

## Abstract

“Shell Day” was a single-day regional water monitoring event coordinating simultaneous coastal carbonate chemistry observations by 59 community science programs and 7 research institutions in the northeastern United States, in which 410 total alkalinity (TA) samples from 86 stations were collected. Samples were collected at low, mid, and high tide by community science volunteers and brought to partnering research laboratories for sample processing. Minimum requirements for participation in Shell Day were the capacity to measure water temperature and salinity – some organizations used thermometers and refractometers, and others used multiparameter datasondes or handheld units. An analysis and interpretation of the temperature, salinity, and total alkalinity data can be found at Rheuban et al 2020 Environ. Res. Lett. in press <https://doi.org/10.1088/1748-9326/abcb39>. Included in this dataset are measurements of water temperature, salinity, total alkalinity, pH, dissolved oxygen concentration, dissolved oxygen saturation, total depth, secchi disk depth, chlorophyll, turbidity, as well as air temperature and barometric pressure, and qualitative assessments of wind, weather, and cloud cover.

## Introduction

Variable descriptions below correspond to columns of data in the data file. Data that were not reported on the sampling sheets or not measured on a sample are given the value of -9999. *Temperature, salinity, and total alkalinity* data were quality controlled according to the QAPP written for this event (see QAPP document uploaded with data/metadata). No other measurements have been quality controlled.

Quality Control codes are:

- 1 - Good - data passed all quality control checks
- 2 - Bad - known issues associated with sampling or sample processing.
- 3 - Questionable - data failed at least one data quality control check (high variability in laboratory replicates, high variability between field duplicates, unusual or unexpected TA based on salinity)

## Data columns and description:

**Site Number** - Unique site identifier. Stations were assigned unique IDs based on the returned field data sheets and bottles from each sampling participant.

**Open House** - Indicates the institution where the open house was held to receive samples.

**Organization** - Indicates the water quality monitoring organization who participated in sample collection at each field site, or whose regularly monitored field sites were sampled on Shell Day.

**State** - US State waters where the sampling station was located.

**Wild or Aquaculture Shellfish Near** - Qualitative assessment of whether there were wild populations of shellfish or aquaculture operations near the sampling station. (Yes, No, Unknown)

**Station Name** - Monitoring organization's unique name for sampling station.

**Latitude - N** - Latitude of sampling station in decimal degrees North (WGS84).

**Longitude - W** - Longitude of sampling station in decimal degrees West (WGS84).

**Waterbody Name** - Name of the estuary or embayment where the sampling station was located.

**Reference Tide Station** - NOAA tidal station used as a reference to determine approximate sampling time.

**Last 24 hr Rainfall** - Estimated rainfall over the 24 hours prior to sample collection.

**Tide** - stage of tidal cycle when the samples were collected (Low, Mid, or High).

**Water Depth (m)** - Water depth during the time of sample collection (meters).

**Secchi Depth (m)** - Secchi depth during the time of sample collection (meters).

**Air Temp (degC)** - Air temperature (degrees celsius).

**% Cloud Cover** - Cloud cover during the time of sample collection as estimated by the volunteer.

**Weather** - Weather conditions during the time of sample collection as estimated by the volunteer.

**Sea State** - Sea state using the Beaufort scale during the time of sample collection as estimated by the volunteer. Values are defined as 0-4 where: 0 = calm/glassy, 1 = calm/rippled, 2 = Smooth/small wavelets, 3 = slight waves, 4 = moderate waves.

**Sample Depth (m)** - Depth of sample collection (meters).

**Time** - Time of sample collection (local time, EDT).

**Water Temp (degC)** - Water temperature during the time of sample collection (degrees celsius).

**Temperature Flag** - QC flag for field temperature data.

**Field Salinity (PSU)** - Salinity as measured in the field (practical salinity units).

**Salinity Flag** - QC flag for field salinity data.

**Lab Salinity (g/kg)** - Salinity as measured in the laboratory on the water collected for total alkalinity - measured using Guildline Portasal (grams per kilogram).

**DO (mg/L)** - Field dissolved oxygen concentration at in situ temperature and salinity measured using a handheld sensor (milligrams per liter).

**pH (NBS)** - Field pH at in situ temperature and salinity measured using a handheld sensor. Data reported on the NBS scale. Uncertainty unknown, but likely +/- 0.1 units.

**Turbidity (NTU)** - Field turbidity at in situ temperature and salinity measured using a handheld sensor (Nephelometric Turbidity Units).

**Chlorophyll (ug/L)** - Field chlorophyll measured using a handheld sensor (micrograms per liter).

**Conductivity (ms)** - Field conductivity measured using a handheld sensor (millisiemens).

**Barometric Pressure (mmHg)** - Barometric pressure measured using a handheld sensor.

**DO (% saturation)** - Field dissolved oxygen percent saturation at in situ temperature and salinity measured using a handheld sensor (percent).

**TA (mg/l)** - Total Alkalinity measured by volunteers. Method unknown. Data reported in milligrams of Calcium Carbonate per liter.

**TA (umol/kg)** - Total alkalinity measured by institutional partnering laboratory (micromoles per kilogram). Method for each sampling event corresponds to the column labeled LAB.

**Data Quality Flag** - Data quality flag for TA.

**TA\_rep1 (umol/kg)** - Total alkalinity measured by institutional partnering laboratory. (micromoles per kilogram). Method for each sampling event corresponds to the column labeled LAB. Field duplicate #1.

**Data Quality Flag Rep1** - Data quality flag for TA\_rep1.

**TA\_rep2 (umol/kg)** - Total alkalinity measured by institutional partnering laboratory (micromoles per kilogram). Method for each sampling event corresponds to the column labeled LAB. Field duplicate #2.

**Data Quality Flag Rep2** - Data quality flag for TA\_rep1

**LAB** - Institutional partnering laboratory where samples were processed. Samples were processed using methods according to the table below. Method and instrument uncertainties can be found in the QAPP uploaded with the data. Uncertainty for all methods used for total alkalinity analysis is < 0.4%.

Table 1. List of laboratory facilities and instruments. Samples were analyzed for TA via automated open-cell gran titration (1) or modified single-point titration (2).

Partnering Laboratory	Titration Brand	Method
Bowdoin College (BOWDOIN)	Metrohm 905 Titrand	1
EPA Atlantic Coastal Environmental Sciences Division (EPA)	Apollo SciTech Model AS-ALK2	1
Northeastern University Marine Science Center (NORTHEASTERN)	VINDTA 3C (Marine Analytics and Data)	1
Massachusetts Institute of Technology (MIT)	Custom built by Andrew Dickson Laboratory UCSD	1
Woods Hole Oceanographic Institution (WHOI)	Metrohm 808 Titrand	1
University of Connecticut (UCONN)	Contros HydroFIA	2
University of New Hampshire (UNH)	Contros HydroFIA	2

**Station Characteristics** - Type of waterbody and/or station location within an estuary (Coastal Ocean, Upper Estuary, Mid Estuary, Lower Estuary).

**Substrate** - Estimated benthic substrate (sandy, muddy, rocky, etc).

**Salinity Method** - Method of field salinity measurement. Reported values include multiparameter datasonde, refractometer, Hanna meter, or not reported.

**Temperature Method** - Method of field temperature measurement. Reported values include multiparameter datasonde, thermometer, or not reported.

**Sonde Make/Model** - Make and/or model of the handheld instruments used to measure field temperature and salinity.

**Date of Calibration** - Date of last calibration of multiparameter datasondes or handheld instruments.