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STANDARD FORM C

PRELIMINARY CRUISE REPORT

Cruise Name/Number:	F2018-011 Bluefin Tuna Ecology and Coral Reef Ecosystem Research

Authorizations:

Coastal State	Authorization Document Number	National Participant(s)
Mexico	PPFE/DGOPA-018/17	Lourdes Vasquez Laura Carrillo

Scientist in charge of reporting:

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NOTE: Research cruise # F2018-011 has a concurrent National Oceanic and Atmospheric Administration cruise identifier: NF-18-02. In the following materials, cruise # NF-18-02 is synonymous with F2018-011.

Scientists from the National Oceanic and Atmospheric Administration (NOAA) Southeast Fisheries Science Center (SEFSC), the University of Miami's Cooperative Institute for Marine and Atmospheric Studies (CIMAS) in Miami, Florida collaborated on a joint project with the Scripps Institution of Oceanography at University of California San Diego, Florida State University, University of Hawaii, Instituto Español de Oceanografía, Malaga, Spain and El Colegio de la Frontera Sur in Mexico aboard the NOAA Ship *Nancy Foster* (NF) during survey number NF-1802 (synonymous with F2018-011.

Bluefin Tuna Ecology (ABT)

Atlantic bluefin tuna (ABT) *thunnus thynnus*, is the highest-valued Atlantic tuna species on the global fisheries market today. This species is an important export for American fishermen, with the majority of the product going to Japanese markets. The United States also imports ABT for consumption from a number of nations. ABT are known to spawn in the Gulf of Mexico during summer (May and June), but the numbers of spawning individuals and the geographic extent of spawning are unknown. Management of the ABT fishery in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea is carried out in accordance with agreements by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the National Marine Fisheries Service (NMFS). In U.S. waters, ABT are subject to two regulations: the Magnuson-Stevens Fishery Conservation and Management Act and the Atlantic Tunas Convention Act. Given the highly migratory behavior of this species, its management is a complex, international concern. ABT are overfished throughout their range in the Atlantic Ocean, and current population levels are at a historic low. To gain a better understanding of the importance of alternative spawning sites and to improve management of the western Atlantic stock, our work focuses on areas adjacent to confirmed spawning grounds (Gulf of Mexico) and assesses the potential contribution to the overall spawning activity in the region.

Previous work

Plankton surveys targeting larval ABT have been completed by NMFS annually in the northern Gulf of Mexico since 1977 using a fixed-grid of stations. However, this current ichthyoplankton sampling strategy is limited to the U.S. Exclusive Economic Zone (EEZ). NOAA and ICCAT scientists traditionally use the larval abundance data collected from surveys in the northern Gulf of Mexico to calculate a larval index of spawning stock biomass. Variability in the current larval index is high: up to 100% of the mean and larger. It is likely that physical oceanographic factors contribute to this variance, but relationships between the distribution of ABT larvae and environmental conditions are not well known. Additionally, little is known about ABT spawning outside the U.S. EEZ. Initial analyses of larval ABT abundances from 1977 to the present indicate that while larvae are found across the Gulf of Mexico between late April and early June, it is not clear what effect, if any, mesoscale features have on these observed larval distributions. This uncertainty is partially an artifact of the design of the fixed-grid surveys, as the distance between sampled stations is large enough to preclude reliable correlations between ABT larvae and environmental gradients. Also the current index does not take into account multiple sources of larvae and the possibility of extended regional spawning. Some of our previous sampling expeditions have found relatively small numbers of ABT larvae adjacent to the Gulf of Mexico. As these areas have not been included previously in the standard larval surveys, it is critical to define possible alternative spawning sites. Results from our 2015 survey have provided evidence that larval transport via the Yucatan current, and persistent eddy translation south of Cuba may be important mechanisms for maintaining regional population connectivity. Our 2016 survey extended the larval survey into the relatively unexplored regions of the western Caribbean in Cuba to determine the extent of ABT spawning and use adaptive sampling methods to further develop a larval habitat model for this species. Additionally, these data may increase our understanding of larval transport, the role of eddies in larval retention, trophic ecology, and other mechanisms by which larvae are either exported or retained.

Current work

During this 2018 research survey aboard NF, we continued our study of the distribution and abundance of ABT and other tuna larvae in the Gulf of Mexico. However, this project's ship time also supported the RESTORE Act Science program, focusing on the impacts of nitrogen in the Gulf of Mexico. We focused on the linkages between ecosystem biogeochemistry (δ15N of nitrate and exported material; nutrient uptake rates), phytoplankton (biomass, composition, taxon-specific growth and grazing rates), zooplankton (biomass, composition and grazing rates; trophic position by stable isotopic analyses, SI), and larval tuna (abundance, size, growth rate, gut contents, and trophic position with SI). Our collaborators in this research included scientists from University of Miami, Scripps Institution of Oceanography at University of California San Diego, Florida State University, University of Hawaii, Instituto Español de Oceanografía (IEO) in Spain, El Colegio de la Frontera Sur (ECOSUR) and the Instituto Nacional de Pesca (INAPESCA) in Mexico.

The ship sampled the boundaries of mesoscale features (i.e. anticyclonic eddies) and targeted ABT larvae to assess relationships to new production nitrogen sources, food-web interactions that lead to preferred ABT prey, and variability of larval trophic position. In addition, the 2018 survey applied similar adaptive sampling methodology used in past NF expeditions in both predicted larval ABT and other tuna habitats, as well as incorporate new techniques in areas that are key to understanding larval transport and retention across the region. Satellite imagery (sea surface temperature, altimetry, and ocean color), satellite-tracked instrumentation, and ocean modeling forecasts were used to guide the sampling (adaptive sampling).

Methods and accomplishments

The shipboard survey work outlined above included the following sampling techniques for the NOAA RESTORE project. See appendix 4 for detailed sampling information.

Plankton sampling: 112 plankton tows using a 90cm-bongo net, 17 tows using a mini-bongo net. 25 ring net tows were taken from the surface to 100 m with a 1-m rig net to collect and calculate mesozooplankton biomass and grazing. In addition to satellite and in situ measurements, we targeted ABT (*Thunnus thynnus*) in the GOM using the BFT_Index" model available at http://www.aoml.noaa.gov/phod/research/ecosystems/fisheries/bft_tseries.php

Physical oceanography sampling: 59 Conductivity-Temperature-Depth (CTD) casts from 0-300 or 500m measured temperature, salinity, dissolved oxygen, chlorophyll, colored dissolved organic matter (CDOM), and water velocity were also performed. 8 casts also measured photosynthetically-active radiation (PAR). Deeper casts from 1500-2500m were conducted (see appendix 4). Continuous surface measurements of temperature, salinity, chlorophyll, CDOM, and water velocity were collected via the ship's flow-through system and hull-mounted acoustic Doppler current profiler (ADCP). 5 satellite-tracked, Lagrangian surface drifters were also deployed.

Nitrogen Fixation using Flow Cytometry Experiments: A total of 498 preserved flow cytometry samples were taken. These were for phytoplankton and bacteria rate estimates at 14 stations, plus an additional 3 stations for water column abundances. 216 live flow cytometry (FC) samples were analyzed on shipboard for abundance estimates of phytoplankton and a new methodology to estimate the abundance of microzooplankton using a flow cytometric dye that stains food vacuoles was tested with an additional 66 samples. For Elemental Nitrogen (N2)-fixing organisms, we collected 54 samples for profiles of the larger nitrogen-fixing organisms that might be present – in particular, *trichodesmium*. We collected 18 samples for stable nitrogen analyses and a sample of sargassum was collected for the same purpose. To assess nano-plankton from 0.8 to ~10 µm in diameter, we prepared 84 epifluorescence slide samples (50 mL sample each). For larger nano-plankton and micro-plankton, an additional 69 microscope slides were prepared.

Sediment Trap Array Experiments: during each cycle the deployment and recovery of the sediment trap bookended operations leading to three 2 to 4 day deployments. Three depth horizons (50 m, 120 m, 200 m) were sampled with 8 sample tubes per depth. Total thorium concentration profiles (dissolved + particulate) were sampled at the beginning and end of each cycle at 12 depths. In addition, 6 samples were taken during deep CTD casts (2500 m) to allow for Th-232:U-238 calibration. During each night of a cycle water from the CTD rosette was used to make 2.2 L incubations for the in situ drift array. 96 of these incubations used 15N-nitrate to measure nitrogen uptake rates while 192 incubations were spiked with 13C-bicarbonate for 13C primary productivity measurements. A total of 48 incubations were conducted in dark bottles to serve as controls for phytoplankton production. The water from each CTD rosette was also sampled for Particulate Organic Matter (POM) leading to 102 distinct measurements. In addition, deckboard incubations were used to measure nitrogen utilization rates within the surface mixed layer. A total of 80 samples were taken for nitrate uptake using a 15N-nitrate spike and incubated for 4 – 24 h (6 h typical) as well as an addition 80 samples for ammonium uptake using 15N-ammonium (paired incubations, triplicates). 66 triplicate incubations for nitrification using a 15N-ammonium spike were conducted. Each incubation was for 24 hours in the surface (clear) incubator.

Dilution Experiments: phytoplankton pigments (279 fluorometric Chla, 210 HPLC samples) Samples (2.2 L) were collected for phytoplankton pigments from 11 hydrographic casts, 8 profiles of grow and grazing rate experiments and 3 shipboard dilution experiments. Samples (285 mL) for fluorometric analysis were filtered, extracted 24 h in 90% acetone and analyzed for chlorophyll-a and phaeopigments on shipboard. Samples (2-2 L) for analysis by high-pressure liquid chromatography were filtered, frozen in liquid N2 and will be analyzed on shore for group-specific chlorophylls and carotenoid accessory pigments. Two-treatment dilution experiments were conducted during three experimental cycles to determine rate profiles (subsurface to 115 m depth) of phytoplankton growth and microzooplankton grazing. All bottles were incubated under ambient conditions of temperature and light for 24 h on the drift array. Community and population-level analyses will be done using samples collected for Chl a, flow cytometry and HPLC pigments.

Anticipated dates for delivery of final results:

Metadata:	January 2020
Raw Data:	Furnished upon request after 2020
Processed Data:	January 2020
Data Analysis:	January 2020
WODC Data Registration (if applicable):	N/A
Data Distribution Method:	A complete data set will be sent off to each coastal state through diplomatic channels (DVD hardcopy). An identical data set will also be made available for public ftp download by the coastal states.

The completed NF-18-02 (F2018-011) itinerary is outlined in Appendix 1 (attached).
The completed NF-18-02 (F2018-011) cruise track and station locations are illustrated in Appendix 2 (attached).
A complete listing of all NF-18-02 (F2018-011) drifter tracks and deployment locations is found in Appendix 3 (attached).
Survey participants are listed in Appendix 4 (attached)
The completed NF-18-02 (F2018-011) station locations, station occupation times, and station operations are detailed in Appendix 5 (attached).

Appendix 1

NF-18-02 (**F2018-011**) Completed Itinerary

Leg 1:

27 April 2018: NOAA Ship *Nancy Foster* departs from Jacksonville, Florida, USA
10 May 2018: NOAA Ship *Nancy Foster* arrives at Pensacola, Florida, USA

Leg 2:

13 May 2018: NOAA Ship *Nancy Foster* departs from Pensacola, Florida, USA
20 June 2018:NOAA Ship *Nancy Foster* arrives at Pascagoula, Mississippi, USA

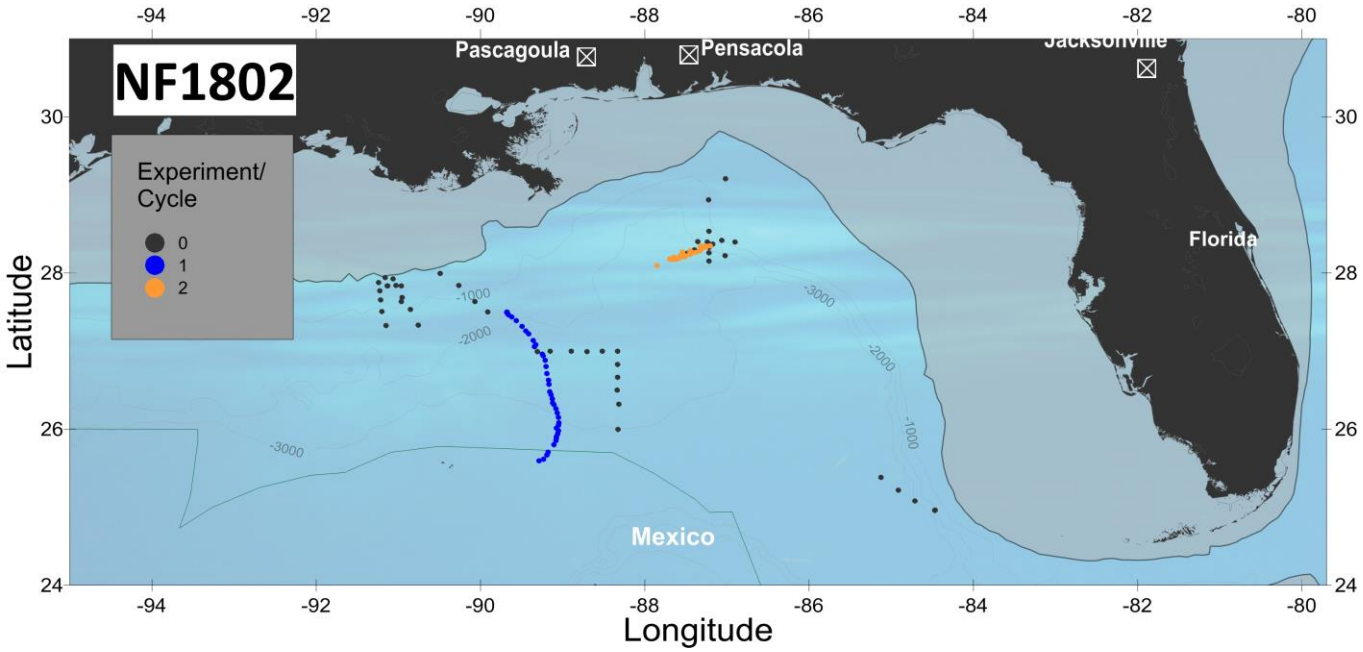
Leg 3: (TRANSIT only, no sampling)

03 June 2018:NOAA Ship *Nancy Foster* departs from Miami, Florida, USA
06 June 2018:NOAA Ship *Nancy Foster* arrives at Charleston, South Carolina, USA

NOTE: Discrete oceanographic/biological station measurements were only collected on legs 1and 2.

Appendix 2

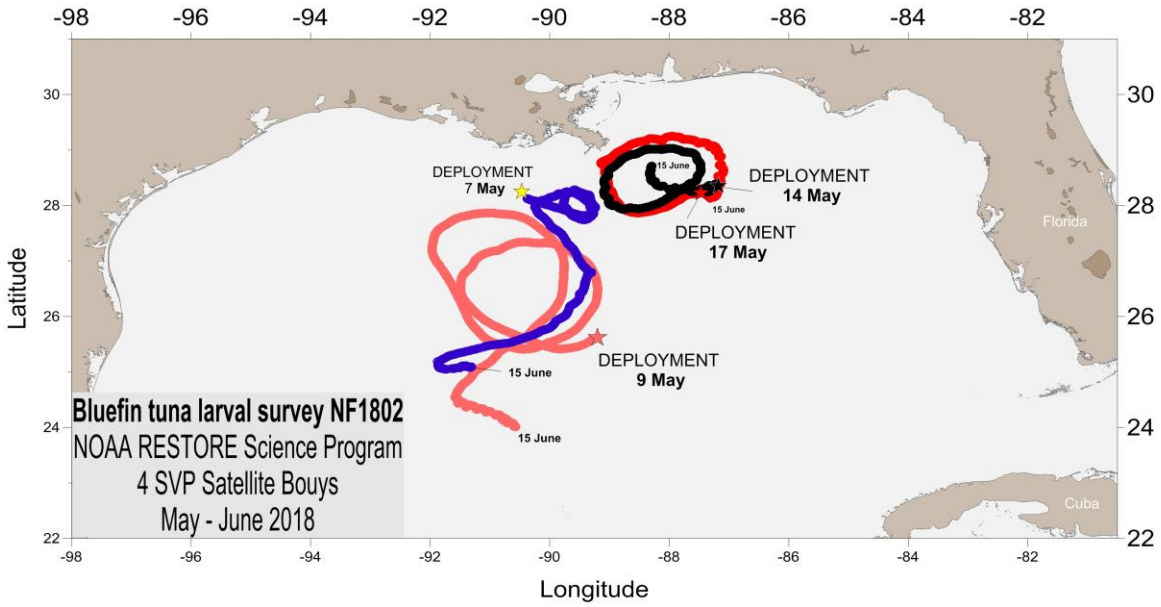
NF-18-02 (**F2018-011**) completed survey Track and station locations



The sampling locations are shown in black, blue, and orange from 27 April to 20 June, 2018 aboard the NOAA Ship Nancy Foster (WTER) for the research survey NF-18-02 (F2018-011). Colors indicate the three experiments or cycles that were conducted. For a detailed description of station activities at each marker location see Appendix 3.

Appendix 3

NF-18-02 (**F2018-011**) survey drifter tracks and deployment positions from 14 May to 26 June 2018.



Seven track lines following the path of seven SVP satellite tracked drifters buoys deployed starting on 14 May up to 26 July, 2017 during survey NF-17-04 (F2016-092) aboard the NOAA Ship Nancy Foster (NF1704). Deployment details shown below. *NOTE: all drifters above will continue to transmit data (position and temperature until they ground or battery malfunctions or expires.*

WMO #	Date (GMT)	Deployment Coordinates	SST (°C)	Color
4201505	14-May-17	25° 30.432', 88° 14.22'	26.17	
4201508	16-May-17	25° 59.34', 89°15.42'	25.29	
4201520	27-May-17	26° 37.788', 90°11.4'	26.69	
4201519	30-May-17	26° 49.668', 89°59.388'	29.6	
4201507	31-May-17	26° 19.992', 88°39.852'	27.12	
4201517	31-May-17	24° 46.992', 85°38.172'	28.86	
4201518	31-May-17	24° 46.992', 85°38.172'	28.86	

Appendix 4

Participants aboard NOAA Ship *Nancy Foster.* Listed in alphabetical order for Legs 1 and 2.

J. Beatty, K. Ford, T. Gerard, T. Kelly, R. Laiz Carrion, J. Lamkin, M. Landry, E. Malca, A. Mnich, N. Norton, S. Privoznik, J. Quintanilla, M. Rider, K. Selph, A. Shiroza, T. Shropshire, M. Stukel, R. Swalethorp, R. Thomas

Station	Leg #	Date GMT	Longitude	Latitude	Exp. Cycle	Sampling Conducted
001	1	30-Apr-18	-84.467	24.965	Exp-0	CTD, Bongo 90, Ring Net
002	1	30-Apr-18	-84.47	24.96	Exp-0	CTD
003	1	30-Apr-18	-84.709	25.0816	Exp-0	CTD, Bongo 90, Ring Net
004	1	01-May-18	-84.9148	25.2163	Exp-0	CTD, Bongo 90, Ring Net
005	1	01-May-18	-85.126	25.384	Exp-0	CTD, Bongo 90, Ring Net
006	1	01-May-18	-88.3267	25.9968	Exp-0	CTD, Bongo 90, Ring Net
007	1	02-May-18	-88.3144	26.3171	Exp-0	Bongo 90
008	1	02-May-18	-88.3346	26.5003	Exp-0	Bongo 90
009	1	02-May-18	-88.3321	26.6651	Exp-0	Bongo 90
010	1	02-May-18	-88.3305	26.8286	Exp-0	Bongo 90
011	1	02-May-18	-88.3333	27	Exp-0	CTD, Bongo 90
012	1	02-May-18	-88.5191	27	Exp-0	CTD, Bongo 90
013	1	02-May-18	-88.704	26.9926	Exp-0	CTD, Bongo 90
014	1	02-May-18	-88.8949	26.9955	Exp-0	CTD, Bongo 90, Ring Net
015	1	02-May-18	-89.153	26.9971	Exp-0	CTD, Bongo 90, Ring Net
016	1	02-May-18	-89.306	26.9935	Exp-0	CTD, Bongo 90
017	1	03-May-18	-90.0656	27.6307	Exp-0	Bongo 90
018	1	03-May-18	-90.2626	27.8389	Exp-0	Bongo 90
019	1	03-May-18	-90.4896	27.9946	Exp-0	Bongo 90
020	1	03-May-18	-90.9619	27.8341	Exp-0	Bongo 90
021	1	03-May-18	-91.13	27.833	Exp-0	Bongo 90
022	1	03-May-18	-91.2157	27.6535	Exp-0	Bongo 90
023	1	03-May-18	-91.2016	27.5049	Exp-0	Bongo 90
024	1	04-May-18	-91.1499	27.324	Exp-0	Bongo 90
025	1	04-May-18	-90.9651	27.6323	Exp-0	Bongo 90
026	1	04-May-18	-90.7551	27.3308	Exp-0	Bongo 90
027	1	04-May-18	-90.8513	27.5344	Exp-0	Bongo 90
028	1	04-May-18	-90.9527	27.688	Exp-0	Bongo 90
029	1	04-May-18	-91.0295	27.8379	Exp-0	Bongo 90
030	1	04-May-18	-91.0667	27.9243	Exp-0	Bongo 90
031	1	04-May-18	-91.1588	27.9418	Exp-0	Bongo 90
032	1	04-May-18	-91.2425	27.8743	Exp-0	Bongo 90
033	1	04-May-18	-91.2232	27.7699	Exp-0	Bongo 90
034	1	04-May-18	-91.1326	27.832	Exp-0	Bongo 90
035	1	04-May-18	-89.9136	27.4985	Exp-0	Bongo 90
036	1	05-May-18	-89.6762	27.4981	Exp-0	Bongo 90
037	1	05-May-18	-89.679	27.4967	Exp-1	Ring Net
038	1	05-May-18	-89.6788	27.4947	Exp-1	CTD, Drift Array
039	1	05-May-18	-89.6753	27.4848	Exp-1	Bongo 90
040	1	05-May-18	-89.66	27.461	Exp-1	CTD
041	1	05-May-18	-89.6196	27.4362	Exp-1	Bongo 90, Mini Bongo
042	1	05-May-18	-89.5623	27.3885	Exp-1	CTD, Bongo 90, Ring Net, Sediment Trap
043	1	05-May-18	-89.4926	27.3142	Exp-1	Bongo 90
044	1	05-May-18	-89.4497	27.2553	Exp-1	Bongo 90

045	1	05-May-18	-89.4156	27.2193	Exp-1	CTD, Bongo 90
046	1	06-May-18	-89.357	27.1349	Exp-1	CTD, Bongo 90, Mini Bongo
047	1	06-May-18	-89.327	27.08	Exp-1	Bongo 90, Ring Net
048	1	06-May-18	-89.345	27.0549	Exp-1	CTD
049	1	06-May-18	-89.249	26.9623	Exp-1	Bongo 90, Drift Array
050	1	06-May-18	-89.237	26.937	Exp-1	CTD
051	1	06-May-18	-89.213	26.883	Exp-1	Bongo 90, Mini Bongo
052	1	06-May-18	-89.204	26.8	Exp-1	CTD
053	1	06-May-18	-89.1896	26.7092	Exp-1	Bongo 90
054	1	06-May-18	-89.1702	26.6249	Exp-1	Bongo 90
055	1	06-May-18	-89.1658	26.5728	Exp-1	CTD, Bongo 90
056	1	07-May-18	-89.1549	26.4778	Exp-1	CTD, Bongo 90, Mini Bongo
057	1	07-May-18	-89.143	26.442	Exp-1	Bongo 90, Ring Net
058	1	07-May-18	-89.1267	26.3869	Exp-1	CTD
059	1	07-May-18	-89.123	26.335	Exp-1	Drift Array
060	1	07-May-18	-89.107	26.313	Exp-1	CTD
061	1	07-May-18	-89.0796	26.2616	Exp-1	Bongo 90, Mini Bongo
062	1	07-May-18	-89.0663	26.2089	Exp-1	CTD, Bongo 90, Ring Net
063	1	07-May-18	-89.0525	26.1475	Exp-1	Bongo 90
064	1	07-May-18	-89.0458	26.0801	Exp-1	Bongo 90
065	1	07-May-18	-89.0506	26.0489	Exp-1	CTD
066	1	08-May-18	-89.0747	26.0106	Exp-1	CTD, Bongo 90, Mini Bongo
067	1	08-May-18	-89.051	25.982	Exp-1	Bongo 90, Ring Net
068	1	08-May-18	-89.0631	25.9374	Exp-1	CTD
069	1	08-May-18	-89.075	25.901	Exp-1	Bongo 90, Drift Array
070	1	08-May-18	-89.075	25.887	Exp-1	CTD
071	1	08-May-18	-89.082	25.852	Exp-1	Bongo 90, Mini Bongo
072	1	08-May-18	-89.108	25.8016	Exp-1	CTD, Bongo 90, Ring Net, Sediment Trap
073	1	08-May-18	-89.1757	25.7064	Exp-1	Bongo 90
074	1	08-May-18	-89.1939	25.6685	Exp-1	CTD , Bongo 90
075	1	09-May-18	-89.2335	25.6173	Exp-1	Bongo 90, Mini Bongo, Ring Net, Drift Array
076	1	09-May-18	-89.2882	25.5944	Exp-1	CTD
077	2	14-May-18	-87.0156	29.2081	Exp-0	Bongo 90
078	2	14-May-18	-87.222	28.9343	Exp-0	Bongo 90
079	2	14-May-18	-87.2161	28.5314	Exp-0	Bongo 90
080	2	14-May-18	-87.2189	28.3693	Exp-0	CTD
081	2	14-May-18	-87.1736	28.37	Exp-0	Bongo 90
082	2	14-May-18	-87.2406	28.398	Exp-0	Bongo 90
083	2	14-May-18	-87.2163	28.3283	Exp-0	Bongo 90
084	2	14-May-18	-87.216	28.2572	Exp-0	Bongo 90
085	2	14-May-18	-87.2167	28.1526	Exp-0	CTD
086	2	14-May-18	-87.0213	28.2234	Exp-0	CTD , Bongo 90
087	2	14-May-18	-87.0633	28.4165	Exp-0	CTD , Bongo 90
088	2	14-May-18	-87.3567	28.4022	Exp-0	CTD , Bongo 90
089	2	14-May-18	-87.2018	28.3494	Exp-2	CTD, Sediment Trap, S25

090	2	15-May-18	-87.2461	28.3409	Exp-2	S25
091	2	15-May-18	-87.2497	28.3327	Exp-2	Bongo 90, Mini Bongo
092	2	15-May-18	-87.2727	28.3338	Exp-2	Bongo 90, Ring Net
093	2	15-May-18	-87.3005	28.3368	Exp-2	CTD
094	2	15-May-18	-87.2969	28.3442	Exp-2	Bongo 90, Drift Array
095	2	15-May-18	-87.3198	28.3305	Exp-2	CTD
096	2	15-May-18	-87.3253	28.3341	Exp-2	Bongo 90, Mini Bongo
097	2	15-May-18	-87.3201	28.3307	Exp-2	CTD, Bongo 90, Ring Net
098	2	15-May-18	-87.3207	28.3173	Exp-2	Bongo 90
099	2	15-May-18	-87.3099	28.307	Exp-2	S25
100	2	15-May-18	-87.3123	28.307	Exp-2	Bongo 90
101	2	16-May-18	-87.3336	28.2769	Exp-2	CTD, Bongo 90
102	2	16-May-18	-87.3784	28.2653	Exp-2	CTD, Bongo 90, Mini Bongo
103	2	16-May-18	-87.4128	28.2573	Exp-2	Bongo 90, Ring Net
104	2	16-May-18	-87.4499	28.2624	Exp-2	CTD
105	2	16-May-18	-87.4445	28.2867	Exp-2	Bongo 90, Drift Array
106	2	16-May-18	-87.4481	28.2684	Exp-2	CTD
107	2	16-May-18	-87.4458	28.2705	Exp-2	Bongo 90, Mini Bongo
108	2	16-May-18	-87.4363	28.2559	Exp-2	CTD, Bongo 90, Ring Net
109	2	16-May-18	-87.4346	28.2654	Exp-2	Bongo 90
110	2	16-May-18	-87.4417	28.2412	Exp-2	Bongo 90
111	2	16-May-18	-87.4548	28.2364	Exp-2	CTD, Bongo 90
112	2	17-May-18	-87.5035	28.2192	Exp-2	CTD, Bongo 90, Mini Bongo
113	2	17-May-18	-87.5107	28.2077	Exp-2	Bongo 90, Ring Net
114	2	17-May-18	-87.5328	28.2108	Exp-2	CTD
115	2	17-May-18	-87.5566	28.2293	Exp-2	Bongo 90, Drift Array
116	2	17-May-18	-87.54	28.27	Exp-2	CTD
117	2	17-May-18	-87.5625	28.2151	Exp-2	Bongo 90, Mini Bongo
118	2	17-May-18	-87.5578	28.2202	Exp-2	CTD, Bongo 90, Ring Net
119	2	17-May-18	-87.5441	28.2255	Exp-2	Bongo 90
120	2	17-May-18	-87.546	28.2118	Exp-2	Bongo 90
121	2	17-May-18	-87.5557	28.2041	Exp-2	CTD, Bongo 90
122	2	18-May-18	-87.5907	28.1847	Exp-2	Bongo 90, Mini Bongo
123	2	18-May-18	-87.6207	28.1713	Exp-2	Bongo 90, Ring Net
124	2	18-May-18	-87.6343	28.2001	Exp-2	CTD
125	2	18-May-18	-87.6346	28.2001	Exp-2	Bongo 90, Drift Array
126	2	18-May-18	-87.6357	28.1936	Exp-2	CTD
127	2	18-May-18	-87.6452	28.198	Exp-2	Bongo 90, Mini Bongo, S25
128	2	18-May-18	-87.6381	28.1963	Exp-2	CTD, Bongo 90, Ring Net
129	2	18-May-18	-87.6425	28.1774	Exp-2	Bongo 90
130	2	18-May-18	-87.6351	28.1767	Exp-2	Bongo 90
131	2	18-May-18	-87.6259	28.1773	Exp-2	CTD, Bongo 90
132	2	19-May-18	-87.6665	28.1757	Exp-2	Bongo 90, Mini Bongo
133	2	19-May-18	-87.6794	28.1783	Exp-2	Ring Net
134	2	19-May-18	-87.6924	28.1753	Exp-2	CTD, Bongo 90

135	2	19-May-18	-87.6954	28.1789	Exp-2	Drift Array
136	2	19-May-18	-87.8514	28.0928	Exp-2	CTD, Bongo 90, Sediment Trap
137	2	19-May-18	-87.5675	28.2085	Exp-0	S25
138	2	19-May-18	-87.4816	28.2507	Exp-0	S25
139	2	19-May-18	-87.3931	28.2925	Exp-0	S25
140	2	19-May-18	-87.3028	28.3275	Exp-0	S25
141	2	19-May-18	-86.9011	28.3964	Exp-0	S25