Serial # 90002

Nancy

Studies of Circulation and Pollutant Transport in Massachusetts Coastal Waters

CRUISE REPORT, WHITE HEATH ~~2-90~~ 90-1

(March 27-29, 1990)

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CRUISE REPORT, WHITE HEATH 2-90

Vessel:	USCG CUTTER WHITE HEATH
Cruise number:	W2-90
Project name:	Studies of Circulation and Pollutant Transport in Massachusetts Coastal Waters
Funding Agency:	Joint Funding Agreement (cost share) between the U.S. Geological Survey and the Massachusetts Water Resources Authority
Contract start/end dates:	July 15, 1989 - - June 30, 1991
Area of operation:	Massachusetts Bay - see Figure 1
Ports:	Boston - Boston
Cruise dates:	March 27,28,29, 1990; day trips
Chief scientist:	Michael Bothner
Scientific party:	On March 27 and 28 for mooring work: Barbanti, Blackwood, Bothner, Butman, Rendigs, and Strahle. Divers to assist in recovery of tripod March 28 were Wayne Spencer and Larry Ball from WHOI. On March 29 for sampling: ~~Barbanti~~, ~~Blackwood~~, ~~Bothner~~, Brown, Parmenter, and ~~Rendigs~~.
Ships captain:	Chief Warrant Officer Michael E. Frias
Purpose of cruise:	The objective of the program is to make long-term measurements of currents and sediment transport in the vicinity of the proposed ocean outfall in Massachusetts Bay. The purpose of this cruise was to recover and redeploy the instrumented moorings. Mooring design is shown in Figure 2. Samples of bottom sediments are collected on each cruise required to service the instruments. This was the second in a series of 6 cruises during the two year period of the present Joint Funding Agreement between the Massachusetts Water Resources Authority and the USGS.

Scientific equipment employed:

The moorings deployed on December 5, 1989 were recovered on this cruise and replaced with new moorings. The moorings consisted of a Butman Tripod, a subsurface array, and a vector measuring current meter (VMCM) suspended about 6 m below the surface from the Large Navigation Buoy (LNB) in western Massachusetts Bay. The details of the instruments deployed are shown in Figure 2.

Sampling equipment included a teflon-coated Van Veen grab sampler (with doors re-designed for less restrictive sampling) and the USGS Hydraulically damped gravity corer.

A television camera (black and white) was fixed to the corer for viewing the bottom before and during collection. This equipment was loaned to us by the USGS, Branch of Pacific Marine Geology in Menlo Park, CA.

Navigation was accomplished by horizontal sextant angles operated by the US Coast Guard personnel. Loran C time delays were also recorded at each sampling site. Locations of the mooring and sampling stations are shown in Figure 1.

Tabulated Information:

Days at sea = 3.
Moorings recovered and redeployed = 3
Sampling stations occupied = 3 (details of samples in Tables 1 and 2).

Remarks:

This cruise was extended to three days in order to recover the tripod which would not release its float on command. Using careful acoustic ranging and highly accurate triangulation, the position of the instrument was pinpointed. On the second day of the cruise (March 28), divers from the Woods Hole Oceanographic Institution were placed within 50 feet of the instrument and attached a retrieval line. All our equipment was recovered without damage. The divers reported that the recovery rope canister was detached from the tripod. A piece of fishing net remained on the tripod suggesting how the rope canister might have been damaged.

Sampling late in the day of March 28 and on March 29, 1990 went smoothly. Three locations in western Massachusetts Bay were occupied.

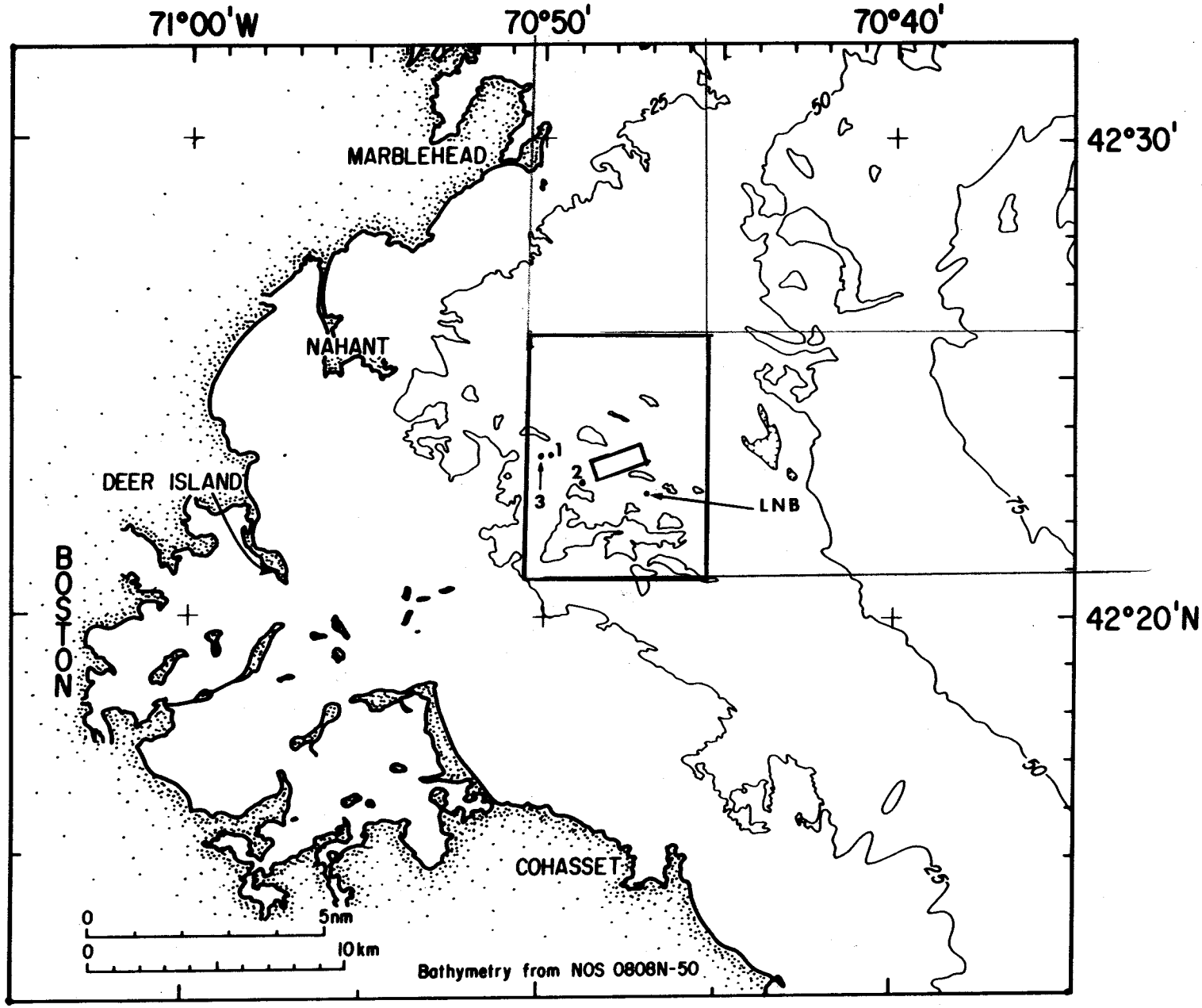

Figure 1. Larger box outlines area of sidescan sonar survey conducted by USGS in April 1989. Smaller rectangle is the proposed site for Boston's outfall diffuser. USGS moorings are located adjacent to the Large Navigation Buoy (LNB) at the approach to Boston Harbor. Sediment sampling locations are indicated by numbers 1 - 3.

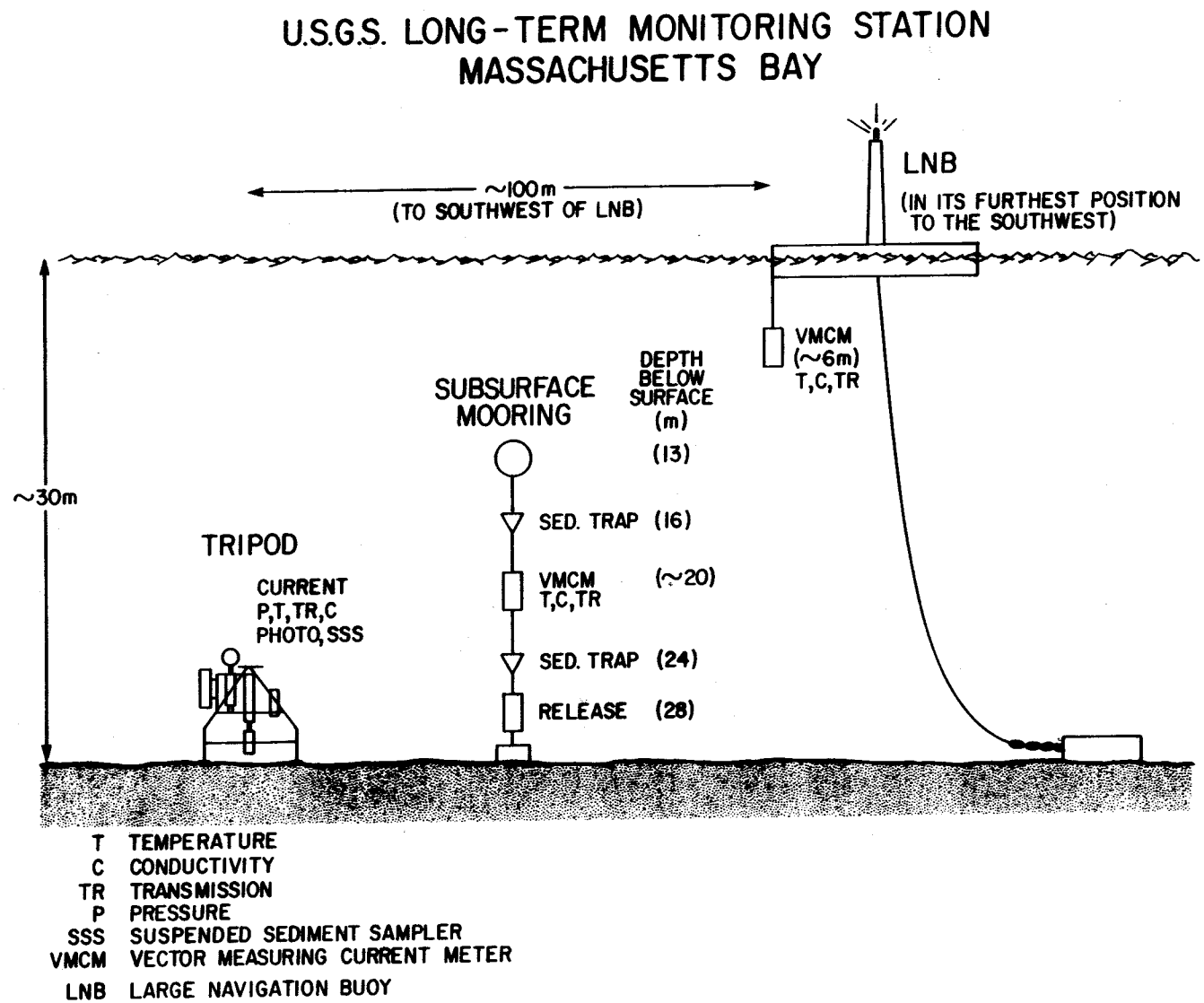

Figure 2. Schematic of USGS current meter installation near Boston Large Navigation Buoy (LNB) showing the three components: bottom tripod, subsurface mooring, and current meter hung below the LNB.

Table 1. Samples of Bottom Sediment Collected on Cruise W2-90

Sample#	Type	Position Lat/Lon (DMS) LORAN C	Water Depth MSL (ft) Approx	Core Length(cm)	Push Core	Trace Metals	Hydro Carbon	Water Content	Clostridium Perfringins	Comments
1A	Core	42-23-23.796 N 70-49-41.637 W 13957.1 25810.2, 44285.3	129	39.5-41.5						Cut at Sea
1B	Core	42-23-23.796 N 70-49-41.637 W 13957.1 25810.2, 44285.3		34.5-36.5						
1C	Grab	42-23-23.796 N 70-49-41.637 W 13957.1 25810.2, 44285.3			Y	Y	Y	2	Y	
1D	Grab	42-23-23.796 N 70-49-41.637 W			Y	Y	Y	2	Y	
2A	Grab	42-22-51.996 N 70-48-55.365 W	111		Y	Y	Y	2	Y	
2B	Grab	42-22-52.331 N 70-48-54.774 W 13954.9, 25792.2, 44280.5	111		Y	Y	Y	2	Y	
2C	Core	42-22-52.086 N 70-48-55.663 W 13955.3, 25792.6, 44280.4	111	23						Cut at Sea
2D	Core	42-22-52.240 N 70-48-55.344 W 13954.8, 25792.8, 44280.8	95							
3A	Core	42-23-23.413 N 70-49-51.888 W 13958.5, 25802.4, 44285.6	109							
3B	Core	42-23-23.413 N 70-49-51.888 W 13958.5, 25802.4, 44285.6		51						Cut at Sea
3C	Core	42-23-23.413 N 70-49-51.888 W 13958.5, 25802.4, 44285.6								
3D	Grab	42-23-23.413 N 70-49-51.888 W 13958.5, 25802.4, 44285.6			Y	Y	Y	2	N	
3E	Grab	42-23-23.413 N 70-49-51.888 W 13958.5, 25802.4, 44285.6			Y	Y	Y	2	Y	

Table 2. Locations of Moorings Deployed March 28, 1990.

Mooring type	Latitude/ LORAN C	Longitude	Water Depth (ft) Approx
Subsurface mooring	42-22-36.525 N 13943.6, 25778.1, 44275.8	70-47-00.056 W	111
Tripod	42-22-37.403 N 13944.2, 25778.9, 44276.0	70-47-06.482 W	111
Current Meter hung from Large Navigation Buoy Published Position	42-22-42.028 N 139843.1, 25778.1, 44275.9 (watch radius=207 yards)	70-47-00.920W	108

W2-90
HDC - Camera log 3/27/90, 3/29/90
USCG cutter Whiteheath
Richard R. Rendigs

Used hydroproducts camera with deckbox and video attachment borrowed from Dave Hoag at MARFAC in Redwood City, CA. (7-459-5864).

Attached camera to inside leg of HOC + orientated the field of view to encompass the core penetrating the sediment. Field of view about 16-20" and can start to see the bottom when corer is 3'-5' above the bottom.

Using Maxell Epitaxial tape. No swivel on the HOC; lowered over side by slacking off a polypro slip line off the capstan in the forecastle.

Two lights were also attached to the HOC and orientated for least backscatter and highest illumination possible. Lights should only be turned on in the water - best setting was on Variac between 70-80. In some casts put a line with are attached shackle for a reference - by and large pretty useless.

Also had light reflection off of the collar on the corer - this was helpful as a reference marker for lights and focusing in water!

<u>Station 2</u> 3/27/90

Tape 000
Time 4:35p - launch

Tape 0111 (approx)
Time 4:45p - on bottom - slow penetration evident - some pullout - ball in place. Looks like sandy-silt with shells. Penetration of core was somewhat intermittent i.e. penetrated - stopped - penetrated a bit more.

Tape 0209
Time 4:47p - on deck - good core 2A?

Tape 0211
Time 5:05p - in the water - on the way down turning lights on/off - changed tape speed from EP--SP.

Tape 0400
Time 5:16p - hit bottom - too hard - bounced corer - ball sprang into place on rebound core no good

Tape 0599
Time 5:20p - on deck

Tape 0610--0815
Time 5:33p - in the water - screwing around on deck and in water column while getting into position.

Tape 0895
Time 5:35p - on bottom and coring into silty sand. Looks good. Soft/fluffy surface layer.

Tape 1030
Time 5:38p - on deck - after fooling around in the water column. Good core - 2C.

Tape 1213
Time 5:58p - in water

Tape 1305
Time 6:02p - on bottom - core didn't come out cleanly - may have lost a bit (5%?) upon pullout.

Tape 1375
Time 6:04p - at surface - good core - 2D.

Station 3 3/29/90

Tape 1450
Time 9:11a - in water and lowering to the bottom

Tape 1538
Time 9:16a - hovering above the bottom - a slight change in contrast as we approach the bottom but only 4'-6' above it.

Tape 1548
Time 9:17a - hit bottom - soft bottom - burrows - ripples?

Tape 1636
Time 9:20a - at surface - good core 3A

Tape 1700
Time 9:37a - start lowering

Tape 1773
Time 9:41a - hit bottom - can see shackle pin + attached string for reference number - soft bottom. Some current evident as disturbed sediment is moved out of the picture.

Tape 1841
Time 9:44a - surface - good core 3B

Tape 1885
Time 10:01a - in water - can see shackle pin as lowering the HOC but falls out of the picture as hit bottom.

Tape 1947
Time 10:04a - on bottom - soft sediment, burrows evident - pretty quick sample!

Tape 2030
Time 10:09a - on deck - good core 3C

Station 1 3/29/90

Tape 2040
Time 12:15p - in water + lowering to the bottom

Tape 2115
Time 12:20p - hit bottom (?) - very turbid - never saw the bottom - lots of resuspended material - even in water column

Tape 2178
Time 12:22p - at surface - good core 1A

Tape 2210
Time 1:36p - in water, on the way down

Tape 2239
Time 1:37p - clouds of material as approach and hit bottom. Again the hit and duration of penetration was less than 30 seconds - never saw the shackle pin. Either a great deal of resuspended material naturally occurring or the corer stirred up all this material - a review of the tape would be useful - good core - 1B.