90016

Studies of Circulation and Pollutant Transport in Massachusetts Coastal Waters

CRUISE REPORT, WHITE HEATH 3-90

WTHT 90-2

(July 10-11, 1990)

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CRUISE REPORT, WHITE HEATH ~~3-90~~ 90-2

Vessel:	USCG CUTTER WHITE HEATH
Cruise number:	W3-90
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:	July 10,11, 1990; day trips
Chief scientist:	Michael Bothner
Scientific party:	On July 10 for mooring work: Barbanti, Bothner, Brown, Marini, Parmenter, Rendigs, and Strahle. On July 11 for sampling: Barbanti, Bothner, Brown, Donald Harrison, Parmenter, and Rendigs.
Ships captain:	Chief Warrant Officer L.J. Blackburn III
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 thrid 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 March 28, 1990 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), the USGS Hydraulically damped gravity corer, and a conventional gravity corer.

A television camera (color) was fixed to the corer for viewing the bottom before and during collection. This equipment was loaned to us for evaluation by _____.

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

Remarks:

All the moorings were recovered without incident. The tripod responded only after mooving the ship about 1/2 mile to the south. The same position yeilded the first response from the acoustic release on the W2 cruise. We hypothesize that the inverted orientation of the transducer, the hard bottom, and the shallow water at the mooring site, must complicate the signal recieved by the transducer. Moving the signal source some distance to the south has on overcome the difficulty on both recovery cruises to date.

Sampling was carried out on July 11. Replicate grabs and cores were collected at stations 2 and 3. Station 3 has replaced station 1 as a long term monitoring site because it has finer sediment texture. We found that station 1 had considerable amounts of slag, coal, and other fragments indicative of solids waste dumping. Both stations 1 and 3 were sampled on cruise W2 (March 29, 1990).

We attempted two gravity cores using a 4" ID barrel at station 3. Recovery was less than 50 cm in each case. We did not have adequate time on this cruise to experiment with different combinations of barrel length, entry speed, and core catchers to improve recovery.

July 10,

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~~ 549 N ~~13943.6~~, 25778.1, ~~44275.8~~	70-47-~~00.056~~ 59.35 W	111
Tripod	42-22-37.~~403~~ 980 N 13944.2, 25778.9, ~~44276.0~~	70-47-06.~~482~~ 927 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

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

Mooring type	Latitude/ LORAN C	Longitude	Water Depth (ft) Approx
Subsurface mooring	42-22-36.549 N	70-47-50.255 W	114
Tripod	42-22-37.890 N	70-47-06.927 W	114
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
Camera (end of transect)	42-22-37.604 N	70-47-06.327 W	114

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.

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.

Table 1. Samples of Bottom Sediment Collected on Cruise W3-90, July 11, 1990

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
3A	Core	42.390039 70.8311983 42-23-24.142 N 70-49-52.287 W 13958.1, 25802.2, 44285.5	120	16.5" 35cm						-------
3C	Core	42.389926 70.831694 42-23-23.735 N 70-49-54.099 W 13958.2, 25802.1, 44285.4	112	50						cut at sea
3F	Grab	42.38977 70.831553 42-23-23.178 N 70-49-53.591 W 13958.1, 25802.3, 44285.0	117	---	Y	Y	Y	2	Y	
3G	Grab	42.389932 70.83125 42-23-23.758 N 70-49-52.505 W 13958.3, 25802.4, 44285.1	117	---	Y	Y	Y	2	Y	
2A	Core	42-22-51.767 N 70-48-54.016 W 13954.6, 25793.01?, 44280.9	82	28	Y	Y	Y	2	Y	
2B	Grab	42.381605 70.815060 42-22-53.778 N 70-48-54.218 W 13954.5, 25793.02?, 44280.8	135	---	Y	Y	Y	2	Y	
2C	Core	42.381863 70.815275 42-22-54.710 N 70-48-54.992 W 13954.5, 25793.03?, 44281.1	80	21						
2G	Grab	42.3807658 70.815373 42-22-50.757 N 70-48-55.344 W 13954.7, 25792.9, 44280.7	100	---	Y	Y	Y	2	Y	
2H	Core	42-22-51.855 N 70-48-56.566 W 13954.9, 25792.7, 44280.7	---	25.5						

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2I	Grab	42.381195 70.8153058 42-22-52.302 N 70-48-55.101 W 13954.6, 25792.6, 44280.7	---	---------	Y	Y	Y	2	Y	Sea
2J	Core	42.381028 70.8152226 42-22-51.704 N 70-48-54.817 W 13954.6, 25792.5, 44280.7	100	25						cut 7/17/90
⇒ 2K	Core	42.3811372 70.815235 42-22-52.094 N 70-48-54.848 W 13954.6, 25792.4, 44280.7	100	---------						
→ 2L	Core	42-22-51.729 N 70-48-54.675 W 13954.6, 25792.5, 44280.6 42.3810358 70.8151875	100	---------						

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2B	Grab	42-22-53.778 N 70-48-54.218 W 13954.5, 25793.02?, 44280.8	135	---------	Y	Y	Y	2	Y	
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W3-90
HDC - Camera log 7/10 - 11/90
USGS Cutter Whiteheath
Rick Rendigs

The Osprey seahawk camera system with self-contained deckbox and video attachment was borrowed from Peter Moon of Sand Dollar Instruments.

This is an integrated color TV system utilizing a hand held size camera, which was attached to the cores, with approximately 50 meters of jacketed cable; illumination was provided by a 300 watt underwater lamp.

The camer's angle of view in water is about 75° which translates to a field of view of about 18" - 22".

Station log - 7/10/90

Tape counter - 000 - test launch in Mass Bay - Time 13:46.

Tape 1788 - on bottom; tape 1872 - off - bottom, Tape 2250 - on deck

Station 3 7/11/90

Hit re-zero on ~~tone~~ tape counter

Tape 0000 - time 0946 - on way down - lost picture - back on deck to repair.

Tape ? - time 11:03 launch, time 11:11 on bottom - hard contact - up and down with the corer - frantic moments and then up with the corer.

Tape 683 stopped

Station 2

A. Tape 683 Time 13:01 - launch - a few more frantic moments of communication - bottom slightly coarser than sta. 3.

Tape 1270 Time 13:15 - on deck

B. Tape 1270 Time 14:00; bottom 14:10; tape 1679 - coarser bottom, shell debris, different angle on light source - no core - never hit bottom cleanly.

C. Tape 1990 Time 15:05 - launch; bottom 15:08 - tape 2115 - finer grained seds - reset position - on deck 15:15 (approx), tape 2360.

D. Tape 2372 Time - ? - launch; bottom 15:31 - tape 2423. On deck - time 15:36. tape 2597.

E. Tape 2600 Time - 15:53 - launch; bottom 15:56 - tape 2695. No core once again! On deck - tape 2923.

F. Tape 2934 Time 16:11 - launch + hovering in water column. On bottom 16:18, tape 3180; off bottom 16:20, tape 3190 - on deck 16:25, tape 3280.