

BRANCH OF ATLANTIC MARINE GEOLOGY  
U.S. GEOLOGICAL SURVEY  
Woods Hole, MA 02543

CRUISE REPORT

December 21, 1994

**Ship name:** NOAA Ship Delaware II

**Cruise no:** 9411

**Project:** Benthic Habitat Studies

**Funding agency:** USGS, NMFS

**Areas of operations:**  
Georges Bank Northern Edge

**Cruise dates:** November 8-18, 1994

**Chief scientist:** Page Valentine

**Scientific party:** Page Valentine, USGS  
Dann Blackwood, USGS  
Barbara Seekins, USGS  
Nancy Soderberg, USGS  
Dave Nichols, USGS  
Eric Schmuck, USGS  
Jeremy Collie, U. Rhode Island  
Galo Escanero, URI  
Jim DaSilva, Salem State College

**Ship's captain:** Gunnar Gudmundsson

**Cruise purposes:**

1. Document the character and distribution of fisheries habitats along the northern edge of Georges Bank in U.S. and Canadian waters between 41° 15'N and 42° 10'N latitude. Resurvey and resample study areas established by this research program in April 1994 (Albatross IV 9401); evaluate changes in dredge disturbance patterns on the sea bed that were imaged with sidescan sonar in April 1994; survey and sample new study areas in disturbed and undisturbed gravel habitat.

2. Determine the impact of scallop dredging and groundfish trawling on the seabed habitat and the benthic biological community, including a quantitative comparison of epibenthic megafaunal composition in fished and unfished areas of the gravel habitat on the northern edge of the bank. Submersible observations in 1986, 1987, and 1989 in dredged and undredged areas indicated that epibenthic species were much more abundant on undredged seabed. These observations were confirmed by data collected in April 1994 (ALB 9401) during the first spring cruise of this program.

**Navigation:** USGS GPS, and differential GPS

**Scientific equipment:**

USGS: 100 kHz sidescan sonar; video and still bottom cameras

NMFS: Naturalist dredge

**Days at sea:** 11 (9 days in study areas), including 1 weather day

**Stations occupied:** (see attached sheets)

Naturalist dredge stations: 39 attempted, 37 successful

Bottom video/still camera stations: 43

Sidescan sonar: 7 areas surveyed for a total of 417 km of tracklines and an area of 65 km<sup>2</sup> mapped (sidescan tracks not shown on figures).

**Sample processing and archival:**

Sidescan sonar data, sediment grab samples, photographs, and video tapes will be processed by the USGS, Woods Hole, MA.

Video tapes and biological photographs will be duplicated and archived at: USGS in Woods Hole, MA; Graduate School of Oceanography, Univ. of Rhode Island, Narragansett, RI; and at the National Undersea Research Center at the University of Connecticut, Groton, CT.

Biological samples will be processed by the Graduate School of Oceanography, University of Rhode Island and National Undersea Research Center, University of Connecticut.

**Preliminary results:**

Sidescan sonar surveys, video observations, and replicate dredging for benthic faunas were conducted in disturbed and undisturbed areas of the gravel habitat on the Northern Edge of the bank in U.S. and Canadian waters. Areas studied in April 1994 were resurveyed and sampled to document changes in habitat condition and faunal composition. In addition, three new areas were studied. Scallop dredges and groundfish trawls account for the bottom disturbance, and fishing vessels were active in the disturbed areas during the cruise. Replicate dredge samples were collected in 6 areas and live specimens of most species were

photographed at sea. Preliminary interpretation of data confirms observations made in April 1994. Numerous benthic species (especially shrimp, small crabs, and attached forms) that are present in undisturbed areas are sparse or absent from intensively disturbed areas. Biodiversity is much lower on disturbed bottom; and gravel particles are clean, presumably as a result of abrasion caused by bottom dredge and trawl gear. Dredge marks imaged by sidescan sonar in April 1994 are less visible in sidescan images collected 6 months later. This possibly is due to the removal of sand (by tidal currents) that is exposed from beneath the gravel habitat during dredging operations. Thus, the fading of dredge marks probably means the gravel layer is healing as sand is removed, but recovery of the epifauna in these areas was not noted.

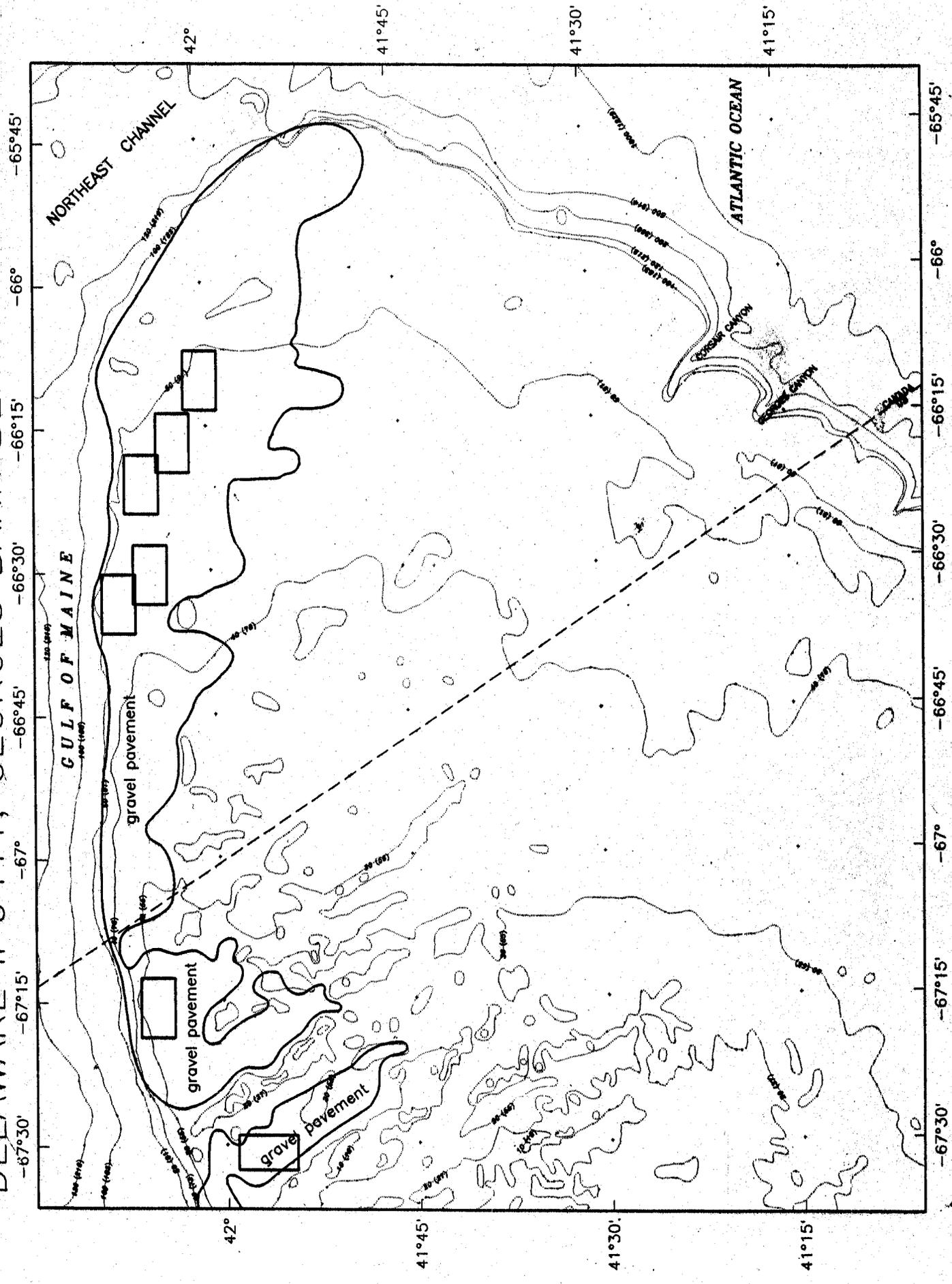
**Delaware II 9411 Stations**

Station	Gear	Lat. N deg min	Long. W deg min	Depth, m
2	Naturalist dredge	42 0.7107	66 10.0388	90
3	"	42 0.7026	66 9.9445	90
6	"	42 0.7209	66 10.0723	90
7	"	42 0.6248	66 12.9841	86
8	"	42 0.5900	66 12.8934	86
9	"	42 0.5862	66 12.8533	87
10	"	42 0.7507	66 11.1920	88
11	"	42 0.6820	66 11.2745	87
12	"	42 0.8616	66 11.2186	87
13	"	42 4.4626	66 30.2714	79
14	"	42 4.3794	66 30.1977	79
15	"	42 4.4407	66 30.2718	79
16	"	42 4.5834	66 31.7997	80
17	"	42 4.4914	66 31.6122	82
18	"	42 4.4523	66 31.5885	82
19	"	42 4.4055	66 27.6071	84
20	"	42 2.8365	66 16.5652	86
21	"	42 2.7169	66 15.5316	85
22	"	42 2.7503	66 15.6274	85
23	"	42 2.7145	66 15.6325	85
33	"	42 4.6016	67 15.5443	47
34	"	42 4.6197	67 15.5638	47
35	"	42 4.6025	67 15.6105	47
39	"	41 57.1433	67 30.9538	43
40	"	41 57.2528	67 31.0737	43
41	"	41 57.1864	67 31.0677	45
54	"	41 58.3055	67 30.8411	42
55	"	41 58.3073	67 30.8844	42
56	"	41 57.5227	67 29.4428	42
57	"	41 58.2497	67 30.9261	42
58	"	41 58.2651	67 30.9247	42
68	"	42 7.5192	66 34.5726	86
69	"	42 7.4364	66 34.6270	86
70	"	42 7.4208	66 34.5988	86
71	"	42 7.3955	66 32.3413	83
72	"	42 7.4676	66 32.2394	83
73	"	42 7.3347	66 32.4005	82

Delaware II 9411 Stations

Station	Gear	Lat. N		Long. W		Depth, m
		deg	min	deg	min	
24	Video/still camera	42	2.8517	66	15.9074	84
25	"	42	3.0005	66	14.4117	86
26	"	42	0.8244	66	9.9797	89
27	"	42	0.7409	66	11.1953	88
28	"	42	0.6116	66	12.9011	86
29	"	42	5.0098	66	20.9679	85
30	"	42	4.4102	66	27.9894	79
31	"	42	4.3596	66	30.4235	81
32	"	42	4.5493	66	31.6556	80
36	"	42	4.6887	67	15.6293	47
37	"	42	4.7718	67	13.7017	45
38	"	42	4.9003	67	17.8532	48
42	"	41	57.1022	67	30.7311	47
43	"	41	56.0327	67	30.8152	51
44	"	41	54.8625	67	30.9646	45
45	"	41	57.4036	67	29.4912	44
46	"	41	57.3900	67	32.5175	43
47	"	41	58.1721	67	30.9469	41
48	"	42	0.2808	67	31.6000	44
49	"	42	0.8080	67	33.7197	46
50	"	42	1.4536	67	35.6017	52
51	"	41	59.5000	67	31.5000	42
52	"	41	58.1193	67	31.3133	40
53	"	41	58.5915	67	32.6453	41
59	"	41	56.8815	67	20.6669	53
60	"	41	58.5830	67	20.4212	53
61	"	42	0.0900	67	20.4147	49
62	"	42	3.3403	67	20.2074	49
63	"	42	1.3409	67	13.5139	49
64	"	42	6.8965	67	3.1580	59
65	"	42	6.9197	66	59.7393	62
66	"	42	7.4865	66	35.6674	83
67	"	42	7.5321	66	31.6130	82
74	"	42	7.4769	66	32.1088	82
75	"	42	7.6325	66	34.5208	83
76	"	42	5.9351	66	6.8159	100
77	"	42	3.9733	66	3.7724	95
78	"	41	56.9824	66	3.0131	94
79	"	41	56.9446	66	59.9269	91
80	"	41	54.3939	65	48.6065	156
81	"	41	57.0095	65	51.1196	159
82	"	42	6.9860	66	34.8263	79
83	"	42	7.0463	66	33.3982	82

# DELAWARE II 9411, GEORGES BANK BENTHIC HABITATS



Map of eastern Georges Bank showing areas in which the sea bed was imaged with sidescan sonar and video/still camera transects and sampled with naturalist dredge. Depths in fathoms (meters).