

*Final cruise report*

**2018 R/V Manta Expeditions to the Northwestern Gulf of Mexico  
(DFH35: 2018/07/22 – 2018/07/26 & DFH37: 2018/09/06 – 2018/09/10)**

By

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A colorful array of mesophotic corals, crinoids, hydroids, and sponges from the DFH35 cruise.  
NOAA/UNCW-UVP

## **Objectives**

Two expeditions aboard the *R/V Manta* were conducted in the Northwestern Gulf of Mexico (NWGOM) in 2018 with the objective to perform remotely operated vehicle (ROV) surveys at reefs and banks under consideration for expansion of the Flower Garden Banks National Marine Sanctuary (FGBNMS). Reefs and banks surveyed during this effort were Alderdice, Bouma, Elvers, Geyer, Parker, Rezak, Sidner, East Flower Garden, and the Bright Bank Complex (Rankin, 28 Fathom, Bright) (Figure 1). These expeditions sought to:

- (1) capture video and imagery surveys of deep-sea coral ecosystems in priority expansion areas identified by FGBNMS;
- (2) confirm predicted mesophotic habitats including crests, ridges, patch reefs, and mounds;
- (3) explore unknown sites;
- (4) collect biological specimens of mesophotic corals, sponges, and associated taxa for confirmation of identifications;
- (5) develop and ground truth habitat suitability models and habitat maps for the reefs and banks in the proposed expansion for FGBNMS.

## **Methodology**

Remotely operated vehicle surveys were conducted aboard the *R/V Manta*, an 82-foot catamaran used as a research platform for research and monitoring activities in the NWGOM. The vessel is equipped with an A-frame and winch configuration used for the ROV operations as well as wet and dry labs for on-board processing of samples collected. During the expeditions, ROV seafloor surveys and transects were completed and samples of mesophotic organisms were taken. At each bank, a minimum of three drop sites were pre-planned based on high resolution multi-beam bathymetry. Bathymetric maps helped the ROV pilots directionalize navigation of the vehicle to drop sites and tracked the routes of each dive. A minimum of one transect was conducted during dives. Annotations were collected throughout the entirety of each dive and treated as separate records to document time, location, events, fish abundance, benthic biological abundance, habitat type, and items of note. To reduce typing errors in data collection, an X-Key pad was set up to assist with annotations. Time codes are utilized to consociate dive tracks, annotations, HD video, SD video, still images, and frame grabs.

HOBO TidbiTs were deployed on weighted marks with a 2 lb weight attached to a rectangle of syntactic foam. Where possible, markers were deployed by ROV and precise latitude and longitude were recorded using the ROV's positioning system. When ROV deployment was not possible, locations were selected using bathymetry data (soft bottom near hard bottom features), then the vessel was positioned over the selected site and the instrument was dropped over board.

### ***ROV seafloor surveys***

Seafloor surveys were conducted using the SubAtlantic *Mohawk 18* ROV co-owned by National Marine Sanctuary Foundation and University of North Carolina at Wilmington Undersea Vehicle Program. During each seafloor survey, the ROV transited at an altitude of approximately 1 m off the bottom and a speed over ground of <0.50 knots. The ROV collected continuous data throughout each dive with the following equipment:

- (1) a high-definition, forward-looking Insite Pacific Mini Zeus II HD video camera, used to record each dive once on bottom until leaving for the surface;

- (2) a high-definition, forward-looking Kongsberg Maritime OE14-408 10 mp digital still camera and OE11-442 strobes to collect images of interesting biology and photograph transect paths;
- (3) parallel Sidus SS501 50 mW lasers projected 10 cm apart, which were used to scale images collected by the video and still cameras;
- (4) an Imaginex 881 sonar system linked to a Trimble SP461 GPS/heading receiver, which provided position information at <0.5 m accuracy every two seconds; and
- (5) a tool skid mounted on the bottom of the ROV which includes an ECA Robotics five-function manipulator arm, retractable bio box with three dividers, four rotatable collection buckets, and reversible/variable speed pump for suction hose usable by way of the manipulator to collect items into the buckets.

### ***ROV transects***

Short, five minute transects that correspond to a survey distance of approximately 100 m were conducted over varying habitat types encountered during each ROV dive. During each transect, the ROV transited at a constant altitude (1 m) and speed (0.50 knots) along the bottom, with the video and still cameras maintaining a wide and fixed frame angled 45° towards the substrate. Photographs were collected using the still-image camera every 30 seconds, or each time the reference lasers passed over benthic colonies, dependent on the biological density at each site. A voiceover was maintained in the HD video recording as a backup to the annotations, to note the start and end of each transect via microphone connected to the recording system to be used in the post-processing of transect data.

Additionally, fish transects were conducted during ROV transect dives to determine fish density among explored areas. Each fish species that was encountered was recorded, counted, and binned by fork length into a size bin: <5 cm, ≥5 to <10 cm, ≥10 to <15 cm, ≥15 cm to 20 cm, ≥20 to <25 cm, ≥25 to <30 cm, ≥30 to <35 cm, and ≥35cm whereby the size of the individual was estimated to the nearest centimeter. The laser projection (10 cm) was utilized for scale.

### ***Specimen collections***

Biological specimens (n=92) were collected during seafloor surveys using the manipulator arm of the ROV to verify identification of species for FGBNMS, as well as provide samples for partnering organizations researching mesophotic coral genomics and morphology. For each collected specimen, the date, time, latitude, longitude, depth, and site were recorded at the time of collection. *In situ* images were also collected of each directed sample. Some opportunistic samples were also recovered from the ROV propellers.

Once specimens were on the deck of the ship, they were examined for commensal organisms, labeled, photographed, and inventoried into a database containing all relevant metadata. Any commensal organisms found on the specimens were removed from the sample and processed separately. Once photographed and labeled, specimens were preserved in an appropriate medium.

**Water quality**

A SBE 49 FastCAT CTD Sensor, mounted to the ROV, was activated at the start of each dive and recorded continuously at a sample frequency of 10 seconds until the end of each dive.

**Permits**

Thermistors were deployed within the sanctuary boundaries under Permit FGBNMS-2014-001, issued to the Superintendent of the FGBNMS, by Office of National Marine Sanctuaries.

**Funding**

The expedition was funded in part by NOAA's Deep Sea Coral Research and Technology Program through the Southeast Deep Coral Initiative, Flower Garden Banks National Marine Sanctuary, and the National Marine Sanctuary Foundation.

**Expedition schedule**

**Table 1.** Schedule of expedition DFH35 that surveyed deep-sea coral ecosystems in the Northwestern Gulf of Mexico July 22 – 26, 2018.

Date	Time	Operations	Comment
2018/07/22	8:00	Arrive Elvers Bank	Conduct ROV launch/recovery training
2018/07/22	10:20	Launch ROV at ELV 3A - Dive ELV8	Two transects completed
2018/07/22	13:19	Relaunch ROV at ELV 3A	Strong currents and wind, blown offsite. Recovered
2018/07/22	14:12	Relaunch ROV at ELV 3A	
2018/07/22	16:27	Relaunch ROV at ELV 3A	1 transect completed
2018/07/23	7:45	Weather stand down	Seas 4-6ft, strong winds
2018/07/23	9:45	Transit to EFGB to moor	
2018/07/23	19:30	Return to Elvers	
2018/07/24	7:30	Start ROV ops	Port generator problems, paused ops
2018/07/24	9:16	Launch ROV at ELV1	3 transects completed
2018/07/24	12:00	Transit to Geyer	1 transect completed (soft bottom)
2018/07/24	13:15	Weather stand down	Lightening and rain storms moving through
2018/07/24	15:45	Launch ROV at GEY2	1 transect completed (soft bottom)
2018/07/24	17:11	Launch ROV at GEY4	2 transects completed
2018/07/24	18:30	End ROV ops	
2018/07/25	8:00	Start ROV ops at GEY1	3 transects completed
2018/07/25	10:30	Transit to EFGB	
2018/07/25	12:00	Arrive EFGB	
2018/07/25	13:00	Start ROV ops at EB1	6 transects completed
2018/07/25	17:45	End ROV ops	
2018/07/25	19:30	Observe HIA-389-A lift	
2018/07/26	7:30	Start ROV ops at BRI1	6 transects completed
2018/07/26	12:30	End ROV ops	
2018/07/26	13:30	Deploy temp thermistors at EFGB	T and U
2018/07/26	13:30	Observe HIA-389-A departure	
2018/07/26	14:00	Depart EFGB	

**Table 2.** Schedule of expedition DFH37 that surveyed deep-sea coral ecosystems in the Northwestern Gulf of Mexico September 6 – 10, 2018.

Date	Operations	Time	Comment
9/6/2018	All aboard and briefing	19:00	
9/6/2018	Depart Galveston	20:00	
9/7/2018	Arrive Alderdice Bank	10:00	Arrive and start ops
9/7/2018	Start ROV ops	10:00	Started ROV ops
9/7/2018	Pause ROV ops	13:00	Weather delay
9/7/2018	Resume ROV ops	14:30	
9/7/2018	End ROV ops at Alderdice	15:00	5 transects completed, 9 samples collected
9/7/2018	Arrive Parker Bank	15:30	5 transects completed, 1 sample collected
9/7/2018	End ROV ops for day	18:15	
9/8/2018	Start ROV ops at Parker Bank	7:45	
9/8/2018	End ROV ops at Parker Bank	18:00	11 transects completed, 17 samples collected
9/9/2018	Start ROV ops at Bouma Complex	7:45	
9/9/2018	ROV ops at Bouma Complex	12:30	
9/9/2018	End ROV ops	18:15	End ops at Rezak
9/10/2018	Start ROV ops at Bouma Complex	7:45	6 transect completed, 9 samples collected
9/10/2018	End ROV ops at Bouma Complex	12:30	End ops - Hurricane Florence to impact east coast

### **Participant list**

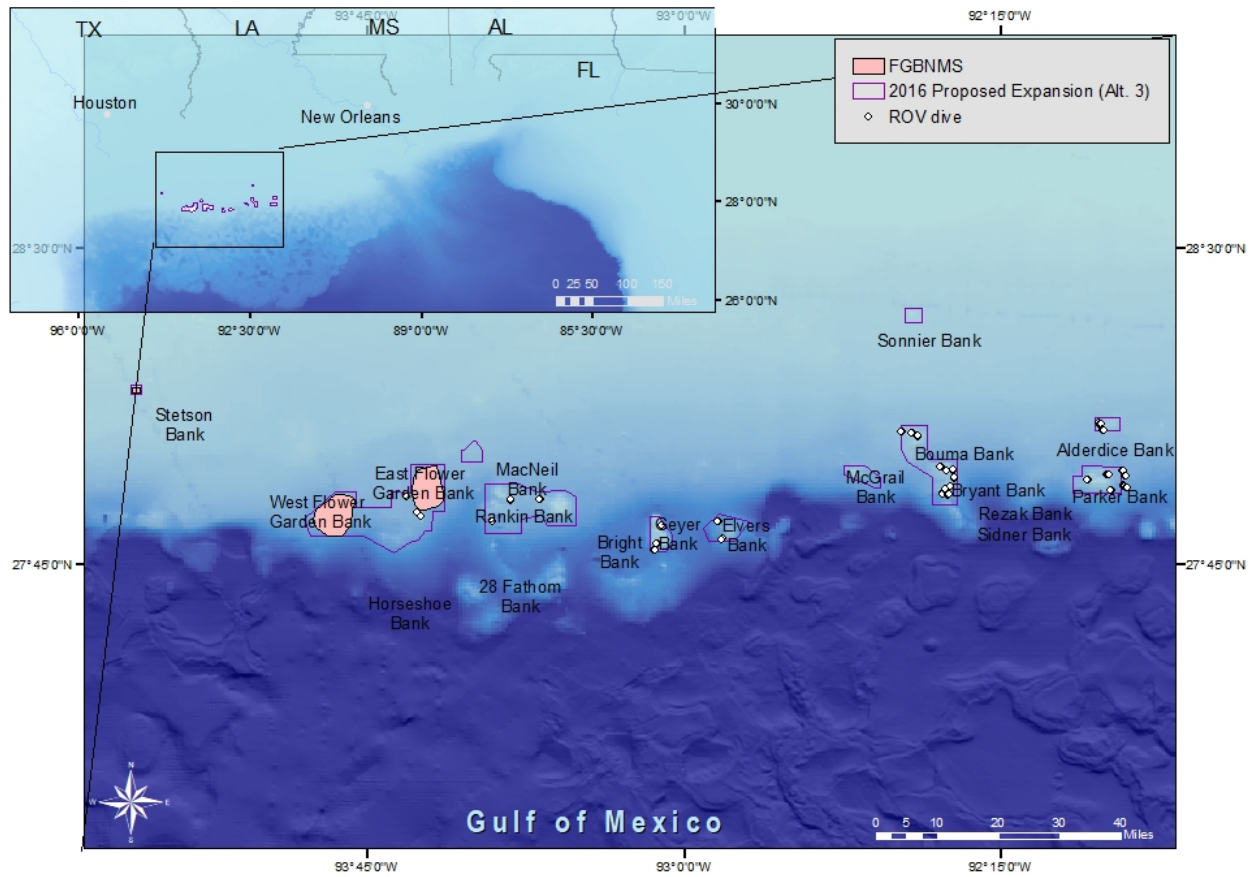
**Table 3.** List of participants of expedition DFH35 that surveyed deep-sea coral ecosystems in the Northwestern Gulf of Mexico July 22 – 26, 2018.

Name	Role	Affiliation	Email
Rachel Bassett	Science	DSCRTP	rachel.basset@noaa.gov
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Karol Breuer	Captain	CPC	kbwahine@gmail.com
Cassidy Brown	Galleyhand	CPC	CaptainCassidyBrown@yahoo.com
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Raven Johnson	Science	CUNY	ravencjohn@gmail.com
Grace McDermott	Science	NOAA Hollings Scholar	grace.mcdermott@maine.edu
Marissa Nuttall	Science	FGBNMS/CPC	marissa.nuttall@noaa.gov
Rachel Ross	Science	CUNY	Rachael3ross@gmail.com
G.P. Schmahl	Science	FGBNMS	george.schmahl@noaa.gov
Jason White	Science	UNCW-UVP	whitejh@uncw.edu

**Table 4.** List of participants of expedition DFH37 that surveyed deep-sea coral ecosystems in the Northwestern Gulf of Mexico September 6 – 10, 2018.

<b>Name</b>	<b>Role</b>	<b>Affiliation</b>	<b>Email</b>
Justin Blake	Captain	CPC	beachsidejustin@yahoo.com
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### Expedition map



**Figure 1.** Map of survey locations using ROV *Mohawk* during the two 2018 research expeditions to the Northwestern Gulf of Mexico aboard the *R/V Manta* (DFH35 and 37). Image: NOAA.

## **Summary statistics**

Preliminary results of the expedition were as follows:

### ***ROV seafloor surveys***

A total of 34 ROV dives were conducted during the two expeditions, including three at Alderdice, Bouma, Bright Bank Complex (Rankin, 28 Fathom, and Bright Bank), Geyer, and East Flower Garden Banks; four at Elvers, Rezak, and Sidner Banks; and seven at Parker Bank. Collectively, these ROV dives yielded a total bottom time of 35.52 h, 45 video clips, 4,165 digital still photos, and a linear distance of approximately 6.5 km surveyed. Depth ranges explored during the ROV dives ranged between 59-173 m. A summary of all ROV dives conducted during the cruises is presented in Table 5. Summaries of all banks visited during the expedition, which includes narratives of the dive sites, dive track maps, and highlight photos are presented in Appendix 1.

### ***ROV transects***

In total 65 seafloor transects were conducted during the expeditions, approximately 100 m in distance each. Transect depths ranged between 59-173 m. A summary of all ROV transect surveys completed during the cruises is presented in Table 6. Additionally, 64 fish transects were completed in depths ranging between 60-173 m, which yielded identification of 65 species comprised of 22 families.

### ***Specimen collections***

Ninety-two biological specimens were collected during the expeditions, 87 purposefully and five opportunistically. Specimens collected included sixty-eight corals, one sponge, one stony coral, one echinoderm, fifteen algae (one brown, two green, one red), one mollusk, two crustaceans, and one zoanthid. Inventory of all specimens collected with the ROV *Mohawk* is presented in Table 7, while laboratory and *in situ* photographs are provided in the “Sample Photographs” section below.



**Dive summary table****Table 5.** Summary information for the thirty-four dives of the ROV *Mohawk* conducted during expeditions DFH35 and 37 in the Northwestern Gulf of Mexico.

Dive number	Locality	Date (UTC)	Start latitude (DD)	Start longitude (DD)	Start depth (m)	End latitude (DD)	End longitude (DD)	End depth (m)	Total Bottom time (h:min)	Specimens collected	Number of transects	Comments
627	Elvers Bank	2018/07/22	27.8137	-92.9101	154	27.8134	-92.9086	126.8	1:12	0	2	Low relief silted rubble, coarse sand, low relief outcroppings, soft bottom, attempted sample collection failed, generator trouble - paused ops
629	Elvers Bank	2018/07/22	27.8138	-92.9188	160	27.8109	-92.9147	130	0:47	0	0	Fine soft sediment, <i>Stichopathes</i> sp., many crinoids and sea pens, abundance of <i>Democrinus brevis</i> , strong currents and wind, crew learning curve, drifted offsite to the east. Site renamed ELV8
630	Elvers Bank	2018/07/22	27.8084	-92.9136	150	27.8110	-92.9146	125	0:44	0	1	Silty soft bottom, abundance of sea pens, few <i>Stylometra spinifer</i> and <i>Comactinia meridionalis</i>
631	Elvers Bank	2018/07/24	27.8526	-92.9204	70	27.8541	-92.9226	92	2:12	4	2	Course sand with rubble/small nodules/sponges, Tilefish mounds, soft bottom, abundance of <i>Stichopathes</i> sp., few black coral sea fans
632	Geyer Bank	2018/07/24	27.8437	-93.0519	160	27.8449	-93.0545	154	0:35	0	1	Soft bottom, low relief patch reefs, many <i>Nicella</i> sp., branching stony corals
633	Geyer Bank	2018/07/24	27.8006	-93.0643	64	27.8006	-93.0676	60	0:54	1	2	High density algae, coralline algae reefs, scattered 1 m outcroppings, 2 m wide <i>Plumapathes</i> sp., abundance of green and brown algae, encrusting sponges, and crustose coralline algae (CCA)
634	Geyer Bank	2018/07/25	27.7874	-93.0711	129	27.7855	-93.0697	145	1:59	2	3	Course sand with rubble, eroded outcroppings, silted algal nodules, abundance of <i>Ellisella</i> sp., black coral sea fans, and encrusting sponge
635	East Flower Garden Bank	2018/07/25	27.9105	-93.6578	102	27.9112	-93.6592	97	1:21	4	2	Eroded outcroppings and mounds, some black coral sea fans, many <i>Tanacetipathes</i> sp.
636	East Flower Garden Bank	2018/07/25	27.8745	-93.6326	112	27.8749	-93.6334	105	1:09	2	2	Eroded outcroppings and reefs, fine soft bottom, few sea whips and <i>Stichopathes</i> sp.

637	East Flower Garden Bank	2018/07/25	27.8635	-93.6224	121.3	27.8644	-93.6235	107	0:24	0	2	Highly eroded outcroppings, soft bottom, many <i>Elatopathes abietina</i> and black coral sea fans, few <i>Scleracis sp.</i> and sea whip
638	Bright Bank Complex	2018/07/26	27.8520	-93.4554	117	27.8539	-93.4548	109	0:40	2	2	Eroded outcroppings, low relief rubble, few yellow Gorgonians, many CCA, and some yellow tube sponges
639	Bright Bank Complex	2018/07/26	27.9026	-93.4109	102	27.9046	-93.4087	107.3	0:59	1	2	Low relief eroded outcroppings, soft bottom, scattered rubble, many sea whips and yellow gorgonians, few branching stony corals, black coral sea fans and sea whips, some slit shells and basket stars
640	Bright Bank Complex	2018/07/26	27.9057	-93.3413	104	27.9068	-93.3430	94.7	1:24	7	2	Eroded outcroppings, soft bottom with rubble, >5m relief, few orange donut sponges and <i>Thesea rubra</i> , many branching stony corals, sea whips and <i>Tanacetipathes sp.</i> , some basket stars
652	Alderdice Bank	2018/09/07	28.0867	-92.0197	88.7	28.0874	-92.0183	86.4	1:09	1	1	Heavily silted low relief rubble with some larger blocks of rock evident, isolated rubble patches with moderate layer of silt, Alderdice 2
653	Alderdice Bank	2018/09/07	28.0820	-92.0154	81.2	28.0832	-92.0143	83.7	0:55	5	2	Moderate relief outcroppings of basalt, silted, with 1m <i>Swiftia</i> fans abundant and some ' <i>Hypnogorgia</i> ' fans, Alderdice 1
654	Alderdice Bank	2018/09/07	28.0704	-92.0103	90	28.0695	-92.0086	88.9	0:47	3	2	Carbonate outcroppings with SO <sub>2</sub> , Alderdice 4
655	Parker Bank	2018/09/07	27.9736	-91.9640	107.8	27.9716	-91.9620	106.7	0:46	0	3	2m relief outcroppings with dense octocorals and black corals, Parker 3
656	Parker Bank	2018/09/07	27.9607	-91.9570	115.6	27.9605	-91.9546	113.5	0:47	1	2	Isolated outcroppings with moderately dense octocorals and black corals
657	Parker Bank	2018/09/08	27.9625	-91.9996	N/A	27.9641	-91.9962	118.7	1:51	9	3	Scamp/grouper sited, lots of good samples -rock, algae, octocorals, yellow <i>Stichopathes sp.</i> , silted nodules and outcroppings with coral cover, Parker 6
658	Parker Bank	2018/09/08	27.9251	-91.9898	142.7	27.9257	-91.9903	124.2	0:42	0	2	Nice highly eroded high relief substrate with crinoids, abundant black coral, and black coral sea fans, Parker 5, long rope/cable debris noted
659	Parker Bank	2018/09/08	27.9377	-91.9610	128.4	27.9366	-91.9591	123	0:31	0	2	Isolated high relief outcrop with dense corals and ridge is rubble on slope, Parker 2, dense areas of <i>Callogorgia gracilis</i>

660	Parker Bank	2018/09/08	27.9337	-91.9548	119.8	27.9323	-91.9528	125	1:16	3	2	High relief outcroppings densely covered with sea fans, white gorgonians and black cup corals surrounded by silted algal nodule fields, Parker 1
661	Parker Bank	2018/09/08	27.9520	-92.0448	73.6	27.9521	-92.0475	72	1:32	5	2	CCA reef, low relief algal nodule fields with sand, Parker 8
662	Sidner Bank	2018/09/09	27.9183	-92.3902	82.8	27.9188	-92.3881	82.7	0:49	2	2	CCA reefs with patchy outcroppings, abundance of lionfish, Sidner 01
663	Sidner Bank	2018/09/09	27.9280	-92.3834	88.7	27.9293	-92.3831	87.8	0:18	2	1	Sand flats with isolated low relief CCA reefs, Sidner 04
664	Sidner Bank	2018/09/09	27.9349	-92.3714	69	27.9370	-92.3714	66.7	0:51	3	2	Dense colorful algal nodule fields with diverse algal growth, Sidner 03
665	Sidner Bank	2018/09/09	27.9149	-92.3760	68.1	27.9162	-92.3751	64.4	0:26	1	1	High relief valley and peak outcroppings of heavily eroded carbonate rock covered in a diversity of algal species, Sidner 05
666	Rezak Bank	2018/09/09	27.9536	-92.3626	130.5	27.9564	-92.3608	122.9	0:55	2	2	Flat soft bottom with sparse rubble and few moderately eroded high relief outcroppings, power issues resulting in intermittent CTD profile, Rezak 03
667	Rezak Bank	2018/09/09	27.9723	-92.3645	128.8	27.9747	-92.3654	107.8	0:26	0	2	Isolate moderate relief outcropping surrounded by soft bottom flats, Rezak 02
668	Rezak Bank	2018/09/09	27.9727	-92.3784	67.1	27.9721	-92.3790	68.6	0:46	3	2	Low to moderate relief CCA reef, Scamp and lionfish seen, large populations of black coral sea fans, Rezak 08
669	Rezak Bank	2018/09/09	27.9815	-92.3930	86.5	27.9820	-92.3951	86.1	0:40	4	2	Low to moderate relief CCA reef with sand extending between them, dense ' <i>Hypnogorgia</i> ' sp. fields, Rezak 09
670	Bouma Bank	2018/09/10	28.0540	-92.4477	71.9	28.0553	-92.4478	71.5	0:58	3	2	0.5-1.0 m high outcropping of highly eroded carbonate rock heavily covered in encrusting sponges and surrounded by large sand patches, Bouma 15
671	Bouma Bank	2018/09/10	28.0623	-92.4611	66.2	28.0619	-92.4629	61.1	1:22	5	3	Low relief CCA reefs and algal nodules, dense black coral sea fans, Bouma 05
672	Bouma Bank	2018/09/10	28.0651	-92.4853	86.3	28.0658	-92.4863	85.5	0:26	1	1	Soft flat bottom with isolate rubble beneath silt, Bouma 01

**Transect summary table****Table 6.** Inventory of ROV transect surveys conducted during expeditions DFH 35 and 37 to the Northwestern Gulf of Mexico. Each transect lasted five minutes and covered a linear distance of approximately 100 m.

Transect Number	Locality	Date	Start Time	Start Latitude (DD)	Start Longitude (DD)	Start Depth (m)	End Time	End Latitude (DD)	End Longitude (DD)	End Depth (m)
ELV8-T1	Elvers Bank	2018/7/22	10:53	27.8131	-92.9098	145	10:58	27.8131	-92.9092	136
ELV8-T2	Elvers Bank	2018/7/22	11:08	27.8133	-92.9089	132	11:13	27.8136	-92.9086	127
ELV3-T1	Elvers Bank	2018/7/22	16:55	27.8088	-92.9135	137	17:00	27.8095	-92.9134	116
ELV1-T1	Elvers Bank	2018/7/24	9:44	27.8531	-92.9191	87	9:48	27.8532	-92.9194	81
ELV1-T2	Elvers Bank	2018/7/24	9:52	27.8533	-92.9197	80	9:57	27.8536	-92.9205	75
ELV1-T3	Elvers Bank	2018/7/24	11:08	27.8538	-92.9222	89	11:13	27.8537	-92.9228	100
GEY2-T1	Geyer Bank	2018/7/24	16:16	27.8442	-93.0535	156	16:21	27.8446	-93.0541	154
GEY4-T1	Geyer Bank	2018/7/24	17:20	27.8006	-93.0643	65	17:26	27.8000	-93.0643	64
GEY4-T2	Geyer Bank	2018/7/24	17:44	27.8000	-93.0650	62	17:49	27.8002	-93.0657	61
GEY1-T1	Geyer Bank	2018/7/25	9:04	27.7862	-93.0717	140	9:09	27.7858	-93.0721	146
GEY1-T2	Geyer Bank	2018/7/25	9:17	27.7857	-93.0721	147	9:22	27.7855	-93.0712	148
GEY1-T3	Geyer Bank	2018/7/25	9:43	27.7856	-93.0701	141	9:48	27.7855	-93.0696	144
EB1-T1	East Flower Garden Bank	2018/7/25	13:33	27.9104	-93.6582	97	13:38	27.9106	-93.6589	97
EB1-T2	East Flower Garden Bank	2018/7/25	14:13	27.9107	-93.6588	97	14:19	27.9111	-93.6591	96
EB2-T1	East Flower Garden Bank	2018/7/25	15:34	27.8744	-93.6332	104	15:39	27.8745	-93.6335	105
EB2-T2	East Flower Garden Bank	2018/7/25	15:49	27.8744	-93.6334	105	15:54	27.8745	-93.6333	105
EB3-T1	East Flower Garden Bank	2018/7/25	17:16	27.8635	-93.6232	118	17:21	27.8638	-93.6233	114
EB3-T2	East Flower Garden Bank	2018/7/25	17:26	27.8641	-93.6235	113	17:31	27.8644	-93.6235	107
B1-T1	Bright Bank Complex	2018/7/26	7:44	27.8521	-93.4551	115	7:50	27.8525	-93.4550	110
B1-T2	Bright Bank Complex	2018/7/26	7:56	27.8529	-93.4548	110	8:01	27.8534	-93.4547	110
B6-T1	Bright Bank Complex	2018/7/26	9:10	27.9027	-93.4109	102	9:15	27.9028	-93.4104	100
B6-T2	Bright Bank Complex	2018/7/26	9:23	27.9034	-93.4102	102	9:28	27.9040	-93.4102	100
B2-T1	Bright Bank Complex	2018/7/26	10:59	27.9059	-93.3419	96.3	11:04	27.9061	-93.3422	91
B2-T2	Bright Bank Complex	2018/7/26	11:39	27.9062	-93.3424	89.9	11:44	27.9065	-93.3428	91.3
A2-T1	Alderdice Bank	2018/9/7	10:21	28.0868	-92.0194	86.4	10:26	28.0873	-92.0190	86.5
A1-T1	Alderdice Bank	2018/9/7	11:50	28.0821	-92.0153	80.47	11:55	28.0825	-92.0149	81.9
A1-T2	Alderdice Bank	2018/9/7	12:11	28.0828	-92.0148	82.6	12:16	28.0831	-92.0144	83.9
A4-T1	Alderdice Bank	2018/9/7	14:24	28.0700	-92.0101	89.1	14:29	28.0699	-92.0094	88.9
A4-T2	Alderdice Bank	2018/9/7	14:35	28.0698	-92.0093	87.7	14:40	28.0697	-92.0088	87.5
P3-T1	Parker Bank	2018/9/7	16:09	27.9735	-91.9640	107.8	16:14	27.9732	-91.9635	111.8
P3-T2	Parker Bank	2018/9/7	16:16	27.9731	-91.9633	111.2	16:21	27.9728	-91.9628	107.8
P3-T3	Parker Bank	2018/9/7	16:34	27.9727	-91.9624	111.8	16:40	27.9724	-91.9626	107.6
P4-T1	Parker Bank	2018/9/7	17:43	27.9610	-91.9564	114	17:48	27.9609	-91.9558	113.9

P4-T2	Parker Bank	2018/9/7	17:52	27.9609	-91.9552	116.7	17:57	27.9613	-91.9548	113.1
P6-T1	Parker Bank	2018/9/8	8:25	27.9628	-91.9993	105.07	8:32	27.9631	-91.9991	99.46
P6-T2	Parker Bank	2018/9/8	9:33	27.9634	-91.9976	110	9:38	27.9637	-91.9973	109.8
P6-T3	Parker Bank	2018/9/8	9:52	27.9638	-91.9971	112.5	9:57	27.9642	-91.9968	113
P5-T1	Parker Bank	2018/9/8	11:22	27.9252	-91.9901	131	11:28	27.9254	-91.9902	123
P5-T2	Parker Bank	2018/9/8	11:47	27.9254	-91.9906	122	11:52	27.9255	-91.9907	119
P2-T1	Parker Bank	2018/9/8	13:15	27.9377	-91.9609	124	13:20	27.9375	-91.9604	121
P2-T2	Parker Bank	2018/9/8	13:33	27.9367	-91.9595	122.7	13:38	27.9366	-91.9592	123
P1-T1	Parker Bank	2018/9/8	14:15	27.9338	-91.9545	119.7	14:20	27.9334	-91.9542	118.5
P1-T2	Parker Bank	2018/9/8	14:52	27.9325	-91.9537	120.4	14:57	27.9323	-91.9535	121.5
P8-T1	Parker Bank	2018/9/8	16:52	27.9522	-92.0452	69.8	16:57	27.9522	-92.0462	62.7
P8-T2	Parker Bank	2018/9/8	17:06	27.9519	-92.0465	63.6	17:11	27.9516	-92.0467	71.19
SD1-T1	Sidner Bank	2018/9/9	8:16	27.9186	-92.3900	82.4	8:21	27.9186	-92.3894	81.5
SD1-T2	Sidner Bank	2018/9/9	8:27	27.9185	-92.3888	81.3	8:32	27.9185	-92.3883	79.9
SD4-T1	Sidner Bank	2018/9/9	9:33	27.9282	-92.3833	88.3	9:38	27.9290	-92.3833	88.2
SD3-T1	Sidner Bank	2018/9/9	10:40	27.9352	-92.3713	70.2	10:45	27.9357	-92.3713	70.2
SD3-T2	Sidner Bank	2018/9/9	10:57	27.9362	-92.3712	69.2	11:04	27.9371	-92.3713	67.7
SD5-T1	Sidner Bank	2018/9/9	11:49	27.9152	-92.3758	64.9	11:54	27.9156	-92.3754	64
R3-T1	Rezak Bank	2018/9/9	13:52	27.9546	-92.3617	124.9	13:57	27.9552	-92.3613	120
R3-T2	Rezak Bank	2018/9/9	14:05	27.9558	-92.3609	125.1	14:10	27.9565	-92.3607	126.6
R2-T1	Rezak Bank	2018/9/9	15:09	27.9731	-92.3655	123.4	15:14	27.9735	-92.3655	117.2
R2-T2	Rezak Bank	2018/9/9	15:20	27.9738	-92.3655	115.1	15:25	27.9744	-92.3653	108.9
R8-T1	Rezak Bank	2018/9/9	16:07	27.9728	-92.3784	67.4	16:12	27.9727	-92.3667	66.8
R8-T2	Rezak Bank	2018/9/9	16:22	27.9727	-92.3796	66.7	16:27	27.9720	-92.3793	69.7
R9-T1	Rezak Bank	2018/9/9	17:31	27.9815	-92.3931	85.5	17:36	27.9817	-92.3939	82.5
R9-T2	Rezak Bank	2018/9/9	17:38	27.9818	-92.3941	82.2	17:42	27.9819	-92.3951	85.7
BO5-T1	Bouma Bank	2018/9/10	8:11	28.0542	-92.4475	72.8	8:16	28.0547	-92.4474	72.8
BO5-T2	Bouma Bank	2018/9/10	8:33	28.0548	-92.4477	71.3	8:38	28.0553	-92.4477	N/A
BO5-T1a	Bouma Bank	2018/9/10	10:16	28.0626	-92.4611	65.6	10:21	28.0627	-92.4620	64
BO5-T2b	Bouma Bank	2018/9/10	10:35	28.0628	-92.4620	62.9	10:40	28.0630	-92.4627	60.6
BO5-T3c	Bouma Bank	2018/9/10	10:59	28.0629	-92.4627	60.4	11:04	28.0624	-92.4629	60
BO1-T1	Bouma Bank	2018/9/10	12:03	28.0656	-92.4860	86.1	12:08	28.0656	-92.4871	86.1

**Specimen summary table****Table 7.** Inventory of specimens collected during expeditions DFH35 and 37 to the Northwestern Gulf of Mexico.

Field Identification	Specimen ID	Date	Time	Locality	Latitude	Longitude	Depth (m)	Preservation	Destination
<i>Swiftia exserta</i>	DFH35-631A	2018/07/24	10:13	Elvers Bank	27.8537	-92.9214	78	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
<i>Stichopathes</i> sp.	DFH35-631B	2018/07/24	10:32	Elvers Bank	27.8538	-92.9214	78	ETOH, RNALater, Dry	Mercer Brugler, CUNY
Brown branched algae	DFH35-631C	2018/07/24	10:51	Elvers Bank	27.8538	-92.9214	78	10% Formalin	FGBNMS
<i>Stichopathes</i> sp.	DFH35-631D	2018/07/24	11:33	Elvers Bank	27.8540	-92.9224	93	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Plumapathes</i> sp.	DFH35-633A	2018/07/24	17:35	Geyer Bank	27.7998	-93.0647	64	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Scleracis</i> sp.	DFH35-634A	2018/07/25	8:52	Geyer Bank	27.7862	-93.0717	140	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
Yellow octocoral	DFH35-634B	2018/07/25	9:54	Geyer Bank	27.7853	-93.0697	145	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
Zoanthid	DFH35-635A	2018/07/25	13:41	East Flower Garden Bank	27.9106	-93.6589	97	ETOH	FGBNMS
<i>Scleracis</i> sp.	DFH35-635B	2018/07/25	13:58	East Flower Garden Bank	27.9106	-93.6590	97	ETOH, DESS	David Hicks, UTRGV
<i>Stichopathes</i> sp.	DFH35-635C	2018/07/25	14:22	East Flower Garden Bank	27.9111	-93.6593	97	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Elatopathes</i> sp.	DFH35-635D	2018/07/25	13:58	East Flower Garden Bank	27.9106	-93.6590	97	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Stichopathes</i> sp.	DFH35-636A	2018/07/25	16:01	East Flower Garden Bank	27.8750	-93.6333	105	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Stichopathes</i> sp.	DFH35-636B	2018/07/25	16:26	East Flower Garden Bank	27.8749	-93.6334	105	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Ellisella</i> sp.	DFH35-638A	2018/07/26	8:11	Bright Bank Complex	27.8539	-93.4548	109	ETOH, DESS	David Hicks, UTRGV
Brittle star	DFH35-638B	2018/07/26	8:11	Bright Bank Complex	27.8539	-93.4548	109	ETOH	FGBNMS
<i>Stichopathes</i> sp.	DFH35-639A	2018/07/26	9:51	Bright Bank Complex	27.9046	-93.4087	107.3	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Stichopathes</i> sp.	DFH35-640A	2018/07/26	11:10	Bright Bank Complex	27.9062	-93.3424	90.3	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Scleracis</i> sp.	DFH35-640B	2018/07/26	11:19	Bright Bank Complex	27.9062	-93.3424	90.1	ETOH, DESS	David Hicks, UTRGV
DFH8-18B	DFH35-640C	2018/07/26	11:34	Bright Bank Complex	27.9062	-93.3424	90	ETOH, DESS	David Hicks, UTRGV
<i>Thesea rubra</i>	DFH35-640D	2018/07/26	11:52	Bright Bank Complex	27.9067	-93.3429	92	ETOH, DESS	FGBNMS, David Hicks
<i>Stichopathes</i> sp.	DFH35-640E	2018/07/26	N/A	Bright Bank Complex	27.9067	-93.3429	90.7	ETOH, RNALater, Dry	Mercer Brugler, CUNY

<i>Stichopathes</i> sp.	DFH35-640F	2018/07/26	12:15	Bright Bank Complex	27.9068	-93.3430	96.3	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Nicella</i> sp.	DFH35-640G	2018/07/26	11:34	Bright Bank Complex	27.9062	-93.3424	90	ETOH, DESS	David Hicks, UTRGV
<i>Stichopathes</i> sp.	DFH37-652A	2018/09/07	N/A	Alderdice Bank	28.0874	-92.0183	86.4	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
<i>Swiftia</i> sp.	DFH37-653A	2018/09/07	11:31	Alderdice Bank	28.0820	-92.0154	80.9	ETOH	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
Rock with <i>Ostreobium</i>	DFH37-653B	2018/09/07	11:44	Alderdice Bank	28.0821	-92.0154	80.4	Live	Suzanne Fredericq, ULL
<i>Thesea</i> sp aff. <i>nivea</i>	DFH37-653C	2018/09/07	11:58	Alderdice Bank	28.0826	-92.0149	81.9	ETOH,DESS	David Hicks, UTRGV
' <i>Hypnogorgia</i> ' sp.	DFH37-653D	2018/09/07	11:58	Alderdice Bank	28.0826	-92.0149	81.9	ETOH	Peter Etnoyer, DSCRTP
<i>Scleracis</i> sp.	DFH37-653E	2018/09/07	12:19	Alderdice Bank	28.0832	-92.0143	84.3	ETOH, DESS	David Hicks, UTRGV
<i>Stichopathes</i> sp.	DFH37-653F	2018/09/07	N/A	Alderdice Bank	Propeller Sample	N/A	N/A	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
<i>Ellisella</i> sp.	DFH37-653G	2018/09/07	N/A	Alderdice Bank	N/A	N/A	N/A	ETOH	David Hicks, UTRGV
<i>Stichopathes</i> sp.	DFH37-653H	2018/09/07	N/A	Alderdice Bank	Propeller Sample	N/A	N/A	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
S02	DFH37-654A	2018/09/07	14:44	Alderdice Bank	28.0697	-92.0087	88	ETOH	FGBNMS
S02	DFH37-654B	2018/09/07	14:57	Alderdice Bank	28.0696	-92.0086	87.9	ETOH	FGBNMS
<i>Stichopathes</i> sp.	DFH37-654C	2018/09/07	15:03	Alderdice Bank	28.0695	-92.0086	88.9	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
<i>Paramuricea</i> sp.	DFH37-656A	2018/09/07	17:28	Parker Bank	27.9609	-91.9564	115.7	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
<i>Verdigellas</i> sp.	DFH37-657A	2018/09/08	8:36	Parker Bank	27.9631	91.9992	99.01	Live	Suzanne Fredericq, ULL
<i>Peyssonnelia</i> sp.	DFH37-657B	2018/09/08	8:36	Parker Bank	27.9631	91.9992	99.01	Live	Suzanne Fredericq, ULL
Rock with algae	DFH37-657C	2018/09/08	8:53	Parker Bank	27.9632	91.9992	99	Live	Suzanne Fredericq, ULL
Red octocoral	DFH37-657D	2018/09/08	8:58	Parker Bank	27.9631	-91.9992	99.6	ETOH, DESS	David Hicks, UTRGV
Yellow <i>Stichopathes</i> sp.	DFH37-657E	2018/09/08	8:58	Parker Bank	27.9631	-91.9992	99.6	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
Pink <i>Callogorgia</i> A	DFH37-657F	2018/09/08	8:53	Parker Bank	27.9639	-91.9974	99	ETOH	David Hicks, UTRGV
Pink <i>Callogorgia</i> B	DFH37-657H	2018/09/08	8:53	Parker Bank	27.9632	91.9992	99	ETOH	David Hicks, UTRGV
White <i>Callogorgia</i> sp.	DFH37-657I	2018/09/08	8:53	Parker Bank	27.9632	91.9992	99	ETOH	David Hicks, UTRGV
<i>Simmialena uniplicata</i>	DFH37-657J	2018/09/08	8:53	Parker Bank	27.9632	91.9992	99	ETOH	Emilio Garcia, ULL
' <i>Hypnogorgia</i> ' sp.	DFH37-660A	2018/09/08	14:25	Parker Bank	27.9335	-91.9542	118.3	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
Fine white <i>Gorgonian</i> sp.	DFH37-660B	2018/09/08	14:40	Parker Bank	27.9333	-91.9540	118.2	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV

Thick ropey white <i>Gorgonian</i> sp.	DFH37-660B	2018/09/08	15:12	Parker Bank	27.9324	-91.9528	125.7	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
CCA, coral rubble, and sand	DFH37-661A	2018/09/08	16:36	Parker Bank	27.9522	-92.0450	72.5	Live	Suzanne Fredericq, ULL
Algal nodules	DFH37-661B	2018/09/08	16:44	Parker Bank	27.9521	-92.0451	72.4	Live	Suzanne Fredericq, ULL
Algal nodule with CCA and green algae	DFH37-661C	2018/09/08	17:16	Parker Bank	27.9516	-92.0470	72	Live	Suzanne Fredericq, ULL
<i>Stichopathes</i> sp.	DFH37-661D	2018/09/08	17:41	Parker Bank	27.9516	-92.0469	71.2	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
Mantis shrimp	DFH37-661E	2018/09/08	17:16	Parker Bank	27.9516	-92.0470	72	ETOH	FGBNMS
Algal nodules	DFH37-662A	2018/09/09	8:40	Sidner Bank	27.9188	-92.3881	83.1	Live	Suzanne Fredericq, ULL
<i>Stichopathes</i> sp.	DFH37-662B	2018/09/09	8:57	Sidner Bank	27.9187	-92.3881	82.7	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
<i>Stichopathes</i> sp.	DFH37-663A	2018/09/09	9:45	Sidner Bank	27.9294	-92.3831	88.1	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
<i>Stichopathes</i> sp.	DFH37-663B	2018/09/09	9:45	Sidner Bank	27.9294	-92.3831	88.1	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
Algal nodules	DFH37-664A	2018/09/09	10:31	Sidner Bank	27.9352	-92.3713	70.4	Live	Suzanne Fredericq, ULL
Algal nodules with brown cyanobacterial mat	DFH37-664B	2018/09/09	10:49	Sidner Bank	27.9356	-92.3714	69.4	Live	Suzanne Fredericq, ULL
<i>Stichopathes</i> sp.	DFH37-664C	2018/09/09	11:07	Sidner Bank	27.9372	-92.3714	66.8	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
Algal nodules, rocks, algae, sciniaie	DFH37-665A	2018/09/09	12:05	Sidner Bank	27.9162	-92.3751	64.4	Live	Suzanne Fredericq, ULL
<i>Paramuricea</i> sp.	DFH37-666A	2018/09/09	14:20	Rezak Bank	27.9564	-92.3608	123.75	ETOH, DESS	David Hicks, UTRGV
<i>Elatopathes abietina</i> (yellow-green)	DFH37-666B	2018/09/09	14:28	Rezak Bank	27.9564	-92.3608	123.7	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Antipathes atlantica/gracilis</i>	DFH37-668A	2018/09/09	16:17	Rezak Bank	27.9727	-92.3796	66.8	ETOH, RNALater, Dry	Mercer Brugler, CUNY
Algal nodules	DFH37-668B	2018/09/09	16:36	Rezak Bank	27.9721	-92.3790	68.6	Live	Suzanne Fredericq, ULL
Mantis shrimp	DFH37-668C	2018/09/09	16:36	Rezak Bank	27.9721	-92.3790	68.6	ETOH	FGBNMS
White ' <i>Hypnogorgia</i> ' sp.	DFH37-669A	2018/09/09	17:20	Rezak Bank	27.9815	-92.3931	86	ETOH	Peter Etnoyer, DSCRTP
Orange <i>Gorgonian</i> sp.	DFH37-669B	2018/09/09	17:48	Rezak Bank	27.9819	-92.3951	86.4	ETOH, DESS	David Hicks, UTRGV
G04	DFH37-669C	2018/09/09	17:51	Rezak Bank	27.9820	-92.3951	86.3	ETOH, DESS	David Hicks, UTRGV
<i>Stichopathes</i> sp.	DFH37-669D	2018/09/09	17:56	Rezak Bank	27.9819	-92.3951	86	ETOH, RNALater, Dry	Mercer Brugler, CUNY
<i>Agaricia</i> sp.	DFH37-670A	2018/09/10	8:30	Bouma Bank	28.0548	-92.4476	71.9	ETOH, dry	FGBNMS
Algal nodules	DFH37-670B	2018/09/10	8:45	Bouma Bank	28.0554	-92.4476	72.2	Live	Suzanne Fredericq, ULL
<i>Stichopathes</i> sp.	DFH37-670C	2018/09/10	9:02	Bouma Bank	28.0554	-92.4478	71.4	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV



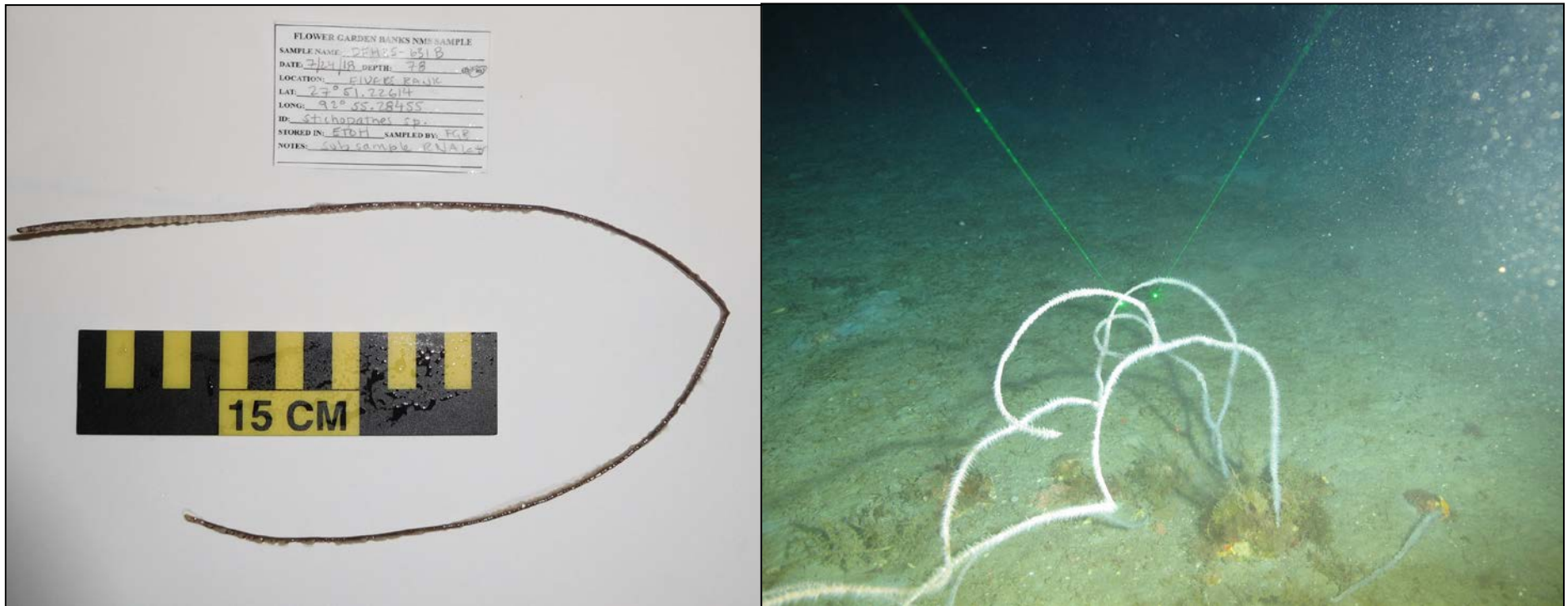
Algal nodules with algae, rocks	DFH37-671A	2018/09/10	9:55	Bouma Bank	28.0624	-92.4612	66.2	Live	Suzanne Fredericq, ULL
<i>Diodogorgia nodulifera</i>	DFH37-671B	2018/09/10	10:30	Bouma Bank	28.0627	-92.4618	64.3	ETOH, DESS	Peter Etnoyer/David Hicks, DSCRTP/UTRGV
<i>Diodogorgia</i> sp. with <i>Peyssonnelia</i> sp. and other algae	DFH37-671C	2018/09/10	10:30	Bouma Bank	28.0627	-92.4618	64.3	Live	Suzanne Fredericq, ULL
<i>Neofibulara</i> sp. with algae and coralline growth	DFH37-671D	2018/09/10	10:49	Bouma Bank	28.0630	-92.4628	60.2	ETOH	FGBNMS
<i>Stichopathes</i> sp.	DFH37-671E	2018/09/10	11:07	Bouma Bank	28.0619	-92.4629	61.1	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV
<i>Ellisella</i> sp.	DFH37-671F	2018/09/10	10:30	Bouma Bank	28.0627	-92.4618	64.3	ETOH	David Hicks, UTRGV
<i>Stichopathes</i> sp.	DFH37-672A	2018/09/10	12:24	Bouma Bank	28.0657	-92.4863	85.9	ETOH, RNALater, Dry	Mercer Brugler/David Hicks, CUNY/UTRGV

### Sample photographs

All available laboratory and *in situ* photographs were provided for each sample collected during the 2018 expeditions to the Northwestern Gulf of Mexico.



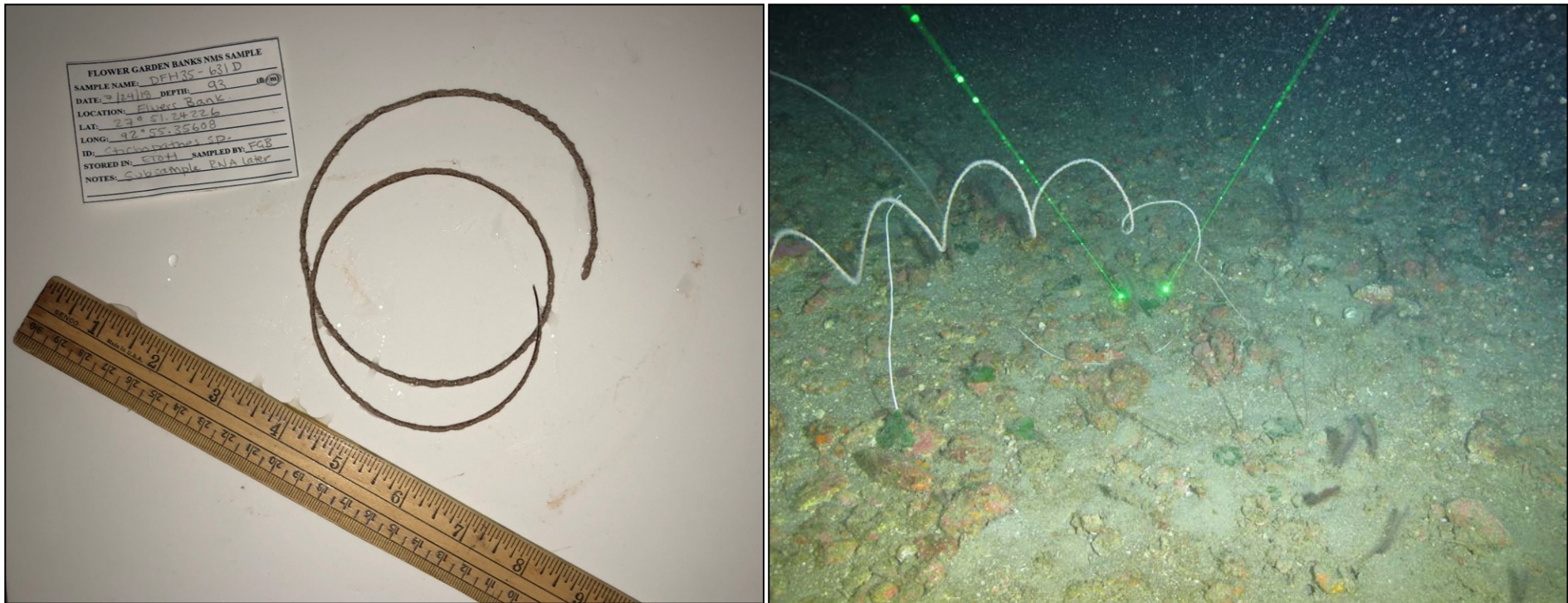
Figure 2. *Swiftia exserta* (DFH35-631A) collected at Elvers Bank from 78 m depth.



**Figure 3.** *Stichopathes* sp. (DFH35-631B) collected at Elvers Bank from 78 m depth.



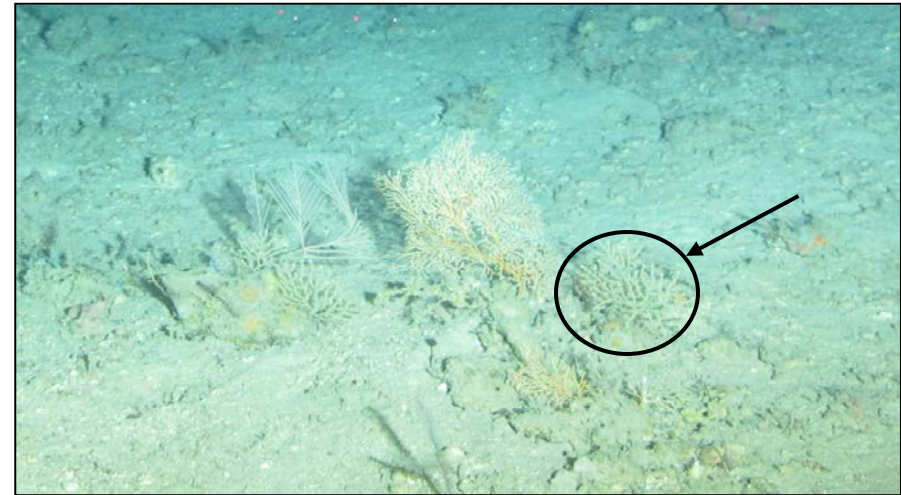
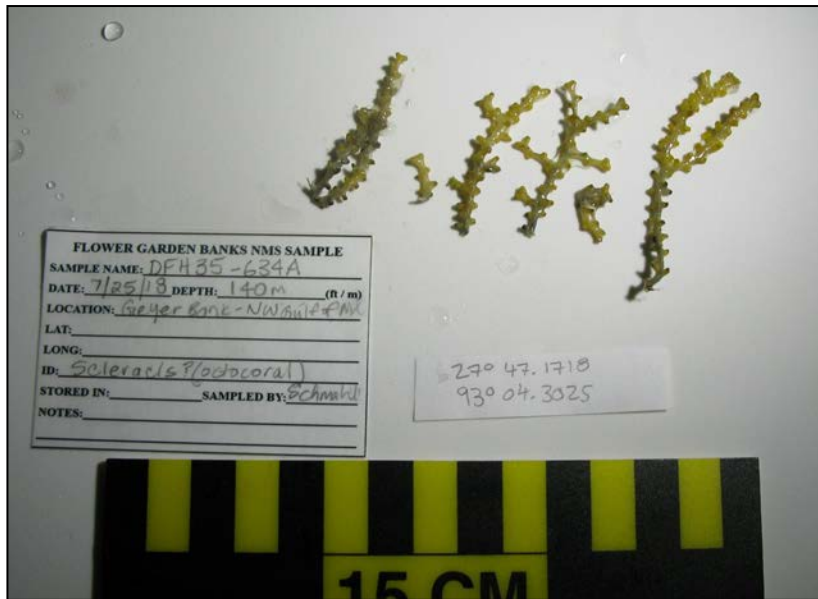
**Figure 4.** Brown branched algae (DFH35-631C) collected at Elvers Bank from 78 m depth.



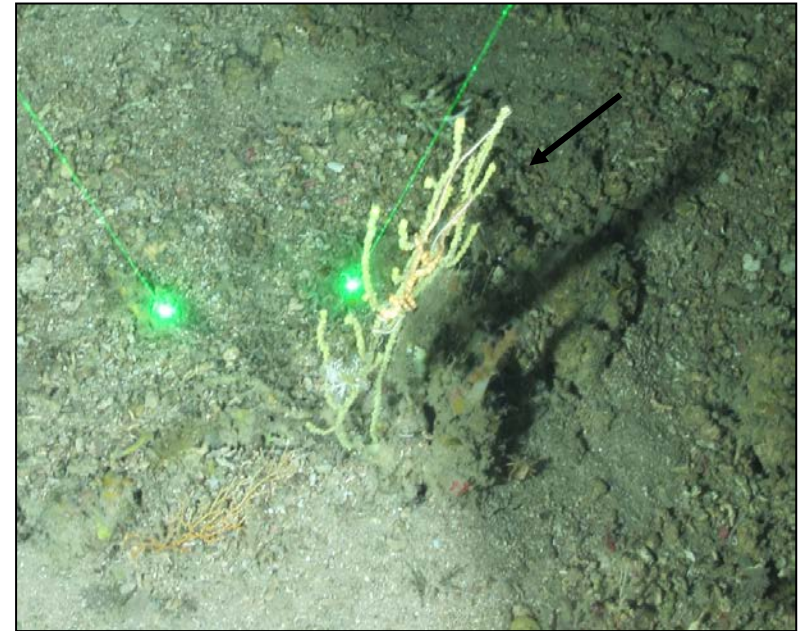
**Figure 5.** *Stichopathes* sp. (DFH35-631D) collected at Elvers Bank from 93 m depth.



**Figure 6.** *Plumapathes* sp. (DFH35-633A) collected at Geyer Bank from 64 m depth.



**Figure 7.** *Scleraxis* sp. (DFH35-634A) collected at Geyer Bank from 140 m depth.



**Figure 8.** Yellow octocoral (DFH35-634B) collected at Geyer Bank from 145 m depth.



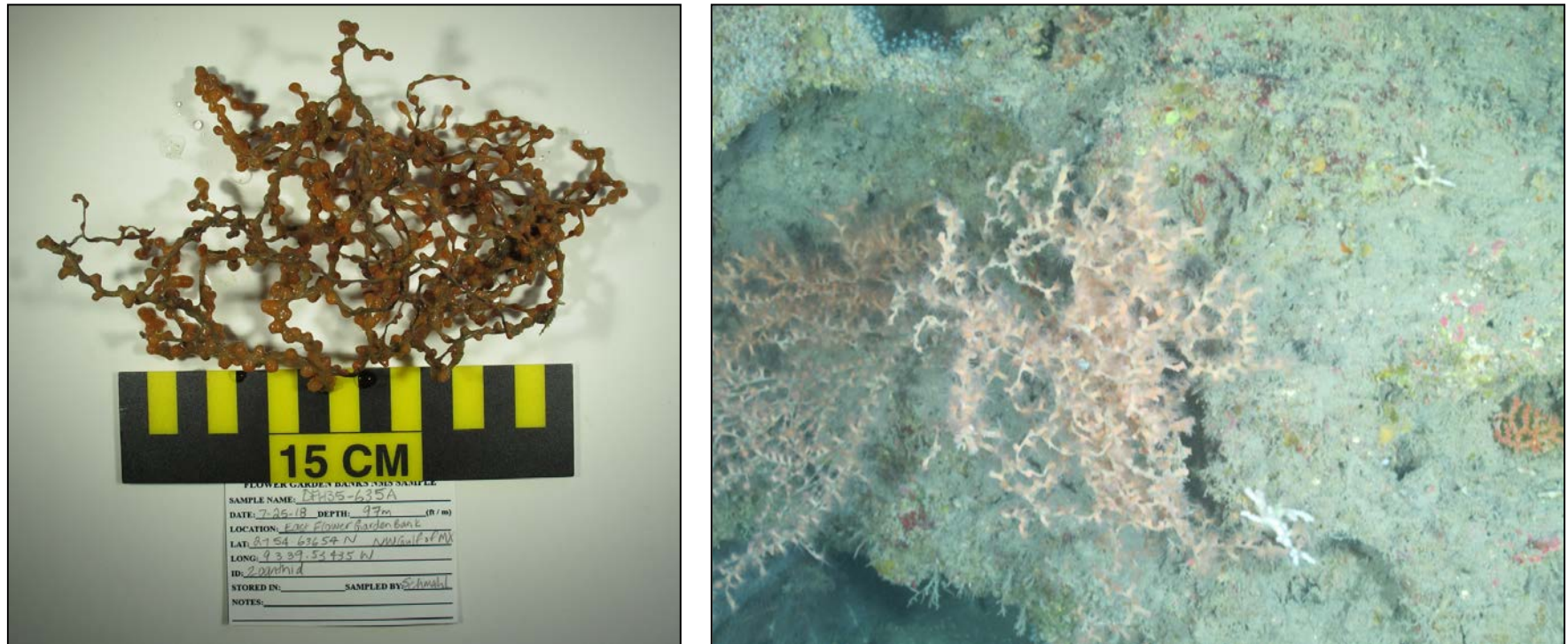
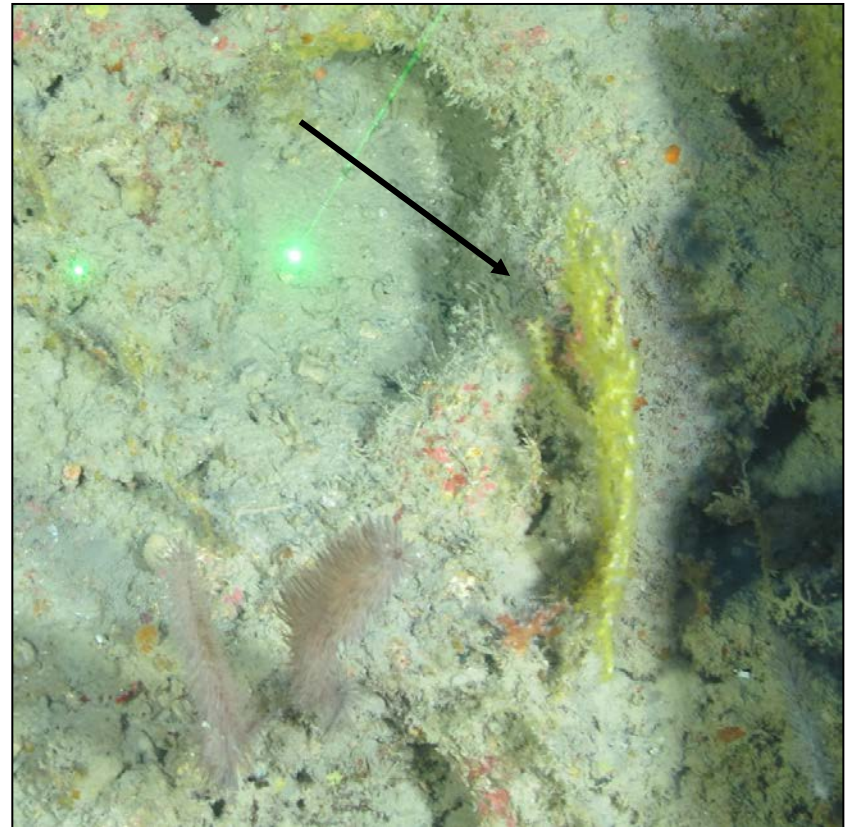
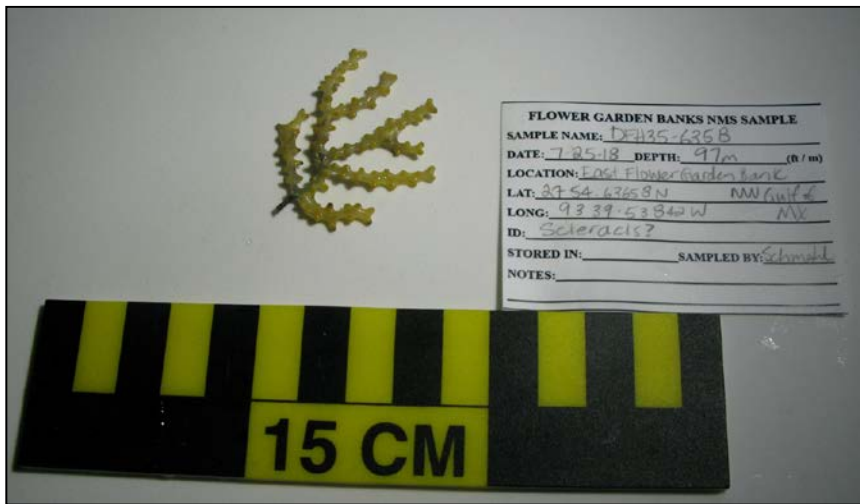


Figure 9. Zoanthid (DFH35-635A) collected at East Flower Garden Bank from 97 m depth.



**Figure 10.** *Scleraxis* sp. (DFH35-635B) collected at East Flower Garden Bank from 97 m depth.



**Figure 11.** *Sticopathes* sp. (DFH35-635C) collected at East Flower Garden Bank from 97 m depth.

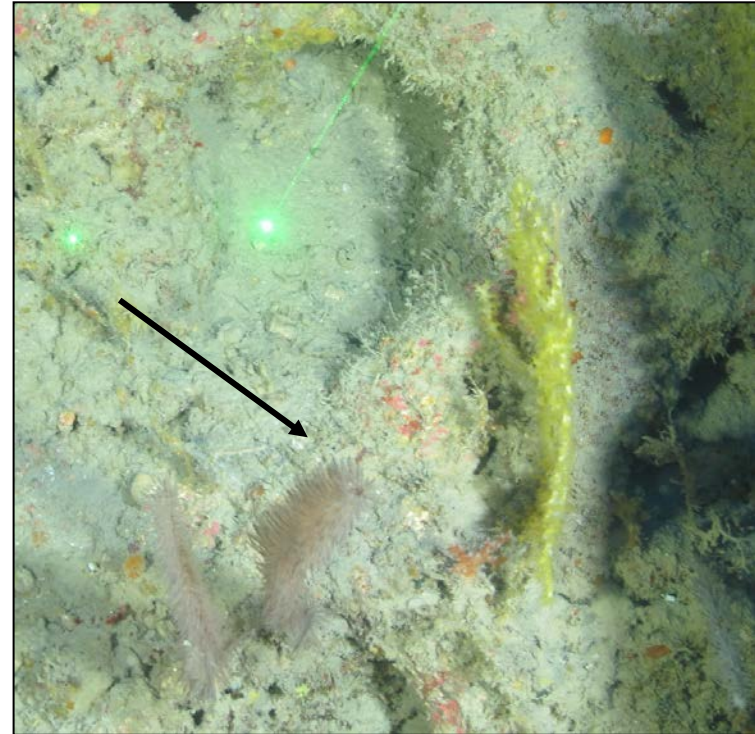
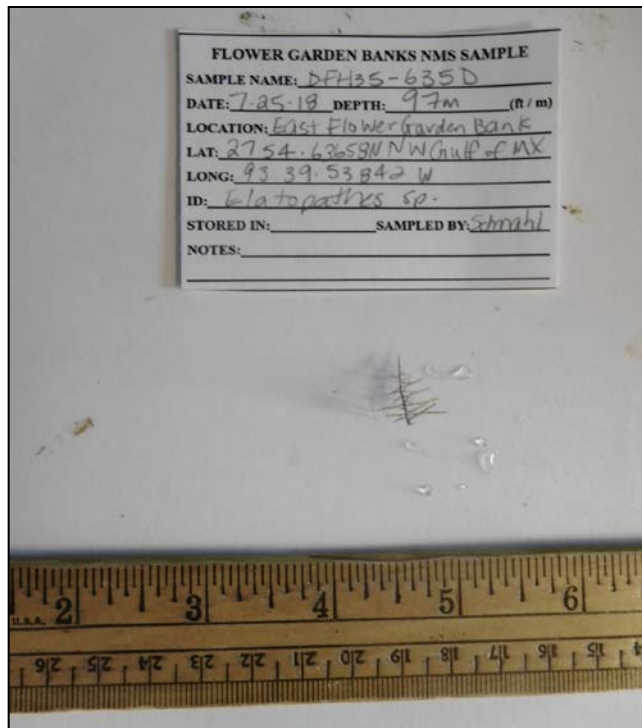
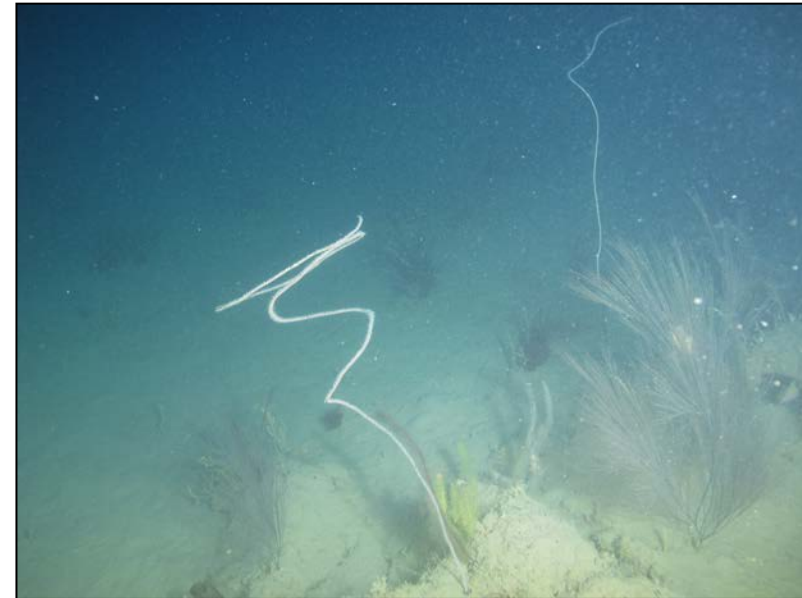


Figure 12. *Elatopathes* sp. (DFH35-635D) collected at East Flower Garden Bank from 97 m depth.



**Figure 13.** *Stichopathes* sp. (DFH-636A) collected at East Flower Garden Bank from 105 m depth.

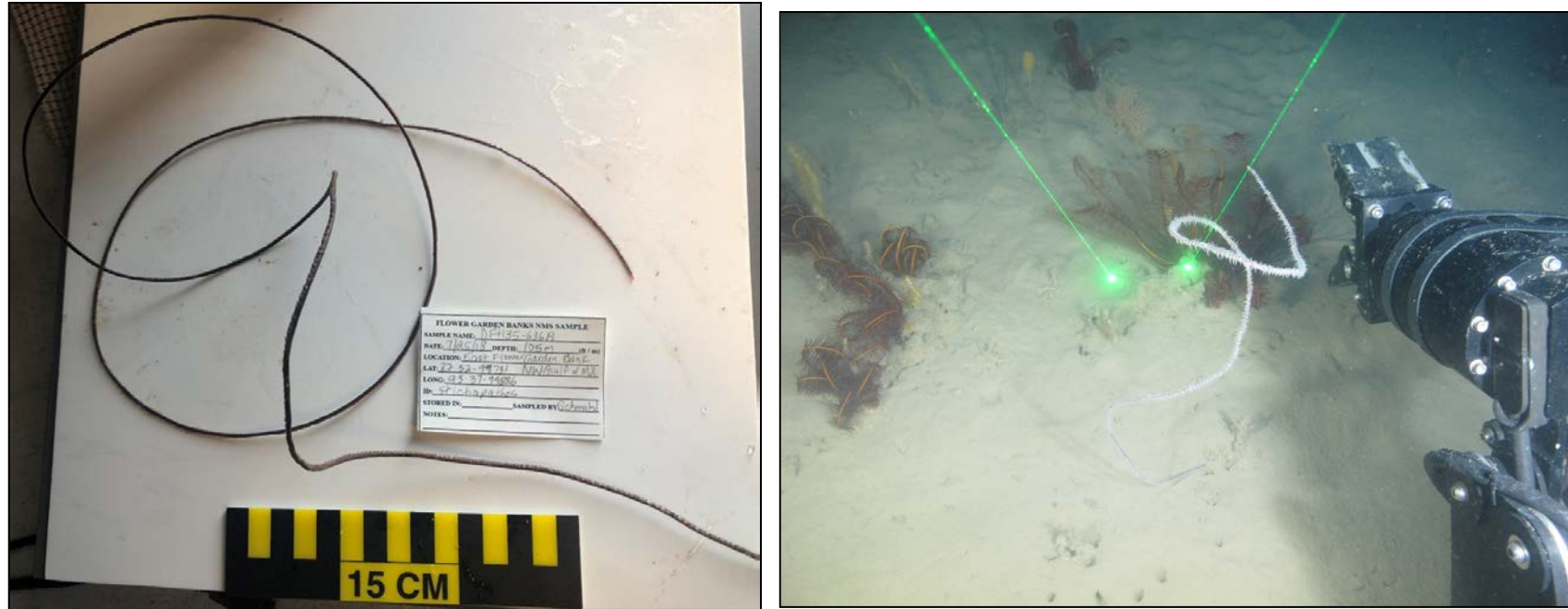
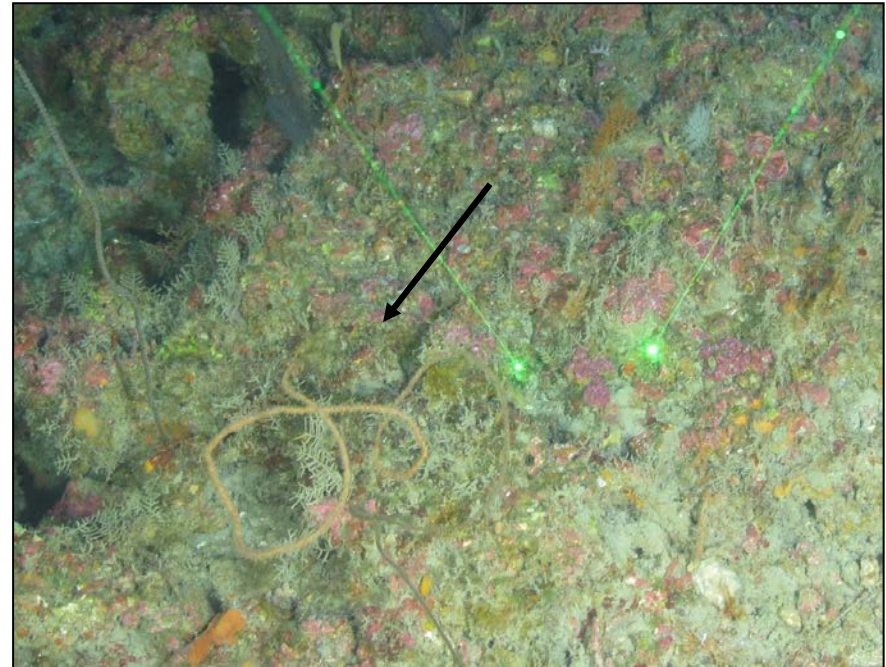


Figure 14. *Stichopathes* sp. (DFH-636B) collected at East Flower Garden Bank from 105 m depth.

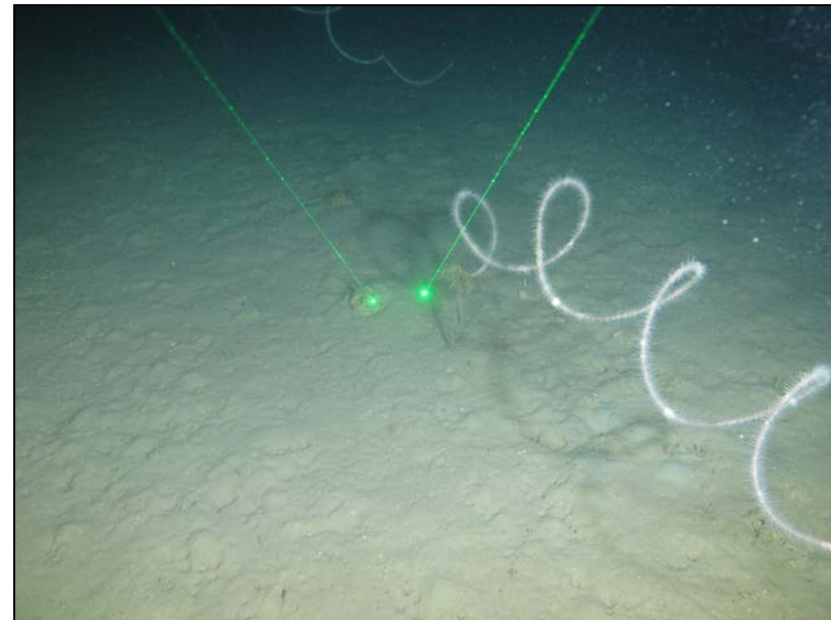


**Figure 15.** *Ellisella* sp. (DFH35-638A) collected at Bright Bank Complex from 109 m depth.



**Figure 16.** *Stichopathes* sp. (DFH35-639A) collected at Bright Bank Complex from 107.3 m depth.





**Figure 17.** *Stichopathes* sp. (DFH35-640A) collected at Bright Bank Complex from 90.3 m depth.



**Figure 18.** *Scleracis* sp. (DFH35-640B) collected at Bright Bank Complex from 90 m depth.



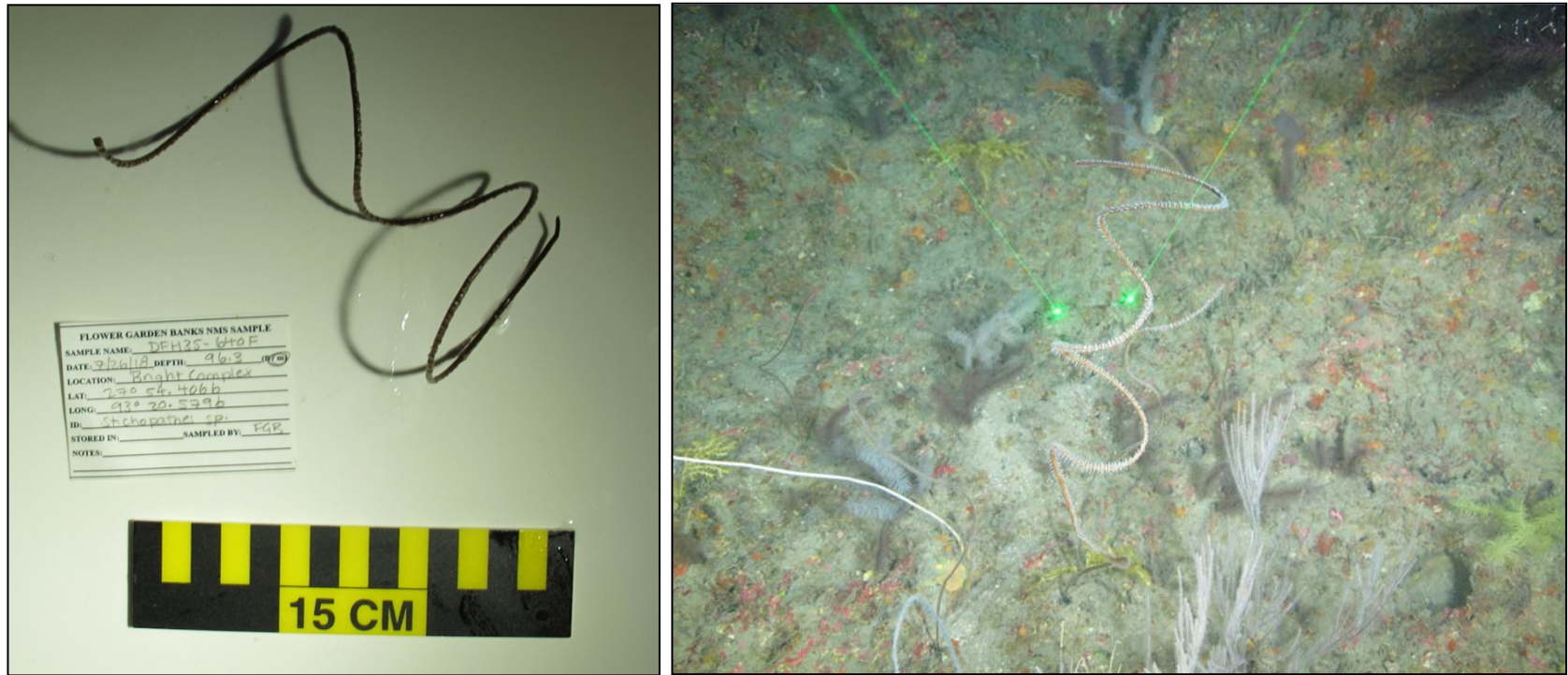
Figure 19. DFH8-18B (DFH35-640C) collected at Bright Bank Complex from 90 m depth.



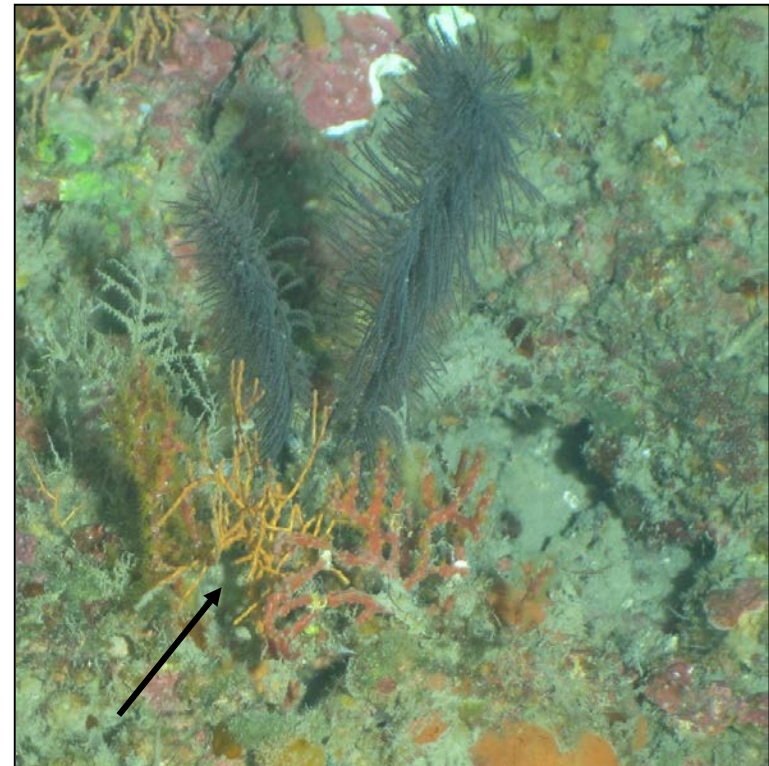
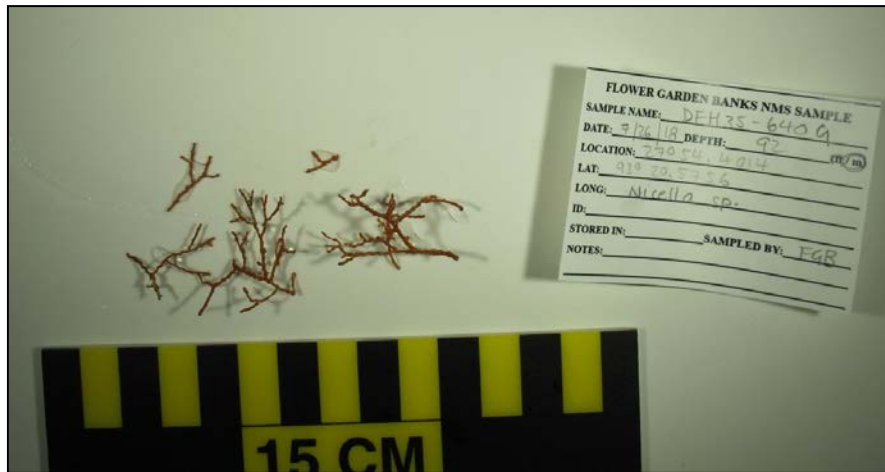
Figure 20. *Theselia rubra* (DFH35-640D) collected at Bright Bank Complex from 92 m depth.



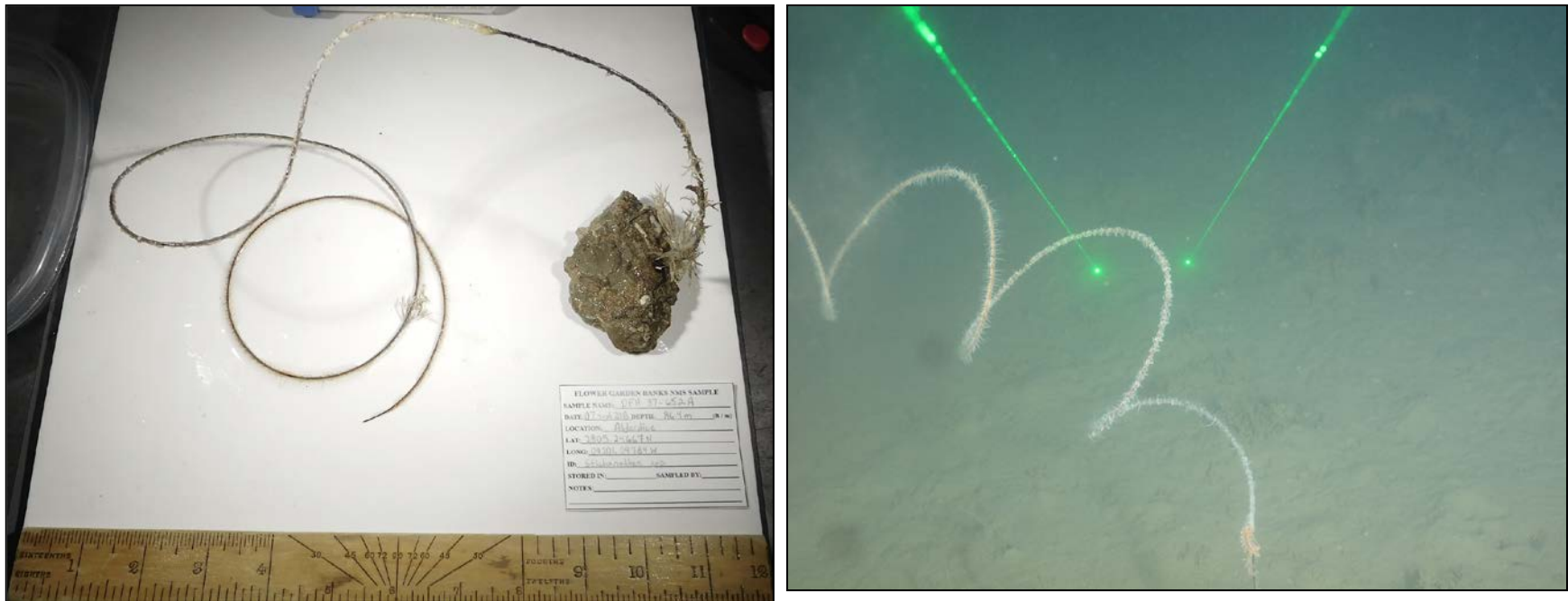
**Figure 21.** *Stichopathes* sp. (DFH35-640E) collected at Bright Bank Complex from 90.7 m depth in the ROV propeller.



**Figure 22.** *Stichopathes* sp. (DFH35-640F) collected at Bright Bank Complex from 96.3 m depth.

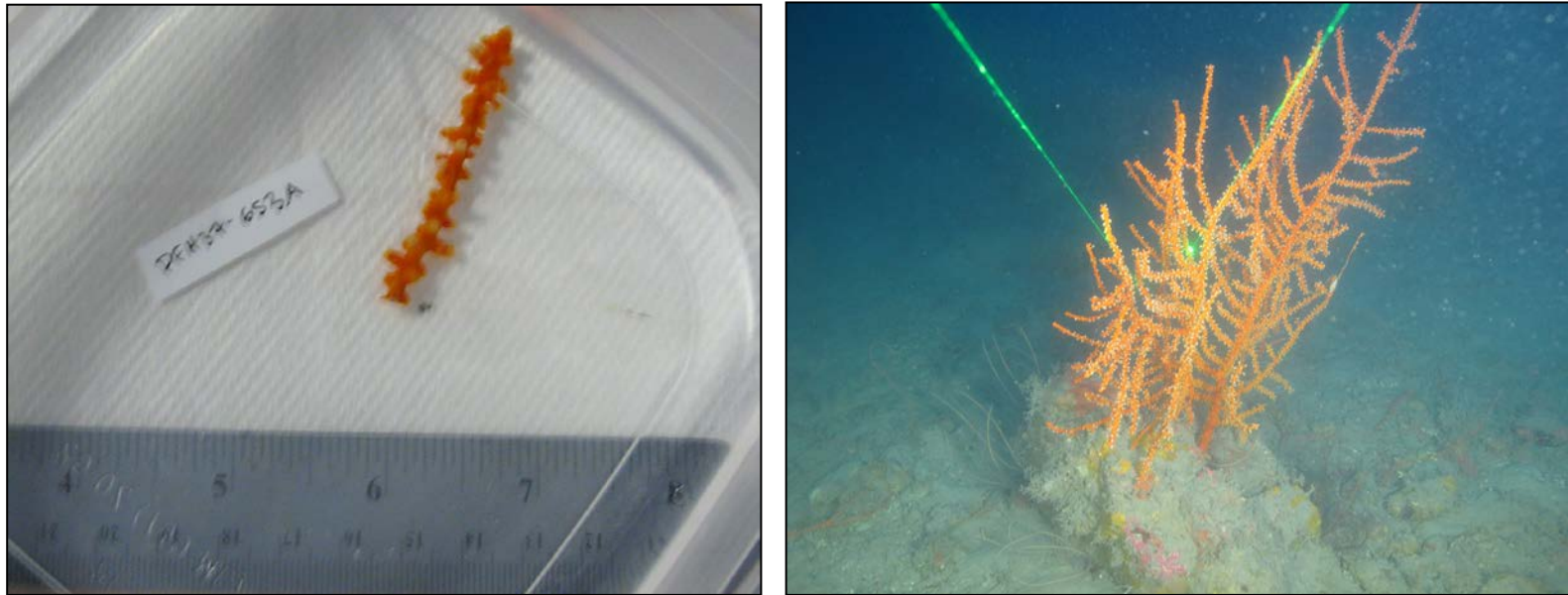


**Figure 23.** *Nicella* sp. (DFH35-640G) collected at Bright Bank Complex from 92 m depth.



**Figure 24.** *Stichopathes* sp. (DFH37-652A) collected at Alderdice Bank from 86.4 m depth.

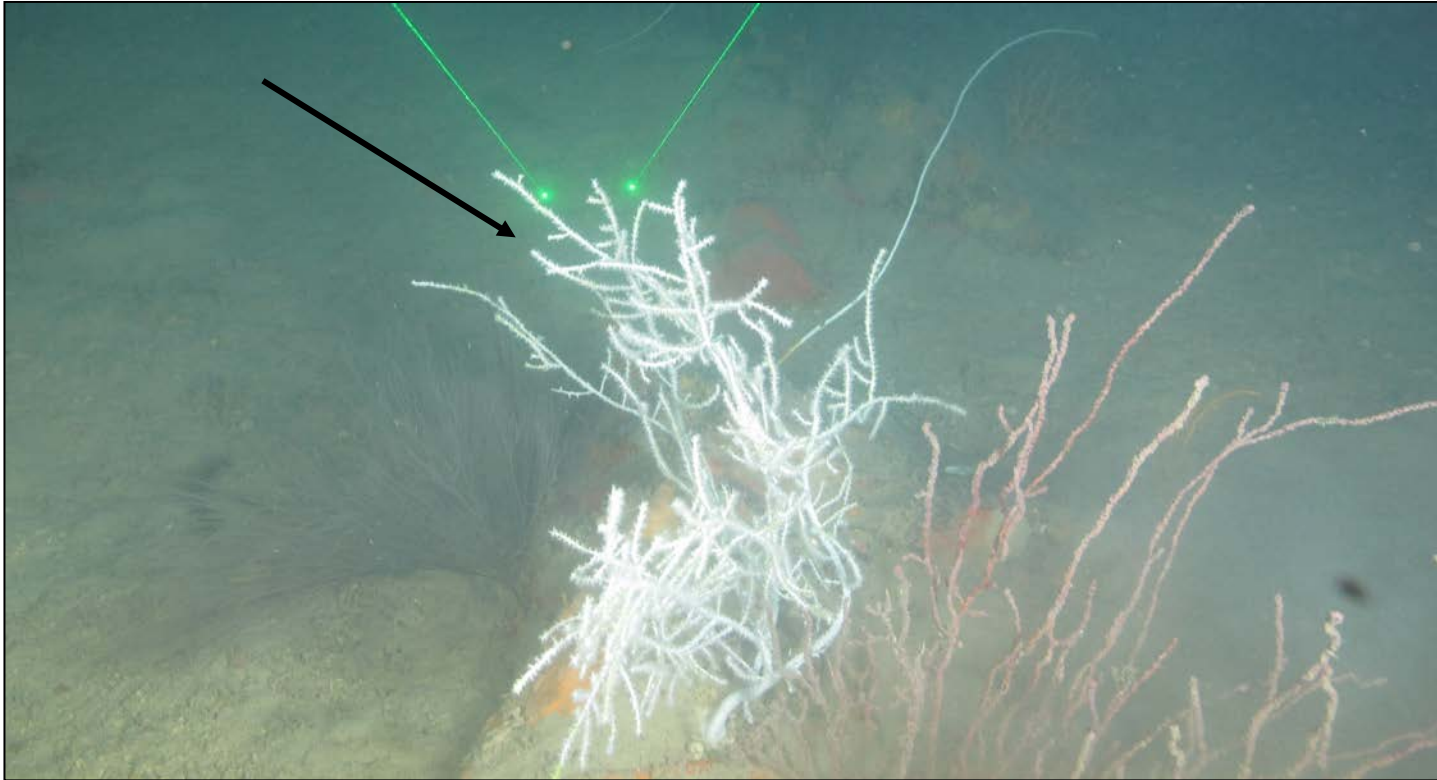




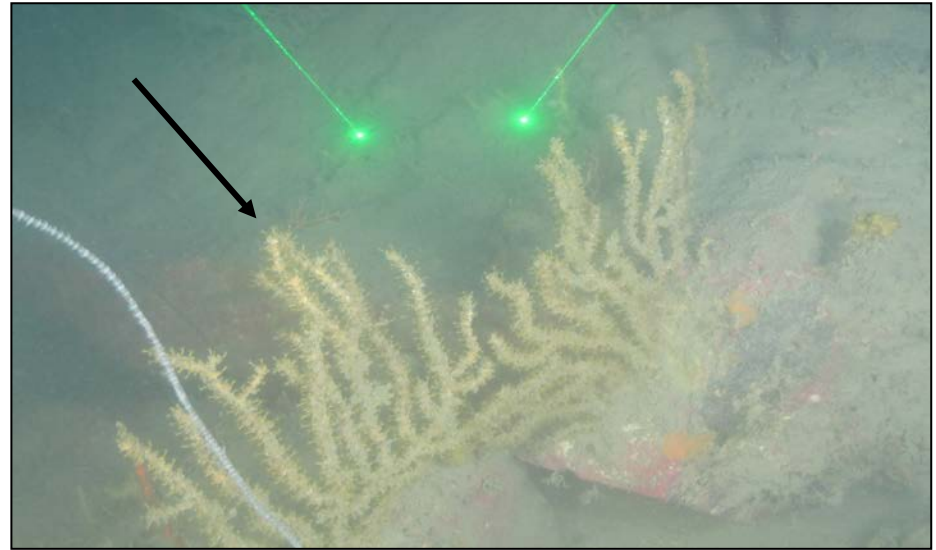
**Figure 25.** *Swiftia* sp. (DFH37-653A) collected at Alderdice Bank from 80.9 m depth.



**Figure 26.** *Thesea sp. aff. nivea* (DFH37-653C) collected from Alderdice Bank from 81.9 m depth.



**Figure 27.** *Hypnorgia* sp. (DFH37-653D) collected from Alderdice Bank from 81.9 m depth.



**Figure 28.** *Scleraxis* sp. (DFH37-653E) collected from Alderdice Bank from 84.3 m depth.



**Figure 29.** *Stichopathes* sp. (DFH37-653F) collected from Alderdice Bank.



Figure 30. *Ellisella* sp. (DFH37-653G) collected from Alderdrice Bank.



**Figure 31.** *Stichopathes* sp. (DFH37-653H) collected from Alderdice Bank.

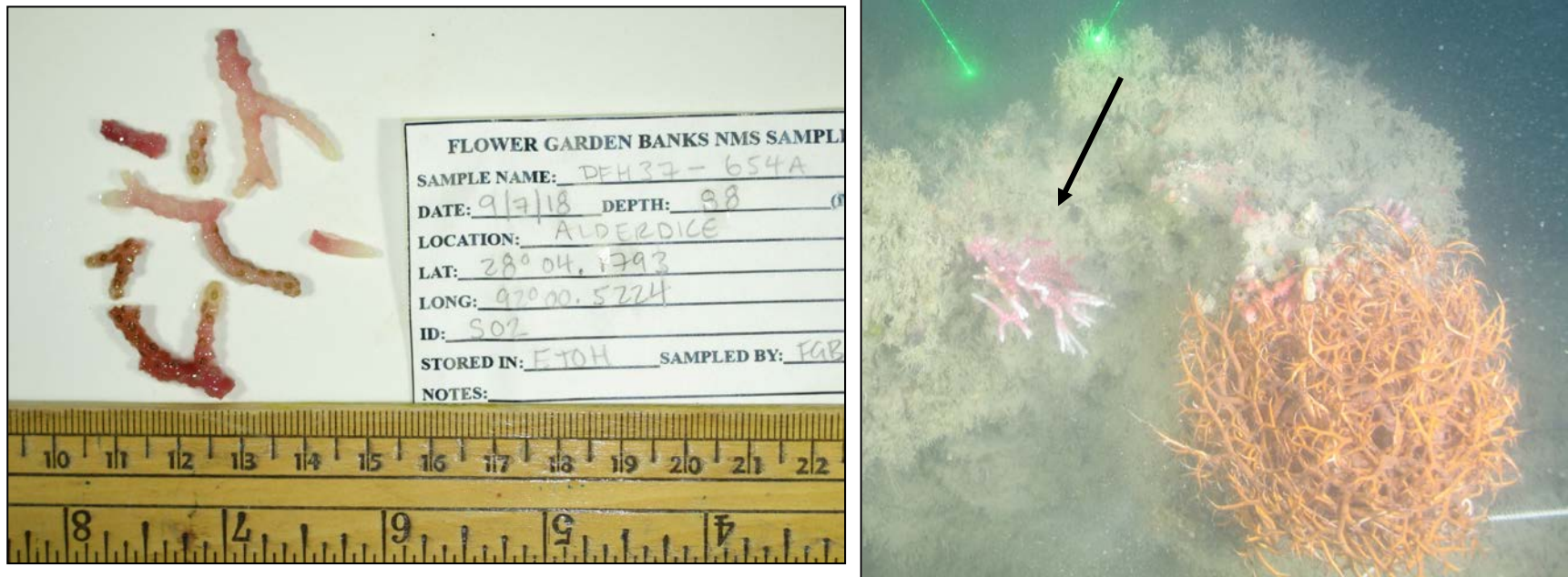
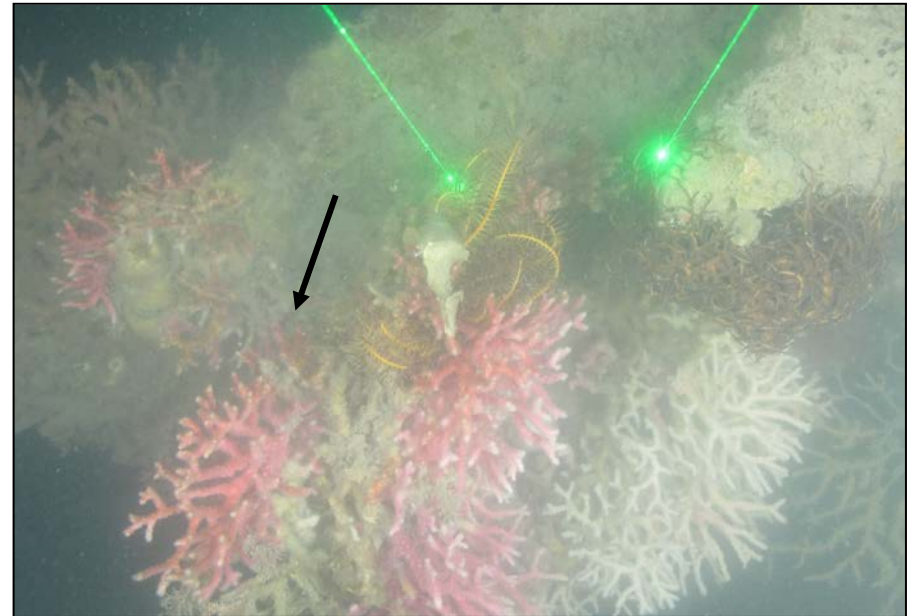


Figure 32. S02 (DFH37-654A) collected from Alderdice Bank from 88 m depth.





**Figure 33.** S02 (DFH37-654B) collected from Alderdice Bank from 87.9 m depth.

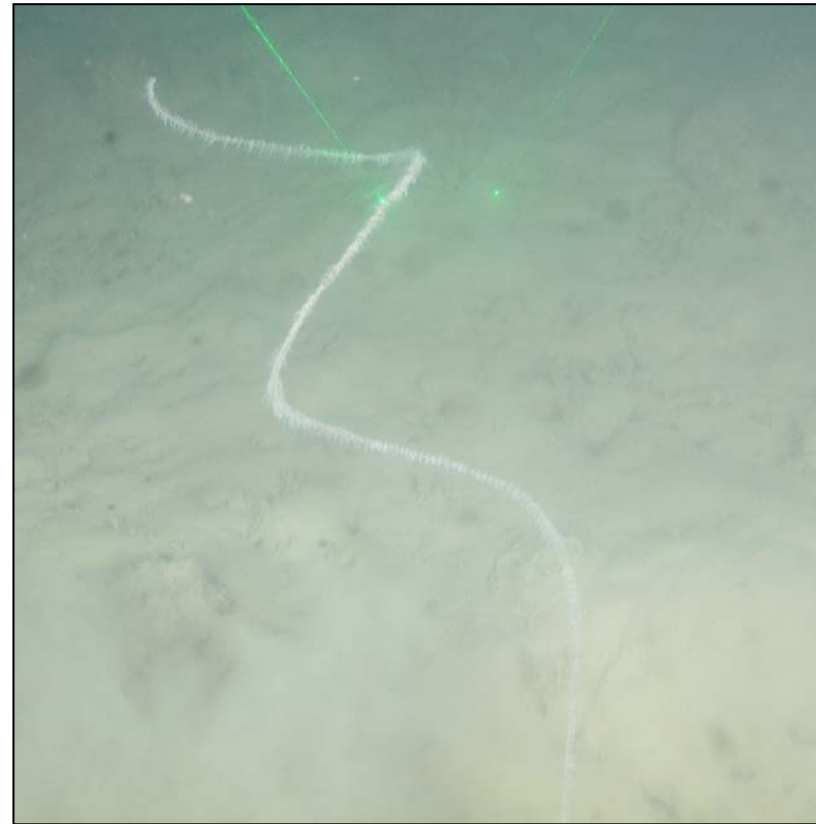
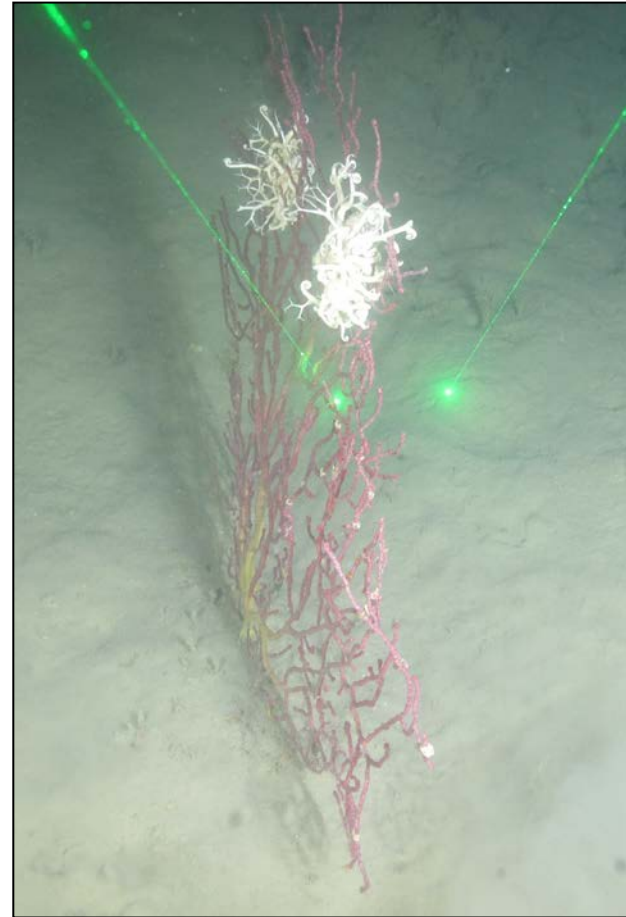
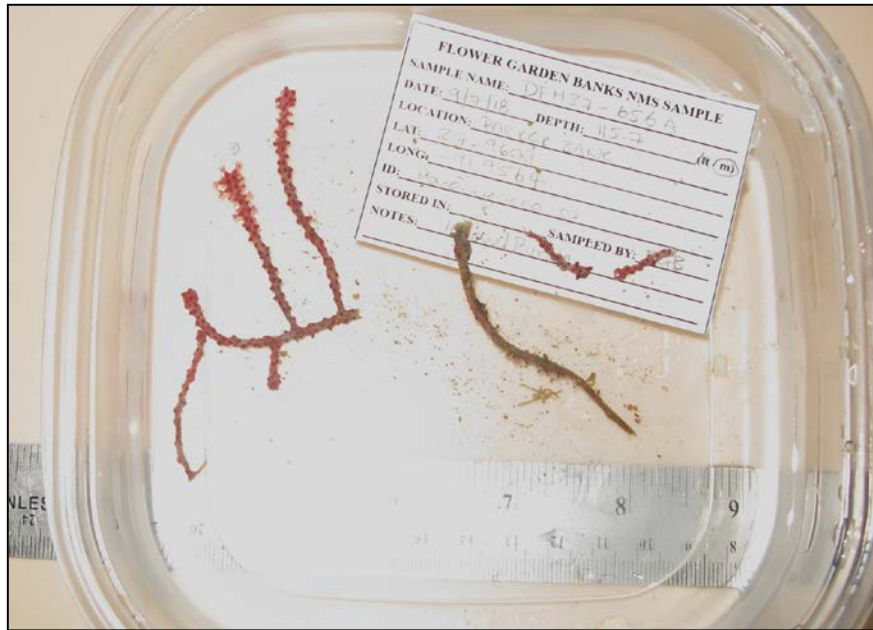


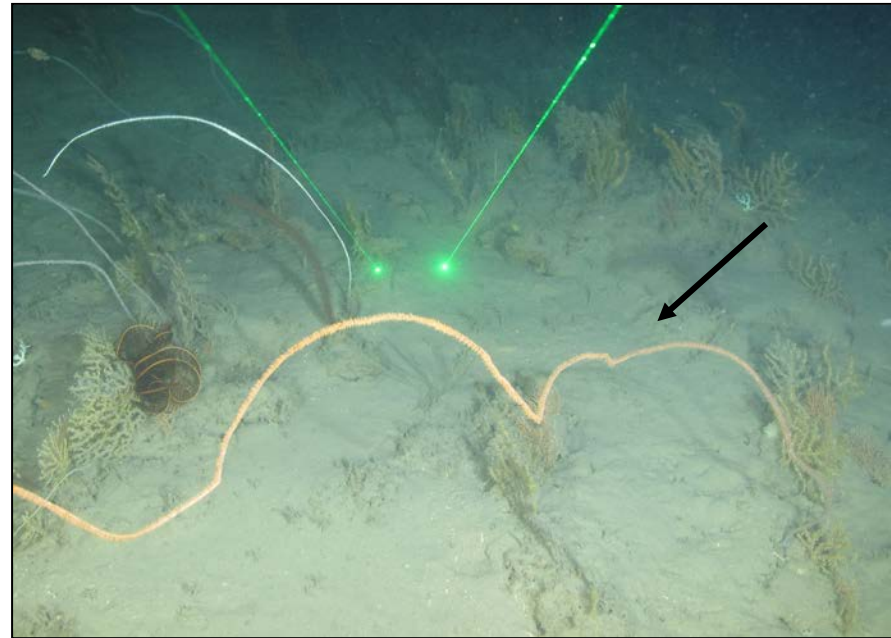
Figure 34. *Stichopathes* sp. (DFH37-654C) collected from Alderdrice Bank from 88.9 m depth.



**Figure 35.** *Paramuricea* sp. (DFH37-656A) collected from Parker Bank from 115.7 m depth.



**Figure 36.** Red octocoral (DFH37-657D) collected from Parker Bank from 99.6 m depth.



**Figure 37.** Yellow *Stichopathes* sp. (DFH37-657E) collected from Parker Bank from 99.6 m depth.



**Figure 38.** Pink *Callogorgia* sp. A (DFH37-657F) collected from Parker Bank from 99 m depth.

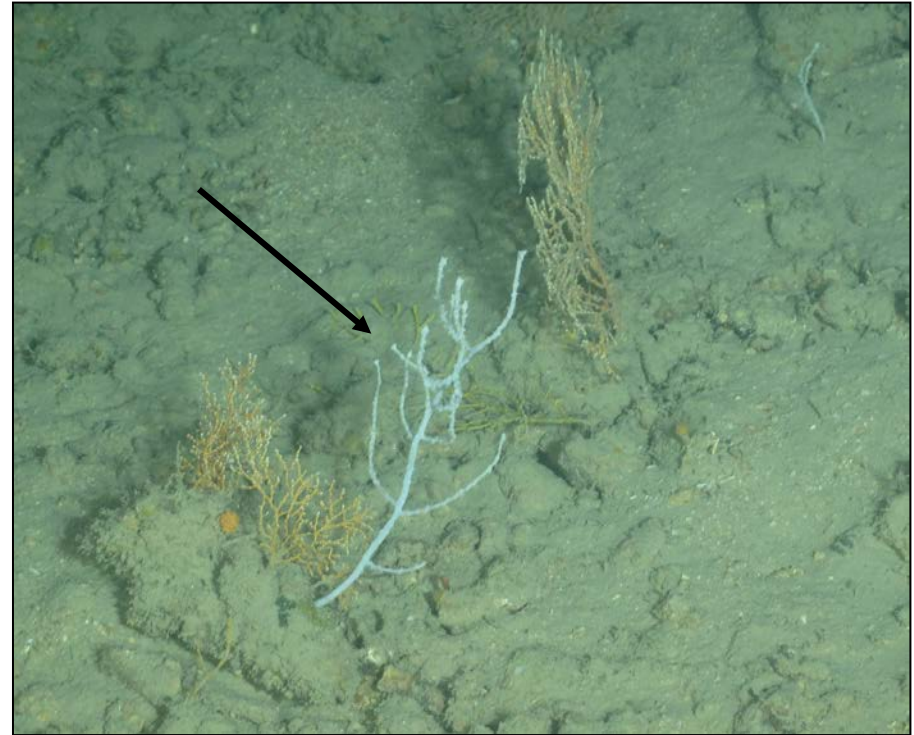


**Figure 39.** Pink *Callogorgia* sp. B (DFH37-657H) collected from Parker Bank from 99 m depth.



**Figure 40.** *Simnialena uniplicata* (DFH37-657J) collected from Parker Bank from 99 m depth.





**Figure 41.** '*Hypnogorgia*' sp. (DFH37-660A) collected from Parker Bank from 118.3 m depth.

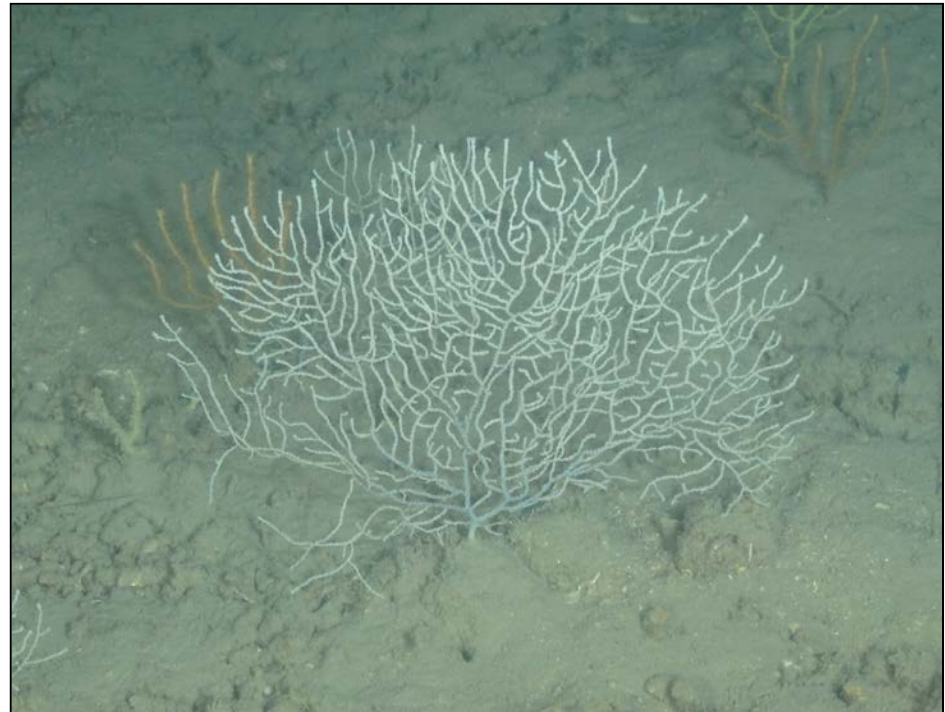
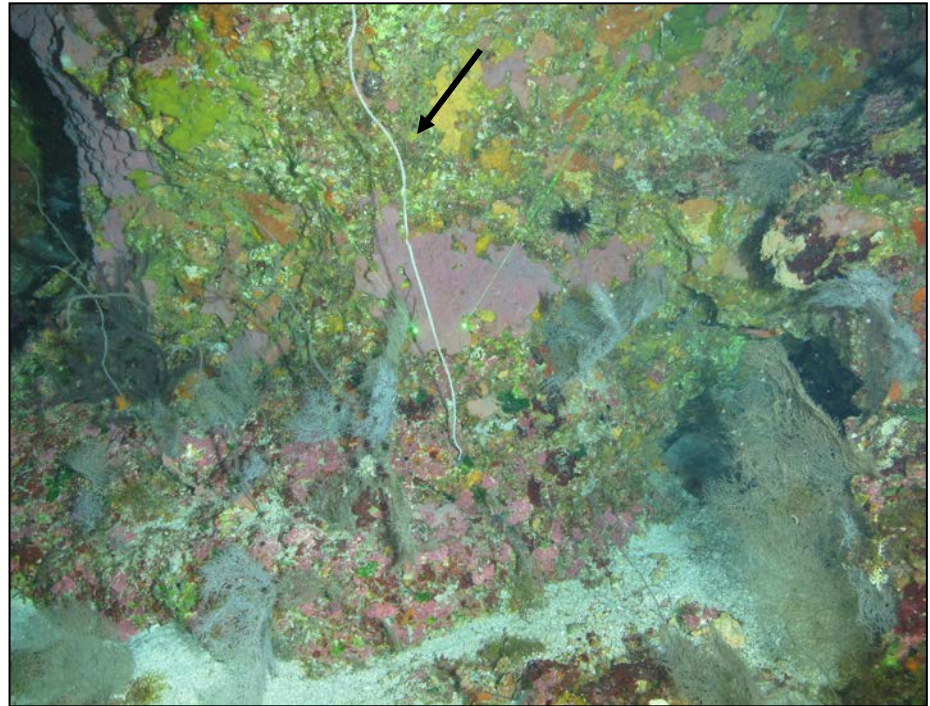


Figure 42. Fine white *Gorgonian* sp. (DFH37-660B) collected from Parker Bank from 118.2 m depth.



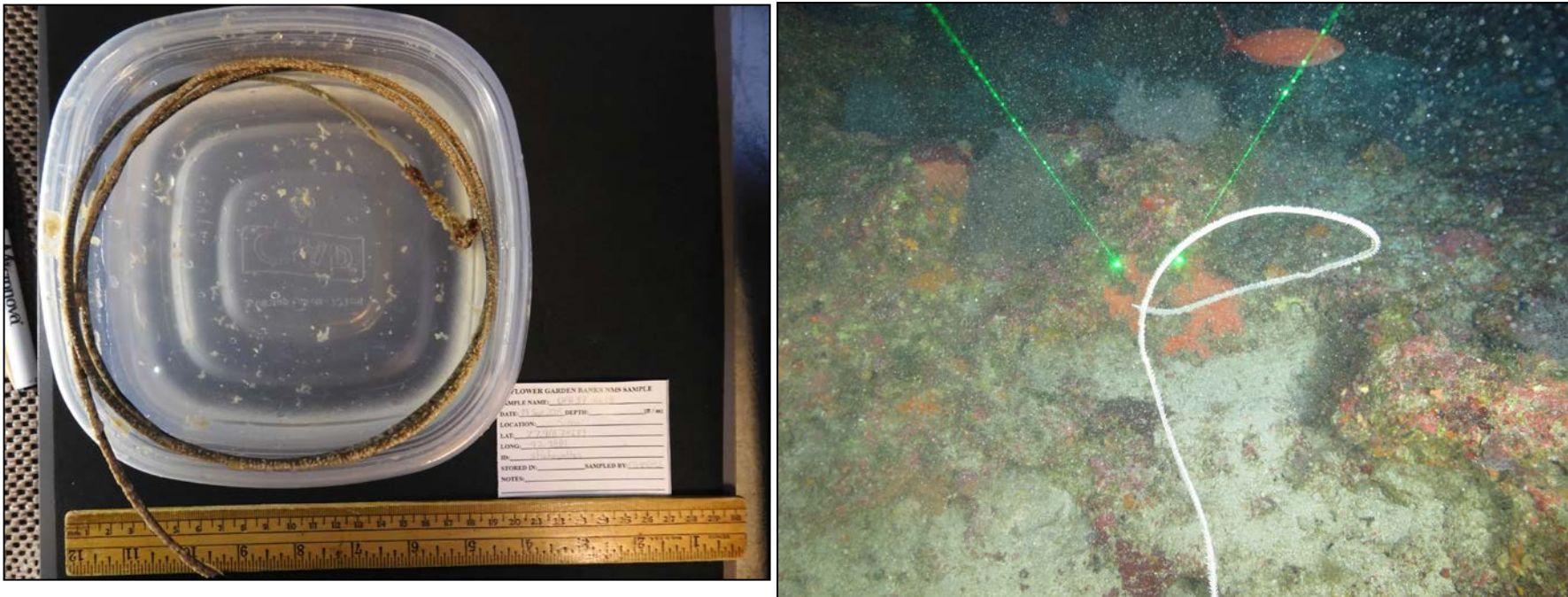
Figure 43. Thick white ropey *Gorgonian* sp. (DFH37-660C) collected from Parker Bank from 125.7 m depth.



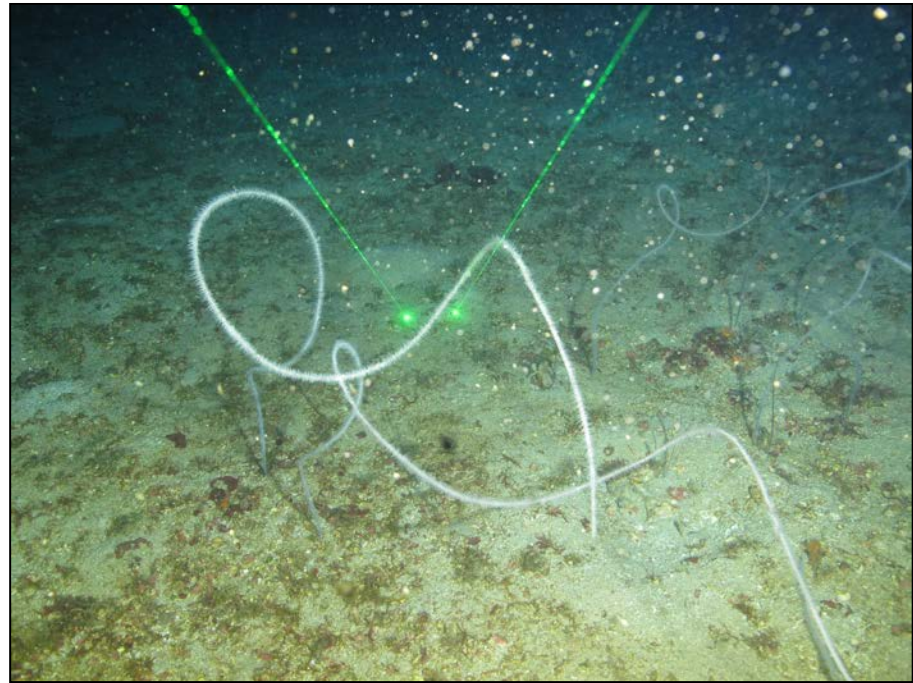
**Figure 44.** *Stichopathes* sp. (DFH37-661D) collected from Parker Bank from 71.2 m depth.



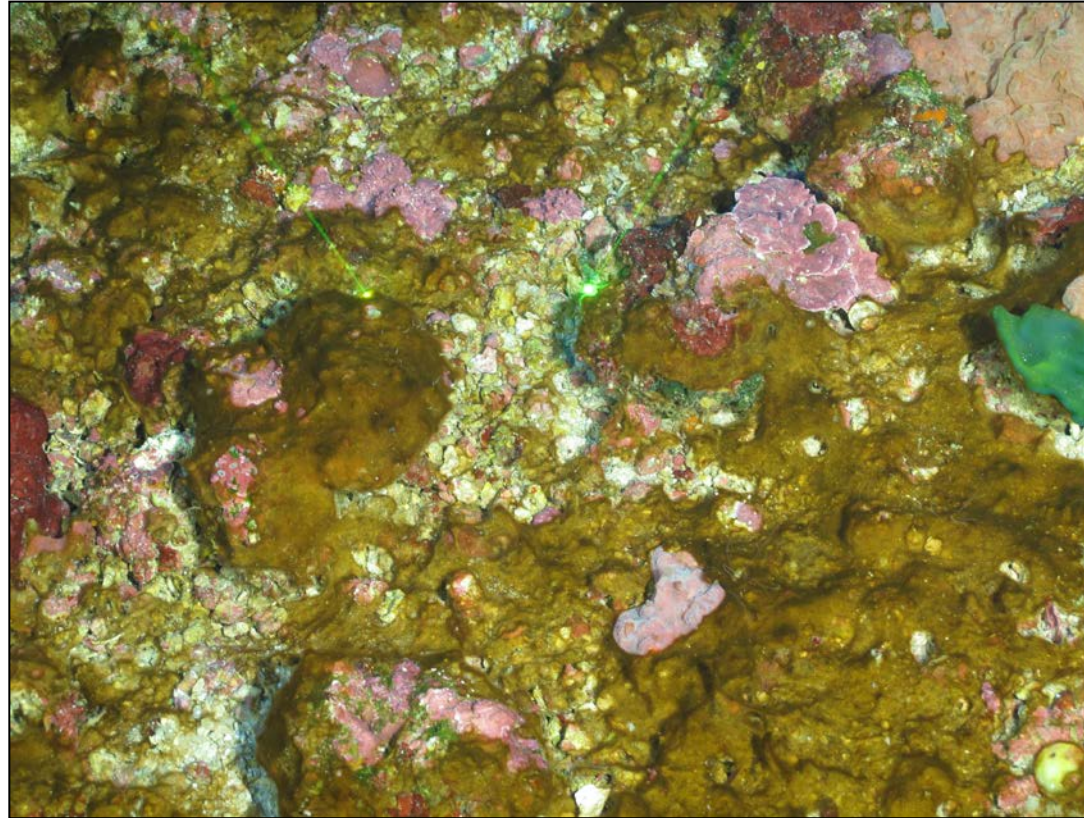
**Figure 45.** Mantis shrimp (DFH37-661E) collected from Parker Bank from 72 m depth.



**Figure 46.** *Stichopathes* sp. (DFH37-662B) collected from Sidner Bank from 82.7 m depth.

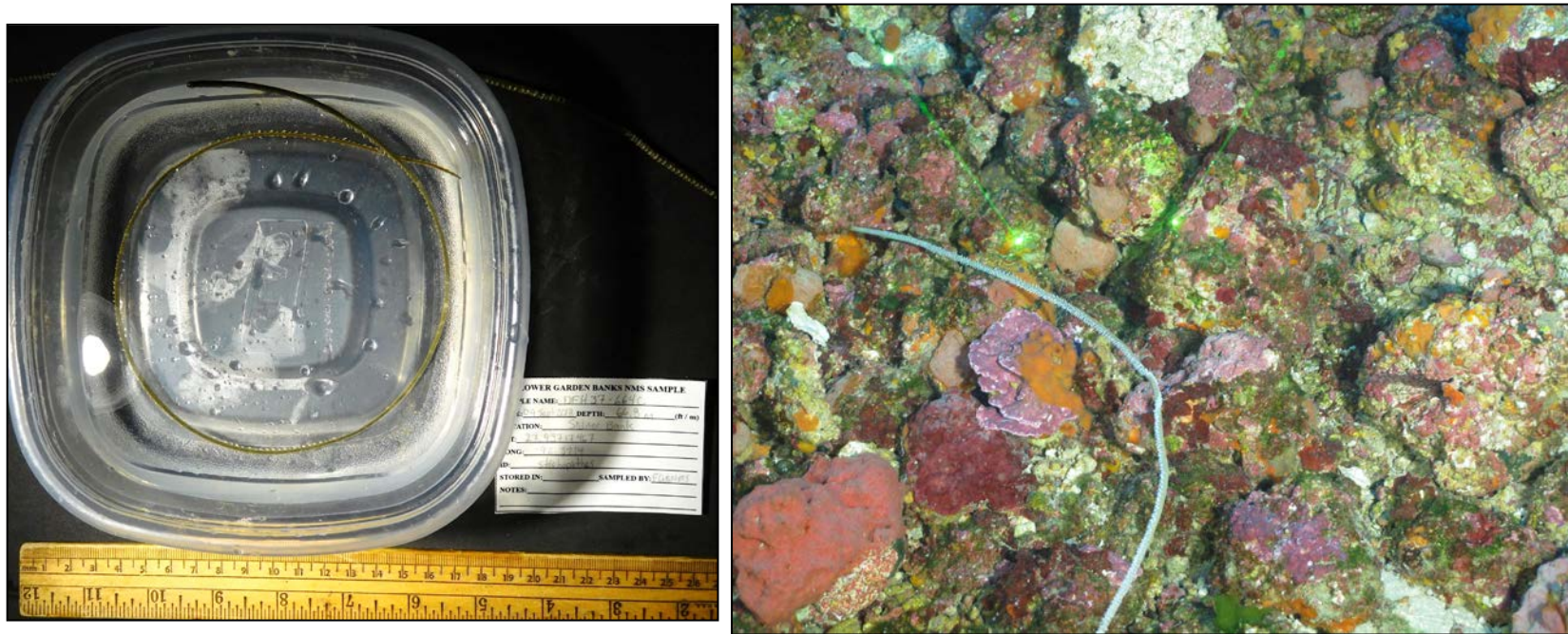


**Figure 47.** *Stichopathes* sp. (DFH37-663A, DFH37-663B) collected from Sidner Bank from 88.1 m depth.



**Figure 48.** Algal nodules with brown cyanobacterial mats (DFH37-664B) collected from Sidner Bank from 69.4 m depth.





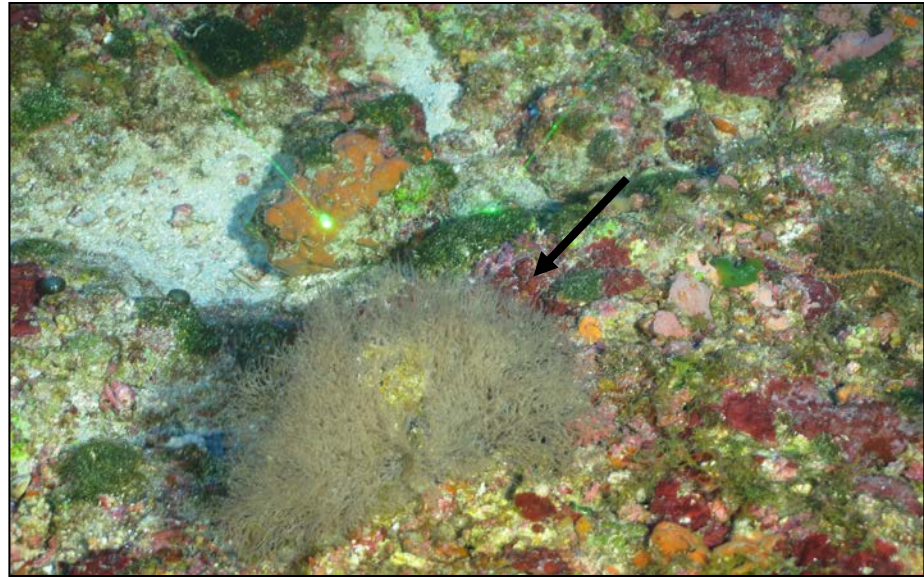
**Figure 49.** *Stichopathes* sp. (DFH37-664C) collected from Sidner Bank from 66.8 m depth.



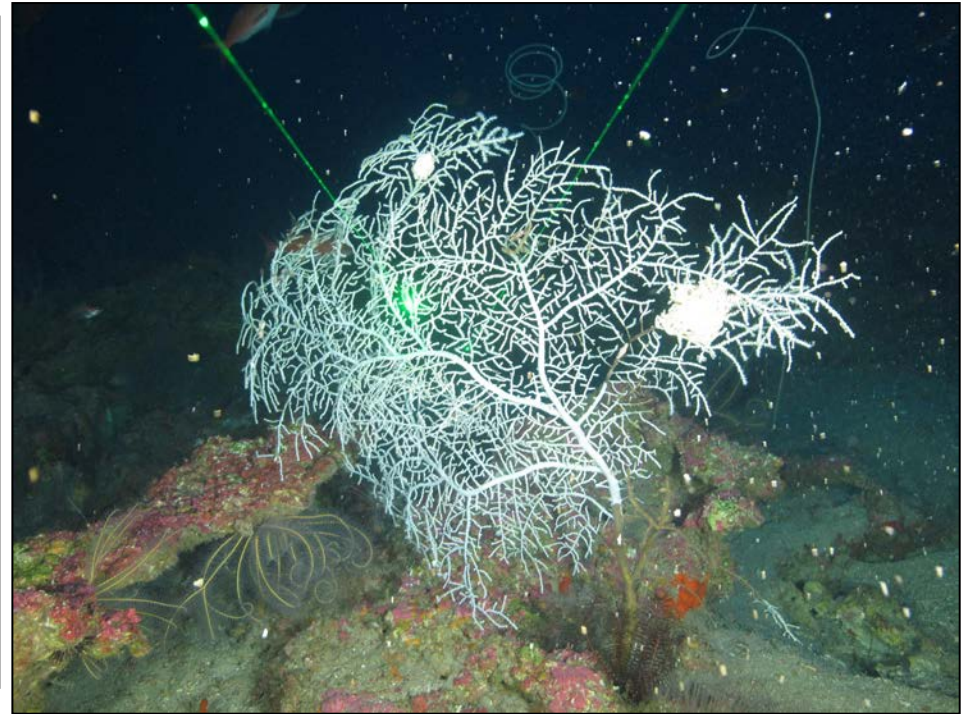
**Figure 50.** *Paramuricea* sp. (DFH37-666A) collected from Rezak Bank from 123.8 m depth.



**Figure 51.** Yellow-green *Elatopathes abietina* (DFH37-666B) collected from Rezak Bank from 123.7 m depth.



**Figure 52.** *Antipathes atlantica/gracilis* (DFH37-668A) collected from Rezak Bank from 66.8 m depth.



**Figure 53.** White '*Hypnorgia*' sp. (DFH37-669A) collected from Rezak Bank from 86 m depth.

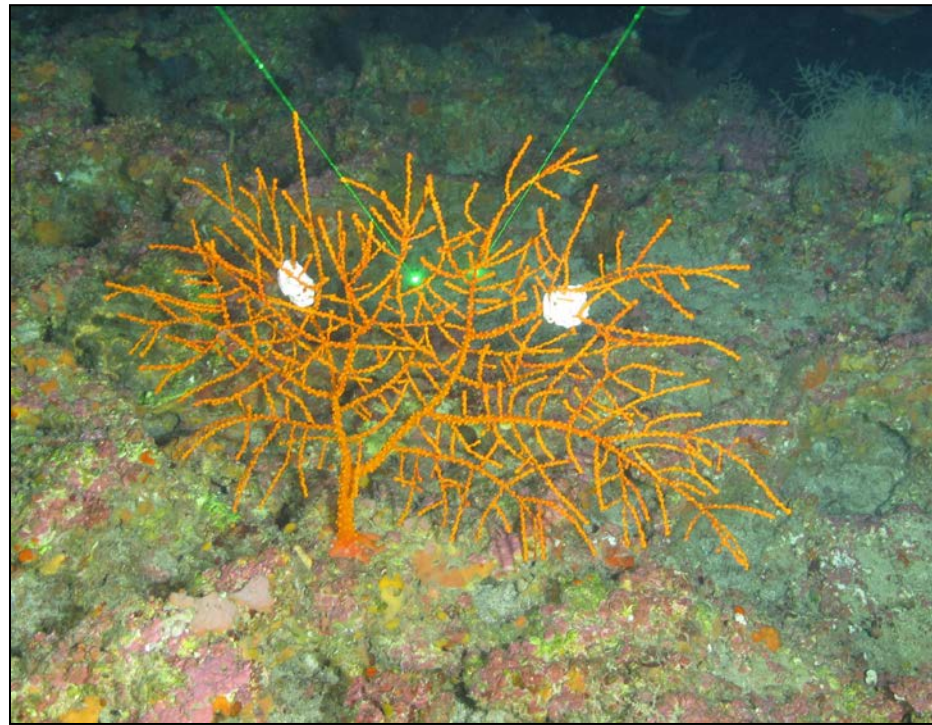


Figure 54. Orange *Gorgonian* sp. (DFH37-669B) collected from Rezak Bank from 86.4 m depth.



**Figure 55.** G04 (DFH37-669C) collected from Rezak Bank from 86.3 m depth.

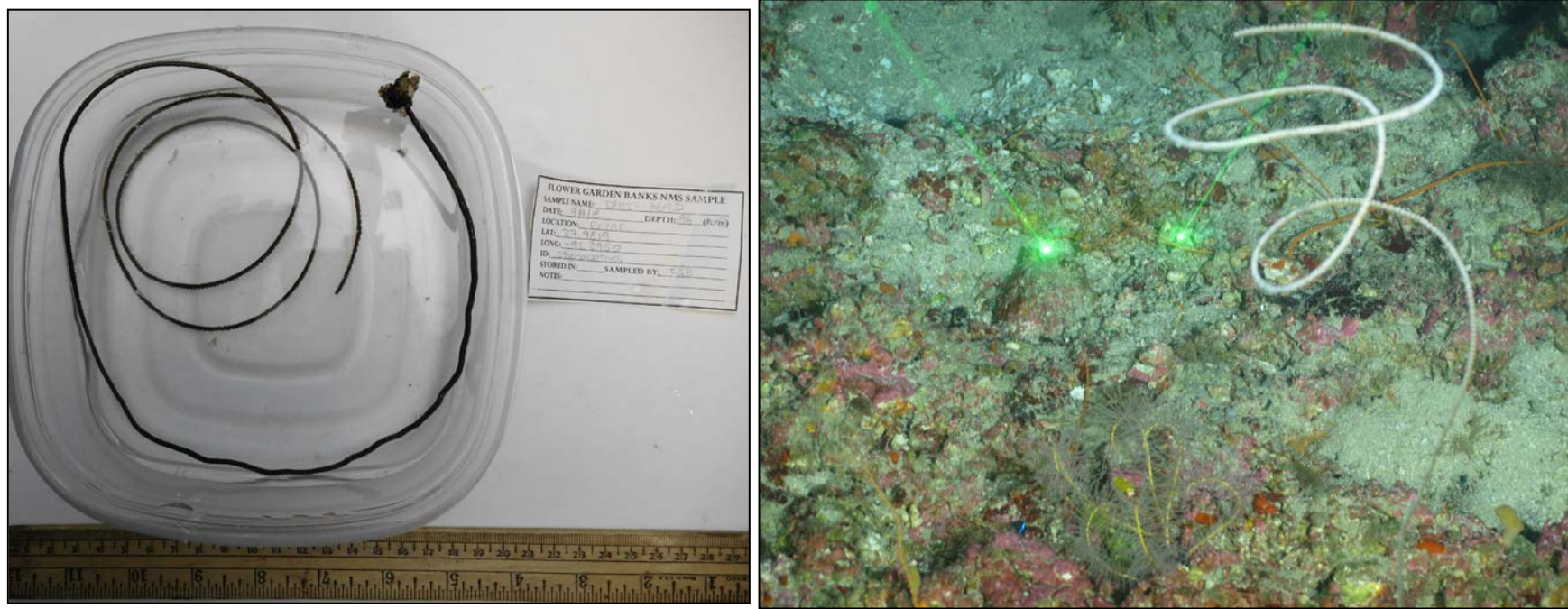
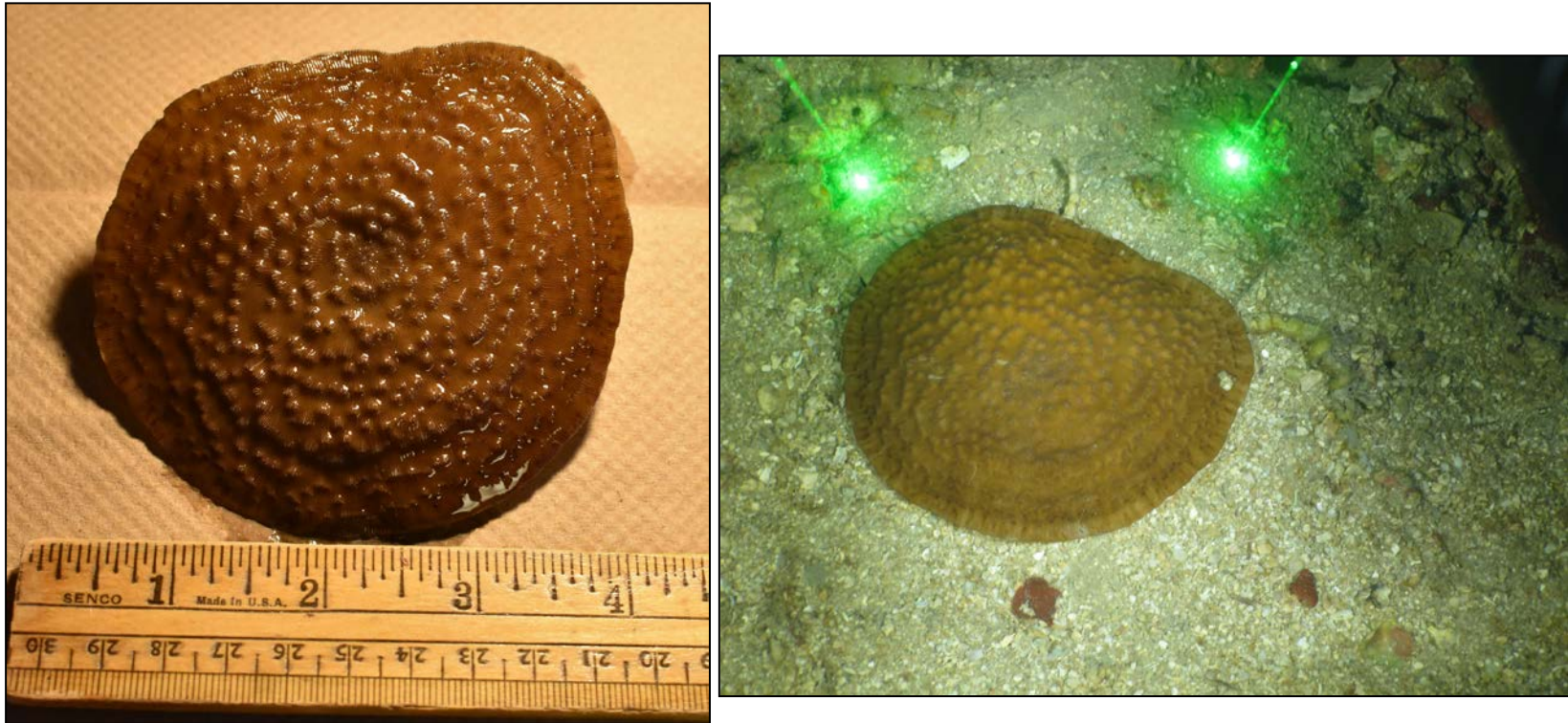


Figure 56. *Stichopathes* sp. (DFH37-669D) collected from Rezak Bank from 86 m depth.





**Figure 57.** *Agaricia* sp. (DFH37-670A) collected from Bouma Bank from 71.9 m depth.

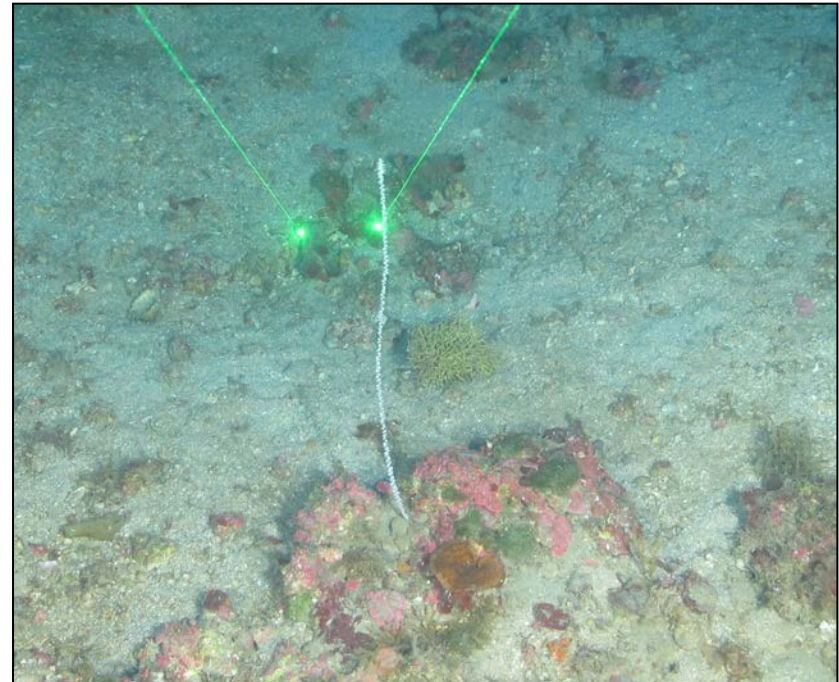
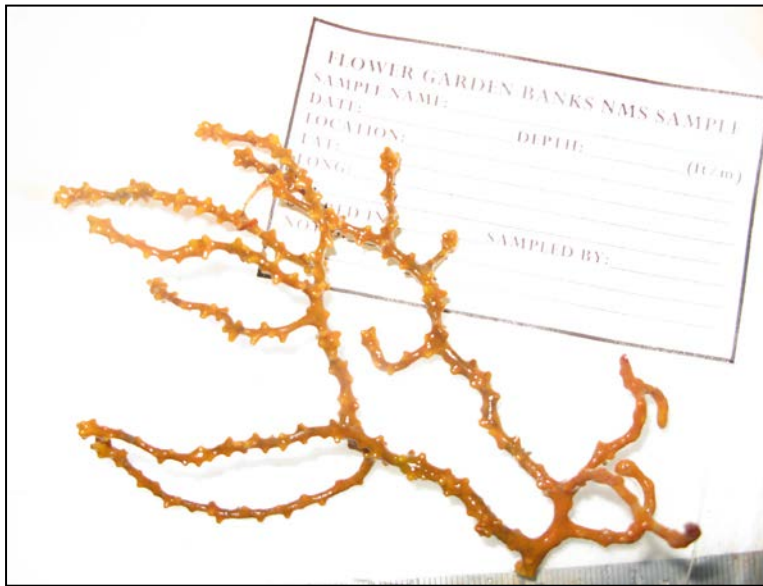


Figure 58. *Stichopathes* sp. (DFH37-670C) collected from Bouma Bank from 71.4 m depth.



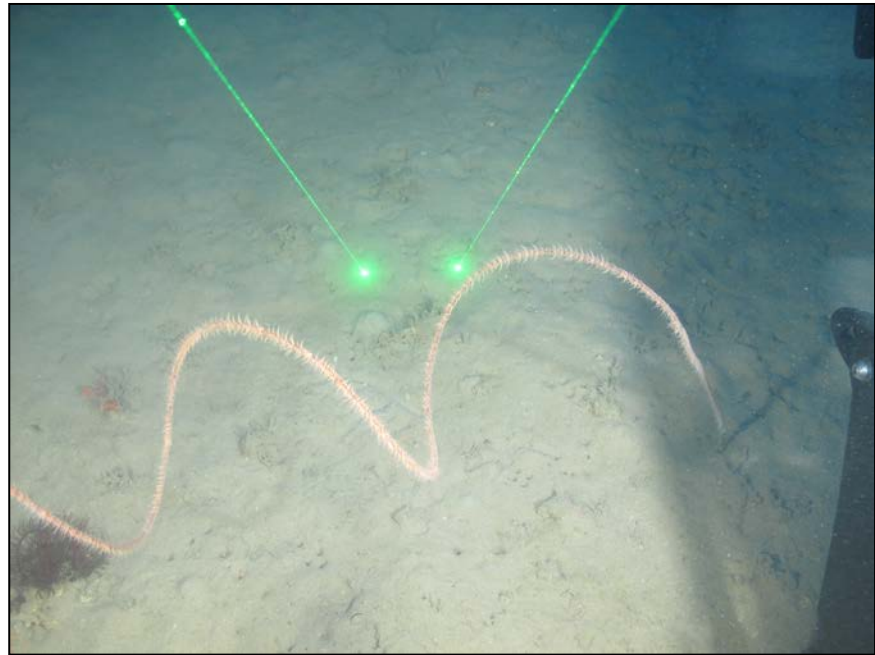
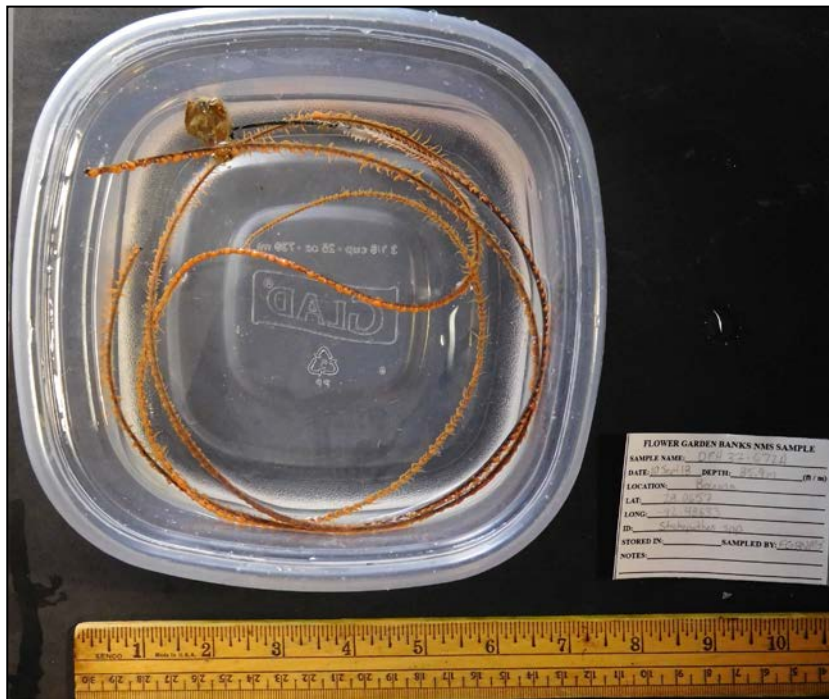
**Figure 59.** *Diodogorgia nodulifera* (DFH37-671B) collected from Bouma Bank from 64.3 m depth.



**Figure 60.** *Stichopathes* sp. (DFH37-671E) collected from Bouma Bank from 61.1 m depth.



**Figure 61.** *Ellisella* sp. (DFH37-671F) collected from Bouma Bank from 64.3 m depth.



**Figure 62.** *Stichopathes* sp. (DFH37-672A) collected from Bouma Bank from 85.9 m depth.

### **Outreach/Education**

FGBNMS hosted a National Oceanic and Atmospheric Administration (NOAA) summer scholar, Grace McDermott, from the University of Maine. Grace participated as a science volunteer on the DFH35 cruise aiding in data recording and ROV launches. Dr. Tom Bright, one of the original oceanographers/biologists to study the northern Gulf of Mexico region and whom Bright Bank was named after, joined the DFH37 cruise.

### **Acknowledgements**

We would like to thank the National Marine Sanctuary Foundation for providing support for the ROV *Mohawk*. Special thanks to the ROV pilots Lance Horn, Jason White, and Eric Glidden, who exhibited meticulous skills in operating the ROV and patience to accommodate our requests. Thanks to DSCRTP for funding, the guidance in developing plans for this cruise, and the onboard assistance. In addition, we thank the crew of the NOAA Ship *R/V Manta* for their hard work and all scientists and volunteers who assisted with operations during the cruise.

### **Disclaimer**

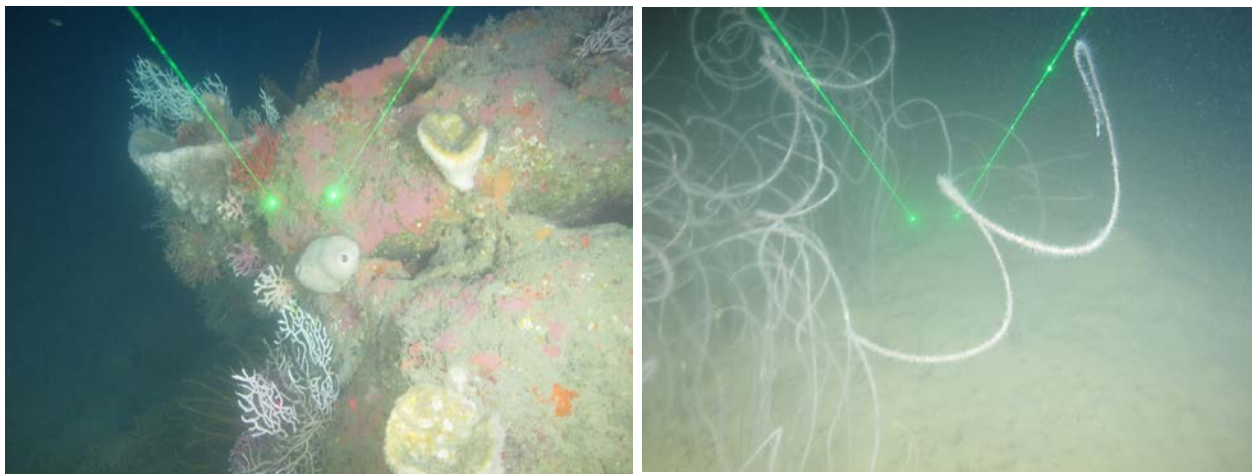
This publication does not constitute an endorsement of any commercial product or intend to be an opinion beyond scientific or other results obtained by NOAA. No reference shall be made to NOAA, or this publication furnished by NOAA, to any advertising or sales promotion which would indicate or imply that NOAA recommends or endorses any proprietary product mentioned herein, or which has as its purpose and interest to cause the advertised product to be used or purchased because of this publication.

## Appendix 1: Dive site summaries

### **Alderdice Bank**

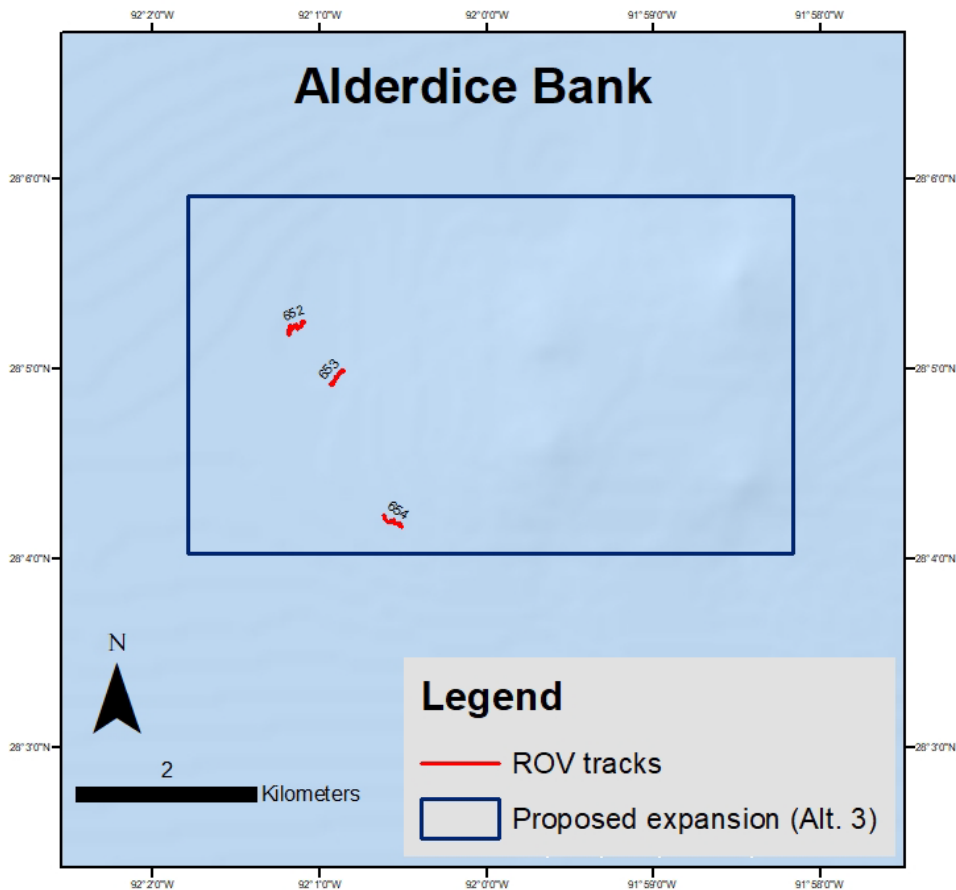
Three dives (652 – 654) were conducted at Alderdice Bank on September 7, 2018, completing five transects that amounted to 500 m of seafloor coverage and totaled 3.6 hours underwater. The initial dive landed on soft bottom featuring *Stichopathes* sp. at 88.7 m water depth. A five minute transect was completed near the landing site that featured hard bottom with isolated rubble patches and a fine silt layer. Few animal species were recorded during the transect, though *Stichopathes* sp. were noted. Following the transect, the ROV experienced poor visibility due to suspended sediments in the water column. Additionally, computer issues were encountered with the new government computer and serial USB drivers being used. In the first dive, a *Stichopathes* sp. was sampled off a silt-covered rocky substrate. The next dive landed on rubble bottom featuring isolated outcroppings and basalt. More animal species were noted on this transect featuring several encrusting sponges, *Swiftia* sp., *Stichopathes* sp., *Caliacis* sp., *Madrepora carolina*, black coral sea fans, and crinoids. The final dive landed among soft bottom, small outcroppings, and rubble. Bioturbation was noted during the first transect location. Similar animal species were seen at this location including *Stichopathes* sp., ‘*Hypnogorgia*’ sp., *Ellisella* sp., *Tanacetipathes* sp., solitary cup corals, encrusting sponges, and basket stars. Scientists noted that multiple Lionfish (*Pterois volitans*) were seen during this final dive.

Several fish species were recorded on the dives at Alderdice Bank, including Sharpnose puffer (*Canthigaster rostrata*), Threadnose bass (*Choranthias tenuis*), Lionfish (*P. volitans*), Spanish flag (*Gonioplectrus hispanus*), Jack-knife fish (*Equetus lanceolatus*), and Hunchback scorpionfish (*Scorpaena dispar*).



Assortment of *Nicella* sp., sponges, and encrusting sponges (left, Dive 653). Dense assemblage of *Stichopathes* sp. (right, Dive 654).





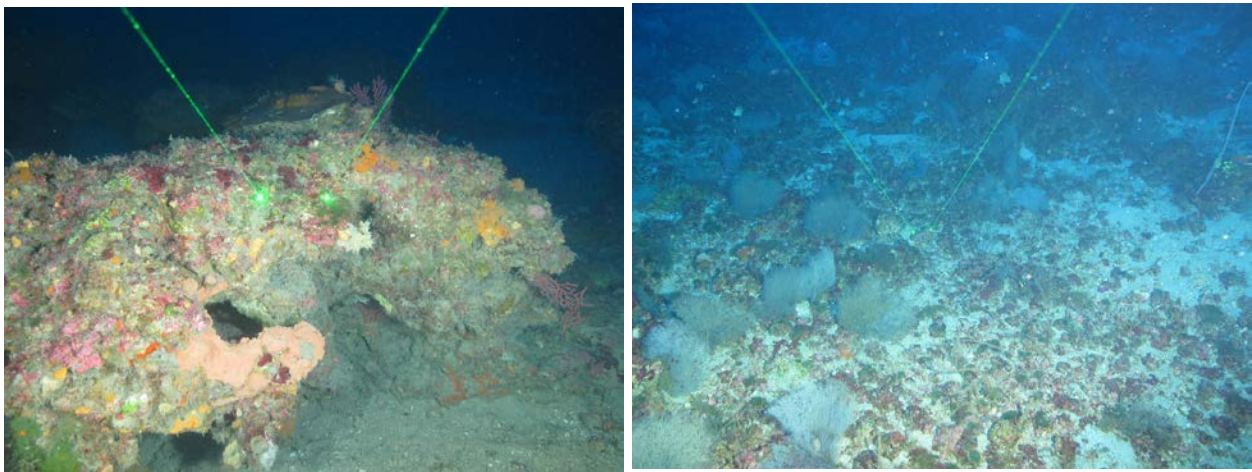
Map showing dive tracks for three ROV dives at Alderdice Bank.

### Bouma Bank

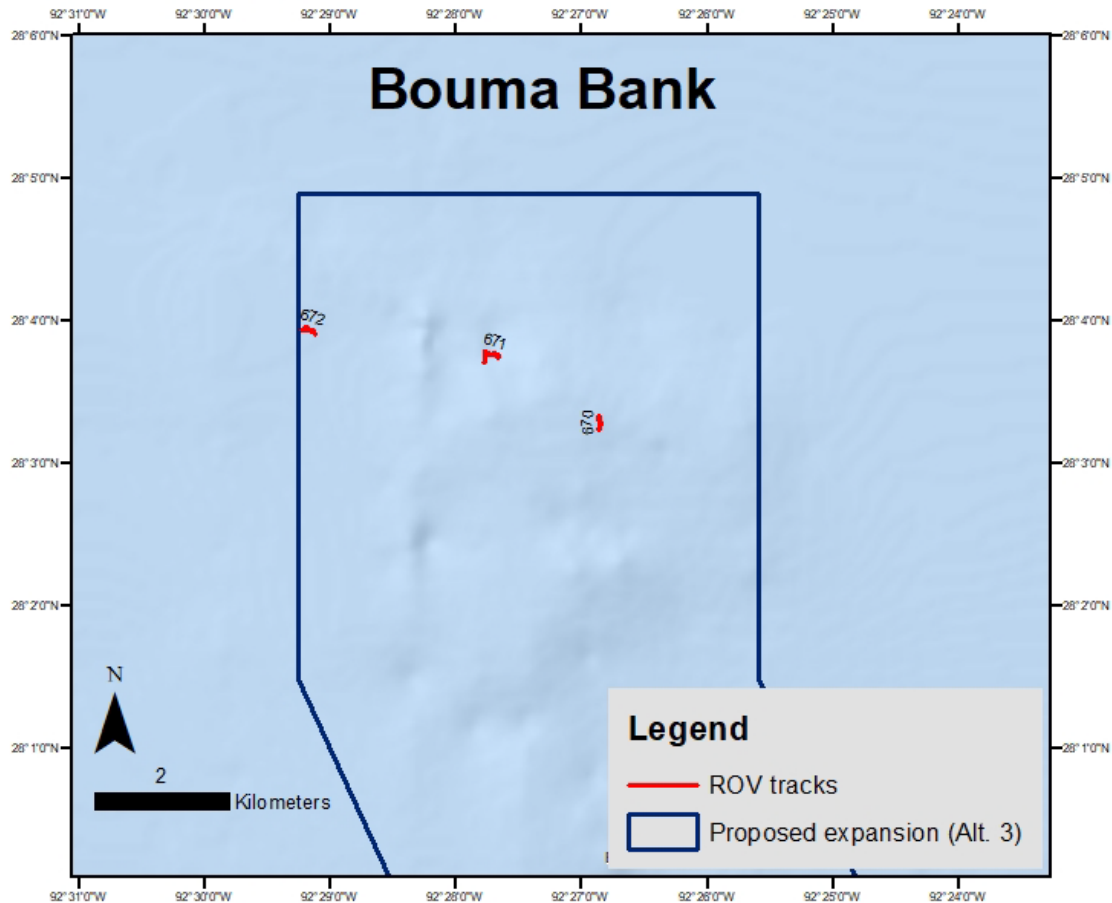
Three dives (670 – 672) were completed at Bouma Bank on September 10, 2018, completing six transects for a total of 600 m of seafloor coverage and 3.45 hours of bottom time. The first dive was characterized by 0.5 – 1.0 m high outcropping of highly eroded carbonate rock that was heavily covered in encrusting sponges and surrounded by large sand patches in approximately 71 m water depth. Multiple *Agaricia* sp. and *Theresa rubra* were seen along the two transects completed at this bank, as well as areas with algae species, peysonnelia and cladophorphisi. Three samples were taken during this dive which included an *Agaricia* sp., algal nodule/benthic debris, and a *Stichopathes* sp. The second dive landed among algal nodules and comprised of dense black coral sea fans, low relief crustose coralline algae (CCA) reefs, and nodules. Additional animal species noted during the dive were *Ellisella* sp., *Stichopathes* sp., *Batrioclada* sp., *Antipathes* sp., ‘Hypnogorgia’, *Tanacetipathes* sp., and *Diodogorgia* sp. A few species of sponge were noted along the transects during the second dive, including *Ircinia* sp., *Neofibulara* sp., and *Xestospongia*. Five samples were collected during this dive – *Stichopathes* sp.; possible *Neofibulara* sponge with algae and CCA growth; two samples of possible *Diodogorgia nodulifera* with one that had peysonnelia and other algae attached; and a large algal nodule with

red, green, and brown algae attached. The final dive landed on soft, flat bottom with isolated rubble beneath a layer of silt and crinoids. A single transect was completed that noted *Stichopathes* sp., orange sponges, and a silted gorgonian. No fish were observed during this dive.

Fish species were noted during the first two dives at Bouma Bank spanning 27 species, representing 13 families. Of note, there were three species of butterflyfish including Longsnout (*Prognathodes aculeatus*), Reef (*Chaetodon sedentarius*), and Spotfin (*Chaetodon ocellatus*). Additionally, there were four species of Angelfish recorded – French (*Pomacanthus paru*), Blue (*Holacanthus bermudensis*), Queen (*Holacanthus ciliaris*), and Rocky Beauty (*Holacanthus tricolor*) – as well as, a pygmy angelfish species, Cherubfish (*Centropyge argi*). Commercially important species, Red snapper (*Lutjanus campechanus*), were also seen during the dives. Finally, the invasive species Lionfish (*P. volitans*) were recorded several times during the dives.



Array of encrusting sponges, *Thesea rubra*, and algae (left, Dive 670). Abundance of black coral sea fans, algae, and a *Stichopathes* sp. (right, Dive 671).



Map showing dive tracks for three ROV dives at Bouma Bank.

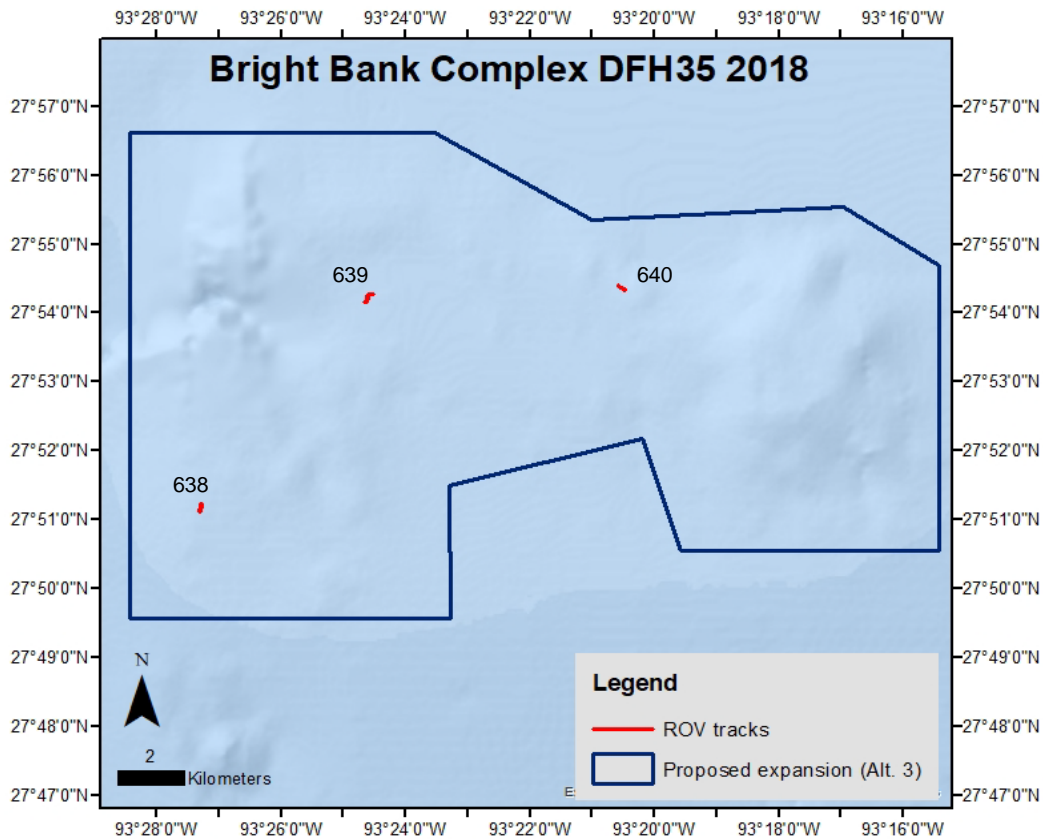
### Bright Bank Complex

Three dives (638 – 640) were conducted at the Bright Bank Complex in which six transects were completed for a total of 3.3 h underwater. The first dive landed on fine, soft bottom with scattered rubble and eroded outcroppings. Two transects were conducted that noted an abundance of *Elatopathes abietina* and *Nicella* sp. Many *Stichopathes* sp., black coral sea fans, and yellow gorgonians were also recorded during the two transects. Two samples were removed which included an *Ellisella* sp. and brittle stars. Dive 2 arrived on soft bottom with scattered rubble and eroded outcroppings. Two transects were completed that noted many sea whips, encrusting sponges, *E. abietina*, and yellow gorgonians. Few branching stony corals and basket stars were seen during the second transect. One sample was taken of a *Stichopathes* sp. from 107 m. The final dive was in approximately 90 m water depth and landed on a high relief outcropping marked by an abundance of corals. Two transects were completed during this dive which noted an abundance of sea whips, *Tanacetipathes* sp., and *Nicella* sp. on the first transect. During the second transect, many *E. abietina*, *Tanacetipathes* sp., and *A. pedata* were seen. Encrusting sponges were noted as being present in both transects. Seven samples were collected during the final dive which included three specimens of *Stichopathes* sp., a *Scleracis* sp., *Thesa rubra*, *Nicella* sp., and Hypnogoria that may be *Scleracis guadalupensis*.

Twenty-three species of fish, across 11 families, were recorded during the ROV transects at the Bright Bank Complex. The most frequently encountered species were Roughtongue bass (*Pronotogrammus martinicensis*), Wrasse basslet (*Liopropoma eukrines*), and Threadnose bass (*Choranthias tenuis*), respectively.



*E. abietina*, *Nicella* sp., Pleurotomariidae, and sea star (top, Dive 638) amongst eroded outcroppings. Crinoids with basket stars on a *Muriceides* sp. cf. *furta* (bottom, Dive 639), *E. abietina*, and Roughtongue bass.



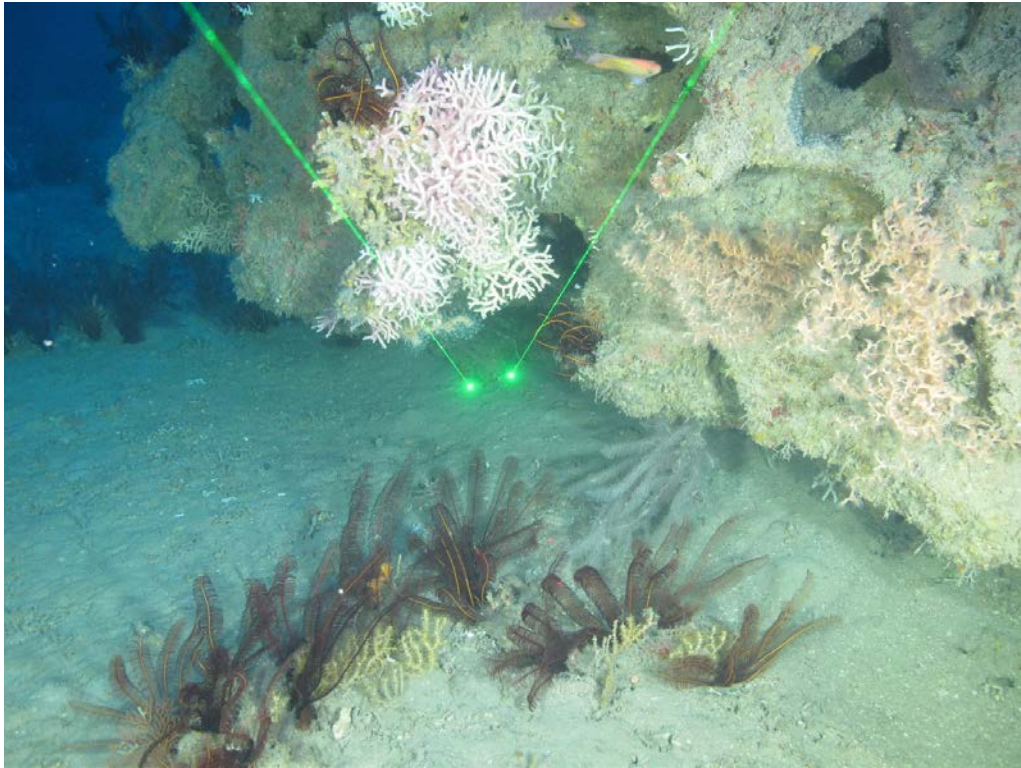
Map showing dive tracks of three ROV dives at Bright Bank Complex.

### East Flower Garden Bank

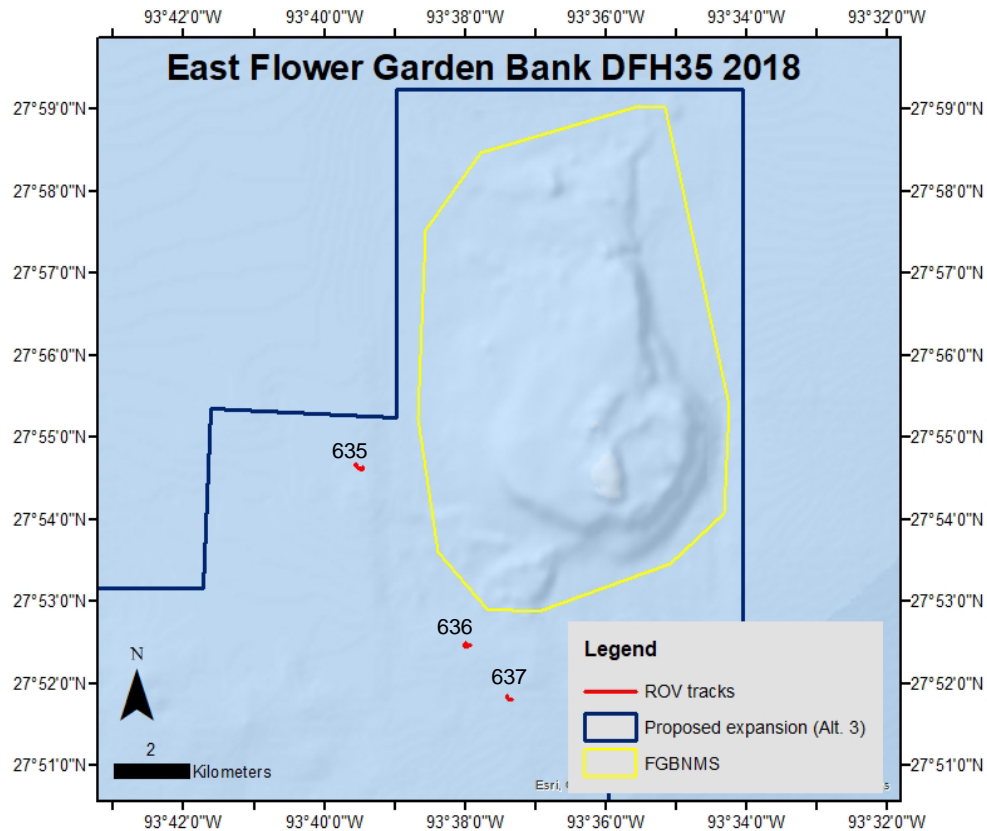
Three dives (635 – 637) and six transects were completed at East Flower Garden Bank July 25, 2018 with total time spent underwater of approximately 3 h. The first dive reached the sea floor in 102 m water depth on soft bottom featuring isolated, eroded outcroppings. Two transects occurred that recorded an abundance of *E. abietina* and crinoids on the first and second transect, respectively. Many *Tanacetipathes* sp. and *Stichopathes* sp. were seen during both transects. Several large shrubs of *Tanacetipathes* sp. were noted during the second transect. Four samples were collected – pink zoanthid, *Stichopathes* sp., *E. abietina*, and a potential *Scleracis* sp. Dive 2 landed on silty bottom marked by high relief outcroppings, and high density of black corals (*A. pedata* and *Tanacetipathes* sp.). Two transects were completed during this dive that recorded many *E. abietina*, crinoids, black coral sea fans, and encrusting sponges. Few *Rhizaxinella clava*, *Oxysmilia rotundifolia*, and *Madrepora carolina* were noted along both transects. Two collections of *Stichopathes* sp. were made during this dive. The ROV landed on soft bottom scattered with highly eroded outcroppings on dive 3. Two transects were conducted that noted many *E. abietina* and black coral sea fans. Additionally, a few *Madrepora carolina*, lithistid sponges, sea whips, *Scleracis* sp., and *Nicella* sp. were seen during the transects.

Along the transects at East Flower Garden Bank, 14 species of fish, spanning 7 families, were recorded. The predominant species noted was roughtongue bass (*Pronotoqrammus*

*martinicensis*). However, species of particular interest that were recorded were the invasive lionfish (*P. volitans*), and commercially important Red snapper (*Lutjanus campechanus*) and Vermillion snapper (*Rhomboplites aurorubens*).



Crinoids, *Nicella* sp., Roughtongue bass, *E. abietina*, and S02 (Dive 635) on an eroded outcropping.



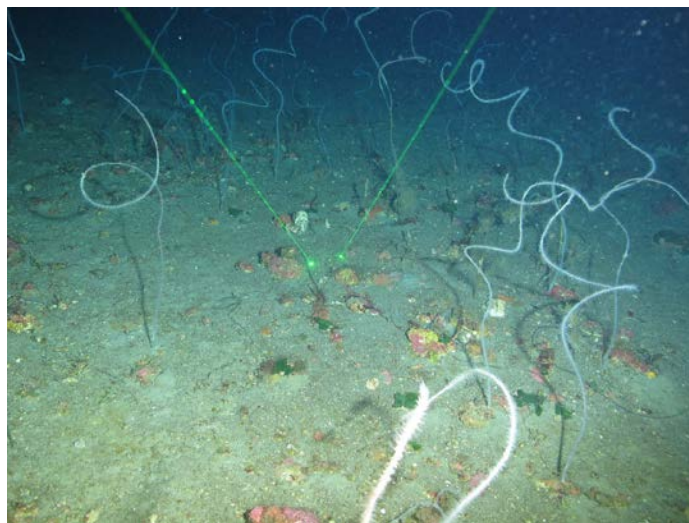
Map showing dive tracks of three ROV dives at East Flower Garden Bank.

### Elvers Bank

Four dives (627, 629 – 631) were completed at Elvers Bank in which five transects, equivalent to approximately 500 m of linear bottom coverage, were conducted in total on July 22, 2018 and July 24, 2019. Dive 1 landed on bottom that featured low relief outcroppings with a high density of octocorals and black corals. Of note, egg casings on *Callogorgia* sp. were seen. Two five-minute transects were completed which highlighted many *Nicella* sp., *E. abietina*, black coral sea fans, and *Paramuricea*. A few sea whips, *C. gracilis*, yellow branching gorgonians, stony corals, and crinoids were also noted. An attempt was made to collect a sample during this dive; however, issues with the manipulator were encountered. The ROV was launched for a second dive, but was recovered shortly after being dispatched as it drifted offsite. The third dive landed on fine, soft sediment marked by pits and burrows, an abundance of *Democrinus brevis* and sea pens. No transects were completed this dive as there were issues maintaining a position on site. Dive 4 landed on silty, soft bottom characterized by an abundance of sea pens and featured a mud volcano. A single transect was completed during this dive but did not record many biological features. No manipulator was available on the ROV during this dive and there was a strong current causing the ROV to drift southeast during descent. No dives were conducted on July 23, 2018 due to inclement weather; therefore, the final dive was completed at Elvers bank on July 24, 2018. This dive landed on soft bottom featuring rubble, Sand tilefish (*Malacanthus plumieri*) mounds, and patches of coarse sand. Three transects were attempted this dive, but only two were completed, as the ROV was being pulled off the first transect due to strong bottom

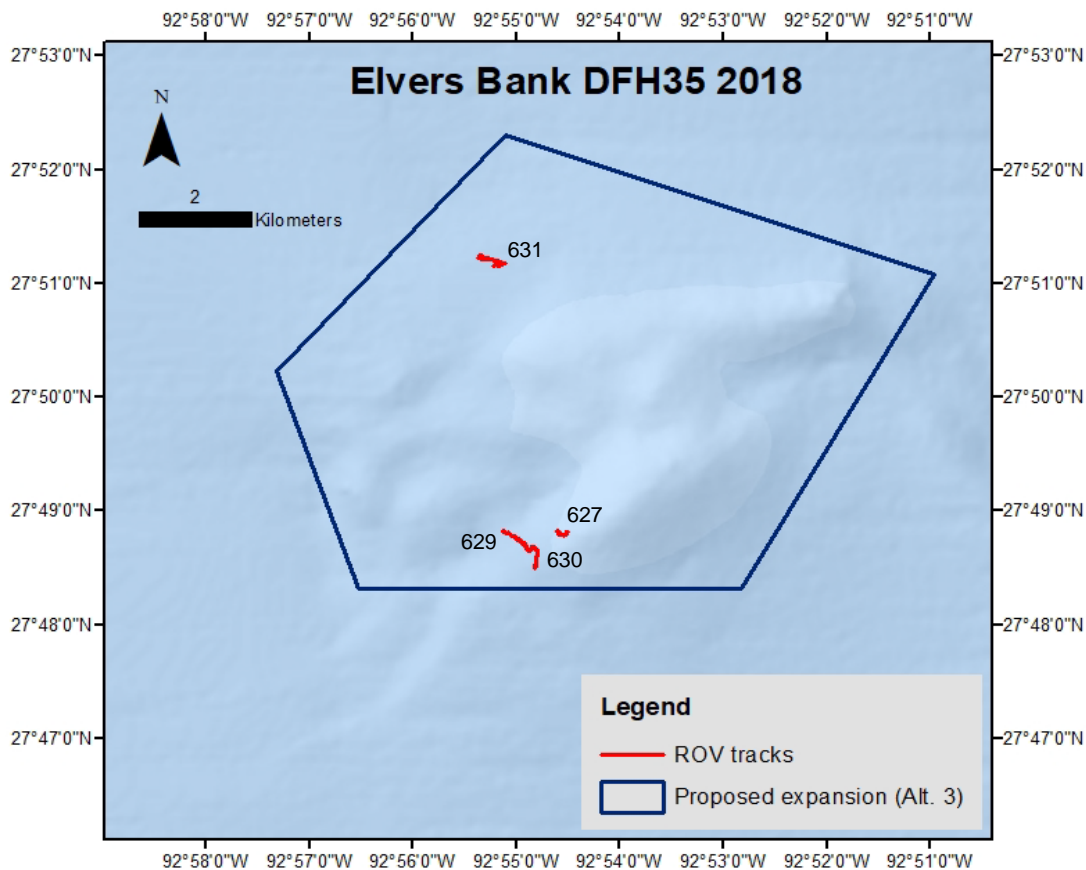
currents. The transects were marked by an abundance of *Stichopathes* sp., with many *Titanophota incrustans* on the second transect and *Swiftia* sp. fields noted during the third transect. Both transects noted encrusting sponges and a variety of algal species. Four collections were made during the final dive at Elvers bank, including a *Swiftia* sp., brown branched algae, and two *Stichopathes* sp.

During the five completed transects, thirteen species of fish comprising eight families were recorded. The most frequently recorded species seen were Sharpnose puffer (*Canthigaster rostrate*), lionfish (*P. volitans*), and Roughtongue bass (*Pronotogrammus martinicensis*), respectively. Several serranid species were noted including Roughtongue bass (*P. martinicensis*), Saddle bass (*Serranus notospilus*), Tattler (*Serranus phoebe*), and Threadnose bass (*Choranthias tenuis*). Two Marbled grouper (*Dermatolepis inermis*) were also noted during the final dive in 99 m water depth.



*Swiftia* sp. (top) and many *Stichopathes* sp. (bottom) on the seafloor (Dive 631).



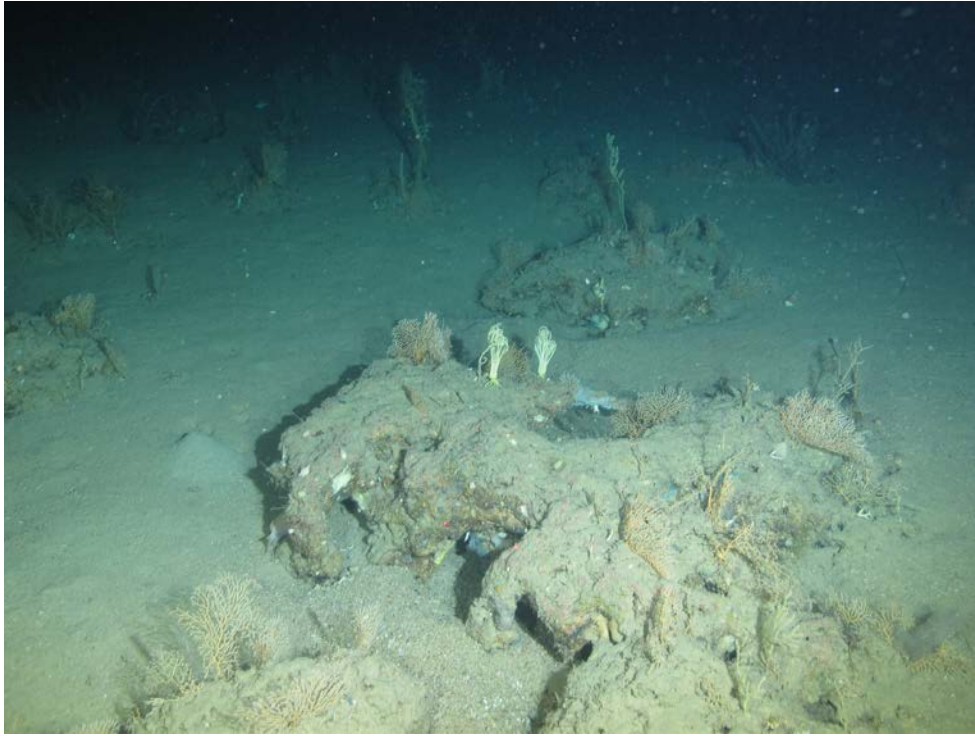


Map showing dive tracks of three ROV dives conducted at Elvers Bank.

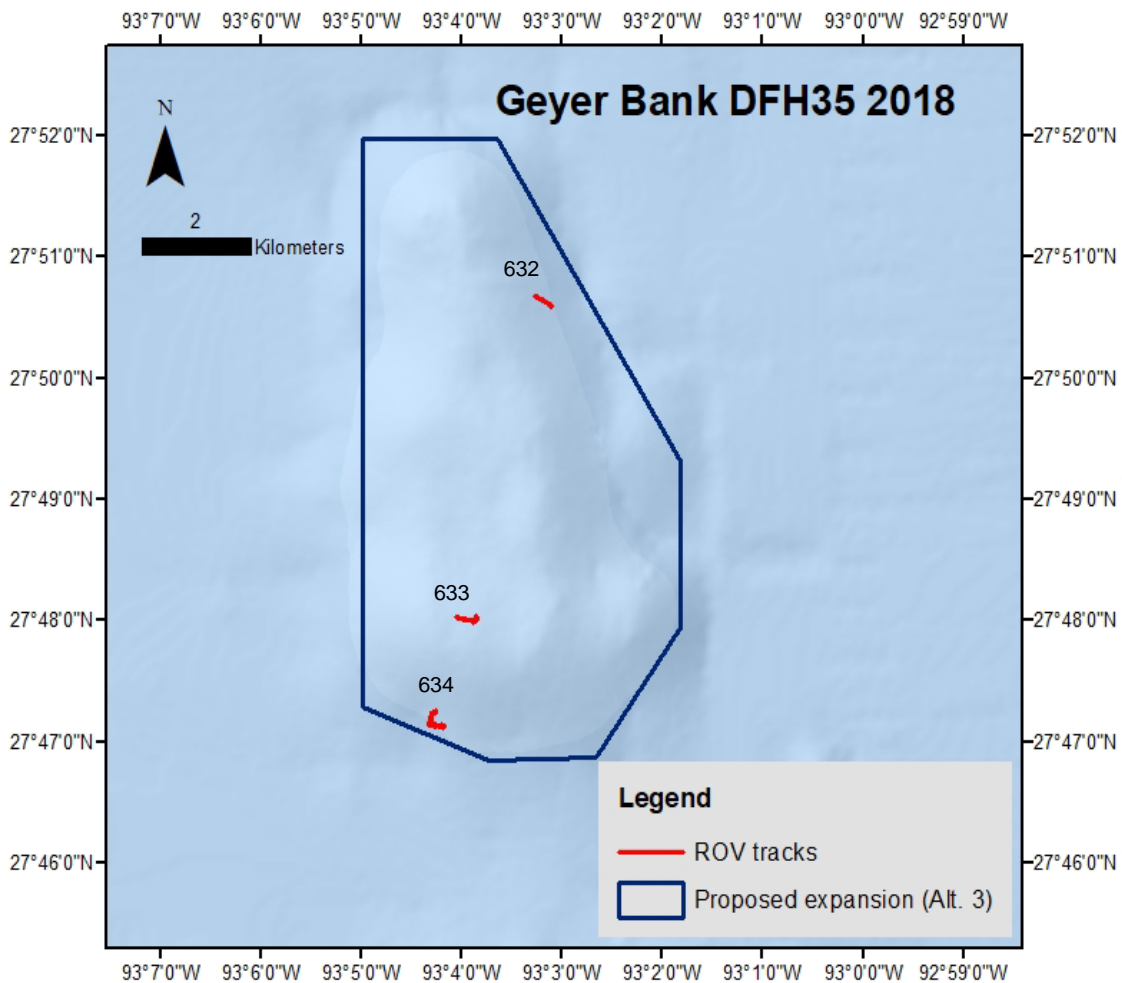
### Geyer Bank

Three dives (632 – 634) were conducted at Geyer Bank July 24-25, 2018, completing six transects for a total bottom time of 4.3 h. The first dive landed on soft bottom with scattered small patch reefs and many *Nicella* sp. and branching stony corals. One transect was completed during this dive but had minimal biological activity. Dive 2 was located in a historic catch location for marbled grouper (*D. inermis*) and landed on sea bottom characterized with a high density of algae and coralline algae reefs. Two transects were completed during this dive that recorded an abundance of encrusting sponges, CCA, and algal species. Additionally, many *Agelas clathrodes* were noted. One sample was taken during this dive of a potential *Plumapathes* sp. The final dive landed on bottom in 129 m water depth among soft bottom with algal nodules, rubble, and an abundance of *Ellisella* sp. The first transect was started; however, was interrupted and had to be stopped. In total, three transects were completed that totaled approximately 300 m of linear distance of sea bottom and encountered many *Acanthopathes thoides*, *E. abietina*, black coral sea fans, and Paramuricea. Of note, some *Henricia sexradiata* were noted, as well as, slit shells. A sample was taken of a potential *Scleracis* sp. and a light yellow gorgonian from 140 and 145 m water depth, respectively.

During the transects, 34 species of fish representing 15 families were recorded. The most frequently seen species was Roughtongue bass (*P. martinicensis*), Bigeye (*Priacanthus arenatus*), and Squirrelfish (*Holocentrus adscensionis*), respectively. Unique to the final dive, was the siting of a Spotted moray (*Gymnothorax moringa*) estimated to be greater than 35 cm in length.



*Nicella* sp., crinoids, and yellow gorgonian on low relief patch reefs (Dive 632).



Map showing dive tracks for three ROV dives at Geyer Bank.

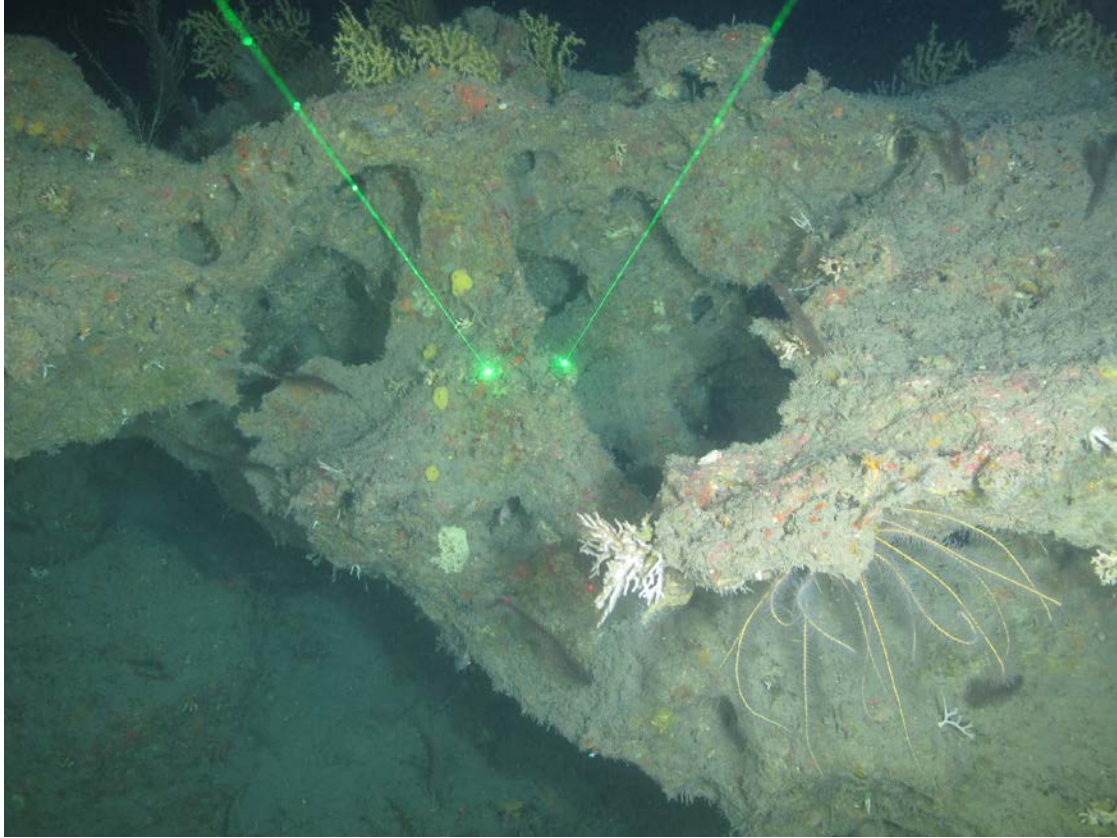
### Parker Bank

Seven dives (655 – 661) were completed at Parker Bank September 7 – 8, 2019 in which 16 transects were conducted, capturing 1.6 km of seafloor and 9.3 hours of video underwater. The dives ranged in depth from approximately 62 m to 142 m. Dive 1 landed on soft bottom with low relief rubble and 2 m relief outcroppings that were marked by dense populations of octocorals and black corals. Animal species noted in abundance during the transects included *Tanacetipathes* sp., *E. abietina*, *Nicella* sp., ‘Hypnogorgia’, *A. pedate*, and *C. gracilis*. Dive 2 landed on soft bottom with isolated outcroppings moderately covered with dense populations of octocorals and black coral species. The two transects completed during this dive noted few Sea whips, *Ellisella* sp., *A. pedata*, brittle stars, and *Scleracis* sp. Additionally many *Nicella* sp., *Tanacetipathes* sp., and *E. abietina* were seen. A purple and yellow Paramuricea was sampled during this dive. The third dive landed on soft bottom characterized by small rubble and eroded outcroppings with evidence of bioturbation. Several grouper and scamp were sighted during this dive. Many sea whips, *Stichopathes* sp., *Nicella* sp., *Antipathes furcata*, and hydroids were noted during the transects. Nine samples were taken during this dive including a yellow *Stichopathes*

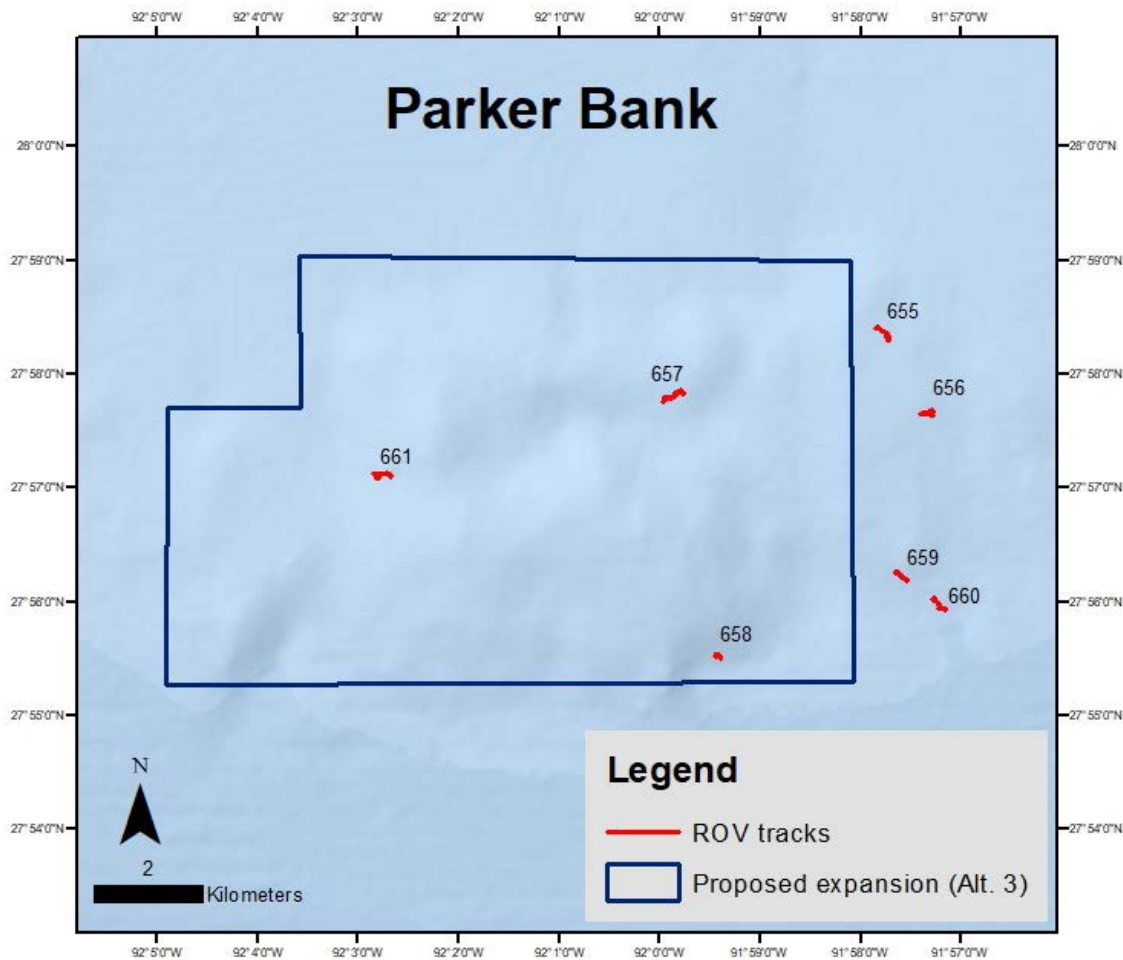
sp., *Simnialena uniplicata*, white *Callogorgia* sp., two pink *Callogorgia* sp., *Verdigellas* green algae, red peyssonnelia, a large rock with algae, and red octocoral.

Dive 4 was characterized by an abundance of black corals and black coral sea fans amongst a soft, silty bottom topography with moderate relief, rubble, and outcroppings. An abundance of *Nicella* sp. and crinoids were recorded along with a few sponges, solitary cup coral, and *E. abietina*. Additionally, it was noted that long rope and/or cable debris was found on the bank at a depth of approximately 121 m. The fifth dive landed in an area marked by isolated high relief outcroppings with dense corals and silted rubble. Sightings of few *C. gracilis*, *Tanacetipathes* sp., *A. furcate*, *E. abietina*, black coral sea fans, solitary cup coral, and orange encrusting sponge were noted. Dive 6 was highlighted by a sea bottom of high relief outcroppings densely covered with sea fans, white gorgonians, and black cup corals that were surrounded by silted algal nodule fields. Many *Nicella* sp., *Ellisella* sp., *Acanthopathes thyoides*, *Acanthopathes expansa*, and crinoids were recorded. An abundance of colonial black cup coral and white gorgonians were also noted during this dive. Three samples were collected during this dive of a 'Hypnogorgia' and two white gorgonians. The final dive at Parker landed on a CCA reef with algal nodule fields and sand patches. An abundance of sea whips, Dictyota, and black coral sea fans were noted during the two transects completed during this dive. Few sightings of *Plumapathes pennacea*, *C. gracilis*, *Ageles clathroides*, and orange encrusting sponge were encountered. Five samples were collected during this dive including a sample of CCA with coral rubble and sand, a small and large algal nodule, an algal nodule with CCA and green algae, *Stichopathes* sp., and a Mantis shrimp. Scamp (*Mycteroperca phenax*) were seen when entering the water in approximately 73 m water depth.

Among seven dives, 33 species of fish comprising 14 families were recorded. Several large fish species were noted including Great barracuda (*Sphyraena barracuda*), Yellowmouth grouper (*Mycteroperca interstitialis*), Yellowedge grouper (*Hyporthodus flavolimbatus*), Red snapper (*L. campechanus*), Greater amberjack (*Seriola dumerili*). The invasive lionfish (*P. volitans*) was also seen during the dives. There were two species of soldierfish noted, Bigeye (*Ostichthys trachypoma*) and Spinycheek (*Corniger spinosus*). Additionally, a Sandbar shark (*Carcharhinus plumbeus*) was seen during the last dive at Parker in approximately 70 m of water.



Encrusting sponges, *E. abietina*, *Nicella* sp., *Callogorgia gracilis*, and S03 on an eroded outcropping (Dive 657).



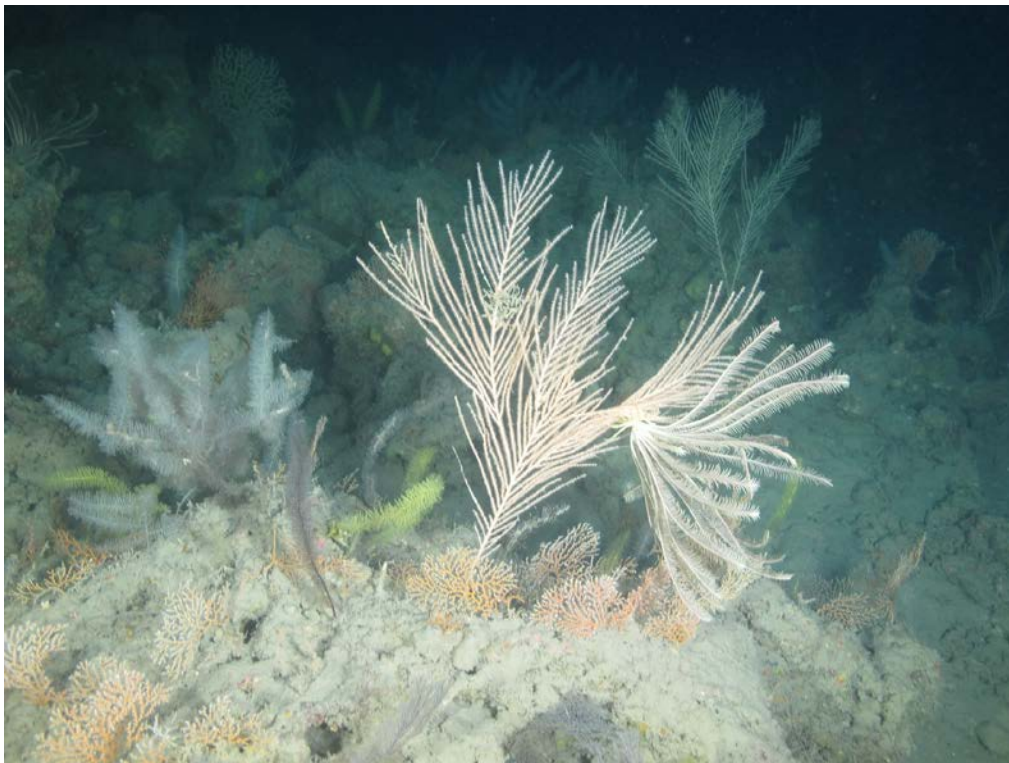
Map showing dive tracks for three ROV dives at Parker Bank.

### Rezak Bank

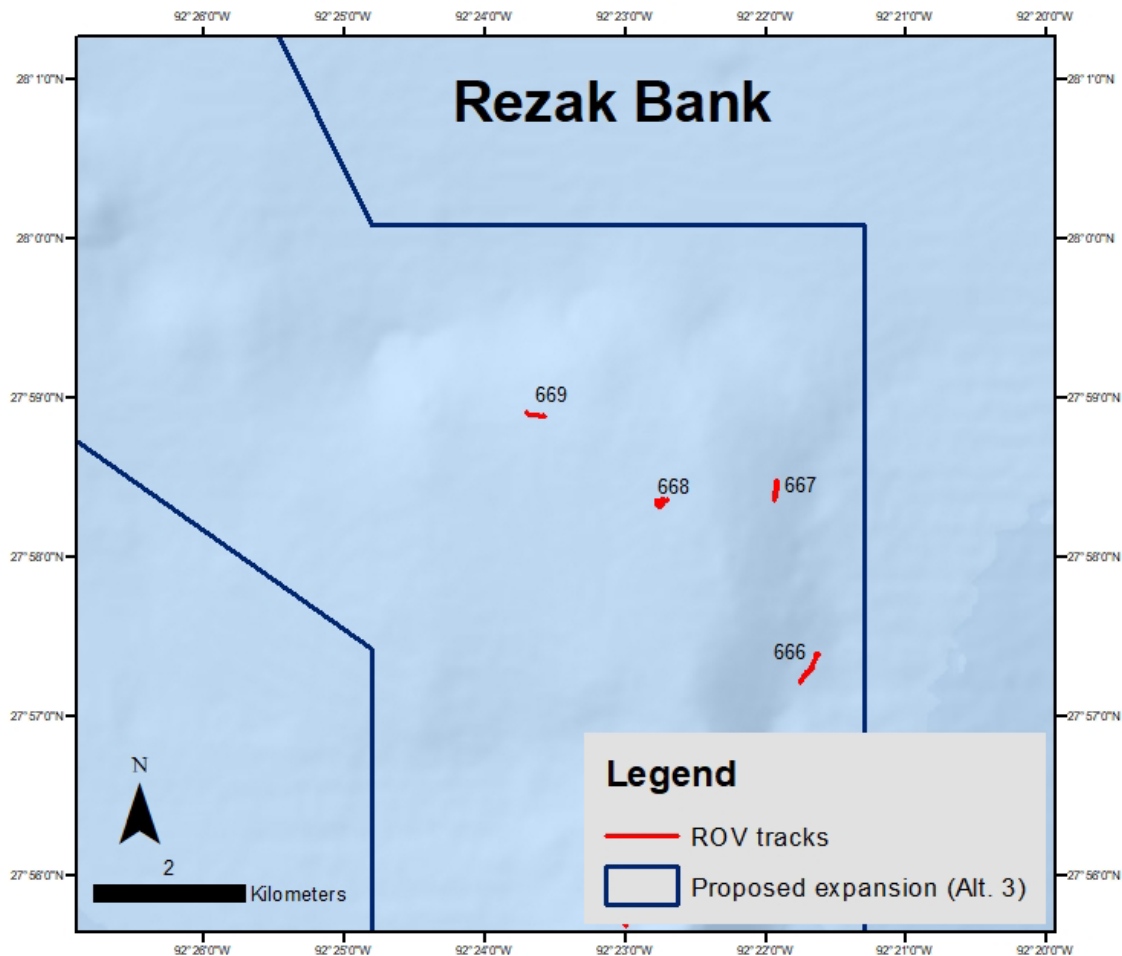
Four dives (666 – 669) were conducted at Rezak Bank on September 9, 2018 in which eight transects covering approximately 800 m of seafloor and totaling 3.5 hours underwater were completed. The first dive landed on flat and silty mud bottom that was marked by isolated rubble patches and highly eroded low relief outcroppings. The initial transect started during this dive had to be redone due to screen loss and power issues, which also resulted in an intermittent CTD profile. Two transects were completed during the first dive which noted few *Nicella* sp., *Oxysmilia rotundifolia*, *Tanacetipathes* sp., and Lathistid sponges. Alternatively, many *E. abietina* were seen during both transects with some solitary cup corals, *Rhizaxinella clava*, and sea whips. Two specimens were collected during this dive from 123 m water depth, *Paramuricea* and a yellow-green *E. abietina*. The second dive landed in 128 m water depth on silted soft bottom with highly eroded low relief outcroppings. Two transects were completed during this dive at 128 and 115 m, respectively. Many *E. abietina*, *Tanacetipathes* sp., and crinoids were recorded, as well as an abundance of *Nicella* sp. Some yellow wall sponges and sea whips were noted during the first transect.

Two transects were completed during the third dive which landed among an algal nodule field interspersed with small sand patches and medium to low relief algal fields. The second transect occurred along a wall of CCA reef dropping down to sand patches. An abundance of black coral sea fans, and green algae species were noted during the transects. The transects were marked by siting's of many *Halymenia hancockii*, sea whips, encrusting sponges, peyssonnelia, and verdigallas. Three collections were made during this dive – an *Antipathes atlantica* or *gracilis*, an algal nodule, and a small mantis shrimp found at 68 m. The final dive at Rezak bank also completed two transects that were on low to moderate relief CCA reefs broken apart by sandy extensions with intermittent dense fields of 'Hypnogorgia'. Many *Ellisella* sp., *Stichopathes* sp., encrusting sponges, and hydroids were noted along the transects. Additionally, few basket stars, black coral sea fans, *Tanacetipathes* sp., *A. furcata*, and brittle stars were recorded during the transects. Four coral species were collected during this dive including a white 'Hypnogorgia', an orange gorgonian, a *Stichopathes* sp., and G04.

Thirty-two species of fish constituting 14 families were recorded along the transects at Rezak bank. The most frequently noted species was Roughtongue bass (*Pronotoqrammus martinicensis*), followed by lionfish (*P. volitans*), Bank butterflyfish (*Prognathodes aya*), Atlantic creolefish (*Paranthias furcifer*), and Yellowtail reeffish (*Chromis enchrysur*).



*A. furcata*, *E. abietina*, and *Nicella* sp. amongst eroded outcroppings (Dive 666).



Map showing dive tracks for three ROV dives at Rezak Bank.

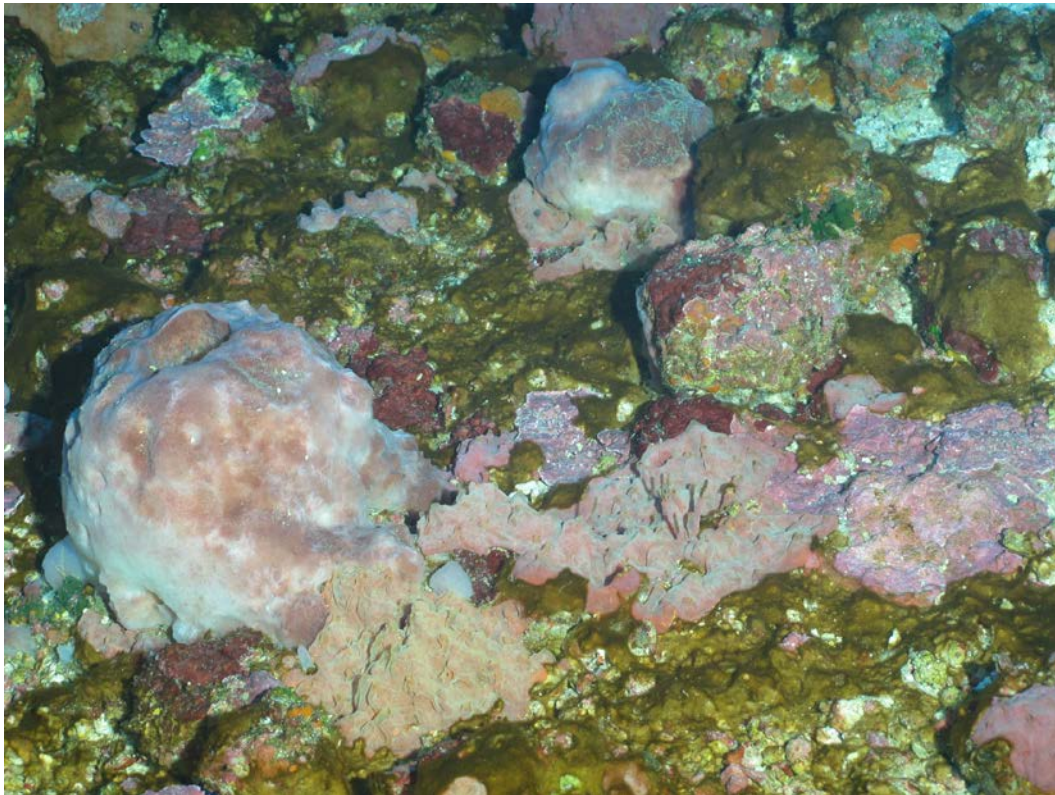
### Sidner Bank

Four dives (662 – 665) were completed at Sidner Bank on September 9, 2018 ranging in depth from 62 – 88 m, accumulating 3.35 h of time under water. The ROV landed on sand bottom with sparse algal nodules and experienced great visibility and moderate current (0.5 – 1.0 knot). Two transects were completed during this dive that lasted approximately five minutes each and covered a linear distance of 200 m. The dive was marked by few *Stichopathes* sp., *Tanacetipathes* sp., various encrusting sponges, banded coral shrimp, and sea whips. Alternatively, an abundance of black coral sea fans and *Nicella* sp. were noted. Two samples were collected during the first dive that included an algal nodule 55-65 cm in diameter from a Tilefish mound and a *Stichopathes* sp. near a CCA reef/sand patch interface. The ROV encountered an abundance of lionfish that appeared to be large in size and likely mature adults. The second dive landed on sandy bottom with notable sand waves. A single transect was completed during this dive totaling 100 m of linear coverage of the seafloor. The dive was marked by few *Stichopathes* sp., lobophora, crinoids and hydroids. The transect ended among a CCA reef with moderate relief, an abundance of fish, surrounded by a flat expansion of sand bottom. Two *Stichopathes* sp. were collected in a low relief, sandy area characterized by patchy algal growth.

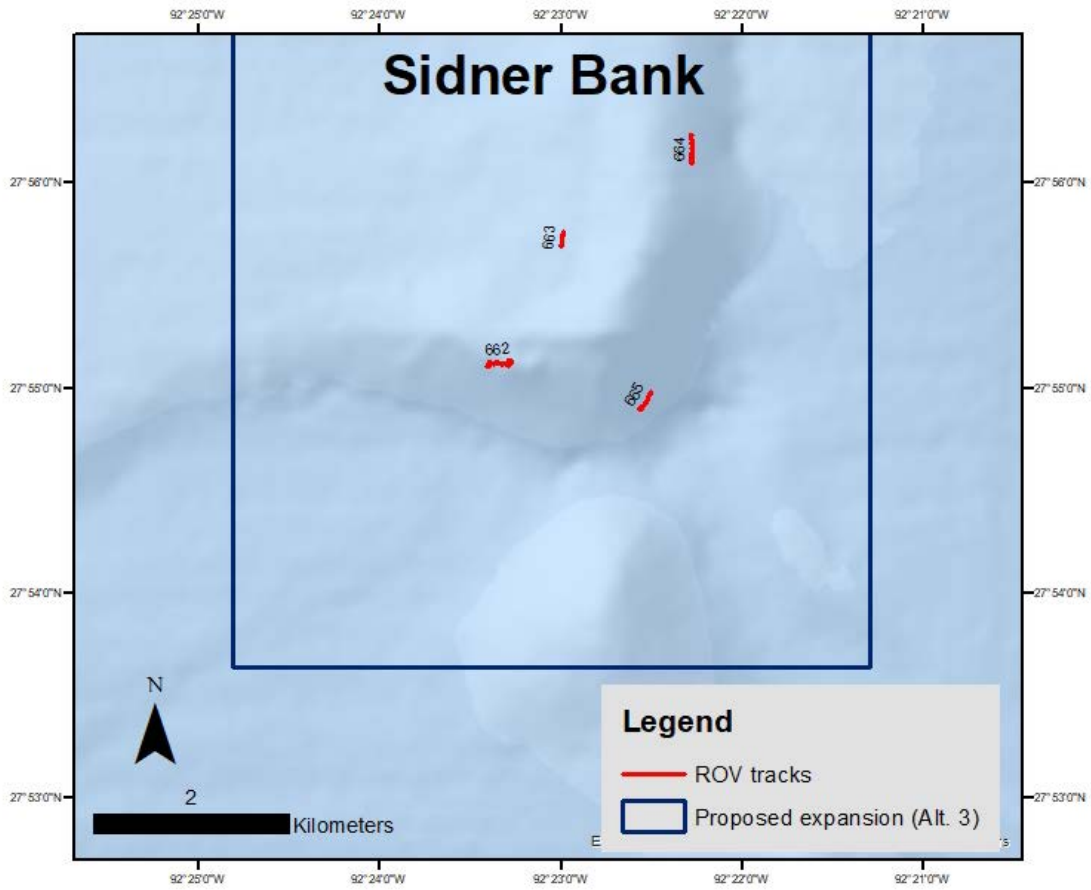


Two transects (200 m linear coverage) were completed during the third dive that landed on a dense algal nodule field with an abundance of algae species and encrusting sponges present. During the transects few *Stichopathes* sp., *Xestospongia*, *Halymenia hancockil*, Verdigallas, and plating CCA were recorded. Debris was encountered during the second transect that appeared to be fishing line. Three samples were collected during this dive – algal nodules, brown cyanobacterial mat attached to an algal nodule, and a *Stichopathes* sp. The final dive landed among a high relief valley characterized by peak outcroppings of heavily eroded carbonate rock covered in *Caulerpa racemosa* and diverse algal species. One transect was completed during this dive that was characterized by few encrusting sponges, *Xestaspongia*, and many plating CCA and *C. racemosa*. A sample of algal nodules and rocks with algae and scinaie growth were collected.

In six transects, 27 species of fish comprising 12 families were recorded. The nonindigenous species, lionfish (*P. volitans*), were recorded during several transects. Marbled grouper (*D. inermis*) were seen at 64 and 82 m water depth among different CCA reefs along the bank. Commercially important species were also recorded during the transects including Dog snapper (*Lutjanus jocu*) and Red snapper (*L. campechanus*). Two species of damselfishes were noted in abundance, Yellowtail reefish (*C. enchrysur*) and Sunshinefish (*Chromis insolata*).



Sponges, algae, and encrusting sponges on a dense algal nodule field.



Map showing dive tracks for three ROV dives at Sidner Bank.