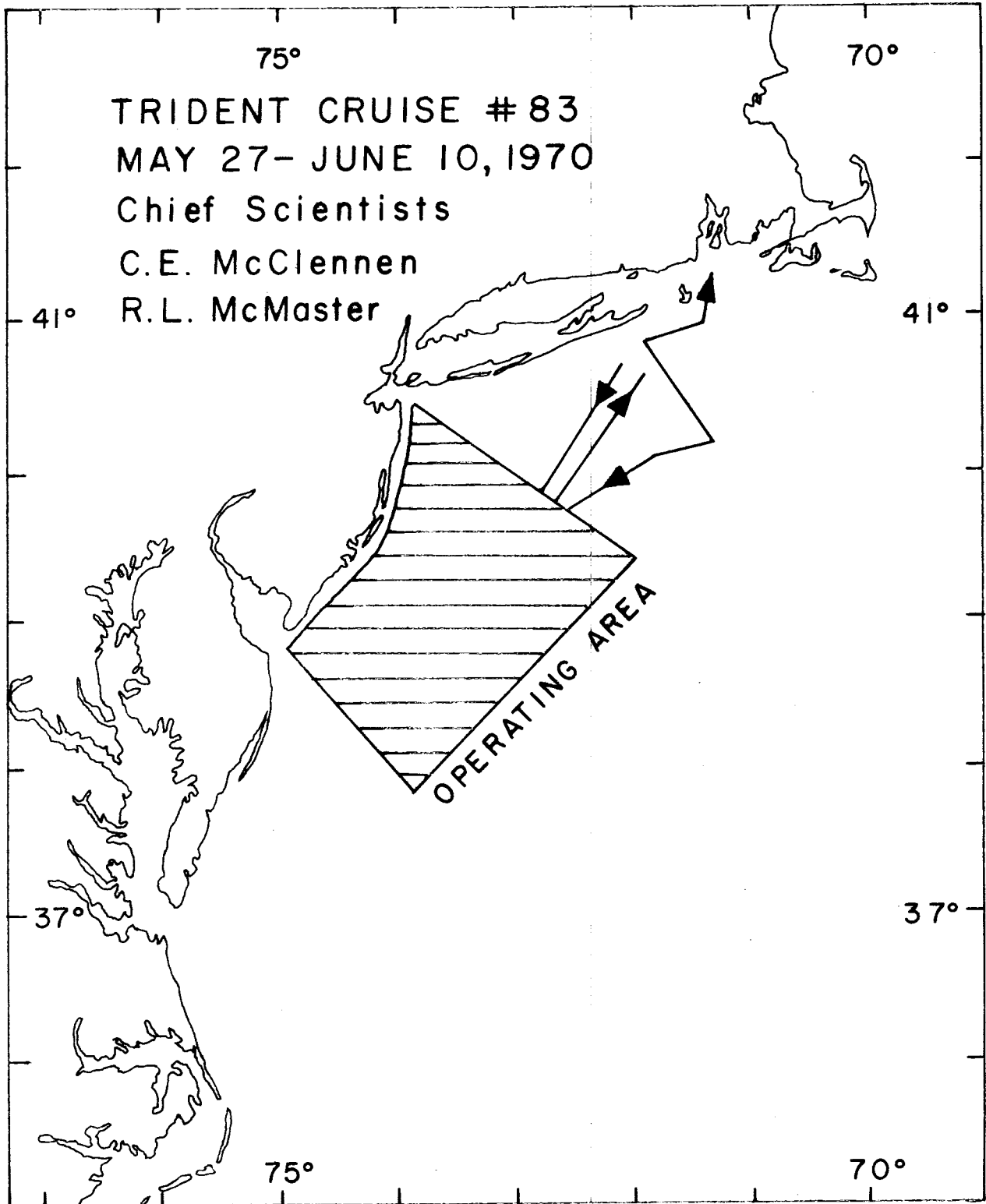
| STATION NO. | DATE | STATION TYPE | LAT. | | LONG. | | LAT. | | LONG. | | DEPTH | | PHYSIOG. AREA |
|-------------|--------|--------------------------------|-----------|-----|-----------|-----|-------|-----------|-------|-----------|-------|-------|---------------|
| | | | START | END | START | END | START | END | START | END | START | END | |
| 32 | 6/8/70 | Grab sample - 10 9 | 38°44.4'N | - | 73°23.5'W | - | - | - | - | - | 72 m | - | N.J. Shelf |
| 33 | " | " - 10 10 | 38°46'N | - | 73°15.0'W | - | - | - | - | - | 76 m | - | " |
| 34 | " | " - 11 11 | 38°44'N | - | 73°03.5'W | - | - | - | - | - | 134 m | - | " |
| | | Bottom photos | " | - | " | - | - | - | - | - | 190 m | 200 m | " |
| 35 | " | Grab sample - 12 12 | 38°50.5'N | - | 73°08.9'W | - | - | - | - | - | 72 m | - | " |
| 36 | " | " - 15 15 | 38°53.5'N | - | 73°13.3'W | - | - | - | - | - | 81 m | - | " |
| 37 | " | " - 14 14 | 38°57.2'N | - | 73°14.5'W | - | - | - | - | - | 75 m | - | " |
| 38 | " | " - 15 15 | 39°07.7'N | - | 73°04.4'W | - | - | - | - | - | 70 m | - | " |
| 39 | " | Recover current meter | 38°50.8'N | - | 73°09.6'W | - | - | - | - | - | 70 m | - | " |
| | | BT | " | - | " | - | - | - | - | - | 70 m | - | " |
| 40 | " | Bottom photos | 39°13.6'N | - | 72°33.2'W | - | - | - | - | - | 134 m | 135 m | " |
| | | Grab sample - 10 10 | " | - | " | - | - | - | - | - | 140 m | - | " |
| 41 | " | Bottom photos | 39°15'N | - | 72°34.3'W | - | - | - | - | - | 140 m | 140 m | " |
| 42 | " | " | 39°30'N | - | 73°06.4'W | - | - | - | - | - | 49 m | 49 m | " |
| 43 | 6/9/70 | " | 39°29'N | - | 72°59'W | - | - | 39°29'N | - | 72°59'W | 60 m | 59 m | " |
| | | Recover current meter | " | - | " | - | - | - | - | - | 59 m | - | " |
| | | BT | " | - | " | - | - | - | - | - | 59 m | - | " |
| 44 | " | Bottom photos | 39°34.5'N | - | 73°25.8'W | - | - | 39°34.5'N | - | 73°25.8'W | 25 m | 26 m | " |
| | | BT | " | - | " | - | - | - | - | - | 26 m | - | " |

26.C. - 7 B.C. 17 GS.

N.M.L. SUMMARY CRUISE REPORT UNDERWAY OBSERVATIONS

SHIP TRIDENT CRUISE NO. TR-083 PAGE 1

| UNDERWAY OBSERVATION | DATE START | TIME | DATE END | TIME | DESCRIPTION | PHYSIOG. AREA |
|----------------------|------------|------|----------|------|--|----------------------------|
| Bathymetry | 5/27/70 | 2000 | 6/3/70 | 0100 | 12 KHz wide beam | N.J. Shelf |
| " | 6/4/70 | 1807 | 6/9/70 | 1130 | " | " |
| Seismic reflection | 5/28/70 | 2047 | 5/28/70 | 2308 | 3.5 KHz Raytheon CESP (correlation echo sounder processor) | " |
| " | 5/29/70 | 1630 | 5/29/70 | 2256 | " | " |
| " | 5/30/70 | 0030 | 5/30/70 | 0800 | " | " |
| " | 5/30/70 | 1120 | 5/30/70 | 1855 | " | " |
| " | 5/30/70 | 1915 | 5/31/70 | 0920 | " | " |
| " | 5/31/70 | 1045 | 5/31/70 | 1449 | " | " |
| " | 5/31/70 | 1707 | 5/31/70 | 2150 | " | " |
| " | 6/1/70 | 0120 | 6/1/70 | 0850 | " | " |
| " | 6/1/70 | 0915 | 6/1/70 | 1332 | " | " |
| " | 6/1/70 | 1418 | 6/2/70 | 0853 | " | " |
| " | 6/2/70 | 1000 | 6/2/70 | 1709 | " | " |
| " | 6/2/70 | 1745 | 6/3/70 | 0100 | " | " |
| " | 6/3/70 | 2229 | 6/4/70 | 0126 | PAR | Southern New England Shelf |
| " | 6/4/70 | 0521 | 6/4/70 | 0820 | " | " |
| " | 6/4/70 | 1807 | 6/5/70 | 0024 | " | N.J. Shelf |
| " | 6/4/70 | 0350 | 6/5/70 | 0720 | " | " |
| " | 6/10/70 | 0054 | 6/10/70 | 0330 | " | Southern New England Shelf |
| " | 6/10/70 | 0724 | 6/10/70 | 1012 | " | " |



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R/V TRIDENT CRUISE TR-083

CRUISE DATES: 26 MAY - 10 JUNE 1970

STATION LISTING

| STA. NO. | DATE - 1970 | LATITUDE | LONGITUDE - | DEPTH - m | CORE | TYPE OF STATION | | |
|-------------|-------------|------------|-------------|-----------|------|-----------------|--------|----|
| | | | | ↓ GRAB | | BT | CAMERA | CM |
| 1 | 28 May | 39° 29.0'N | 072° 59.0'W | -59 | G | | X | L |
| 2 | " | 39° 34.4'N | 073° 26.0'W | | | | X | L |
| 3 | " | 38° 50.7'N | 073° 09.5'W | | | | X | L |
| | " | 38° 49.7'N | 073° 10.4'W | | | X | | |
| 4 | 29 May | 38° 45.5'N | 073° 03.3'W | | | | X | |
| 5 | " | 39° 02.0'N | 073° 05.1'W | | | | X | |
| 6 | " | 39° 04.0'N | 073° 07.0'W | | | | X | |
| 7 | 31 May | 38° 46.0'N | 073° 15.0'W | | | | X | |
| 8 | 1 June | 38° 50.9'N | 073° 09.0'W | | | | X | |
| 9 | 5 June | 38° 53.4'N | 073° 12.7'W | -81 | B | | | |
| 10 | " | 39° 03.0'N | 073° 08.0'W | -65 | B | | | |
| 11 | " | 39° 18.9'N | 073° 29.0'W | -47 | B | | | |
| 12 | " | 39° 37.9'N | 073° 49.9'W | -32 | B | | | |
| 13 | " | 39° 34.0'N | 073° 25.5'W | -32 | B | | | |
| 14 | " | 39° 30.7'N | 073° 06.5'W | -49 | B | | | |
| 15 | " | 39° 29.5'N | 073° 02.5'W | -67 | B | | | |
| | 6 June | 39° 29.9'N | 073° 01.5'W | | | | X | |
| 16 | " | 39° 08.0'N | 073° 03.8'W | | | | X | |
| | " | 39° 08.3'N | 073° 03.2'W | | S-1 | | | |
| 17 | " | 39° 02.6'N | 073° 08.0'W | | | | X | |
| | " | 39° 02.8'N | 073° 08.0'W | | S-2 | | | |
| 18 | " | 39° 05.4'N | 073° 13.5'W | | | | X | |
| 19 | " | 38° 57.2'N | 073° 14.5'W | | | | X | |

GRAB: S=Smith-McIntyre Sampler

BT(Bathythermograph) & CAMERA (Bottom photograph):

CORE: G=Gravity Corer; B=Box Corer

X=Station

CURRENT METER: L=Launched

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R/V TRIDENT CRUISE TR-083

CRUISE DATES: 26 MAY - 10 JUNE 1970

STATION LISTING(continued)

| STA. NO. | DATE - 1970 | LATITUDE | LONGITUDE | GRAB | CORE | TYPE OF STATION | | |
|-------------|-------------|------------|-----------------|--------------|------|-----------------|--------|----|
| | | | | | | BT | CAMERA | CM |
| | 6 June | 38° 56.6'N | 073° 14.4'W | S(no sample) | | | | |
| 20 | " | 39° 18.9'N | 073° 28.8'W | | | | X | |
| 21 | " | 39° 19.5'N | 073° 26.2'W | | | | X | |
| | " | 39° 19.2'N | 073° 25.8'W | S-3 | | | | |
| 22 | " | 39° 37.5'N | 073° 50.0'W | | | | X | |
| 23 | " | 39° 36.2'N | 073° 47.0'W | | | | X | |
| | 6 June | 39° 36.0'N | 073° 46.8'W | S-4 | | | | |
| 24 | 7 June | 39° 03.0'N | 073° 57.5'W | | | | X | |
| 25 | " | 38° 54.5'N | 074° 08.0'W | | | | X | |
| 26 | " | 38° 50.0'N | 074° 15.0'W | | | | X | |
| 27 | " | 38° 33.0'N | 074° 10.5'W | | | | X | |
| 28 | " | 38° 52.0'N | 074° 32.0'W | S-5 | | | X | |
| 29 | " | 38° 21.8'N | 073° 45.0'W | S-6 | | | X | |
| 30 | " | 38° 12.0'N | 073° 48.0'W-118 | S-7 | G | | X | |
| 31 | 7 June | 38° 30.2'N | 073° 29.2'W | S-8 | | | X | |
| 32 | 8 June | 38° 44.4'N | 073° 23.5'W | S-9 | | | X | |
| 33 | " | 38° 46.0'N | 073° 15.0'W | S-10 | | | | |
| 34 | " | 38° 44.0'N | 073° 03.5'W | S-11 | | | X | |
| 35 | " | 38° 50.5'N | 073° 08.9'W | S-12 | | | | |
| 36 | " | 38° 53.5'N | 073° 13.3'W | S-13 | | | | |
| 37 | " | 38° 57.2'N | 073° 14.5'W | S-14 | | | | |
| 38 | " | 39° 07.7'N | 073° 04.4'W | S-15 | | | | |
| 39 | " | 38° 50.8'N | 073° 09.6'W | | | X | | R |
| 40 | " | 39° 13.6'N | 072° 33.2'W | S-16 | | | X | |

GRAB: S=Smith-McIntyre Sampler

BT: (Bathythermograph): X-Station

CAMERA: (Bottom Photograph): X=Station

CURRENT METER: R=Recovered

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R/V TRIDENT CRUISE TR-083

CRUISE DATES: 26 MAY - 10 JUNE 1970

STATION LISTING (continued)

| STA. NO. | DATE | LATITUDE | LONGITUDE | GRAB | CORE | TYPE OF STATION | | |
|-------------|--------|------------|-------------|------|------|-----------------|--------|----|
| | | | | | | BT | CAMERA | CM |
| 41 | 8 June | 39° 15.0'N | 072° 34.3'W | | | | X | |
| 42 | " | 39° 30.0'N | 073° 06.4'W | | | | X | |
| 43 | 9 June | 39° 29.0'N | 072° 59.0'W | | | X | X | R |
| 44 | " | 39° 34.5'N | 073° 25.8'W | | | X | X | |

GRAB: 16 Samples; S=Smith-McIntyre Sampler

CORE: 8 Cores. G=Gravity Corer; B=Box Corer

BT=Bathythermograph: 4 stations; X=Station

CAMERA: Bottom Photographs: 32 Stations; X=Station

CURRENT METER: L=Launched; R=Recovered

1 instrument at each location

R/V TRIDENT CRUISE REPORT RESULTS - UNIVERSITY OF RHODE ISLAND CRUISE TR-083

JUNE, 1970

Researcher: Wayne R. Davis

Affiliation: National Marine Water Quality Laboratory
Environmental Protection Agency, Water Quality Office
P.O. Box 277, West Kingston, R. I. 02892
(August 1970-Present)

Financial Support: Personal.

Project Relationship:

Base line data on trace metal body burdens of off-shore infauna.

Analysis:

Systematic identifications; neutron activation analysis; computer data processing.

General Results:

Trace metal water quality criteria is based on body burdens of individual species and their position in marine food webs. In order to interpret meaning of body burdens of in-shore estuarine populations, they should be compared to off-shore populations without high metal stress.

Data from the TR-083 Cruise (June, 1970) proved valuable in establishing body burdens significantly less than those found in Narragansett Bay.

Cruise TR-099 (June, 1971) will sample similar populations while in addition, will analyze water column/zooplankton and sediment/infauna trace metal relationships along the shelf extending into Narragansett Bay.

*Trace Metals: Iron, Zinc, Cobalt, Chromium,
Silver, Scandium, Samarium,
and Antimony*

RWD:dgg
4/15/71