Final Scientific Report Mission 85-5

Growth and metamorphosis of coral reef fish larval stages in the Salt River canyon, St. Croix, USVI

by

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Abstract

During this mission we made 47 bottom tows in various parts of the canyon, 19 nocturnal collections in the beam of the habitat light, 24 overnight sets of light traps and 17 sets of a specially designed settlement trap. The settlement traps were unsuccessful and failed to attract larval fishes. The light traps were only partly successful but showed some promise if they are fitted with more powerful lights and better floatation. Results of the bottom tows were similar to those of 1984. Collecting in the beam of the Hydrolab light was extremely productive; more than 64,000 larvae were collected by this technique.

This report includes a list of the fish species so far reported from the Salt River canyon and a summary from the literature of the spawning seasons of the families represented in the known fauna.

Introduction

This report summarizes the results of Hydrolab mission 85-5a which was a continuation of studies on the larval stages of the reef fishes of Salt River Canyon, St. Croix. Also included are preliminary data resulting from study of a series of collections made from the surface during a week-long stay in September 1986.

The overall goal of these studies is to gain a better understanding of the early life history stages of West Indian coral reef fishes, their identification, distribution, abundance and ecology. A tangible long term goal is the production of an atlas that can be used for the identification of larval stages of West Indian reef fishes.

The immediate objectives of this mission were to collect specimens throughout the canyon and throughout the diurnal cycles for taxonomic studies and in an effort to determine activity cycles and distribution patterns.

One of the recognized NOAA goals is investigation of the factors that contribute to the successful recruitment of marine fishes. The study of larval fishes has been gaining momentum during the past two decades until today it is a dominant area of fisheries research.

In the past, larval fishes have been viewed as helpless organisms that drift passively at the mercy of whatever ocean currents they happen to encounter. This view is now

changing and the very fact that larval fishes concentrate around lights at night demonstrates that they are effective swimmers capable of selecting their own microhabitats. The fact that many species have structural specializations that disappear when they assume a benthic habitat indicates a high degree of habiatat selection and partitioning.

The biggest problem with working with larval fishes is the difficulty of identifying the larvae. Although the taxonomy of adult Caribbean reef fishes is reasonably well known, larval fishes are so different from the adults that precise identification of most larval fishes is, at present, impossible. Both of the principal investigators are museum scientists whose major interest and training is the field of fish systematics. Thus, a principal object of our studies is the preparation of an identification guide for these larvae. During this year we have continued to make drawings of the various larval fishes and have been able to identify the young of several additional families of fishes. In this work we have been fortunate to have Mrs. Naomi Stern volunteer her artistic services. The final atlas, however, will be years in the making and the present report will deal mostly with the abundance and distribution of larval fishes in the Salt River Canyon.

Methods

Bottom tows were made with a small plankton net (30 cm diameter opening, 120 cm long) attached to an aluminum frame with two handles and fitted with a collecting bucket with side ports covered with .505 mm mesh. This net was towed by one or two divers, close to the surface and among corals and gorgonians. Tows were made for ten minutes, or over a set course, for example along the B-line from the west wall bubble to the tennis ball line and on to the C-spar bubble. The same net was used to sweep the beam of the Hydrolab flood light. Samples were transferred to glass quart jars wrapped with duct tape as described in our report for mission H84-5 and sent to the surface for preservation and processing.

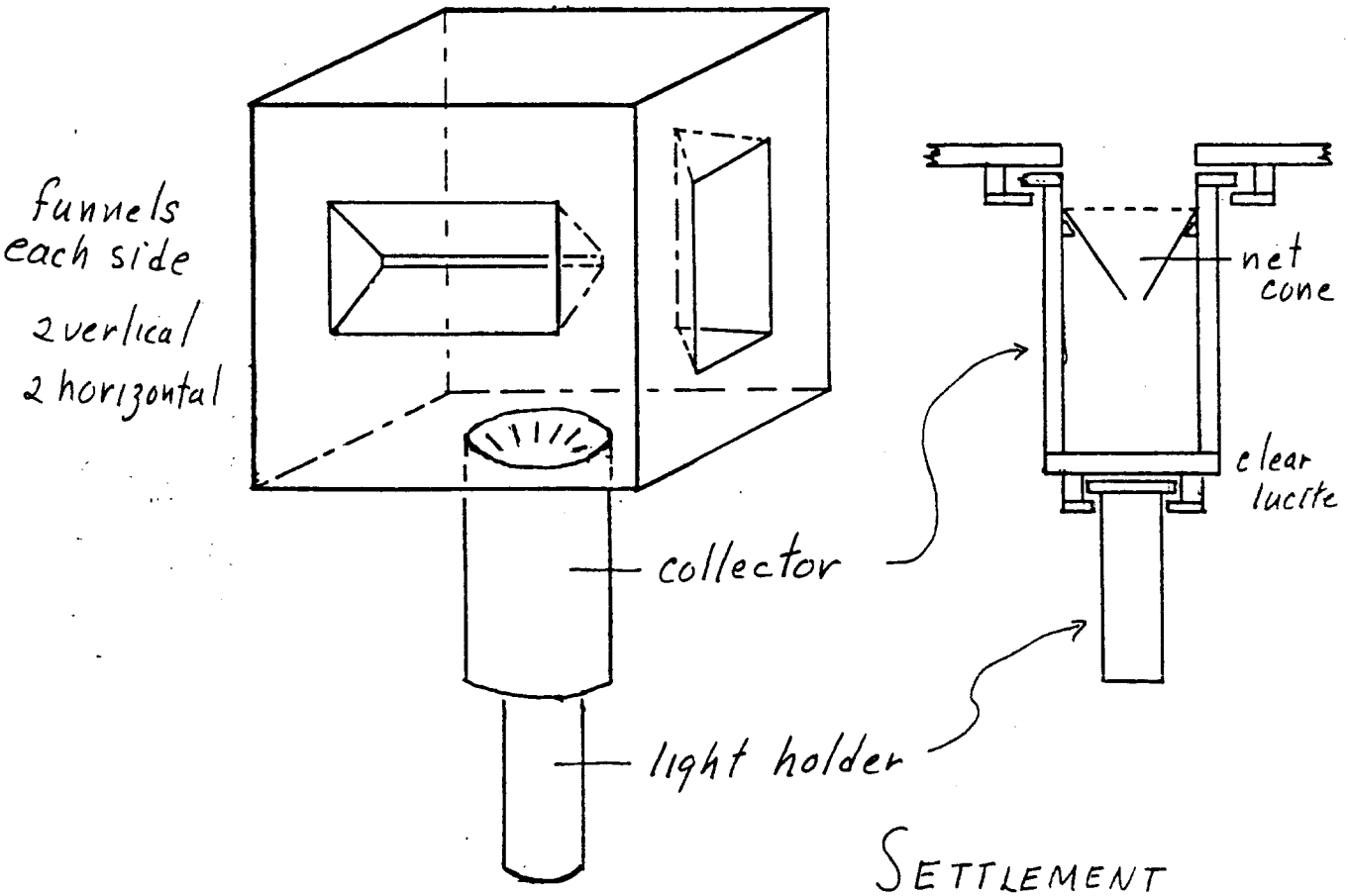
During this mission we also tested two types of traps; rigid plastic box light traps and settlement traps. A sketch of the design of these traps is provided in figure 1. The settlement traps placed in PVC pipe containers with screw caps for transfer to the surface. The design of these containers was suggested by Richard Bery.

Results

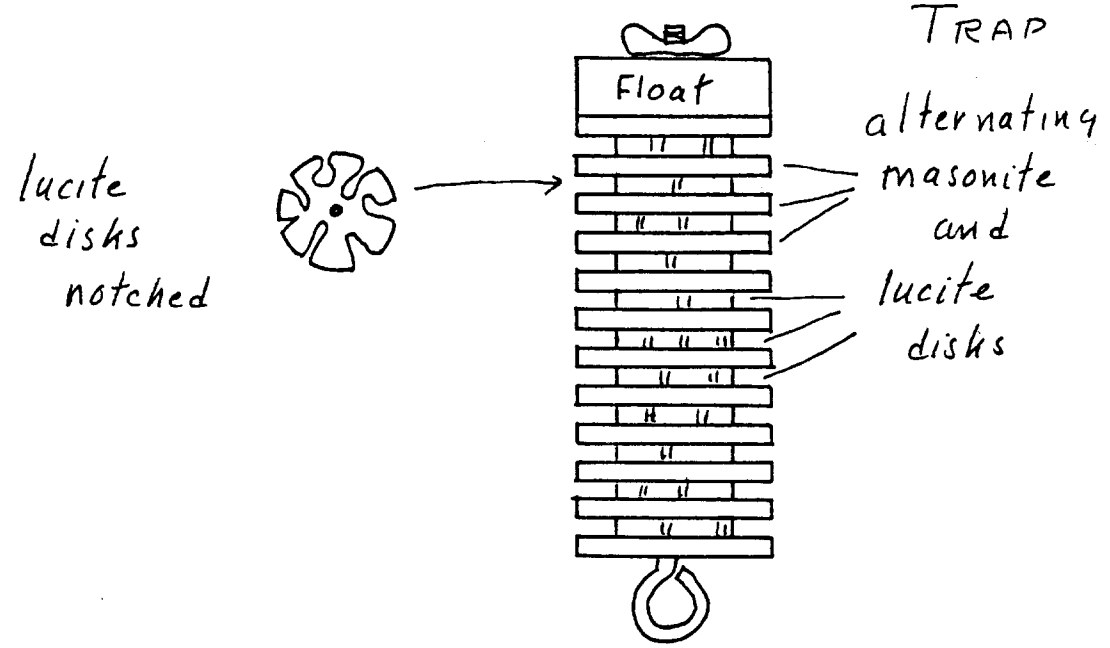
Bottom tows -- We made a total of 47 bottom tows, 26 during daylight (0500 to 1500) and 21 at night (1800 to 0200). 14 daylight tows contained larval fishes (1 to 167 individuals, ave. 16.21 per tow). The overall average was 8.73 larvae per tow. Night collections were more productive.

LARVAL FISH TRAPS HBS-5

LIGHT TRAP



SETTLEMENT TRAP



21 night tows contained 1134 larvae, an average of 54 larvae per tow. Individual tows containes 1 to 385 larvae. Results are given in Appendix 1.2.

The larvae were not distributed randomly through the canyon at night:

location	no. samples	average per sample
C-spar to		
Habitat	6	123.2
80' to C-spar	6	37.2
WW Bubble	4	29.5
WW to C-spar	5	10.8

Apparently the collections taken along the C-line between the C-spar and the Habitat sampled the region lighted by habitat floodlight and this resulted in larger catches of larval fishes.

Light traps -- Light traps were clear lucite boxed with slit funnels on each of four sides. cylinder fitted with a conical throat of plankton net material was fitted to the bottom of the trap. This collecting chamber had a clear plastic bottom and a light to shine up through the chamber into the main trap. At first we tried cyalume lights but they were too faint and we modified the light holders to accept Q-lights.

A panel of styrofoam sheet was placed in the top of the trap to serve as floatation but at 50 feet and deeper the styrofoam compressed and thereafter failed to provide aqequate floatation. Additional floatation was only partly successful.

ALthough the results from these sets were erratic, we will modify the traps for future use by providing more powerful and longerlasting lights and better floatation.

THe results of the light trap sets are presented in Appendix 1.3.

Settlement traps -- The differences in abundance of larval fishes in daylight as opposed to nighttime collections suggests alternative possibilities: either the larvae move into and disperse through the water column during the day or they seek shelter in the sand or in crevices in the reef fabric. Since we know that the larvae are abundant around the habitat at night we attempted to provide shelter sites in order to test the hypothesis that they seek hiding places in the reef during the day. The structures we used were stacks of masonite and lucite disks on a threaded rod. The opaque masonite disks were larger than the lucite disks and the latter were deeply notched to provide various types of shaded holes. A styrofoam block provided floatation so that the structure could be anchored to float vertically at any height above the sea floor. Here

again we ran into trouble with inadequate floatation as the styrofoam collapsed at depths.

This experiment was totally unsuccessful and only one larva was collected in a settlement trap. Appendix 1.4 summarizes the sets. The question now remaining is whether our traps did not catch larvae because of their improper design or because the fish simply do not seek shelter.

Habitat light -- By far the most successful technique was sweeping the beam of the habitat light with the small plankton net. 19 collections yielded more than 64,000 larval fishes (Appendix 1.5). These samples are dominated by clupeids, blennioids and gobioids with small numbers of other species including clingfishes, Gobiesocidae.

Samples were taken at hourly and two-hour intervals throughout two nights and replicated less systematically on other nights. There seems to be no peak of abundance nor is there any obvious cycle of relative numbers of the major taxa.

Surface tows in the Salt River Canyon -- Although it would be desirable to take surface tows at the same time the underwater samples are taken, this has proved to be logistically difficult. We therefore made a separate trip to St. Croix to make surface tows in the canyon. Even though these samples were made at a different time of year they

provide interesting comparisons. These collections are summarized in Appendix 2. Replicate samples were made with the net near the surface followed immediately by a second tow at a slower speed so the net was below the surface. In the future we will use a depressor to make the second tow deeper.

Offshore samples -- Through the courtesy of Dr. John Ogden we have received the larval fishes from two stations made north of St. Croix using multiple opening and closing nets (MOCNESS). These are truly pelagic samples that contain oceanic and deepwater species with a small proportion of reef fish families. Study of these samples is underway.

Discussion

Perhaps the most striking and immediate observation is that none of the fishes in the light samples have the striking larval adaptations that we associate with plantonic larvae. Such adaptations as elongate dorsal spines, elongate and spinulose pelvic spines, elaborate spines on the preopercle and top of the neurocranium, body shape and protruding hindgut are common in oceanic larvae and since they disappear when the fish metamorphose and assume their definitive life style it is reasonable to interpret them as adaptations to the planktonic existence.

The fact that none of the fish larvae taken in the

benthic tows and light samples have such adaptations seems to indicate the presence of two larval fish communities; a near-field assemblage whose members are unspecialized and an offshore, far-field assemblage whose members have the specializations. We suggest that those species that lack the specializations are good swimmers that are able to avoid being carried out to sea. Those with the specializations, on the other hand, are able to "attach themselves to a piece of water" and take advantage of currents for long-distance transport.

The present samples provide strong support for this hypothesis although, of course, we need far more samples for conclusive results. Specialized larvae are absent from the samples from the floor of the canyon, make up a small fraction of the specimens in the surface tows and are abundant in the offshore tows.

We believe that this observation is of considerable significance to the management of marine fishes. The open water forms are able to disperse to distant environments; the near-field fishes have more limited dispersal abilities. In the event of environmental catastrophies such as the widespread destruction of reefs along the north coast of Jamaica by a hurricane and the extreme overfishing that has occurred in several West Indian regions, the ability of the reef fish populations to rebound may well be linked to this dispersal ability.

We are aware of other investigators who have become interested in the same phenomenon. One group is investigating genetic diversity with the hypothesis that far-field fishes should show less heterogeneity than near-field fishes whose dispersal is less rapid. The other group is looking directly at the length of larval life as reflected in the daily otolith increments.

Figure 1. Traps used during Hydrolab mission 85-5.

Appendix 1. Collecting data for Mission 85-5.

1.1 All collections.

1.2 Bottom tows.

1.3 Light traps.

1.4 Settlement traps.

1.5 Hydrolab light sweeps.

No	Date	Time	location	Type	No. larvae
X85-029-00, 5-057-00,	85/05/19,	01:00-01:10,	HAB	HL	2777
X85-094-00,	85/05/21,	01:00-02:00,	CSPAR-HAB	BT1	9
X85-095-00,	85/05/21,	01:00-02:00,	HAB	HL	2793
X85-096-00,	85/05/21,	01:00-02:00,	WWB	BT1	45
X85-097-00,	85/05/21,	01:00-02:00,	80F-CSPAR	BT1	20
X85-098-00,	85/05/21,	01:00-02:00,	WWB-CSPAR	BT1	19
X85-099-00,	85/05/21,	01:00-05:00,	WWB	LT	4
X85-100-00,	85/05/21,	01:00-05:00,	CSPAR	LT	0
X85-101-00,	85/05/21,	01:00-05:00,	CSPAR	LT	0
X85-118-00,	85/05/22,	02:00-02:10,	HAB	HL	5667
X85-058-00,	85/05/19,	03:00-03:10,	HAB	HL	2245
X85-059-00,	85/05/19,	04:00-04:10,	HAB	HL	2336
X85-119-00,	85/05/22,	04:00-04:10,	HAB	HL	7407
X85-060-00,	85/05/19,	05:00-05:10,	HAB	HL	466
X85-102-00,	85/05/21,	05:00-06:45,	CSPAR-HAB	BT1	5
X85-103-00,	85/05/21,	05:00-06:45,	WWB	BT1	0
X85-104-00,	85/05/21,	05:00-06:45,	80F-CSPAR	BT1	0
X85-030-00,	85/05/17,	08:00-08:10,	WWALLTR	BT1	4
X85-079-00,	85/05/20,	08:30-08:40,	WWB	BT1	0
X85-048-00,	85/05/18,	08:30-09:10,	WWB	BT1	17
X85-049-00,	85/05/18,	08:30-09:10,	CSPAR-80F-	BT1	0
X85-050-00,	85/05/18,	08:30-09:10,	CSPAR-HAB	BT1	4
X85-051-00,	85/05/18,	08:30-09:10,	WWB-CSPAR	BT1	0
X85-080-00,	85/05/20,	08:30-09:30,	WWB-CSPAR	BT1	0
X85-081-00,	85/05/20,	08:30-09:30,	CSPAR-80F-	BT1	1
X85-082-00,	85/05/20,	08:30-09:30,	CSPAR-HAB	BT1	0
-083-00,	85/05/20,	08:30-09:30,	HAB	BT1	167
X85-031-00,	85/05/17,	09:15-09:25,	CSPAR-HAB	BT1	1
X85-012-00,	85/05/16,	09:30-11:30,	WWB	BT1	0
X85-014-00,	85/05/16,	09:30-11:30,	WWB-CSPAR	BT1	0
X85-011-00,	85/05/16,	09:30-11:30,	CSPAR-HAB	BT1	8
X85-013-00,	85/05/16,	09:30-11:30,	HAB	BT1	13
X85-032-00,	85/05/17,	14:00-14:10,	EWALLTR-PIN	BT1	1
X85-065-00,	85/05/19,	14:00-15:30,	WTB	BT1	1
X85-066-00,	85/05/19,	14:00-15:30,	ETB	BT1	2
X85-067-00,	85/05/19,	14:00-15:30,	CSPAR-75F	BT1	2
X85-068-00,	85/05/19,	14:00-15:30,	CSPAR-HAB	BT1	0
X85-069-00,	85/05/19,	14:00-15:30,	CSPAR	BT1	1
X85-033-00,	85/05/17,	14:15-14:25,	EWALLB	BT1	0
X85-034-00,	85/05/17,	14:30-15:00,	EB-HAB	BT1	0
X85-042-00,	85/05/18,	18:00-08:00,	80F	LT	0
X85-043-00,	85/05/18,	18:00-08:00,	HAB	ST	0
X85-044-00,	85/05/18,	18:00-08:00,	CSPAR	ST	0
X85-045-00,	85/05/18,	18:00-08:00,	80F	ST	0
X85-046-00,	85/05/18,	18:00-08:00,	WWB	ST	0
X85-047-00,	85/05/18,	18:00-08:00,	HAB	ST	0
X85-061-00,	85/05/19,	18:00-08:00,	HAB	LT	0
X85-062-00,	85/05/19,	18:00-08:00,	HAB	LT	0
X85-063-00,	85/05/19,	18:00-08:00,	HAB	ST	0
X85-064-00,	85/05/19,	18:00-08:00,	HAB	ST	0
X85-039-00,	85/05/18,	18:00-08:00,	HAB	LT	83
X85-040-00,	85/05/18,	18:00-08:00,	HAB	LT	0
X -041-00,	85/05/18,	18:00-08:00,	WWB	LT	0

X85-037-00,	85/05/17,	18:30-20:15,	CSPAR-HAB	BT1	28
5-035-00,	85/05/17,	18:30-20:15,	WWB-CSPAR	BT1	2
5-036-00,	85/05/17,	18:30-20:15,	80F-CSPAR	BT1	14
X85-038-00,	85/05/17,	18:30-20:15,	HAB	HL	4046
X85-018-00,	85/05/16,	18:30-20:30,	HAB	HL	2421
X85-015-00,	85/05/16,	18:30-20:30,	CSPAR-HAB	BT1	385
X85-016-00,	85/05/16,	18:30-20:30,	WWB	BT1	68
X85-017-00,	85/05/16,	18:30-20:30,	80-CSPAR	BT1	2
X85-071-00,	85/05/19,	18:50-19:30,	80F-CSPAR	BT1	3
X85-072-00,	85/05/19,	18:50-19:30,	WWB-CSPAR	BT1	3
X85-073-00,	85/05/19,	18:50-19:30,	HAB	HL	2269
X85-070-00,	85/05/19,	18:50-19:30,	CSPAR-HAB	BT1	32
X85-075-00,	85/05/20,	19:00-08:00,	HAB	LT	1
X85-026-00,	85/05/17,	19:00-08:00,	80F	LT	0
X85-074-00,	85/05/20,	19:00-08:00,	80F	LT	4
X85-076-00,	85/05/20,	19:00-08:00,	HAB	LT	1
X85-078-00,	85/05/20,	19:00-08:00,	CSPAR	LT	6
X85-027-00,	85/05/17,	19:00-08:00,	HAB	LT	0
X85-077-00,	85/05/20,	19:00-08:00,	WWB	LT	1
X85-028-00,	85/05/17,	19:00-08:00,	HAB	LT	1
X85-020-00,	85/05/17,	19:00-08:00,	CSPAR	ST	0
X85-019-00,	85/05/17,	19:00-08:00,	WWB	ST	0
X85-023-00,	85/05/17,	19:00-08:00,	HAB	ST	0
X85-021-00,	85/05/17,	19:00-08:00,	80F	ST	0
X85-022-00,	85/05/17,	19:00-08:00,	HAB	ST	0
X85-024-00,	85/05/17,	19:00-08:00,	WWB	LT	0
X85-025-00,	85/05/17,	19:00-08:00,	CSPAR	LT	0
-052-00,	85/05/18,	19:00-19:10,	HAB	HL	99
X85-110-00,	85/05/21,	19:00-19:10,	HAB	HL	0
X85-113-00,	85/05/21,	19:00-20:00,	WWB-CSPAR	BT1	25
X85-114-00,	85/05/21,	19:00-20:00,	80F-CSPAR	BT1	161
X85-112-00,	85/05/21,	19:00-20:00,	CSPAR-HAB	BT1	274
X85-115-00,	85/05/21,	19:00-20:00,	WWB	BT1	1
X85-053-00,	85/05/18,	20:00-20:10,	HAB	HL	6659
X85-111-00,	85/05/21,	20:00-20:40,	HAB	HL	6167
X85-093-00,	85/05/21,	21:00-01:00,	HAB	LT	0
X85-090-00,	85/05/21,	21:00-01:00,	CSPAR	LT	0
X85-092-00,	85/05/21,	21:00-01:00,	80F	LT	1
X85-089-00,	85/05/21,	21:00-01:00,	HAB	LT	140
X85-091-00,	85/05/21,	21:00-01:00,	WWB	LT	0
X85-104-00,	85/05/21,	21:00-19:00,	CSPAR	ST	1
X85-107-00,	85/05/21,	21:00-19:00,	WWB	ST	0
X85-108-00,	85/05/21,	21:00-19:00,	80F	ST	0
X85-106-00,	85/05/21,	21:00-19:00,	HAB	ST	0
X85-109-00,	85/05/21,	21:00-19:00,	HAB	ST	0
X85-054-00,	85/05/18,	21:00-21:10,	HAB	HL	4558
X85-087-00,	85/05/20,	21:00-22:30,	80F-CSPAR	BT1	23
X85-086-00,	85/05/20,	21:00-22:30,	CSPAR-HAB	BT1	11
X85-085-00,	85/05/20,	21:00-22:30,	WWB-CSPAR	BT1	5
X85-084-00,	85/05/20,	21:00-22:30,	WWB	BT1	4
X85-055-00,	85/05/18,	22:00-22:10,	HAB	HL	2485
X85-088-00,	85/05/20,	22:00-22:10,	HAB	HL	4467
X85-116-00,	85/05/21,	22:00-22:10,	HAB	HL	5788
-056-00,	85/05/18,	23:00-23:10,	HAB	HL	1873

X85-117-00, 85/05/22, 24:00-24:10, HAB , HL , 3619

X85-094-00,	85/05/21,	01:00-02:00,	CSPAR-HAB ,	BT1 ,	9
-096-00,	85/05/21,	01:00-02:00,	WWB ,	BT1 ,	45
-098-00,	85/05/21,	01:00-02:00,	WWB-CSPAR ,	BT1 ,	19
X85-097-00,	85/05/21,	01:00-02:00,	80F-CSPAR ,	BT1 ,	20
X85-102-00,	85/05/21,	05:00-06:45,	CSPAR-HAB ,	BT1 ,	5
X85-103-00,	85/05/21,	05:00-06:45,	WWB ,	BT1 ,	0
X85-104-00,	85/05/21,	05:00-06:45,	80F-CSPAR ,	BT1 ,	0
X85-030-00,	85/05/17,	08:00-08:10,	WWALLTR ,	BT1 ,	4
X85-079-00,	85/05/20,	08:30-08:40,	WWB ,	BT1 ,	0
X85-048-00,	85/05/18,	08:30-09:10,	WWB ,	BT1 ,	17
X85-049-00,	85/05/18,	08:30-09:10,	CSPAR-80F- ,	BT1 ,	0
X85-050-00,	85/05/18,	08:30-09:10,	CSPAR-HAB ,	BT1 ,	4
X85-051-00,	85/05/18,	08:30-09:10,	WWB-CSPAR ,	BT1 ,	0
X85-082-00,	85/05/20,	08:30-09:30,	CSPAR-HAB ,	BT1 ,	0
X85-083-00,	85/05/20,	08:30-09:30,	HAB ,	BT1 ,	167
X85-080-00,	85/05/20,	08:30-09:30,	WWB-CSPAR ,	BT1 ,	0
X85-081-00,	85/05/20,	08:30-09:30,	CSPAR-80F- ,	BT1 ,	1
X85-031-00,	85/05/17,	09:15-09:25,	CSPAR-HAB ,	BT1 ,	1
X85-012-00,	85/05/16,	09:30-11:30,	WWB ,	BT1 ,	0
X85-014-00,	85/05/16,	09:30-11:30,	WWB-CSPAR ,	BT1 ,	0
X85-011-00,	85/05/16,	09:30-11:30,	CSPAR-HAB ,	BT1 ,	8
X85-013-00,	85/05/16,	09:30-11:30,	HAB ,	BT1 ,	13
X85-032-00,	85/05/17,	14:00-14:10,	EWALLTR-PIN,	BT1 ,	1
X85-068-00,	85/05/19,	14:00-15:30,	CSPAR-HAB ,	BT1 ,	0
X85-065-00,	85/05/19,	14:00-15:30,	WTB ,	BT1 ,	1
X85-066-00,	85/05/19,	14:00-15:30,	ETB ,	BT1 ,	2
X85-067-00,	85/05/19,	14:00-15:30,	CSPAR-75F ,	BT1 ,	2
-069-00,	85/05/19,	14:00-15:30,	CSPAR ,	BT1 ,	1
X85-033-00,	85/05/17,	14:15-14:25,	EWALLB ,	BT1 ,	0
X85-034-00,	85/05/17,	14:30-15:00,	EB-HAB ,	BT1 ,	0
X85-037-00,	85/05/17,	18:30-20:15,	CSPAR-HAB ,	BT1 ,	28
X85-035-00,	85/05/17,	18:30-20:15,	WWB-CSPAR ,	BT1 ,	2
X85-036-00,	85/05/17,	18:30-20:15,	80F-CSPAR ,	BT1 ,	14
X85-015-00,	85/05/16,	18:30-20:30,	CSPAR-HAB ,	BT1 ,	385
X85-017-00,	85/05/16,	18:30-20:30,	80-CSPAR ,	BT1 ,	2
X85-016-00,	85/05/16,	18:30-20:30,	WWB ,	BT1 ,	68
X85-070-00,	85/05/19,	18:50-19:30,	CSPAR-HAB ,	BT1 ,	32
X85-072-00,	85/05/19,	18:50-19:30,	WWB-CSPAR ,	BT1 ,	3
X85-071-00,	85/05/19,	18:50-19:30,	80F-CSPAR ,	BT1 ,	3
X85-114-00,	85/05/21,	19:00-20:00,	80F-CSPAR ,	BT1 ,	161
X85-112-00,	85/05/21,	19:00-20:00,	CSPAR-HAB ,	BT1 ,	274
X85-113-00,	85/05/21,	19:00-20:00,	WWB-CSPAR ,	BT1 ,	25
X85-115-00,	85/05/21,	19:00-20:00,	WWB ,	BT1 ,	1
X85-084-00,	85/05/20,	21:00-22:30,	WWB ,	BT1 ,	4
X85-085-00,	85/05/20,	21:00-22:30,	WWB-CSPAR ,	BT1 ,	5
X85-086-00,	85/05/20,	21:00-22:30,	CSPAR-HAB ,	BT1 ,	11
X85-087-00,	85/05/20,	21:00-22:30,	80F-CSPAR ,	BT1 ,	23

LIGHT TRAP CORRECTIONS, MISSION [illegible]

CX85-099-00,	85/05/21,	01:00-05:00,	WWB	,	LT	, 4
CX85-100-00,	85/05/21,	01:00-05:00,	CSPAR	,	LT	, 0
CX85-101-00,	85/05/21,	01:00-05:00,	CSPAR	,	LT	, 0
CX85-042-00,	85/05/18,	18:00-08:00,	BOF	,	LT	, 0
CX85-040-00,	85/05/18,	18:00-08:00,	HAB	,	LT	, 0
CX85-041-00,	85/05/18,	18:00-08:00,	WWB	,	LT	, 0
CX85-061-00,	85/05/19,	18:00-08:00,	HAB	,	LT	, 0
CX85-062-00,	85/05/19,	18:00-08:00,	HAB	,	LT	, 0
CX85-039-00,	85/05/18,	18:00-08:00,	HAB	,	LT	, 83
CX85-025-00,	85/05/17,	19:00-08:00,	CSPAR	,	LT	, 0
CX85-027-00,	85/05/17,	19:00-08:00,	HAB	,	LT	, 0
CX85-077-00,	85/05/20,	19:00-08:00,	WWB	,	LT	, 1
CX85-028-00,	85/05/17,	19:00-08:00,	HAB	,	LT	, 1
CX85-024-00,	85/05/17,	19:00-08:00,	WWB	,	LT	, 0
CX85-075-00,	85/05/20,	19:00-08:00,	HAB	,	LT	, 1
CX85-026-00,	85/05/17,	19:00-08:00,	BOF	,	LT	, 0
CX85-074-00,	85/05/20,	19:00-08:00,	BOF	,	LT	, 4
CX85-076-00,	85/05/20,	19:00-08:00,	HAB	,	LT	, 1
CX85-078-00,	85/05/20,	19:00-08:00,	CSPAR	,	LT	, 6
CX85-092-00,	85/05/21,	21:00-01:00,	BOF	,	LT	, 1
CX85-089-00,	85/05/21,	21:00-01:00,	HAB	,	LT	, 140
CX85-090-00,	85/05/21,	21:00-01:00,	CSPAR	,	LT	, 0
CX85-091-00,	85/05/21,	21:00-01:00,	WWB	,	LT	, 0
CX85-093-00,	85/05/21,	21:00-01:00,	HAB	,	LT	, 0

:X85-043-00,	85/05/18,	18:00-08:00,	HAB	,	ST	, 0
: 5-044-00,	85/05/18,	18:00-08:00,	CSPAR	,	ST	, 0
: 5-046-00,	85/05/18,	18:00-08:00,	WWB	,	ST	, 0
:X85-047-00,	85/05/18,	18:00-08:00,	HAB	,	ST	, 0
:X85-045-00,	85/05/18,	18:00-08:00,	80F	,	ST	, 0
:X85-063-00,	85/05/19,	18:00-08:00,	HAB	,	ST	, 0
:X85-064-00,	85/05/19,	18:00-08:00,	HAB	,	ST	, 0
:X85-021-00,	85/05/17,	19:00-08:00,	80F	,	ST	, 0
:X85-020-00,	85/05/17,	19:00-08:00,	CSPAR	,	ST	, 0
:X85-019-00,	85/05/17,	19:00-08:00,	WWB	,	ST	, 0
:X85-023-00,	85/05/17,	19:00-08:00,	HAB	,	ST	, 0
:X85-022-00,	85/05/17,	19:00-08:00,	HAB	,	ST	, 0
:X85-107-00,	85/05/21,	21:00-19:00,	WWB	,	ST	, 0
:X85-108-00,	85/05/21,	21:00-19:00,	80F	,	ST	, 0
:X85-106-00,	85/05/21,	21:00-19:00,	HAB	,	ST	, 0
:X85-104-00,	85/05/21,	21:00-19:00,	CSPAR	,	ST	, 1
:X85-109-00,	85/05/21,	21:00-19:00,	HAB	,	ST	, 0

X85-057-00,	85/05/19,	01:00-01:10,	HAB	,	HL	, 2777
5-095-00,	85/05/21,	01:00-02:00,	HAB	,	HL	, 2793
5-118-00,	85/05/22,	02:00-02:10,	HAB	,	HL	, 5667
X85-058-00,	85/05/19,	03:00-03:10,	HAB	,	HL	, 2245
X85-059-00,	85/05/19,	04:00-04:10,	HAB	,	HL	, 2336
X85-060-00,	85/05/19,	05:00-05:10,	HAB	,	HL	, 466
X85-038-00,	85/05/17,	18:30-20:15,	HAB	,	HL	, 4046
X85-018-00,	85/05/16,	18:30-20:30,	HAB	,	HL	, 2421
X85-073-00,	85/05/19,	18:50-19:30,	HAB	,	HL	, 2269
X85-052-00,	85/05/18,	19:00-19:10,	HAB	,	HL	, 99
X85-110-00,	85/05/21,	19:00-19:10,	HAB	,	HL	, 0
X85-053-00,	85/05/18,	20:00-20:10,	HAB	,	HL	, 6659
X85-111-00,	85/05/21,	20:00-20:40,	HAB	,	HL	, 6167
X85-054-00,	85/05/18,	21:00-21:10,	HAB	,	HL	, 4558
X85-055-00,	85/05/18,	22:00-22:10,	HAB	,	HL	, 2485
X85-116-00,	85/05/21,	22:00-22:10,	HAB	,	HL	, 5788
X85-088-00,	85/05/20,	22:00-22:10,	HAB	,	HL	, 4467
X85-056-00,	85/05/18,	23:00-23:10,	HAB	,	HL	, 1873
X85-117-00,	85/05/22,	24:00-24:10,	HAB	,	HL	, 3619

Appendix 2. Collecting data for surface tows, September, 1985.

X85-132-00,	85/09/25,	06:00-06:15,	SRC	SUR2 ,	9
5-133-00,	85/09/25,	06:20-06:35,	SRC	SS2 ,	15
85-134-00,	85/09/25,	07:00-07:15,	SRC	SUR2 ,	5
X85-135-00,	85/09/25,	07:20-07:35,	SRC	SS2 ,	4
X85-136-00,	85/09/25,	08:00-08:15,	SRC	SUR2 ,	9
X85-137-00,	85/09/25,	08:20-08:35,	SRC	SS2 ,	15
X85-124-00,	85/09/24,	09:00-09:15,	SRC	SUR2 ,	23
X85-125-00,	85/09/24,	09:25-09:40,	SRC	SS2 ,	37
X85-138-00,	85/09/25,	10:00-10:15,	SRC	SUR2 ,	3
X85-148-00,	85/09/26,	10:00-10:15,	SRC	SUR2 ,	9
X85-139-00,	85/09/25,	10:20-10:35,	SRC	SS2 ,	10
X85-149-00,	85/09/26,	10:20-10:35,	SRC	SS2 ,	13
X85-166-00,	85/09/28,	10:55-11:10,	SRC	SUR2 ,	13
X85-140-00,	85/09/25,	11:00-11:15,	SRC	SUR2 ,	2
X85-167-00,	85/09/28,	11:15-11:30,	SRC	SS2 ,	9
X85-141-00,	85/09/25,	11:20-11:35,	SRC	SS2 ,	4
X85-160-00,	85/09/27,	11:25-11:40,	SRC	SUR2 ,	4
X85-150-00,	85/09/26,	11:30-11:45,	SRC	SUR2 ,	1
X85-161-00,	85/09/27,	11:45-12:00,	SRC	SS2 ,	12
X85-151-00,	85/09/26,	11:50-12:05,	SRC	SS2 ,	0
X85-126-00,	85/09/24,	12:00-12:15,	SRC	SUR2 ,	18
X85-127-00,	85/09/24,	12:20-12:35,	SRC	SS2 ,	36
X85-152-00,	85/09/26,	13:00-13:15,	SRC	SUR2 ,	2
X85-153-00,	85/09/26,	13:20-13:35,	SRC	SS2 ,	15
X85-120-00,	85/09/23,	13:45-14:00,	SRC	SUR2 ,	4,
X85-121-00,	85/09/23,	14:05-15:20,	SRC	SS2 ,	8
X85-128-00,	85/09/24,	14:15-14:30,	SRC	SUR2 ,	1
-129-00,	85/09/24,	14:20-14:35,	SRC	SS2 ,	10
X85-122-00,	85/09/23,	15:00-15:15,	SRC	SUR2 ,	3
X85-162-00,	85/09/27,	15:05-15:20,	SRC	SUR2 ,	12
X85-163-00,	85/09/27,	15:25-15:40,	SRC	SS2 ,	20
X85-123-00,	85/09/23,	15:30-15:45,	SR INSIDE	SUR2 ,	3
X85-130-00,	85/09/24,	16:00-16:15,	SRC	SUR2 ,	5
X85-131-00,	85/09/24,	16:20-16:35,	SRC	SS2 ,	4
X85-142-00,	85/09/25,	16:45-17:00,	SRC	SUR2 ,	0
X85-154-00,	85/09/26,	17:00-17:15,	SRC	SUR2 ,	7
X85-164-00,	85/09/27,	17:05-17:20,	SRC	SUR2 ,	0
X85-143-00,	85/09/25,	17:05-17:20,	SRC	SS2 ,	1
X85-155-00,	85/09/26,	17:20-17:35,	SRC	SS2 ,	6
X85-165-00,	85/09/27,	17:25-17:40,	SRC	SS2 ,	10
X85-156-00,	85/09/26,	18:00-18:15,	SRC	SUR2 ,	2
X85-157-00,	85/09/26,	18:20-18:35,	SRC	SS2 ,	3
X85-158-00,	85/09/26,	19:00-19:15,	SRC	SUR2 ,	13
X85-159-00,	85/09/26,	19:20-19:35,	SRC	SS2 ,	10
X85-144-00,	85/09/25,	19:50-20:05,	SRC	SUR2 ,	8
X85-145-00,	85/09/25,	20:10-20:25,	SRC	SS2 ,	11
X85-146-00,	85/09/25,	21:50-22:05,	SRC	SUR2 ,	28
X85-147-00,	85/09/25,	22:10-22:25,	SRC	SS2 ,	23

25 SUR2 net at surface

23 SS2 net just below surface

½ meter net

Appendix 3. List of fishes reported from Salt River Canyon, St. Croix.

FISHES OF THE SALT RIVER CANYON
revised VI-16-85

Orectolobidae -- Carpet sharks

Ginglymostoma cirratum (Bonnaterre) Nurse shark
This species is listed in ST78-2.

Dasyatidae -- stingrays

Dasyatis americana Hildebrand and Schroeder Southern stingray.
Southern sting rays are common in the Salt River and are frequently accompanied by bar jack (Caranx ruber) as the feed on the sandy areas of the canyon.

Myliobatidae -- Eagle rays

Aetobatus narinari (Euphrasen) Spotted eagle ray
Included on the authority of ST78-2.

Albulidae -- Bonefishes

Albula vulpes (Linnaeus) Bonefish
Bonefish larvae were taken in plankton tows during Mission 85-5

Elopidae -- Tarpons

Megalops atlanticus Valenciennes Tarpon
Tarpon are present in the enclosed pond behind the base camp where one was caught by Rick Rounds on May 18,1985. Their larvae are to be expected in the canyon.

Muraenidae -- Morays

Gymnothorax moringa (Cuvier) Spotted moray
The spotted moray is reasonable common and frequently observed during the day. One was active at the East Wall tank rack on May 1985.
Gymnothorax funebris Ranzani Green moray
A very large green moray was present under the east side of the base of the Hydrolab during March, 1984.
Gymnothorax vicinus (Castelnau) Purplemouth moray
Recorded on the authority of Kaufman and Ebersole.
Muraena miliaris (Kaup) Goldentail moray
Listed by Smith and Tyler ST78-2

Congridae -- Conger eels

Nystactichthys halis (Bohlke) Garden eel
Common in the deeper sandy areas of the Canyon, especially at depths greater than 70 feet.

Ophichthidae -- Snake eels

Ophichthus ophis (Linnaeus) Spotted snake eel
A large individual was seen frequently in June, 1978, usually mostly buried in the sand in the area between C-Spar and the excursion limit line. One was seen at

night May 20, 1985 at the C-Spar tank rack.

Clupeidae -- Herrings

Jenkinsia lamprotaenia (Gosse) dwarf herring
Larvae of this species were extremely abundant at the Hydrolab light during Mission 85-5.

Synodontidae -- Lizardfishes

Synodus intermedius (Agassiz) Sand diver
Large lizardfishes, presumed to be this species, are common in the canyon.

Gobiesocidae -- Clingfishes

Larval clingfishes were taken in plankton collections around the light during mission 85-5.

Exocetidae -- Flyingfishes

Flying fish larvae are frequently collected in surface plankton tows.

Belonidae -- Needlefishes

Needlefishes are common in Salt River near the base camp and larval needlefishes collected in surface plankton tows in 1984.

Atherinidae -- Silversides

Silversides, probably Allanetta harringtonensis, are common around the base camp.

Holocentridae -- Squirrelfishes

Holocentrus ascensionis (Osbeck) Squirrelfish
Common in the reef. One large individual was seen frequently around the base of the habitat in 1985.
Holocentrus coruscus (Poey) Reef squirrelfish
Probably more common than records indicate. A juvenile was observed at night over sand near the C line during 85-5.
Holocentrus rufus (Walbaum) Longspine squirrelfish
Common, often around the base of the habitat.
Holocentrus vexillarius (Poey) Dusky squirrelfish
Reported by Kaufman and Ebersole.
Holocentrus marianus (Cuvier) Longjaw squirrelfish
Common in the canyon and around the base of the habitat.
Myripristis jacobus Cuvier Blackbar soldierfish
Very common in shelter areas including the habitat.

Aulostomidae -- Trumpetfishes

Aulostomus maculatus Valenciennes Trumpetfish
One of the most abundant predators of the reef.

Fistulariidae

Fistularia tabacaria Linnaeus Bluespotted cornetfish

Observed in the deeper parts of the canyon in 1978.

Syngnathidae -- Pipefishes

Syngnathus sp.
One small postlarva was collected in a plankton net between the West bubble and C-Spar during Mission 85-5.

Serranidae -- Sea basses

Diplectrum sp. ?
Reported by Schulman et al. Small individuals were recruited on artificial reefs in the canyon.
Epinephelus adscensionis (Osbeck) Rock hind
Listed by Smith and Tyler in 1978 and by Kaufman and Ebersole.
Epinephelus cruentatus (Lacepede) Graysby
This common species is usually seen around the base of the habitat. Graysbys were especially abundant during 1985, appeared to be less so in 1985.
Epinephelus fulvus (Linnaeus) Coney
Reasonably abundant on both walls of the canyon.
Epinephelus guttatus (Linnaeus) Red hind
Present in the canyon but not especially abundant.
Epinephelus itajara (Lichtenstein) Jewfish
Reported by Kaufman and Ebersole.
Epinephelus striatus (Bloch) Nassau grouper
Surprisingly uncommon. We have only one sight record from 1978 and it was not listed by Kaufman and Ebersole.
Hypoplectrus puella (Cuvier) Barred hamlet
ST78-2
Hypoplectrus unicolor (Walbaum) Butter hamlet
ST78-2 and Kaufman and Ebersole
Liopropoma rubre Poey Peppermint bass
ST78-2 and Kaufman and Ebersole
Mycteroperca bonaci (Poey) Black grouper
One sight record at the West Wall bubble, May 16, 1985.
Mycteroperca venenosa (Linnaeus) Yellowfin grouper
Sight record in 1978, ST78-2.
Paranthias furcifer (Valenciennes) Creole-fish
Observed in 1984 near the West Wall tank rack.
Serranus baldwini (Evermann and Marsh) Lantern bass
Common in the gorgonian-rubble areas of the east wall near the tennis ball line in 1984 and 1985.
Serranus tabacarius (Cuvier) Tobaccofish
Juveniles are reasonable common in the canyon especially on the east wall.
Serranus tigrinus (Bloch) Harlequin bass
Also rather common on the east wall.

Grammistidae -- Soapfishes

Rypticus saponaceus (Schneider) Greater soapfish
Usually there is one individual near the habitat and it feeds around the habitat light at night.

Rypticus subbifrenatus (Gill) Spotted soapfish
Reported by Schulman et al. as having recruited to artificial reefs.

Grammidae -- Basslets

Gramma loreto (Poey) Fairy basslet
Common around corals throughout the canyon.

Priacanthidae -- Bigeyes

Priacanthus cruentatus Cuvier Bigeye
Common.

Apogonidae -- Cardinalfishes

Apogon binotatus (Poey) Barred cardinalfish
Identified by G. Dale, 1978 (ST78-2)
Apogon lachneri Bohlke Whitestar cardinalfish
Common on west wall at night. Seldom seen during daylight.
Apogon maculatus (Poey) Flamefish
Common. One seen at PUTS during mission 85-5.
Apogon planifrons Longley and Hildebrand Pale cardinalfish
Identified by G. Dale (ST78-2)
Apogon pseudomaculatus Longley Twospot cardinalfish
Identified by G. Dale (ST78-2)
Apogon quadrisquamatus Longley Sawcheek cardinalfish
Frequently seen at night hovering near the bottom over sand.
Apogon robinsi Bohlke and Randall Roughlip cardinalfish
Identified by G. Dale. (ST78-2)
Apogon townsendi (Breder) Belted cardinalfish
Common in crevices and holes in the west wall.
Astrapogon stellatus (Cope) Conchfish
Small individuals believed to be this species were see at night near the C-line during mission 85-5. Queen conchs reasonably common in this area.
Phaeoptyx conklini (Silvester) Freckled cardinalfish
Frequently seen at night.

Malacanthidae -- Tilefishes

Malacanthus plumieri (Bloch) Sand tilefish
Not too common but there is the remains of a large nest at the base of the wall in the vicinity of C-spar.

Echeneidae -- Remoras

Echeneis naucrates Linnaeus Sharksucker
Listed (as Echeneis sp.) by Kaufman and Ebersole.

Carangidae -- Jacks

Caranx latus Agassiz Horse-eye jack
Listed by Smith and Tyler (ST78-2).
Caranx ruber (Bloch) Bar jack
Common in the canyon. Frequently accompanies sting rays as they feed. During mission 85-5 a pair of bar jacks was seen chasing and circling each other. Could have been a

courtship of territorial display.
Trachinotus goodei Jordan and Evermann Palométa
Sight record ST78-2.
Seriola sp. Probably S. rivoliana Valenciennes the almaco jack. Sight record 1978.

Lutjanidae -- Snappers

Lutjanus buccanella (Cuvier) Blackfin snapper
Juveniles are sometimes seen in the deeper parts of the canyon and were attracted to artificial reefs (Shulman et al.).
Lutjanus analis (Cuvier) Mutton snapper
Reasonable common in the canyon.
Lutjanus apodus (Walbaum) Schoolmaster
Common around mangroves near the base camp.
Lutjanus mahogoni (Cuvier) Mahogany snapper
Reasonably common in the canyon. Usally in small groups.
Lutjanus synagris (Linnaeus) Lane snapper
Less common than the mahogony snapper.
Ocyurus chrysurus (Bloch) Yellowtail snapper
Always around the habitat.

Gerreidae -- Mojarras

Eucinostomus argenteus Baird Spotfin mojarra
Common in Salt River near base camp but unusual in the canyon.
Gerres cinereus (Walbaum) Yellowfin mojarra
Frequent around the habitat and over sand in other parts of the canyon.

Haemulidae -- Grunts

Anisotremus surinamensis (Bloch) Black margate
Sight record 1978 (ST78-2)
Anisotremus virginicus (Linnaeus) Porkfish
Frequently seen from habitat during mission 85-5.
Haemulon aurolineatum Cuvier Tomtate
Reported to colonize artificial reefs by Shulman et. al.
Haeumlon chrysargyreum Gunther Smallmouth grunt
Commonly attracted to the light at night during mission 85-5.
Haemulon flavolineatum (Desmarest) French grunt
Surprisingly uncommon during mission 85-5.
Haemulon melanurum (Linnaeus) Cottonwick
Reported by Shulman et al.
Haemulon plumieri (Lacepede) White grunt
Occasionally seen along the west wall and around the habitat.
Haemulon sciurus (Shaw) Bluestriped grunt
Reported by Kaufman and Ebersole.

Inermiidae -- Bonnetmouths

Inermia vittata Poey Boga

Not rare along the west wall (ST78-2)

Sparidae -- Porgies

Calamus sp.
Occasional over sandy bottom in the canyon.

Sciaenidae -- Drums

Equetus acuminatus (Schneider) High-hat
Reported at artificial reefs by Shulman et al.
Equetus lanceolatus (Linnaeus) Jackknife-fish
Reported by Shulman et al.
Equetus punctatus (Schneider) Spotted drum
Sight record by Smith and Tyler (ST78-2)
Odontoscion dentex (Cuvier) Reef croaker
Commonly seen at the habitat light at night.

Mullidae -- Goatfishes

Mulloidichthys martinicus (Cuvier) Yellow goatfish
Abundant in the shallower parts of the canyon. Usually in groups of 5 or more.
Pseudupeneus maculatus (Bloch) Spotted goatfish
Common in the canyon but tends to be solitary.

Pempheridae -- Sweepers

Pempheris schomburgki Muller and Troschel glassy sweeper
In deeper caves in the west wall. Common in plankton samples in 1984.

Kyphosidae -- Sea chubs

Kyphosus sp.
Moderate sized individuals are common near the 50 foot line on the west wall.

Chaetodontidae -- Butterflyfishes

Chaetodon aculeatus (Poey) Longsnout butterflyfish
Common on the west wall.
Chaetodon capistratus Linnaeus Foureye butterflyfish
Common throughout the canyon and around the mangroves in Salt River.
Chaetodon sedentarius Poey Reef butterflyfish
Reported by Shulman et al. as recruiting on artificial reefs.
Chaetodon striatus Linnaeus Banded butterflyfish
Common.

Pomacanthidae -- Angelfishes

Holacanthus ciliaris (Linnaeus) Queen angelfish
Infrequent.
Holacanthus tricolor (Bloch) Rock beauty
Fairly common in the west wall.
Pomacanthus arcuatus (Linnaeus) Gray angelfish
Throughout the canyon.

Pomacanthus paru (Bloch) French angelfish
Throughout the canyon.

Pomacentridae -- Damselfishes

Abudefduf saxatilis (Linnaeus) Sergeant major
Abundant around the habitat. Nests on the habitat base and other artificial structures.

Chromis cyaneus (Poey) Blue chromis
Tends to be more common in the deeper parts of the canyon.

Chromis insolatus (Cuvier) Sunshinefish
Sight records 1978 (ST78-2)

Chromis multilineatus (Guichenot) Brown chromis
Common.

Chromis scotti Emery Purple reeffish
Sight records 1978 (ST78-2)

Microspathodon chrysurus (Cuvier) Yellowtail damselfish
Common on shallow reefs.

Pomacentrus dicaeneus (Jordan and Rutter) Longfin damselfish
See next species.

Pomacentrus dorsopunicans (Poey) Dusky damselfish
This is said to be a shallow-water species. It is very similiar to the preceeding species and the two are difficult to distinguish in the field. Probably most of the "dusky damselfishes" are dicaeneus but close observation is necessary to insure correct identification.

Pomacentrus partitus Poey Bicolor damselfish
Common.

Pomacentrus planifrons Cuvier Threespot damselfish
Common.

Pomacentrus variabilis (Castelnau) Cocoa damselfish
Frequent.

Cirrhitidae -- Hawkfishes

Amblycirrhitus pinos (Mowbray) Redspotted hawkfish
Sight record 1978 (ST78-2)

Labridae -- Wrasses

Bodianus rufus (Linnaeus) Spanish hogfish
Occurs throughout the canyon in some numbers.

Clepticus parrai (Bloch and Schneider) Creole wrasse
Abundant at the north end of the canyon. Often in large school. Sometimes seen in crevices in the reef at night.

Halichoeres bivittatus (Bloch) Slippery dick
Small individuals are common over sand, sometimes in company with razor fish.

Halichoeres garnoti (Valenciennes) Yellowhead wrasse
Abundant.

Halichoeres maculipinna (Muller and Troschel) Clown wrasse
Fairly common.

Halichoeres pictus (Poey) Rainbow wrasse

Recorded on the west wall by Kaufman and Ebersole.
Halichoeres poeyi (Steindachner) Blackear wrasse
Recorded on the east wall by Kaufman and Ebersole.
Halichoeres radiatus (Linnaeus) Puddingwife
Not uncommon on the east wall. Large adult near habitat in 1985.
Hemipteronotus splendens (Castelnau) Green razorfish
Razorfish are fairly common near objects on the sandy floor of the canyon. Identified as this species by Kaufman and Ebersole.
Lachnolaimus maximus (Walbaum) Hogfish
Occasional.
Thalassoma bifasciatum (Bloch) Bluehead
Common.

Scaridae -- Parrotfishes

Cryptotomus roseus Cope Bluelip parrotfish
Reported near the west wall by Kaufman and Ebersole.
Scarus coelestinus Valenciennes Midnight parrotfish
Sight record 1978 (ST78-2).
Scarus croicensis Bloch Striped parrotfish
Common.
Scarus guacamaia Cuvier Rainbow parrotfish
Frequent.
Scarus taeniopterus Desmarest Princess parrotfish
Common.
Scarus vetula Schneider Queen parrotfish
Reported on the east wall by Kaufman and Ebersole.
Sparisoma atomarium (Poey) Greenblotch parrotfish
Reported by Kaufman and Ebersole on the east wall.
Sparisoma aurofrenatum (Valenciennes) Redband parrotfish
Common.
Sparisoma chrysopterum (Bloch and Schneider) Redtail parrotfish
Reported by Kaufman and Ebersole.
Sparisoma viride (Bonnaterre) Stoplight parrotfish
Common.

Sphyraenidae -- Barracudas

Sphyraena barracuda (Walbaum) Great barracuda
Common.

Opistognathidae -- Jawfishes

Opistognathus aurifrons (Jordan and Thompson) Yellowhead jawfish
Reported by Kaufman and Ebersole.

Clinidae -- Clinids

Acanthemblemaria spinosa Metzelaar Spinyhead blenny
Reported by Smith and Tyler in 1978 (ST78-2)
Emblemaria bahamensis (Stephens) Blackhead blenny
See below.

Recorded on the west wall by Kaufman and Ebersole.
Halichoeres poeyi (Steindachner) Blackear wrasse
Recorded on the east wall by Kaufman and Ebersole.
Halichoeres radiatus (Linnaeus) Puddingwife
Not uncommon on the east wall. Large adult near habitat in 1985.
Hemipteronotus splendens (Castelnau) Green razorfish
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Clinidae -- Clinids

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Reported by Smith and Tyler in 1978 (ST78-2)
Emblemaria bahamensis (Stephens) Blackhead blenny
See below.

Emblemaria pandionis Evermann and Marsh Sailfin blenny
Reported by Kaufman and Ebersole. See note below.
Enneanectes sp.
Triplefins are frequently seen on coral but specimens are needed to confirn their specific identification.
Pseudemblemaria signifera (Ginsburg) Flagfin blenny
Doubtfully recorded by Smith and Tyler. Specimens are needed for positive identification of these closely sinilar species.

Blenniidae -- Combtooth blennies

Lucayablennius zingaro (Bohlke) Arrow blenny
Reported by Smith and Tyler (ST78-2) and Kaufman and Ebersole.
Ophioblennius atlanticus (Valenciennes) Redlip blenny
Probably occurs at the top of the wall but we have no definite notes.

Callionymidae -- Dragonets

Callionymus bairdi Jordan Lancer dragonet
Reported by Shulman et al.

Gobiidae -- Gobies

Coryphopterus dicrus Bohlke and Robins Colon goby
Reported by Smith and Tyler (ST78-2).
Coryphopterus glaucofraenum Gill Bridled goby
Common.
Coryphopterus lipernes Bohlke and Robins Peppermint goby
Common on live coral colonies.
Coryphopterus personatus (Jordan and Thompson) Masked goby
Common on the walls. Possibly C. hyalinus is here also as they have similar hovering habits.
Gnatholepis thompsoni Jordan Goldspot goby
Common.
Gobiosoma chancei Beebe and Hollister Shortstripe goby
Reported by Smith and Tyler (ST78-2).
Gobiosoma genie Bohlke and Robins Cleaning goby
Common.
Gobiosoma tenox Bohlke and Robins Slaty goby
Reported by Kaufman and Ebersole.
Gobiosoma saucrum (Robins) Figure-eight goby
Common on coral heads.
Ioglossus helenae Randall Hovering goby
Reported by Kaufman and Ebersole.
Quisquilius hippoliti (Metzelaar) Rusty goby
Reported by Kaufman and Ebersole.

Acanthuridae -- Surgeonfishes

Acanthurus bahianus Castelnau Ocean surgeon
Common.
Acanthurus chirurgus (Bloch) Doctorfish
Frequent.

Acanthurus coeruleus Schneider Blue tang
Common.

Scombridae -- Mackerels

Scomberomorus regalis (Bloch) Cero
Occasional in the water column in the canyon.

Scorpaenidae -- Scorpionfishes

Scorpaena plumieri Bloch Spotted scorpionfish
Occasional. Perhaps more common that realized because of its camouflage.

Dactylopteridae -- Flying gurnards

Dactylopterus volitans Linnaeus Flying gurnard
One or two individuals consistently present near the C line in 1984 and 1985.

Bothidae -- Lefteye flounders

Bothus lunatus (Linnaeus) Peacock flounder
Common on canyon floor.
Bothus ocellatus (Agassiz) Eyed flounder
Reported by Kaufman and Ebersole.

Balistidae -- Leatherjackets

Melichthys niger (Bloch) Black durgon
Nearly alway present over the top of the reef at the north end of the canyon.
Monacanthus tuckeri Bean Slender filefish
Reported by Kaufman and Ebersole.

Ostraciidae -- Boxfishes

Lactophrys bicaudalis (Linnaeus) Spotted trunkfish
Frequent.
Lactophrys polygonia (Poey) Honeycomb cowfish
Reported by Smith and Tyler (ST78-2) and by Kaufman and Ebersole.
Lactophrys quadricornis (Linnaeus) Scrawled cowfish
Sight record by Smith and Tyler (ST78-2).
Lactophrys trigueter (Linnaeus) Smooth trunkfish
Common.

Tetraodontidae -- Puffers

Canthigaster rostrata (Bloch) Sharpnose puffer
Common.
Sphoeroides spengleri (Bloch) Bandtail puffer
Frequent.

Diodontidae -- Porcupinefishes

Diodon hystrix Linnaeus Porcupinefish
Reported by Kaufman and Ebersole.
Chilomycterus sp.
Reported by Kaufman and Ebersole.

Sources:

(ST78-2) Fishes observed near the NULS-I Habitat.in: Smith, C. L. and J. C. Tyler 1978 Final Scientific Report of Mission 78-2, June 10-17, 1978.

Kaufman, L. S. and J. P. Ebersole 1984 Microtopography and the organization of two assemblages of coral reef fishes in the West Indies. J. Exp. Mar. Biol. Ecol. 78: 253-268.

Schulman, M. J., J. C. Ogden, J. P. Ebersole, W. N. McFarland, S. L. Miller, and N. G. Wolf 1983 Priority effects in the recruitment of juvenile coral reef fishes. Ecology 64(6): 1508-1513.

Personal observations recorded in the diaries of Smith and Tyler during Missions H84-5 and H85-5.

Appendix 4. Spawning seasons of West Indian fishes. Compiled from literature sources.

SPAWNING SEASONS OF SALT RIVER CANYON FISHES (Compiled)

	J-F	M-A	M-J	J-A	S-O	N-D
Orectolobidae				x	x	x
Dasyatidae		x			x	
Myliobatidae				x		
Albulidae	x	x	x	x	x	x
Elopidae	x	x	x	x	x	x
Muraenidae	x	x				
Congridae	x					
Ophichthidae		x				
Clupeidae	x					
Synodontidae	x	x				x
Gobiesocidae	x	x	x	x	x	x
Exocoetidae	x	x	x	x	x	x
Belonidae		x	x		x	x
Atherinidae			x	x		
Holocentridae	x	x	x	x	x	x
Aulostomidae	x					x
Fistulariidae				x		
Syngnathidae	x	x		x	x	
Serranidae	x	x	x			x
Grammistidae						
Grammidae		x				
Priacanthidae		x	x		x	x
Apogonidae	x	x	x	x	x	

Malacanthidae		x				
Echeneidae				x		
Carangidae	x	x	x	x	x	x
Lutjanidae	x	x	x	x	x	x
Gerreidae	x	x	x	x		
Haemulidae	x	x	x	x	x	x
Inermidae						
Sparidae	x	x	x			x
Sciaenidae	x	x	x	x	x	x
Mullidae	x	x	x	x		
Pempheridae						
Kyphosidae	x	x				
Chaetodontidae		x	x			x
Pomacanthidae	x	x	x	x	x	x
Cirrhitidae						
Labridae	x	x	x	x	x	x
Scaridae	x	x	x	x	x	x
Sphyraenidae	X	x	x	x	x	x
Opistognathidae		x	x			
Clinidae		x	x			
Dactyloscopidae		x				
Blenniidae		x	x	x	x	x
Callionymidae						
Gobiidae	x	x	x	x	x	x
Acanthuridae	x	x		x		x
Scombridae	x	x	x	x	x	x

Scorpaenidae				x		x
Dactylopteridae	x	x	x	x	x	
Bothidae		x	x			
Balistidae	x	x	x	x	x	x
Ostraciidae	x	x	x	x	x	x
Tetraodontidae	x				x	x
Diodontidae	x	x	x	x	x	x

Sources. Erdman, D. S. 1976. Spawning patterns of fishes from the Northeastern Caribbean, Agricultural and Fisheries Contributions VIII(2):4-36. and Munro, J.L., V.C. Gaut, R. Thompson, and P. H. Reeson. 1973. The spawning seasons of Caribbean reef fishes. J. Fish Biology 5: 69-83.