No	Metadata element name	Your input	Help reference no.
1	Submission Date	19/1/2018	1
2	Accession no. of related data sets	0163566, 0127524	2
3	Investigator-1 name	Rik Wanninkhof	3.1
4	Investigator-1 institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	3.2
5	Investigator-1 address	4301 Rickenbacker Causeway, Miami, FL 33149, USA	3.3
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8	Investigator-1 researcher ID		3.6
9	Investigator-1 ID type (ORCID, Researcher ID, etc.)		3.7
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15	Investigator-2 researcher ID		3.6
16	Investigator-2 ID type (ORCID, Researcher ID, etc.)		3.7
17	Investigator-3 name	Jonathan A. Hare	3.1
18	Investigator-3 institution	NOAA Northeast Fisheries Science Center	3.2
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20	Investigator-3 phone	401-782-3295	3.4
21	Investigator-3 email	Jon.Hare@NOAA.gov	3.5
22	Investigator-3 researcher ID		3.6
23	Investigator-3 ID type (ORCID, Researcher ID, etc.)		3.7
471	Investigator-4 name	Denis Pierrot	3.1
472	Investigator-4 institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	3.2
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475	Investigator-4 email	Denis.Pierrot@noaa.gov	3.5
476	Investigator-4 researcher ID		3.6
477	Investigator-4 ID type (ORCID, Researcher ID, etc.)		3.7
478	Investigator-5 name	Donald Christopher Melrose	3.1
479	Investigator-5 institution	NOAA Northeast Fisheries Science Center	3.2
480	Investigator-5 address	28 Tarzwell Drive, Narragansett, RI 02882	3.3
481	Investigator-5 phone	401-782-3350	3.4
482	Investigator-5 email	Chris.Melrose@NOAA.gov	3.5
483	Investigator-5 researcher ID		3.6
484	Investigator-5 ID type (ORCID, Researcher ID, etc.)		3.7
485	Investigator-6 name	Nathan D.Rebuck	3.1
486	Investigator-6 institution	NOAA Northeast Fisheries Science Center	3.2
487	Investigator-6 address	28 Tarzwell Drive, Narragansett, RI 02882	3.3
488	Investigator-6 phone	401-782-3240	3.4
489	Investigator-6 email	Nathan.Rebuck@NOAA.gov	3.5
490	Investigator-6 researcher ID		3.6
491	Investigator-6 ID type (ORCID, Researcher ID, etc.)		3.7
492	Investigator-7 name	Christopher Taylor	3.1
493	Investigator-7 institution	NOAA Northeast Fisheries Science Center	3.2
494	Investigator-7 address	28 Tarzwell Drive, Narragansett, RI 02882	3.3
495	Investigator-7 phone		3.4
496	Investigator-7 email	Chris.1.Taylor@NOAA.gov	3.5
497	Investigator-7 researcher ID		3.6
498	Investigator-7 ID type (ORCID, Researcher ID, etc.)		3.7
499	Investigator-8 name	David W. Townsend	3.1

500	**Investigator-8 institution**	University of Maine	3.2
501	**Investigator-8 address**	341 Aubert Hall, Orono, ME 04469-5707	3.3
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503	**Investigator-8 email**	davidt@umaine.edu	3.5
504	**Investigator-8 researcher ID**		3.6
505	**Investigator-8 ID type (ORCID, Researcher ID, etc.)**		3.7
506	**Investigator-9 name**	Maura Thomas	3.1
507	**Investigator-9 institution**	University of Maine	3.2
508	**Investigator-9 address**	454 Aubert Hall, Orono, ME 04469-5707	3.3
509	**Investigator-9 phone**	207-581-4314	3.4
510	**Investigator-9 email**	mthomas@umaine.edu	3.5
511	**Investigator-9 researcher ID**		3.6
512	**Investigator-9 ID type (ORCID, Researcher ID, etc.)**		3.7
24	**Data submitter name**	Leticia Barbero	4.1
25	**Data submitter institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	4.2
26	**Data submitter address**	4301 Rickenbacker Causeway, Miami, FL 33149, USA	4.3
27	**Data submitter phone**	(305) 361-4453	4.4
28	**Data submitter email**	Leticia.Barbero@noaa.gov	4.5
29	**Data submitter researcher ID**		4.6
30	**Data submitter ID type (ORCID, Researcher ID, etc.)**		4.7
31	**Title**	Monitoring of Water Column DIC, TAlk, and pH on the Northeast U.S. Shelf and the Development of Ocean Acidification Indicators to Inform Marine Resource Management	5
32	**Abstract**	Increasing amounts of atmospheric carbon dioxide from human industrial activities are causing changes in global ocean carbon chemistry resulting in a reduction in pH, a process termed ocean acidification. Studies have demonstrated adverse effects on calcifying organisms, particularly some invertebrates, corals, sea urchins, pteropods, and coccolithophores. This effort is in support of the coastal monitoring and research objectives of the NOAA Ocean Acidification Program (OAP).	6
33	**Purpose**	To measure key carbon, physical and biogeochemical parameters in coastal waters of the US in relation to Ocean Acidification and monitor changes over time.	7
34	**Start date**	5/17/2017	8.1
35	**End date**	6/21/2017	8.2
36	**Westbd longitude**		9.1
37	**Eastbd longitude**		9.2
38	**Northbd latitude**		9.3
39	**Southbd latitude**		9.4
40	**Spatial reference system**	WGS 84	10
41	**Geographic names**	Gulf of Maine, Georges Bank, Mid-Atlantic Bight	11
42	**Location of organism collection**		12
43	**Funding agency name**	NOAA's Ocean Acidification Program	13.1
44	**Funding project title**	East and Gulf Coast Ocean Acidificati0on Observing Support. Monitoring of Water Column DIC, TAlk, and pH on the Northeast U.S. Shelf and the Development of Ocean Acidification Indicators to Inform Marine Resource Management	13.2
45	**Funding project ID (Grant no.)**		13.3
46	**Research projects**	none	14
47	**Platform-1 name**	Gordon Gunter	15.1
48	**Platform-1 ID**	33GG	15.2
49	**Platform-1 type**	Research Vessel	15.3
50	**Platform-1 owner**	NOAA, U.S. Government	15.4
51	**Platform-1 country**	United States	15.5
62	**EXPOCODE**	33GG20170516, 33GG20170530, 33GG20170610	16
63	**Cruise ID**	GU1701_Leg1, GU1701_Leg2, GU1702	17

64	**Section**	none	18
65	**Author list for citation**	Barbero, Leticia, Wanninkhof, Rik, Pierrot, Denis; Melrose, Donald Christopher; Rebuck, Nathan D., Townsend, D.W., Thomas, M.; Taylor, C.	19
66	**References**		20
67	**Supplemental information**	Please consult Readme file for additional information on analysis of carbon parameters. The most up to date version of this dataset is available at http://www.aoml.noaa.gov/ocd/gcc/shortcruises.htm	21
68	**DIC: Variable abbreviation in data files**	DIC	22.1
69	**DIC: Observation type**	Profile/underway (flow through)	22.2
70	**DIC: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	22.3
71	**DIC: Manipulation method (SPECIAL USE ONLY) (SPECIAL USE ONLY)**		22.4
72	**DIC: Variable unit**	micro-mol/kg	22.5
73	**DIC: Measured or calculated**	Measured	22.6
74	**DIC: Calculation method and parameters**		22.7
75	**DIC: Sampling instrument**	Niskin bottle / flow through system	22.8
76	**DIC: Analyzing instrument**	Two systems consisting of a coulometer (UIC Inc.) coupled with a Dissolved Inorganic Carbon Extractor (DICE) inlet system. DICE was developed by Esa Peltola and Denis Pierrot of NOAA/AOML and Dana Greeley of NOAA/PMEL to modernize a carbon extractor called SOMMA (Johnson et al. 1985, 1987, 1993, and 1999; Johnson 1992)	22.9
77	**DIC: Detailed sampling and analyzing information**	Samples for total dissolved inorganic carbon (DIC) measurements were drawn according to procedures outlined in the Guide to best practices for ocean CO2 measurements (Dickson et al., 2007) from Niskin bottles into cleaned 294-ml glass bottles. Bottles were rinsed and filled from the bottom, leaving 6 ml of headspace; care was taken not to entrain any bubbles. After 0.2 ml of saturated HgCl2 solution was added as a preservative, the sample bottles were sealed with glass stoppers lightly covered with Apiezon-L grease and were stored at room temperature to be sent back to the lab for analysis after the cruise. The analysis was done by coulometry with two analytical systems (AOML3 and AOML4) used simultaneously. In the coulometric analysis of DIC, all carbonate species are converted to CO2 (gas) by addition of excess hydrogen ion (acid) to the seawater sample, and the evolved CO2 gas is swept into the titration cell of the coulometer with pure air or compressed nitrogen, where it reacts quantitatively with a proprietary reagent based on ethanolamine to generate hydrogen ions. In this process, the solution changes from blue to colorless, triggering a	22.10
78	**DIC: Field replicate information**	151 samples each 500-ml, 12 sets of duplicate samples.	22.11
79	**DIC: Standardization technique description**	The coulometers were calibrated by injecting aliquots of pure CO2 (99.99%) by means of an 8-port valve outfitted with two sample loops with known gas volumes bracketing the amount of CO2 extracted from the water samples for the two AOML systems.	22.12.1
80	**DIC: Frequency of standardization**	The stability of each coulometer cell solution was confirmed three different ways: two sets of gas loops were measured at the beginning; also the Certified Reference Material (CRM), supplied by Dr. A. Dickson of UCSD, were measured at the beginning; and the duplicate samples at the beginning, middle, and end of each cell solution. The coulometer cell solution was replaced after 25 mg of carbon was titrated, typically after 9 to 12 hours of continuous use.	22.12.2
81	**DIC: CRM manufacturer**	Dr. A. Dickson of UCSD	22.12.3.1
82	**DIC: Batch number**	Batches 150, 153	22.12.3.2
83	**DIC: Poison used to kill the sample**	saturated HgCl2	22.13.1
84	**DIC: Poison volume**	0.2 ml	22.13.2
85	**DIC Poisoning correction description**	The DIC values were corrected for dilution by 0.2 ml of saturated HgCl2 used for sample preservation. The total water volume of the sample bottles was 288 ml (calibrated by Esa Peltola, AOML). The correction factor used for dilution was 1.00037.	22.13.3
86	**DIC: Uncertainty**		22.14
87	**DIC: Data quality flag description**	WOCE quality control flags are used: 2 = good value, 3 = questionable value, 4 = bad value, 5 = value not reported, 6 = mean of replicate measurements, 9 = sample not drawn.	22.15
88	**DIC: Method reference (citation)**	Dickson, A.G., Sabine, C.L. and Christian, J.R. (Eds.) 2007. Guide to best practices for ocean CO2 measurements. PICES Special Publication 3, 191 pp. Johnson, K.M., Kortzinger, A., Mintrop, L., Duinker, J.C. and Wallace, D.W.R. (1999). Coulometric total carbon dioxide analysis for	22.16
89	**DIC: Researcher Name**	Rik Wanninkhof	22.17.1
90	**DIC: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	22.17.2
91	**TA: Variable abbreviation in data files**	TAlk	23.1
92	**TA: Observation type**	Profile/underway (flow through)	23.2
93	**TA: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	23.3

94	TA: Manipulation method (SPECIAL USE ONLY)		23.4
95	TA: Variable unit	micro-mol/kg	23.5
96	TA: Measured or calculated	Measured	23.6
97	TA: Calculation method and parameters		23.7
98	TA: Sampling instrument	Niskin bottle / flow through system	23.8
99	TA: Analyzing instrument	Semi-automatic titration systems, System 1 consists of a Metrohm 765 Dosimat titrator, a pH meter (Orion 720A, ThermoScientific), a ROSS half cell pH glass electrode (Orion 9101BN, ThermoScientific) and a reference electrode (Orion 900200, ThermoScientific)	23.9
100	TA: Type of titration	Full Titration	23.10
101	TA: Cell type (open or closed)	Open	23.11
102	TA: Curve fitting method	Least-Square Analysis	23.12
103	TA: Detailed sampling and analyzing information	All of the samples were run using leftover water from the same sample bottles used for DIC and pH. Please refer to DIC for detailed information on sampling and conservation of samples. For each measurement, approximately 200 ml of water sample were titrated with an HCl solution provided by Dr. Andrew Dickson of UCSD (0.25175 moles per kilogram-solution). Please consult the accompanying Readme file for additional details.	23.13
104	TA: Field replicate information	151 samples each 500-ml, 12 sets of duplicate samples.	23.14
105	TA: Standardization technique description	2 CRM samples were run daily on each cell, before and after the seawater samples. The Total Alkalinity for the water samples was corrected using the daily averaged ratios between the certified and measured values of the 2 CRMs run on each cell. This TA titration system has a precision of 0.1 %. All the TA values were directly measured with reference to Certified Reference Material. The accuracy after correction is 0.1%. Please check attached pdf for more details.	23.15.1
106	TA: Frequency of standardization	All values were directly measured with reference to Certified Reference Material (Dickson, UCSD). 2 CRM samples were run daily on each cell.	23.15.2
107	TA: CRM manufacturer	Dr. A. Dickson of UCSD	23.15.3.1
108	TA: Batch Number	CRM batches: 129, 150 and 153	23.15.3.2
109	TA: Poison used to kill the sample	saturated HgCl2	23.16.1
110	TA: Poison volume	0.2 ml	23.16.2
111	TA: Poisoning correction description		23.16.3
112	TA: Magnitude of blank correction		23.17
113	TA: Uncertainty	The precision of this method is better than 0.1% and accuracy is 0.1%.	23.18
114	TA: Data quality flag description	WOCE quality control flags are used: 2 = good value, 3 = questionable value, 4 = bad value, 5 = value not reported, 6 = mean of replicate measurements, 9 = sample not drawn.	23.19
115	TA: Method reference (citation)	Millero, F. J., Zhang, J. Z., Lee, K., & Campbell, D. M. (1993). Titration alkalinity of seawater. *Marine Chemistry* , *44* (2), 153-165.	23.20
116	TA: Researcher Name	Rik Wanninkhof	23.21.1
117	TA: Researcher Institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	23.21.2
118	pH: Variable abbreviation in data files	pH	24.1
119	pH: Observation type	Profile/underway (flow through)	24.2
120	pH: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	In-situ observation	24.3
121	pH: Manipulation method (SPECIAL USE ONLY)		24.4
122	pH: Measured or calculated	Measured	24.5
123	pH: Calculation method and parameters		24.6
124	pH: Sampling instrument	Niskin bottle / flow through system	24.7
125	pH: Analyzing instrument	Agilent 8453 spectrometer setup with a custom-made temperature-controlled cell holder	24.8
126	pH: pH scale	Total	24.9
127	pH: Temperature of measurement	20 (+/- 0.05) degrees Celsius	24.10

128	pH: Detailed sampling and analyzing information	The same sample bottle was used for pH, DIC and Talk analyses, with pH being analyzed first. The samples were fixed with HgCl2 (refer to DIC for more information on sampling and storage). Samples were thermostated at 20 (+/- 0.05) degrees Celsius in a water bath. Approximately 80 ml of sample were extracted from each DIC sample bottle by syringe before DIC analysis to determine the pH. Temperature for each sample was measured before analysis using a Hart Scientific Fluke 1523 reference thermometer. Absorbance blanks were taken for each sample and 10 micro liter of purified m-cresol purple (10 mmol kg-1) were added for the analysis. The equations of Liu et al, 2011 formulated using the purified m-cresol purple indicator were used to determine pH of the samples. pH samples were analyzed at 20C. Please check accompanying readme file for additional details.	24.11
129	pH: Field replicate information	151 samples each 500-ml, 12 sets of duplicate samples.	24.12
130	pH: Standardization technique description	The pH is calibration-free.	24.13.1
131	pH: Frequency of standardization		24.13.2
132	pH: pH values of the standards		24.13.3
133	pH: Temperature of standardization		24.13.4
134	pH: Temperature correction method		24.14
135	pH: at what temperature was pH reported	20 degrees Celsius	24.15
136	pH: Uncertainty	Please check attached pdf for more details	24.16
137	pH: Data quality flag description	WOCE quality control flags are used: 2 = good value, 3 = questionable value, 4 = bad value, 5 = value not reported, 6 = mean of replicate measurements, 9 = sample not drawn.	24.17
138	pH: Method reference (citation)	Liu, X.; Patsavas, M.C.; and Byrne, R. H. (2011). Purification and characterization of meta-cresol purple for spectrophotometric seawater pH measurements. Environmental Science and Technology, 45(11), 4862-4868. doi: 10.1021/es200665d	24.18
139	pH: Researcher Name	Rik Wanninkhof	24.19.1
140	pH: Researcher Institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	24.19.2
141	pCO2A: Variable abbreviation in data files		25.1
142	pCO2A: Observation type		25.2
143	pCO2A: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)		25.3
144	pCO2A: Manipulation method (SPECIAL USE ONLY)		25.4
145	pCO2A: Variable unit		25.5
146	pCO2A: Measured or calculated		25.6
147	pCO2A: Calculation method and parameters		25.7
148	pCO2A: Sampling instrument		25.8
149	pCO2A: Location of seawater intake		25.9
150	pCO2A: Depth of seawater intake		25.10
151	pCO2A: Analyzing instrument		25.11
152	pCO2A: Detailed sampling and analyzing information		25.12
153	pCO2A: Equilbrator type		25.13.1
154	pCO2A: Equilibrator volume (L)		25.13.2
155	pCO2A: Vented or not		25.13.3
156	pCO2A: Water flow rate (L/min)		25.13.4
157	pCO2A: Headspace gas flow rate (L/min)		25.13.5
158	pCO2A: How was temperature inside the equilibrator measured .		25.13.6
159	pCO2A: How was pressure inside the equilibrator measured.		25.13.7
160	pCO2A: Drying method for CO2 gas		25.14
161	pCO2A: Manufacturer of the gas detector		25.15.1
162	pCO2A: Model of the gas detector		25.15.2
163	pCO2A: Resolution of the gas detector		25.15.3
164	pCO2A: Uncertainty of the gas detector		25.15.4
165	pCO2A: Standardization technique description		25.16.1
166	pCO2A: Frequency of standardization		25.16.2
167	pCO2A: Manufacturer of standard gas		25.16.3.1

168	**pCO2A: Concentrations of standard gas**		25.16.3.2
169	**pCO2A: Uncertainties of standard gas**		25.16.3.3
170	**pCO2A: Water vapor correction method**		25.17
171	**pCO2A: Temperature correction method**		25.18
172	**pCO2A: at what temperature was pCO2 reported**		25.19
173	**pCO2A: Uncertainty**		25.20
174	**pCO2A: Data quality flag description**		25.21
175	**pCO2A: Method reference (citation)**		25.22
176	**pCO2A: Researcher Name**		25.23.1
177	**pCO2A: Researcher Institution**		25.23.2
178	**pCO2D: Variable abbreviation in data files**		26.1
179	**pCO2D: Observation type**		26.2
180	**pCO2D: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**		26.3
181	**pCO2D: Manipulation method (SPECIAL USE ONLY)**		26.4
182	**pCO2D: Variable unit**		26.5
183	**pCO2D: Measured or calculated**		26.6
184	**pCO2D: Calculation method and parameters**		26.7
185	**pCO2D: Sampling instrument**		26.8
186	**pCO2D: Analyzing instrument**		26.9
187	**pCO2D: Storage method**		26.10
188	**pCO2D: Seawater volume (mL)**		26.11
189	**pCO2D: Headspace volume (mL)**		26.12
190	**pCO2D: Temperature of measurement**		26.13
191	**pCO2D: Detailed sampling and analyzing information**		26.14
192	**pCO2D: Field replicate information**		26.15
193	**pCO2D: Manufacturer of the gas detector**		26.16.1
194	**pCO2D: Model of the gas detector**		26.16.2
195	**pCO2D: Resolution of the gas detector**		26.16.3
196	**pCO2D: Uncertainty of the gas detector**		26.16.4
197	**pCO2D: Standardization technique description**		26.17.1
198	**pCO2D: Frequency of standardization**		26.17.2
199	**pCO2D: Temperature of standardization**		26.17.3
200	**pCO2D: Manufacturer of standard gas**		26.17.4.1
201	**pCO2D: Concentrations of standard gas**		26.17.4.2
202	**pCO2D: Uncertainties of standard gas**		26.17.4.3
203	**pCO2D: Water vapor correction method**		26.18
204	**pCO2D: Temperature correction method**		26.19
205	**pCO2D: at what temperature was pCO2 reported**		26.20
206	**pCO2D: Uncertainty**		26.21
207	**pCO2D: Data quality flag description**		26.22
208	**pCO2D: Method reference (citation)**		26.23
209	**pCO2D: Researcher Name**		26.24.1
210	**pCO2D: Researcher Institution**		26.24.2
211	**Var1: Variable abbreviation in data files**	Depth_station	27.1
212	**Var1: Full variable name**	Depth of water at station	27.2
213	**Var1: Observation type**	Profile	27.4
214	**Var1: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	Surface underway and profile	27.5
215	**Var1: Variable unit**	meters	27.7
216	**Var1: Measured or calculated**	Measured or calculated	27.8
217	**Var1: Calculation method and parameters**	Calculated from ETOPO1 global relief (http://www.ngdc.noaa.gov/mgg/global/global.html) when sounder or altimeter data not available	27.9

218	**Var1: Sampling instrument**	Sounder or altimeter, models vary	27.10
219	**Var1: Analyzing instrument**		27.11
220	**Var1: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
221	**Var1: Detailed sampling and analyzing information**	Ship based sounder used when available. Depth from an altimeter on the CTD may also be used. Where neither of theses sources were available (typically due to water depth exceeding sounder's detection limit), depth may be estimated using the ETOPO1 bathymetry.	27.13
222	**Var1: Field replicate information**		27.14
223	**Var1: Uncertainty**	Uncertainty varies with source	27.15
224	**Var1: Data quality flag description**	-999 indicates bad or missing data	27.16
225	**Var1: Method reference (citation)**		27.17
226	**Var1: Biological subject (SPECIAL USE ONLY)**		27.18
227	**Var1: Species Identification code (SPECIAL USE ONLY)**		27.19
228	**Var1: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
229	**Var1: Researcher Name**	D. Christopher Melrose	27.21.1
230	**Var1: Researcher Institution**	NOAA Northeast Fisheries Science Center	27.21.2
231	**Var2: Variable abbreviation in data files**	Depth_sampling	27.1
232	**Var2: Full variable name**	Depth of water at sample collection	27.2
233	**Var2: Observation type**	Profile	27.4
234	**Var2: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
235	**Var2: Variable unit**	meters	27.7
236	**Var2: Measured or calculated**	Measured	27.8
237	**Var2: Calculation method and parameters**		27.9
238	**Var2: Sampling instrument**	SBE 911plus CTD	27.10
239	**Var2: Analyzing instrument**		27.11
240	**Var2: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
241	**Var2: Detailed sampling and analyzing information**		27.13
242	**Var2: Field replicate information**		27.14
243	**Var2: Uncertainty**	plus or minus 1 meter (data has also been vertically binaveraged to 1 decibar bins)	27.15
244	**Var2: Data quality flag description**	-999 indicates bad or missing data	27.16
245	**Var2: Method reference (citation)**		27.17
246	**Var2: Biological subject (SPECIAL USE ONLY)**		27.18
247	**Var2: Species Identification code (SPECIAL USE ONLY)**		27.19
248	**Var2: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
249	**Var2: Researcher Name**	D. Christopher Melrose	27.21.1
250	**Var2: Researcher Institution**	NOAA Northeast Fisheries Science Center	27.21.2
251	**Var3: Variable abbreviation in data files**	CTDPRS	27.1
252	**Var3: Full variable name**	Water pressure	27.2
253	**Var3: Observation type**	Profile	27.4
254	**Var3: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
255	**Var3: Variable unit**	decibars	27.7
256	**Var3: Measured or calculated**	Measured	27.8
257	**Var3: Calculation method and parameters**		27.9
258	**Var3: Sampling instrument**	SBE 911plus CTD	27.10
259	**Var3: Analyzing instrument**		27.11
260	**Var3: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
261	**Var3: Detailed sampling and analyzing information**		27.13

262	**Var3: Field replicate information**		27.14
263	**Var3: Uncertainty**	plus or minus decibar (data has also been vertically binaveraged to 1 decibar bins)	27.15
264	**Var3: Data quality flag description**	-999 indicates bad or missing data	27.16
265	**Var3: Method reference (citation)**		27.17
266	**Var3: Biological subject (SPECIAL USE ONLY)**		27.18
267	**Var3: Species Identification code (SPECIAL USE ONLY)**		27.19
268	**Var3: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
269	**Var3: Researcher Name**	D. Christopher Melrose	27.21.1
270	**Var3: Researcher Institution**	NOAA Northeast Fisheries Science Center	27.21.2
271	**Var4: Variable abbreviation in data files**	CTDTMP	27.1
272	**Var4: Full variable name**	Water temperature	27.2
273	**Var4: Observation type**	Profile	27.4
274	**Var4: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
275	**Var4: Variable unit**	degrees celsius (ITS-90)	27.7
276	**Var4: Measured or calculated**	Measured	27.8
277	**Var4: Calculation method and parameters**		27.9
278	**Var4: Sampling instrument**	SBE 911plus CTD	27.10
279	**Var4: Analyzing instrument**		27.11
280	**Var4: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
281	**Var4: Detailed sampling and analyzing information**		27.13
282	**Var4: Field replicate information**		27.14
283	**Var4: Uncertainty**	plus or minus 0.001 degrees celsius	27.15
284	**Var4: Data quality flag description**	-999 indicates bad or missing data	27.16
285	**Var4: Method reference (citation)**		27.17
286	**Var4: Biological subject (SPECIAL USE ONLY)**		27.18
287	**Var4: Species Identification code (SPECIAL USE ONLY)**		27.19
288	**Var4: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
289	**Var4: Researcher Name**	D. Christopher Melrose	27.21.1
290	**Var4: Researcher Institution**	NOAA Northeast Fisheries Science Center	27.21.2
291	**Var5: Variable abbreviation in data files**	CTDSAL	27.1
292	**Var5: Full variable name**	Salinity	27.2
293	**Var5: Observation type**	Profile	27.4
294	**Var5: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
295	**Var5: Variable unit**	practical salinity scale of 1978	27.7
296	**Var5: Measured or calculated**	Seasave 7, calculated from temperature and conductivity	27.8
297	**Var5: Calculation method and parameters**		27.9
298	**Var5: Sampling instrument**	SBE 911plus CTD	27.10
299	**Var5: Analyzing instrument**		27.11
300	**Var5: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
301	**Var5: Detailed sampling and analyzing information**	CTD Salinity values were validated using water samples collected during profiles. Corrections were applied when needed.	27.13
302	**Var5: Field replicate information**		27.14
303	**Var5: Uncertainty**	plus or minus 0.01 PSS-78	27.15
304	**Var5: Data quality flag description**	-999 indicates bad or missing data	27.16
305	**Var5: Method reference (citation)**		27.17
306	**Var5: Biological subject (SPECIAL USE ONLY)**		27.18
307	**Var5: Species Identification code (SPECIAL USE ONLY)**		27.19

308	Var5: Life stage of the Biological subject (SPECIAL USE ONLY)		27.20
309	Var5: Researcher Name	D. Christopher Melrose	27.21.1
310	Var5: Researcher Institution	NOAA Northeast Fisheries Science Center	27.21.2
311	Var6: Variable abbreviation in data files	Sigma-Theta	27.1
312	Var6: Full variable name	Potential density at surface pressure	27.2
313	Var6: Observation type	Profile	27.4
314	Var6: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	In-situ observation	27.5
315	Var6: Variable unit	kilograms per cubic meter minus 1000	27.7
316	Var6: Measured or calculated	Calculated	27.8
317	Var6: Calculation method and parameters	SeaBird Seasave 7 from measured temperature, conductivity and pressure	27.9
318	Var6: Sampling instrument	SBE 911plus CTD	27.10
319	Var6: Analyzing instrument		27.11
320	Var6: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)		27.12
321	Var6: Detailed sampling and analyzing information		27.13
322	Var6: Field replicate information		27.14
323	Var6: Uncertainty	plus or minus 0.01 kilograms per cubic meter	27.15
324	Var6: Data quality flag description	-999 indicates bad or missing data	27.16
325	Var6: Method reference (citation)		27.17
326	Var6: Biological subject (SPECIAL USE ONLY)		27.18
327	Var6: Species Identification code (SPECIAL USE ONLY)		27.19
328	Var6: Life stage of the Biological subject (SPECIAL USE ONLY)		27.20
329	Var6: Researcher Name	D. Christopher Melrose	27.21.1
330	Var6: Researcher Institution	NOAA Northeast Fisheries Science Center	27.21.2
331	Var7: Variable abbreviation in data files	CTDOXYmg	27.1
332	Var7: Full variable name	Dissolved Oxygen	27.2
333	Var7: Observation type	Profile	27.4
334	Var7: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)		27.5
335	Var7: Variable unit	milligrams per liter	27.7
336	Var7: Measured or calculated	Measured	27.8
337	Var7: Calculation method and parameters		27.9
338	Var7: Sampling instrument	SBE-43 dissolved oxygen sensor	27.10
339	Var7: Analyzing instrument		27.11
340	Var7: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)		27.12
341	Var7: Detailed sampling and analyzing information		27.13
342	Var7: Field replicate information		27.14
343	Var7: Uncertainty	plus or minus 2 percent of saturation	27.15
344	Var7: Data quality flag description	-999 indicates bad or missing data	27.16
345	Var7: Method reference (citation)		27.17
346	Var7: Biological subject (SPECIAL USE ONLY)		27.18
347	Var7: Species Identification code (SPECIAL USE ONLY)		27.19
348	Var7: Life stage of the Biological subject (SPECIAL USE ONLY)		27.20
349	Var7: Researcher Name	D. Christopher Melrose	27.21.1
350	Var7: Researcher Institution	NOAA Northeast Fisheries Science Center	27.21.2
351	Var8: Variable abbreviation in data files	CTDOXY	27.1
352	Var8: Full variable name	Dissolved Oxygen	27.2
353	Var8: Observation type	Profile	27.4

354	Var8: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)		27.5
355	Var8: Variable unit	micromoles per kilogram	27.7
356	Var8: Measured or calculated	Measured	27.8
357	Var8: Calculation method and parameters		27.9
358	Var8: Sampling instrument	SBE-43 dissolved oxygen sensor	27.10
359	Var8: Analyzing instrument		27.11
360	Var8: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)		27.12
361	Var8: Detailed sampling and analyzing information		27.13
362	Var8: Field replicate information		27.14
363	Var8: Uncertainty	plus or minus 2 percent of saturation	27.15
364	Var8: Data quality flag description	-999 indicates bad or missing data	27.16
365	Var8: Method reference (citation)		27.17
366	Var8: Biological subject (SPECIAL USE ONLY)		27.18
367	Var8: Species Identification code (SPECIAL USE ONLY)		27.19
368	Var8: Life stage of the Biological subject (SPECIAL USE ONLY)		27.20
369	Var8: Researcher Name	D. Christopher Melrose	27.21.1
370	Var8: Researcher Institution	NOAA Northeast Fisheries Science Center	27.21.2
371	Var9: Variable abbreviation in data files	SILCAT	27.1
372	Var9: Full variable name	Silicic acid concentration	27.2
373	Var9: Observation type	Profile	27.4
374	Var9: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	In-situ observation	27.5
375	Var9: Variable unit	micromoles per kilogram	27.7
376	Var9: Measured or calculated	Measured	27.8
377	Var9: Calculation method and parameters		27.9
378	Var9: Sampling instrument	SeaBird 32 Carousel Water Sampler	27.10
379	Var9: Analyzing instrument	The samples are analyzed using a Bran-Luebbe Autoanalyzer 3	27.11
380	Var9: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)		27.12
381	Var9: Detailed sampling and analyzing information	Water samples collected during vertical CTD profiles, analysis of Samples performed by Maura Thomas, University of Maine	27.13
382	Var9: Field replicate information		27.14
383	Var9: Uncertainty	0.22 micromolar detection limit	27.15
384	Var9: Data quality flag description	-999 indicates bad or missing data	27.16
385	Var9: Method reference (citation)	Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p.	27.17
386	Var9: Biological subject (SPECIAL USE ONLY)		27.18
387	Var9: Species Identification code (SPECIAL USE ONLY)		27.19
388	Var9: Life stage of the Biological subject (SPECIAL USE ONLY)		27.20
389	Var9: Researcher Name	David Townsend and Maura Thomas	27.21.1
390	Var9: Researcher Institution	University of Maine	27.21.2
391	Var10: Variable abbreviation in data files	NITRIT+NITRAT	27.1
392	Var10: Full variable name	Nitrate and Nitrite total concentration	27.2
393	Var10: Observation type	Profile	27.4
394	Var10: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	In-situ observation	27.5
395	Var10: Variable unit	micromoles per kilogram	27.7
396	Var10: Measured or calculated	Measured	27.8
397	Var10: Calculation method and parameters		27.9
398	Var10: Sampling instrument	SeaBird 32 Carousel Water Sampler	27.10

399	**Var10: Analyzing instrument**	The samples are analyzed using a Bran-Luebbe Autoanalyzer 3	27.11
400	**Var10: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
401	**Var10: Detailed sampling and analyzing information**	Water samples collected during vertical CTD profiles, analysis of Samples performed by Maura Thomas, University of Maine	27.13
402	**Var10: Field replicate information**		27.14
403	**Var10: Uncertainty**	0.12 micromolar detection limit	27.15
404	**Var10: Data quality flag description**	-999 indicates bad or missing data	27.16
405	**Var10: Method reference (citation)**	Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p.	27.17
406	**Var10: Biological subject (SPECIAL USE ONLY)**		27.18
407	**Var10: Species Identification code (SPECIAL USE ONLY)**		27.19
408	**Var10: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
409	**Var10: Researcher Name**	David Townsend and Maura Thomas	27.21.1
410	**Var10: Researcher Institution**	University of Maine	27.21.2
411	**Var11: Variable abbreviation in data files**	AMMONIA	28.1
412	**Var11: Full variable name**	Ammonia concentration	28.2
413	**Var11: Observation type**	Profile	27.4
414	**Var11: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
415	**Var11: Variable unit**	micromoles per kilogram	27.7
416	**Var11: Measured or calculated**	Measured	27.8
417	**Var11: Calculation method and parameters**		27.9
418	**Var11: Sampling instrument**	SeaBird 32 Carousel Water Sampler	27.10
419	**Var11: Analyzing instrument**	The samples are analyzed using a Bran-Luebbe Autoanalyzer 3	27.11
420	**Var11: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
421	**Var11: Detailed sampling and analyzing information**	Water samples collected during vertical CTD profiles, analysis of Samples performed by Maura Thomas, University of Maine	27.13
422	**Var11: Field replicate information**		27.14
423	**Var11: Uncertainty**	0.14 micromolar detection limit	27.15
424	**Var11: Data quality flag description**	-999 indicates bad or missing data	27.16
425	**Var11: Method reference (citation)**	Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p.	27.17
426	**Var11: Biological subject (SPECIAL USE ONLY)**		27.18
427	**Var11: Species Identification code (SPECIAL USE ONLY)**		27.19
428	**Var11: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
429	**Var11: Researcher Name**	David Townsend and Maura Thomas	27.21.1
430	**Var11: Researcher Institution**	University of Maine	27.21.2
431	**Var12: Variable abbreviation in data files**	PHSPHT	28.1
432	**Var12: Full variable name**	Phosphate concentration	27.4
433	**Var12: Observation type**	Profile	27.5
434	**Var12: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.7
435	**Var12: Variable unit**	micromoles per kilogram	27.8
436	**Var12: Measured or calculated**	Measured	27.9
437	**Var12: Calculation method and parameters**	SeaBird 32 Carousel Water Sampler	27.10
438	**Var12: Sampling instrument**	The samples are analyzed using a Bran-Luebbe Autoanalyzer 3	27.11
439	**Var12: Analyzing instrument**		27.12
440	**Var12: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**	Water samples collected during vertical CTD profiles, analysis of Samples performed by Maura Thomas, University of Maine	27.13
441	**Var12: Detailed sampling and analyzing information**		27.14
442	**Var12: Field replicate information**	0.17 micromolar detection limit	27.15

443	**Var12: Uncertainty**	-999 indicates bad or missing data	27.16
444	**Var12: Data quality flag description**	Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p.	27.17
445	**Var12: Method reference (citation)**		27.18
446	**Var12: Biological subject (SPECIAL USE ONLY)**		27.19
447	**Var12: Species Identification code (SPECIAL USE ONLY)**		
448	**Var12: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
449	**Var12: Researcher Name**	David Townsend and Maura Thomas	27.21.1
450	**Var12: Researcher Institution**	University of Maine	27.21.2
451	**Var13: Variable abbreviation in data files**	Niskin_nuts	28.1
452	**Var13: Full variable name**	Profile	27.4
453	**Var13: Observation type**	In-situ observation	27.5
454	**Var13: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**		27.7
455	**Var13: Variable unit**		27.8
456	**Var13: Measured or calculated**		27.9
457	**Var13: Calculation method and parameters**	SeaBird 32 Carousel Water Sampler	27.10
458	**Var13: Sampling instrument**	The samples are analyzed using a Bran-Luebbe Autoanalyzer 3	27.11
459	**Var13: Analyzing instrument**		27.12
460	**Var13: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**	Niskin bottle from where nutrients were sampled, at times different from Niskin used for CO2 parameteres, but tripped at the same depth.	27.13
461	**Var13: Detailed sampling and analyzing information**		27.14
462	**Var13: Field replicate information**		27.15
463	**Var13: Uncertainty**		27.16
464	**Var13: Data quality flag description**		27.17
465	**Var13: Method reference (citation)**		27.18
466	**Var13: Biological subject (SPECIAL USE ONLY)**		
467	**Var13: Species Identification code (SPECIAL USE ONLY)**		27.19
468	**Var13: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
469	**Var13: Researcher Name**		27.21.1
470	**Var13: Researcher Institution**		27.21.2