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CRUISE REPORT
R/V Johnson Cruise No. J-163 (Leg IV)
28 July - 4 August 1984

84009

SCIENTIFIC PARTY:

Dr. Robert S. Jones, Co-Chief Scientist, HBF
Dr. Churchill B. Grimes, Co-Chief Scientist, Rutgers
Dr. Kenneth W. Able, Scientist, Rutgers
Mr. David C. Twitchell, Scientist, USGS
Dr. Edward P. Laine, Scientist, URI
Mr. Gregory C. Kennedy, Engineer, HBF
Mr. Simon Sainsbury, Engineer, HBF

OBJECTIVES:

1) To test our hypothesis that rough bottom topography in the Mid-Atlantic Bight resulted from bioerosion by the tilefish community.

2) To further develop the use of sidescan sonar and subbottom profiling as a tool for assessing critical habitat for fishery resources.

RESULTS:

During this leg optimal weather conditions allowed us to conduct a variety of submersible, sidescan sonar and subbottom profiling operations (Table 1) in the area ("Middle Grounds") between Block and Atlantis submarine canyons (Fig. 1, 2). Overall, we successfully completed 13 submersible dives and made numerous transects for sidescan sonar (total = 70.0 nautical miles) and subbottom profiling (total = 156.8 nautical miles).

Completion of the first objective must await final analysis of the numerous data obtained, particularly for the sidescan sonar and subbottom profile observations. To date, we feel that the sea floor in the vicinity of the "Middle Grounds" does not appear as rough nor as stratified as that previously observed by us on both flanks of Hudson Submarine Canyon. However, it was also obvious that the hydrologic and geologic background in the "Middle Grounds" area is much different than that at Hudson Canyon. For example, the sedimentation rate in the area may be very high as reported by Twichell et al. (1981). Thus, at present, we feel confident that our original hypothesis for the Hudson Canyon area is accurate but may not be applicable to all portions of the Mid-Atlantic Bight. We did identify numerous locations with submersible and sidescan sonar observations where tilefish burrows were abundant. Sidescan sonar and subbottom profile transects were concentrated in these areas (Fig. 2) so that we have similar data sets to that for the Hudson Canyon area (Grimes et al. in press).

The second objective was successfully achieved during the cruise, although more through analyses remain. We are more convinced than ever that sidescan sonar and subbottom profiling acoustic techniques are efficient tools for assessing critical habitat for some fishery resources. We have known for several years (see Twichell et al. submitted, for details) that we could detect tilefish burrows with sidescan sonar (100 KHz) towed from a surface vessel. During this cruise we were able to demonstrate convincingly that we can detect tilefish burrows as small as 0.5 m. This was confirmed by in situ measurements of burrows from the submersible during this cruise and similar operations by us during 1984 off the east coast of Florida. Thus, sidescan sonar offers a reasonable means of assessing the potential for tilefish fisheries in relatively unexploited areas, such as the Gulf of Mexico. Our recent proposal to the NURP office plans this kind of work for the summer of 1985 off the west coast of Florida. In addition to tilefish (Lopholatilus) we have recently shown, with sidescan and Johnson-Sea-Link submersibles, that this is a useful means of detecting the occurrence and abundance of another commercially important species the blueline tilefish (Caulolatilus microps) (Able et al. pers. observ.) off the east coast of Florida. Our initial successes with these acoustic techniques have been limited to burrowing species because these are the easiest to detect, but we believe that some specific habitat types, that are important to fishes and crabs, may be identified by this technique as well. A manuscript on this approach is currently in preparation.

In addition to observations directly related to our objectives, we gathered additional information on tilefish habitats and the fishery. We collected invertebrates that live in tilefish burrows including a large isopod that apparently makes long tunnels into the clay of tilefish burrows. Other burrow associates were photographed easily with the new Johnson-Sea-Link laser aimed camera. We also photographed clumps of clay on the seafloor in the vicinity of burrows which indicate that tilefish are orally excavating at least portions of their burrows. Numerous sediment samples (Table 1), taken throughout the study area, will aid considerably in our attempts to define sediment characterisitcs critical for tilefish burrows. These data have now been collected in the Mid-Atlantic Bight, the east coast of Florida, and are planned for the Gulf of Mexico off Texas for a later leg of this cruise. If these data are consistent it may allow us to predict tilefish occurrence for other areas where sediment data is available.

Burrow sizes near Veatch Canyon, based on observations from Johnson-Sea-Link, have remained remarkably consistent since 1980 suggesting that our speculations about factors affecting geographical variation in burrow size and complexity (Grimes et al., in press) may be accurate.

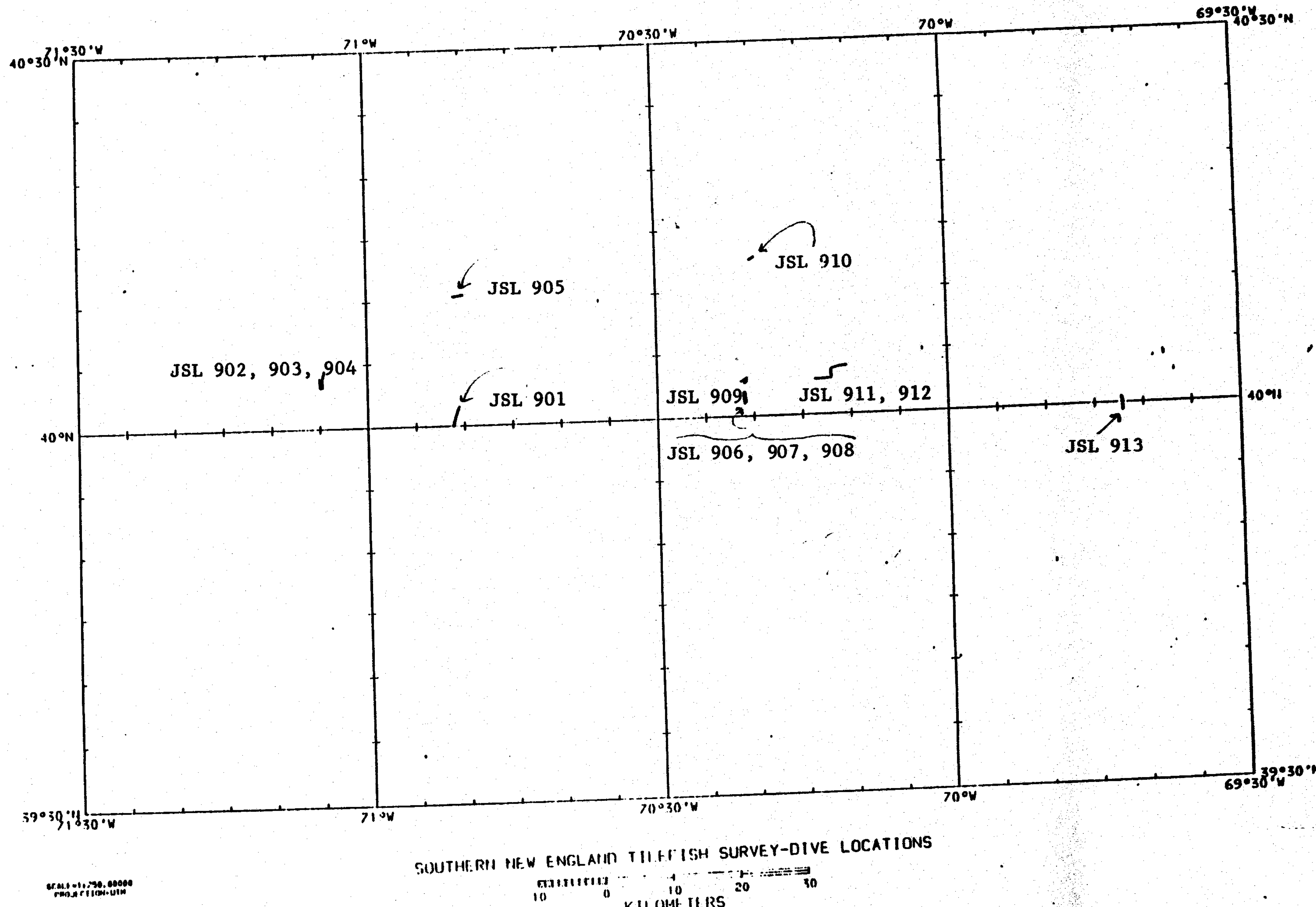
Incidental observations from Johnson-Sea-Link this year confirmed those of recent years; there are large numbers of "abandoned" tilefish burrows. These filled in burrows are presumably the result of increased tilefish mortality due to extensive fishing effort in the Mid-Atlantic Bight since the late 1970's. Smaller burrows, potentially of juvenile tilefish, were numerous in certain areas suggesting that recruitment is continuing.

Of particularly interest was the relatively common occurrence of American lobsters in tilefish burrows. Although we and the MURT team from Woods Hole have frequently observed lobsters with tilefish in pueblo habitats in submarine

Table 1. Summary of data sources from submersible operations, sidescan sonar and subbottom profiling in the Mid-Atlantic Bight from R.V. Johnson/Johnson-Sea-Link Cruise J-163 (Leg IV) during July 27 - August 6, 1984.

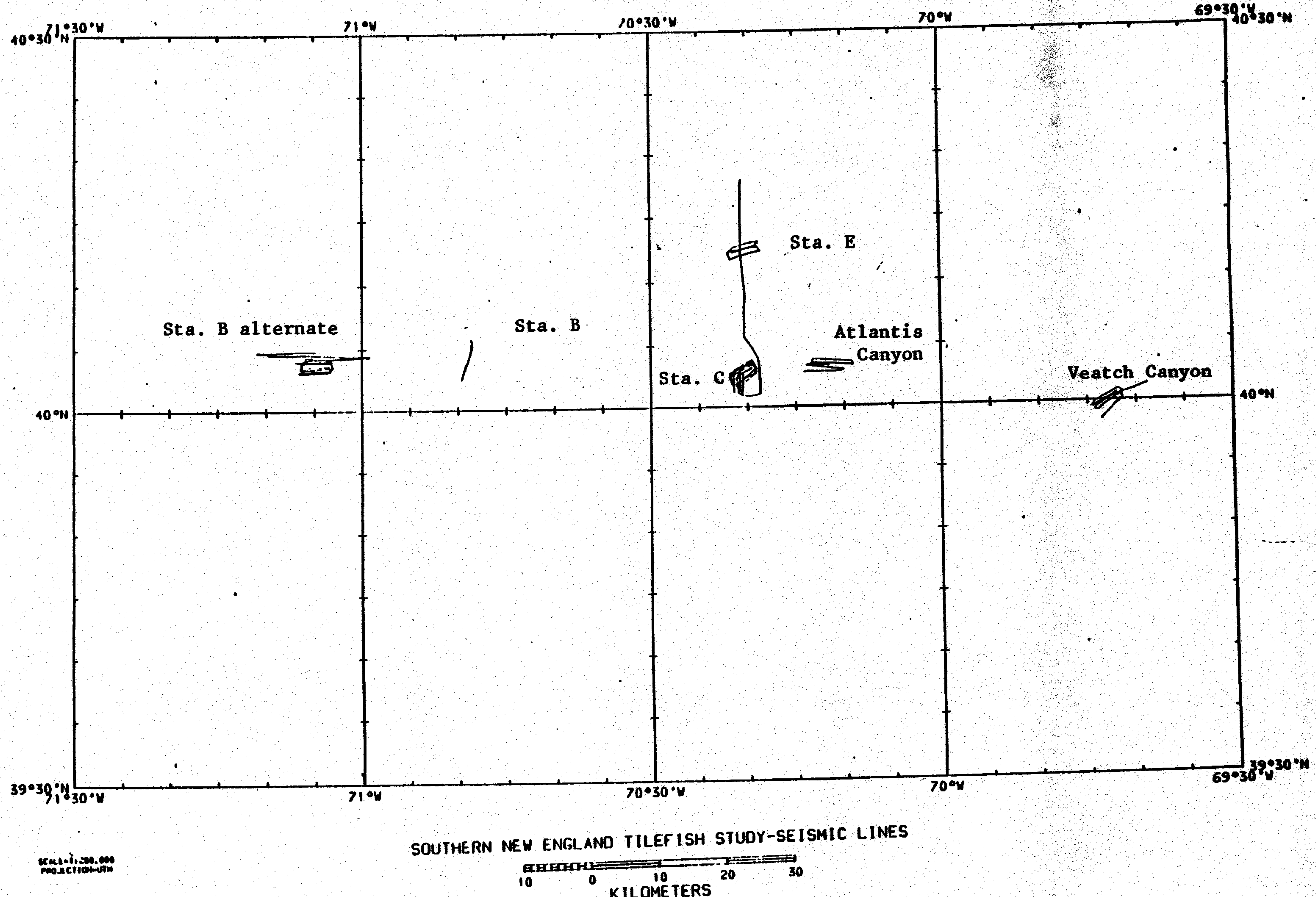
	Sediment Samples	Penetrability Measurements	Burrow Size Measurements	Collections of Invertebrates	Video	35 mm Photog.	80 mm Photog.	Mapping with Submersible	Sidescan Sonar Transects (in nm)	3.5 KH2 Profiler Transects (in nm)
Sta. B										18 33
Dive 901	2			+	+					
Sta. B alt.									8 15K	28 52
Dive 902	2	4		+	+	+	+			
Dive 903				+	+	+	+	+		
Dive 904						+	+	+		
Sta. A.										
Dive 905	3	4		+	+	+				
Sta. C									17.5 32	49.3 91
Dive 906	6	4		+	+	+	+			
Dive 907						+		+		
Dive 908						+		+		
Dive 909	5	6		+	+	+	+			
Sta. E									11.5 21	11.5 21
Dive 910	1	3		+	+	+	+			
Atlantis Canyon										17 31
Dive 911	3	2		+	+	+	+			
Dive 912	2			+	+	+				
Veatch Canyon									17 31	17 31
Dive 913	2	4	+		+	+	+	+		
Alvin to Atlantis Canyon									16 30	16 30
									176	289

Fig. 1



SOUTHERN NEW ENGLAND TILEFISH SURVEY-DIVE LOCATIONS

Fig. 2


71°30'W
71°W
70°30'W
70°W
69°30'W
40°30'N
40°N
39°30'N
Sta. B alternate
Sta. B
Sta. C
Sta. E
Atlantis
Canyon
Veatch Canyon
SOUTHERN NEW ENGLAND TILEFISH STUDY-SEISMIC LINES
10
0
10
20
30
KILOMETERS