U.S. GEOLOGICAL SURVEY-BRANCH OF ATLANTIC MARINE GEOLOGY

CRUISE REPORT-SEAX96017

1. **SHIP NAME (Parent vessel)/SUBMERSIBLE/OWNER-OPERATOR:** R/V SEAWARD EXPLORER/ PETER SKIP-SEAWARD EXPLORER INC. MIAMI, FLORIDA

2. **PRE-CRUISE SERIAL # AND/OR CRUISE-LEG:** SEAX96017

3. **PROJECT # AND NAME:** 7241-32020/LONG ISLAND SOUND ENVIRONMENTAL STUDIES

4. **FUNDING AGENCY:** U.S.GEOLOGICAL SURVEY(USGS)

5. **CONTRACT (If applicable):** N/A

6. **AREA OF OPERATIONS:** LONG ISLAND SOUND(LIS)

7. **DATES AND PORTS OF CALL:** 4-11-96 to 4-17-96; WOODS HOLE, MA. to WOODS HOLE, MA.

8. **CHIEF SCIENTIST(S):** RICK RENDIGS(USGS)

9. **SCIENTIFIC PARTY (Names,affiliations,cruise duties):**

Ken Parolski, USGS, Electronics Technician
Dann Blackwood, USGS, Photographer
Rick Rendigs, USGS, Geologist/Chief Scientist
Nancy Soderberg, USGS, Data Curator
Brenton Taylor, USGS, Geological Technician
Mike Casso, USGS, Geological Technician

10. **SHIP'S CAPTAIN (and affiliation):** Keith Davis, master- R/V Seaward Explorer

11. **PURPOSE OF CRUISE (brief statement) Collection of** bottom samples(grabs)and videocamera footage at selected sites throughout LIS for validation of sedimentary environments as determined from a regional USGS sidescan-sonar survey in 1995. Selected videocamera transcets will be utilized to verify transition areas of sedimentary environments within LIS. A secondary objective, if time allowed, was to collect additional sidescan sonar data in areas of LIS where no data or additional records were required as an adjunct to last year's cruise(Andr95010).

12. **NAVIGATION TECHNIQUES:** Differential Global Positioning System(GPS)

13. **SCIENTIFIC EQUIPMENT:**

Van Veen grab sampler with still and videocamera systems
Differential GPS navigation system
Odum echosounder
Osprey videocamera monitor
Hydro products HY-88 winch
Datasonics sidescan sonar system
Q-MIPS sidescan data acquisition system
EPC recorder
Pinger
22ft^3 Lab-Line refrigerator/freezer

14. **TABULATED INFORMATION:**

DAYS AT SEA: 7

CONTINUOUS DATA (in km): n/a

STATIONS OCCUPIED (stationary and underway): 129 grab samples/ 9 camera transcets

SUBMERSIBLE DIVES (BY #): N/A

STATION INFORMATION:

STATION	JD/TIME(ZULU) -HIT BOTTOM	LATITUDE	LONGITUDE	WATER DEPTH(M)
13-01	103/11:45:54	41° 11.8901'	72° 34.4365'	26
15-01	103/12:44:54	41° 13.9206'	72° 35.4365'	14
15-02	103/13:32:24	41° 10.4714'	72° 37.6830'	32
16-01	103/14:02:34	41° 11.5470'	72° 39.5211'	29
17-01	103/15:00:34	41° 11.6327'	72° 41.4464'	22
19-01	103/15:41:14	41° 13.2408'	72° 44.0171'	12
21-01	103/16:28:49	41° 12.1159'	72° 48.1060'	14
23-01	103/17:15:49	41° 11.0268'	72° 51.8349'	16
26-01	103/18:25:09	41° 11.5995'	72° 57.3604'	12
27-01	103/19:15:04	41° 10.2011'	72° 59.3642'	13
28-01	103/19:39:34	41° 09.6223'	73° 01.3200'	14
30A-01	103/20:11:24	41° 08.1249'	73° 05.3113'	12
29-01	103/20:30:44	41° 07.5758'	73° 03.5496'	12
31-01	103/21:14:29	41° 05.2102'	73° 07.8026'	22
46A-01	103/21:38:39	41° 05.9125'	73° 09.3402'	15
34-01	103/22:11:59	41° 05.9172'	73° 12.8741'	14
36-01	103/22:45:19	41° 05.6699'	73° 16.4558'	16
37-01	103/23:07:24	41° 05.1307'	73° 18.2620'	14
38-01	103/23:57:39	41° 01.8565'	73° 20.9782'	24
39-01	104/00:20:59	42° 02.4377'	73° 22.5210'	16
41-01	104/00:57:39	41° 01.8151'	73° 26.5159'	24
42-01	104/01:20:04	41° 00.7108'	73° 28.2920'	24
44-01	104/02:07:04	40° 58.1950'	73° 32.5322'	15
44-02	104/02:28:19	40° 57.3945'	73° 32.7340'	21
44-03	104/02:57:04	40° 56.2702'	73° 32.9662'	14

43-01	104/03:29:09	40° 57.9293'	73° 30.7545'	22
42-02	104/03:58:44	40° 57.6773'	73° 28.3374'	17
39-03	104/04:29:24	40° 56.8730'	73° 25.3755'	12
40-02	104/05:01:14	40° 58.9112'	73° 25.1493'	29.5
40-01	104/05:28:29	41° 00.4379'	73° 24.7363'	19
39-02	104/05:50:44	41° 00.4391'	73° 23.0576'	52
C-1	104/07:09:14	41° 00.4854'	73° 22.0640'	47
C-1	104/07:26:59	41° 00.4691'	73° 22.2571'	28
38-02	104/08:01:49	40° 59.8639'	73° 21.5922'	28
47A-01	104/08:32:04	40° 57.9185'	73° 22.0569'	18
47A-02	104/08:54:39	40° 57.5468'	73° 20.9897'	14
34-04	104/09:43:24	40° 56.5771'	73° 17.0388'	14
47A-03	104/10:16:04	40° 57.6306'	73° 15.0662'	19
32-03	104/10:51:19	40° 56.6648'	73° 11.9004'	17
47A-04	104/11:22:54	40° 58.3465'	73° 11.0329'	28
33-01	104/13:12:34	40° 58.7159'	73° 12.8953'	24
36-02	104/13:57:49	40° 59.0068'	73° 18.1660'	23
35-01	104/14:31:34	41° 01.2662'	73° 15.7597'	37
34-03	104/15:07:09	41° 00.9089'	73° 14.0975'	38
32-02	104/15:41:19	41° 00.2452'	73° 10° 7401'	35
31-03	104/16:17:39	41° 00.5913'	73° 08.8570'	39
29-04(1)	104/16:42:04	40° 59.4565'	73° 07.1080'	16
30B-02(1)	104/17:04:24	41° 01.2269'	73° 06.9204'	45
C-2	104/17:29:59	41° 00.9639'	73° 08.8531'	39
C-2	104/17:41:44	41° 00.9081'	73° 08.9229'	nd
31-02	104/18:32:15	41°00.9608'	73°08.8689'	29
34-02	104/19:19:59	41° 02.8548'	73° 13.7048'	24
32-01	104/20:04:19	41° 04.2220'	73° 09.7856'	16
30B-01	104/20:36:59	41° 04.0292'	73° 06.7047'	22
30B-02(2)	104/21:11:09	41° 01.2011'	73° 07.1077'	42
29-04(2)	104/21:37:19	40° 59.4414'	73° 07.3081'	16
29-03	104/22:09:09	40° 59.9615'	73° 05.6572'	34
29-02	104/22:39:44	41° 01.8000'	73° 05.0663'	39
28-02	104/23:01:16	41°01.2002'	73°03.3653'	36
27-04	104/23:19:59	41° 00.2199'	73° 02.2000'	24
27-03	105/00:32:49	41° 02.3609'	73° 01.4303'	41

45-01	105/00:57:54	41° 04.4204'	73° 00.6303'	32
27-02	105/01:30:09	41° 07.0655'	73° 00.1599'	23
26-02	105/01:53:44	41° 07.7974'	72° 58.2610'	19
26-03	105/02:21:14	41° 05.8627'	72° 58.7680'	27
C-3	105/02:51:14	41° 05.0966'	72° 57.2751'	30
C-3	105/03:13:59	41° 05.0551'	72° 57.4185'	30
25-02	105/04:30:49	41° 04.1252'	72° 57.4314'	31
24-02	105/05:08:09	41° 02.9739'	72° 55.9865'	36
25-03	105/05:59:15	41° 01.0250'	72° 58.1681'	30
22-01	105/13:18:54	41° 08.2703'	72° 51.3228'	26
21-02	105/13:59:59	41° 09.1859'	72° 48.9389'	25
25-01	105/15:00:49	41° 09.7326'	72° 55.9040'	18
24-01	105/15:24:04	41° 08.2562'	72° 54.5871'	22
23-02	105/15:46:49	41° 06.4091'	72° 53.2831'	28
23-03	105/16:16:29	41° 03.5970'	72° 54.0221'	32
24-03	105/16:51:49	41° 01.3383'	72° 56.3888'	42
22-02	105/17:19:29	41° 01.4680'	72° 52.8111'	40
C-4	105/19:19:54	40° 59.2291'	72° 53.4316'	17
C-4	105/19:32:34	40° 59.1177'	72° 53.4636'	12
22-03	105/19:53:34	40° 58.7492'	72° 53.5606'	12
20-03	105/20:35:24	40° 59.9530'	72° 49.3187'	31
19-04	105/21:07:04	41° 01.1135'	72° 47.6861'	35
20-02	105/21:32:09	41° 02.2056'	72° 49.2659'	37
21-04	105/21:56:59	41° 03.4575'	72° 50.5248'	32
21-03	105/22:42:29	41° 06.4200'	72° 49.7598'	30
C-5	105/23:10:14	41° 06.9570'	72° 48.5171'	30
C-5	105/23:24:44	41° 06.6541'	72° 48.6373'	30
20-01	106/00:04:14	41° 07.9820'	72° 47.7397'	30
19-03	106/00:51:19	41° 05.3318'	72° 46.5544'	31
18-02	106/01:44:54	41° 02.9371'	72° 45.4073'	32
17-03	106/02:53:59	40° 59.2871'	72° 44.5699'	21
14-04	106/04:11:39	41° 00.3635'	72° 37.4039'	17
15-04	106/04:45:09	41° 01.2936'	72° 40.5669'	25
16-03	106/05:18:09	41° 03.7116'	72° 41.6437'	27
17-02	106/05:48:24	41° 05.5280'	72° 42.9952'	29
18-01	106/06:21:49	41° 07.6561'	72° 44.1824'	29

19-02	106/07:08:04	41° 10.0474'	72° 45.4298'	23
16-02	106/07:58:24	41° 08.3661'	72° 40.4958'	27
15-03	106/08:37:24	41° 06.0509'	72° 39.1278'	26
14-03	106/09:15:19	41° 04.2046'	72° 37.4365'	23
13-03	106/09:41:29	41° 03.3492'	72° 36.3927'	21
11-04	106/10:18:59	41° 02.7475'	72° 33.0961'	17
11-03	106/10:44:24	41° 04.3312'	72° 32.8983'	33
12-03	106/11:09:34	41° 05.6551'	72° 34.3964'	27
13-02	106/11:33:34	41° 07.2980'	72° 35.7680'	25
14-02	106/11:58:49	41° 06.7805'	72° 37.8079'	27
C-6	106/13:03:24	41° 08.6405'	72° 38.8571'	30
C-6	106/13:17:49	41° 08.5657'	72° 39.0504'	30
14-01	106/13:52:09	41° 08.9879'	72° 36.9532'	29
C-7	106/14:18:49	41° 09.2346'	72° 35.6319'	30
C-7	106/14:33:29	41° 09.3622'	72° 35.5282'	30
12-02	106/15:08:34	41° 09.8453'	72° 33.0498'	27
11-02	106/15:44:44	41° 08.3626'	72° 31.6547'	34
10-02	106/16:12:54	41° 07.6336'	72° 29.7791'	39
9-03	106/16:56:59	41° 05.2886'	72° 28.9686'	22
8-02	106/17:24:54	41° 07.7908'	72° 26.5045'	25
9-02	106/18:23:09	41° 09.3849'	72° 27.8441'	44
10-01	106/18:53:24	41° 10.7040'	72° 28.7699'	30
11-01	106/19:29:59	41° 12.2994'	72° 30.6023'	22
12-01	106/20:09:54	41° 13.0561'	72° 32.3655'	28
9-01	106/21:13:14	41° 12.0081'	72° 27.4323'	42
8-01	106/21:40:59	41° 10.5357'	72° 26.0319'	40
7-02	106/22:10:59	41° 09.2174'	72° 24.6168'	37
6-02	106/22:37:49	41° 08.7984'	72° 22.9580'	37
C-9	106/23:33:04	41° 11.4068'	72° 25.1330'	28
C-9	106/23:45:39	41° 11.3498'	72° 25.8362'	19
C-8	107/01:40:04	41° 13.3081'	72° 15.8660'	45
C-8	107/01:53:24	41°13.3336'	72°15.8660'	45
7-01	107/03:09:59	41° 12.8581'	72° 23.5282'	47
6-01	107/03:52:09	41° 11.4366'	72° 22.2078'	49
5-01	107/04:43:04	41° 09.4348'	72° 20.8595'	25
4-02	107/05:30:29	41° 11.0084'	72° 18.7576'	33

25-05	107/22:36:54	41° 11.9574'	72° 54.4438'	12
23-04	107/23:20:29	41° 13.3935'	72° 49.7577'	12
46B-01	107/23:58:19	41° 09.9363'	72° 50.7910'	20
46B-02	108/00:48:14	41° 11.1940'	72° 44.4380'	20
46B-03	108/01:39:44	41° 12.0293'	72° 40.2139'	21
46B-04	108/02:24:24	41° 12.5808'	72° 37.1265'	18
45-02	108/05:07:14	41° 12.3454'	72° 19.6405'	48
3-02	108/05:41:49	41° 11.0372'	72° 16.9717'	42
2-02	108/06:10:54	41° 11.9916'	72° 15.1921'	32
3-01	108/06:52:04	41° 13.0397'	72° 16.5462'	40
4-01	108/07:22:09	41° 13.9045'	72° 17.9935'	38
45-03	108/07:50:59	41° 13.4331'	72° 14.6179'	52
2-01	108/08:16:29	41° 14.9558'	72° 14.2581'	34
1-01	108/08:42:14	41° 13.8448'	72° 12.8574'	48

C=CAMERA
TRANSCET
( )= duplicate
nd= no data

15. **PAGE-SIZE TRACKCHART (including station & line #'s):** See overleaf

16. **SUBMITTED BY AND DATE:** Rick Rendigs (7-11-96)

17. **REMARKS**

The cruise was very successful in accomplishing most of the" landside" expectations. All of the 122 primary sites and seven of the thirty secondary sites in LIS were sampled for bottom sediments using a 0.1m^2 teflon coated Van Veen grab sampler. The top two centimeters of sediment was removed from the grab sampler using a calibrated teflon coated scoop and stored in an acid and methanol washed

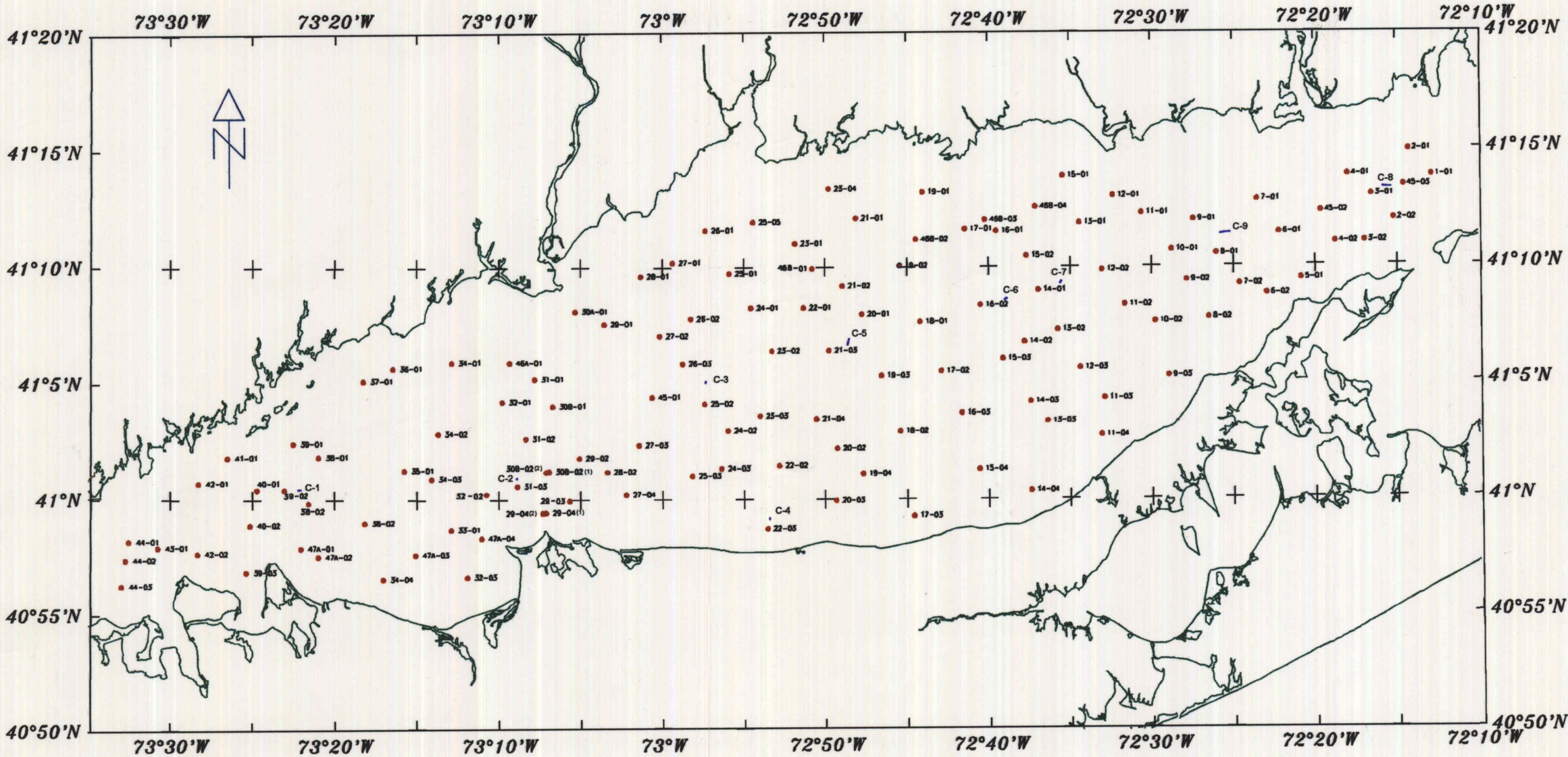
one- pint plastic freezette containers. Additionally, the sediment was homogenized in the container and subsampled for trace metal and bacterialogical (Clostridium perfringens) analyses. A representative split of the remaining sediment in the container, will be used for textural analysis. This data will be used as an adjunct to last years side-scan sonar data for determining regional sedimentary environments throughout Long Island Sound.

Videocamera footage of most of these stations was also accomplished using an Osprey color videocamera system to document the bottom type and biological nature of each of the specific sample sites. Anemones, clams(razor and mercenaria), gastropods, worms, crabs, skates and lobsters were the predominate macro fauna observed from the camera footage.

Sediment types ranged from clayey-silts and silty-clays in the deeper portions of the western and central basins of LIS. The texture gradually became sandier and gravelly as the sampling progressed to the near-shore areas and the eastern-most stations in LIS where the embayment becomes more constricted and the swifter current regime selectively winnows the fines and transports them into western portions of the sound.

Clasts of indurated clay have been observed from analyses of the video footage from the eastern most stations. This material has also been observed in selected grab samples from this cruise and as a distinct horizon below the sand and gravel layer from cores collected by a USGS team in June,1996 (SEAX96024). This is thought to be a post glacial lake clay deposited during the formation of glacial Lake Connecticut about 17,000 years ago.

My thanks to the captain and crew of the R/V Seaward Explorer for making this research trip an overall success and of course to the USGS participants and support personnel without whose collective expertise much of the LIS sediment would still be in situ.



5 0 5 10 15 KILOMETERS

5 0 5 10 15 NAUTICAL MILES

Station Locations •

Camera Transects — (C)

Alber's Equal Area Projection

SAMPLING MAP LONG ISLAND SOUND

SEAX–96017