

**Northeast Coastal and Barrier Network
Inventory and Monitoring Program**

**NCBN Coastal Topography 2D
Monitoring Database
User's Guide**

Version 1.1

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Table of Contents

<i>Getting Started</i>	3
File Directory Structure	3
Accessing the Coastal Topography Front-end and Desktop Applications	4
<i>Coastal Topography Front-end Application - The Main Menu</i>	6
Reports Tab	6
Surveys Tab	7
Look Ups Tab	8
Locations Tab	9
Admin Tab	11
<i>Data Entry</i>	13
Adding a Survey Event	13
Data Import Using the Desktop Client Import Application	14
Importing Survey Measurement Data File	14
Importing Artifacts	15
Finalizing a Survey Event	18

Getting Started

The Coastal Topography 2D Monitoring database consists of a single, main SQL server database; a web-based front-end application hosted on the NPS Integrated Resource Management Applications (IRMA) Portal; and a stand-alone desktop application for uploading associated data artifacts to IRMA. This User's Guide was created to instruct approved Network personnel in the methods for data entry and to outline the organization of the database. Only authorized personnel may input or alter information in the database.

File Directory Structure

In order to ensure proper functioning of the database and to ease the process of data archiving, the following guidelines are provided for creating a coherent, consistent directory structure on the NCBN server to store associated data files and applications. When a park has delivered a complete set of transect data from a monitoring season, it is important for the Project Lead to first examine the dataset for completeness before the data are uploaded to the database.

Figure 1 outlines how new folders are created for each park/year/season as data are received.

Each such folder should contain the following types of data files:

- Raw data (.zip archive file)
- Formatted data (.csv)
- Copy of Field Data Form (.pdf)
- Photos (.zip archive file)

Raw data. These files contain the complete raw survey data collected from the GNSS rover receiver, as well as information regarding any real-time correction services used (network or local base station). These data are generally exported from the data collector/controller or post-processing software.

Formatted data. These are exported data files that contain transect ID, northing and easting coordinates, elevation, and other information for each topo point collected during the survey. These tables are generated by exporting survey data from post-processing software such as Trimble Business Center (TBC). Field technicians and Project Leads should ensure that northing and easting coordinates are not mistakenly transposed and that there is a "Comments" column present.

Copy of the Field Data Form (FDF). Either a scan of the original paper form or as digital version, these files contain written details about the survey event from each surveyor. They contain important notes that describe any issues in the field such as difficulties in accessing a transect, or problems encountered with the survey equipment. This information is necessary for post-processing of the data and to facilitate the creation of accurate metadata.

Photos. One or more photos are taken at each transect at the time of the survey.

Once the completeness of the survey deliverables has been verified, the files should be stored on the NCBN server, which is automatically backed up on a nightly and weekly basis. Folder structure should follow the same convention as in Figure 1. In that example, the folder entitled, “GATE_2D_Spring2019” contains the monitoring data files from that season.

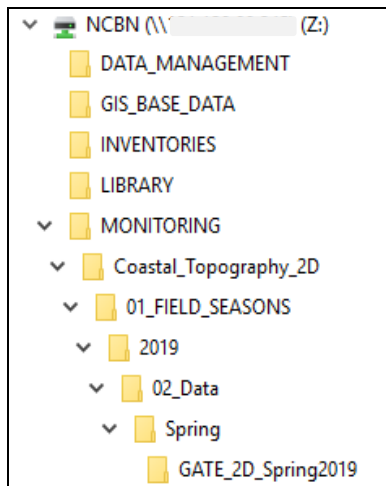


Figure 1. File structure of NCBN Coastal Topography 2D monitoring data.

Accessing the Coastal Topography Front-end and Desktop Applications

The web-based front-end application (Figure 2) was developed to enter, store, and validate data collected by the NCBN Coastal Topography Monitoring Program, as well as to generate reports of certified data. The front-end Coastal Topography App can be accessed at:

<https://irma.nps.gov/NCBN/CoastalTopography/app/>

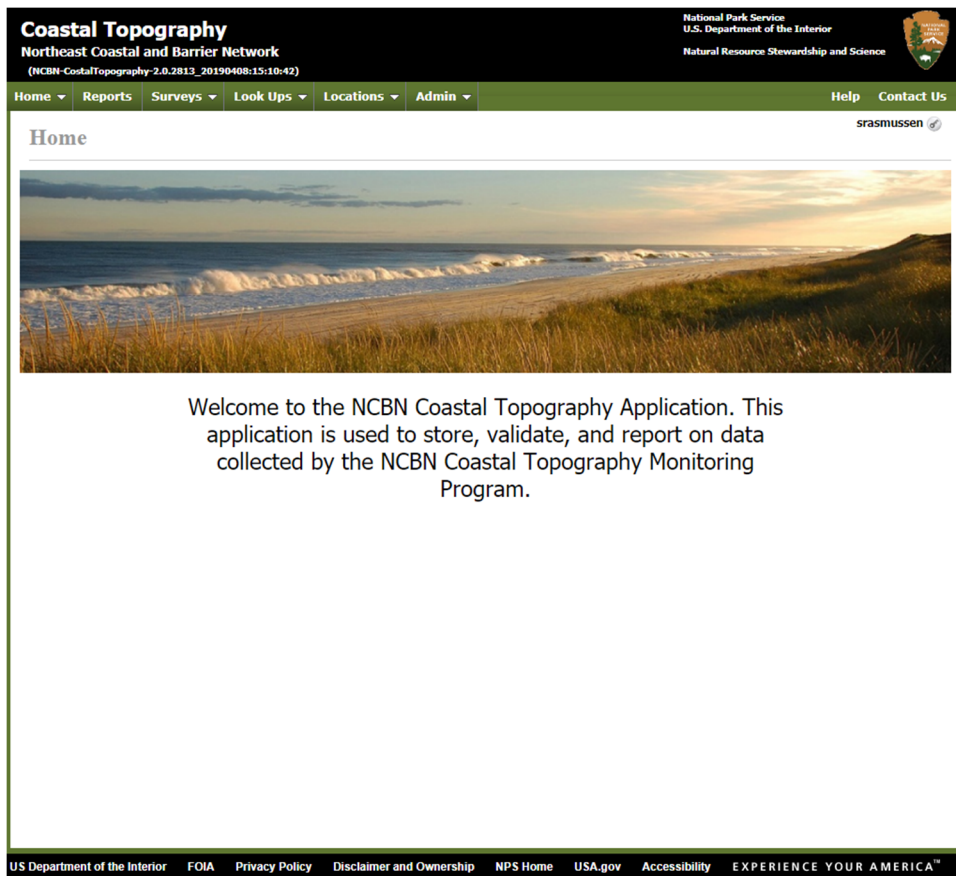


Figure 2. Home page of the NCBN Coastal Topography Front-end Application.

Once a survey event has been created in the front-end application, users can easily upload surveyed transects data, profile field sheets, and photos via a Desktop Client Import Tool. For first time users, a required certificate must be installed on each laptop/desktop running the Import Tool. This is a one-time installation process per machine and must be done before installing the Import Tool.

To install the tool, go to the home page of the Coastal Topography front-end application (Figure 2), hover over the “Home” tab, and select “Desktop Client Download”. Follow installation instructions on that page (Figure 3). Once the “Download Certificate” tab is pressed, the Certificate Import Wizard will launch and guide the user through the certificate installation process.

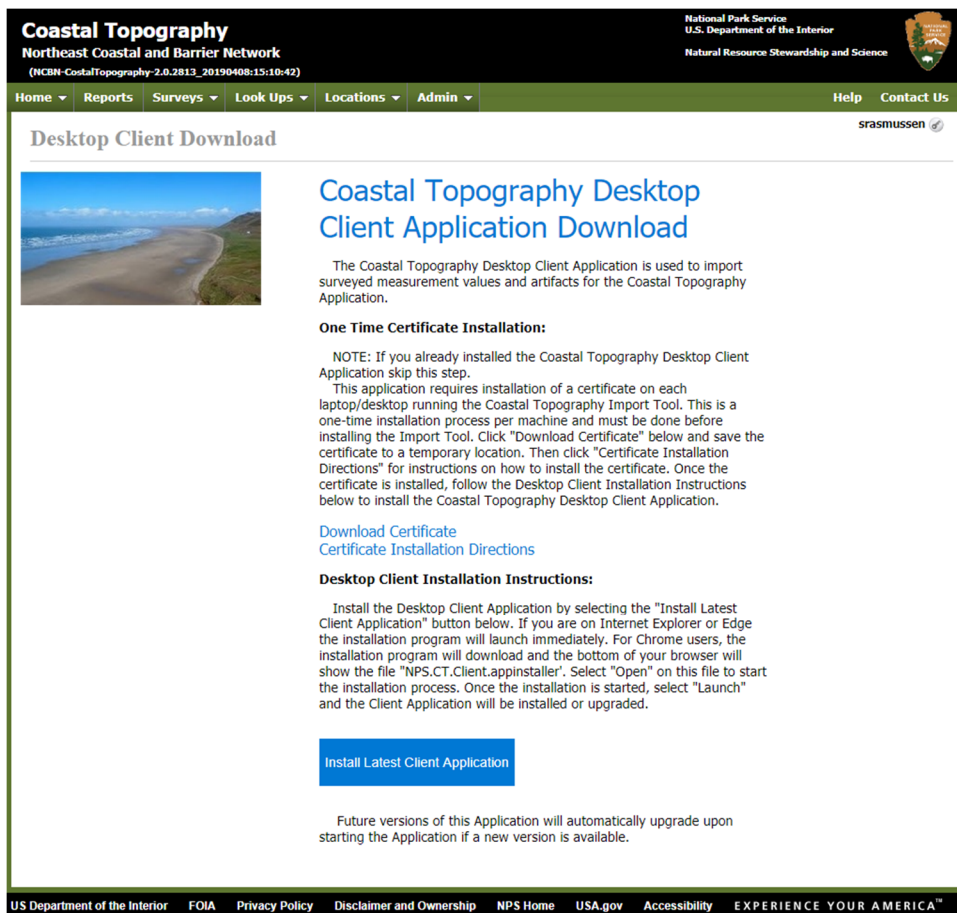


Figure 3. NCBN Coastal Topography Desktop Client Application Download.

Note: Updates will be made periodically to reflect improvements/changes to the monitoring protocol and its associated SOPs. As future versions of the Coastal Topography applications are released, upgrades will be clearly reflected upon launching each app.

There is a Help link on the Coastal Topography front-end listing answers to frequently asked questions for users having difficulties using the applications. For further assistance and all other information about the application, please contact:

Dennis Skidds
Dennis_skidds@nps.gov
 401-874-4305

Coastal Topography Front-end Application - The Main Menu

Reports Tab

The Reports tab can be used to quickly create a report of survey data that have been entered into the database. There are several types of reports that can be generated, including a list of Survey Control Monuments (Benchmarks), a summary of Surveyed Transect Measurements,

and list of Physical and Virtual Transect Monuments (Transect Benchmarks). Once a report type is selected, a screen will appear with a series of drop-down options. The user can filter by criteria such as Park Code, Park Unit, or Survey Year and then select the “View Report” button in the upper right-hand corner of the screen (Figure 4). The user can export the report in one of several formats: XML, CSV, PDF, MHTML, Excel, TIFF, or Word doc.

Park Code(s) Park Sub Unit(s)

Park Section(s) Is Active

Protected Status

[View Report](#)

Figure 4. Drop down selection of a report generator.

Surveys Tab

The Survey Events List details all topographical surveys that have been entered into the database. Users can search for particular survey events by filtering the list either by park name, sub-unit name, survey season, or survey year. To view or edit an existing survey event, click the edit icon  to the far left of any survey event listed in each row. To create a new survey event, simply click “Add New Survey Event” located on the upper right-hand corner of the Survey Events table (Figure 5).

Coastal Topography
Northeast Coastal and Barrier Network
(NCBN-CoastalTopography-2.0.2813_20190408:15:16:42)

National Park Service
U.S. Department of the Interior
Natural Resource Stewardship and Science

Home Reports Surveys Look Ups Locations Admin Help Contact Us

srasmussen

Survey Events List

Park

Park Sub Unit

Survey Season

Survey Year

Include Supplemental Surveys ☒

[Clear Filters](#)

Survey Events

[Add New Survey Event](#)

	Location ^	Survey Date ^	Survey Qualifier	Survey Season	Observer	Supplemental Surv...	Data Processing L...
	ASIS	04/17/2019	Successful	Spring	Winn, Neil	No	Raw
	ASIS	04/16/2019	Successful	Spring	Winn, Neil	No	Raw
	ASIS	04/15/2019	Successful	Spring	Winn, Neil	No	Raw
	GATE - JBU - BP	10/17/2018	Successful	Fall	Ames, Katy	No	Raw
	ASIS	10/15/2018	Successful	Fall	Winn, Neil	No	Raw
	GATE - JBU - BP	10/10/2018	Successful	Fall	Ames, Katy	No	Raw
	GATE - SIU - GK	10/08/2018	Successful	Fall	Ames, Katy	No	Raw
	GATE - SIU - GK	10/08/2018	Successful	Fall	Habeck, Andrea	No	Raw
	GATE - JBU - BP	10/03/2018	Successful	Fall	Habeck, Andrea	No	Raw
	GATE - SHU	09/27/2018	Successful	Fall	Ames, Katy	No	Raw
	GATE - SHU	09/27/2018	Successful	Fall	Liu, Glenn	No	Raw
	GATE - SHU	09/26/2018	Successful	Fall	Liu, Glenn	No	Raw
	GATE - SHU	09/26/2018	Successful	Fall	Ames, Katy	No	Raw
	GATE - JBU - PB	09/24/2018	Successful	Fall	Liu, Glenn	No	Raw
	GATE - JBU - PB	09/24/2018	Successful	Fall	Ames, Katy	No	Raw
	GATE - SIU - FW	09/24/2018	Successful	Fall	Liu, Glenn	No	Raw
	GATE - SIU - FW	09/24/2018	Successful	Fall	Ames, Katy	No	Raw
	GATE - SIU - MF	09/24/2018	Successful	Fall	Liu, Glenn	No	Raw

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Figure 5. Survey Events List

Look Ups Tab

Lists of current observers, equipment, equipment types, and correction services used to populate drop-down menus in the database can be found here. If the user is entering a new survey event, they should first ensure the applicable observer, equipment, etc. are listed here; otherwise, those options will not appear in the drop-down menus for selection. To create a new entry for any of the Look Up categories, simply click “Add New...” in the right-hand corner of the managing tables.

Observers. Observers are the individuals who conducted the survey in the field. Figure 6 is the pop up that appears to enter new observer information into the database. It is important to fill in the fields as completely as possible.

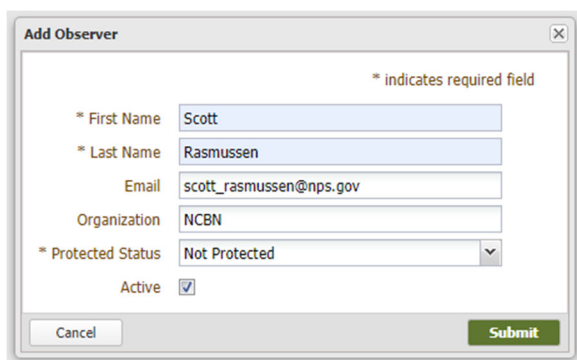
A screenshot of a web application window titled "Add Observer". The window contains several input fields: "First Name" (filled with "Scott"), "Last Name" (filled with "Rasmussen"), "Email" (filled with "scott_rasmussen@nps.gov"), "Organization" (filled with "NCBN"), "Protected Status" (a dropdown menu set to "Not Protected"), and "Active" (a checked checkbox). A legend at the top right states "* indicates required field". At the bottom are "Cancel" and "Submit" buttons.

Figure 6. Add Observer pop up

Equipment. The equipment list references the GNSS receivers used for the survey. The user can specify if the receiver was used as a base station or rover. Although not a required field, entering in the device’s serial number will help track an individual receiver’s survey history and can help pinpoint any survey errors should they arise. Figure 7 is the pop up that appears to enter a new receiver information into the database.

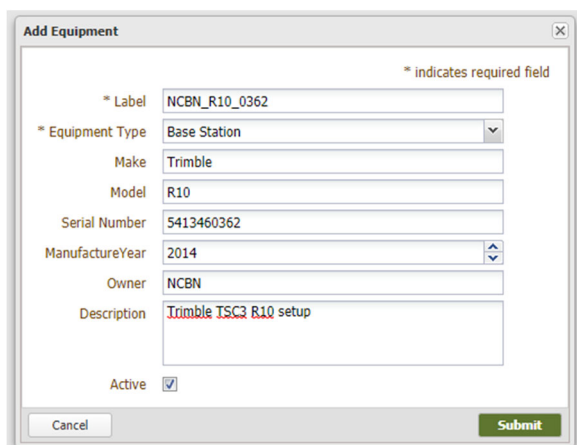
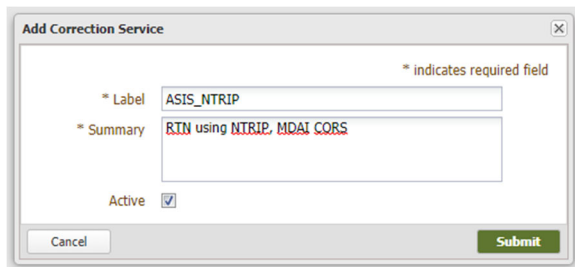
A screenshot of a web application window titled "Add Equipment". The window contains several input fields: "Label" (filled with "NCBN_R10_0362"), "Equipment Type" (a dropdown menu set to "Base Station"), "Make" (filled with "Trimble"), "Model" (filled with "R10"), "Serial Number" (filled with "5413460362"), "ManufactureYear" (a dropdown menu set to "2014"), "Owner" (filled with "NCBN"), and "Description" (filled with "Trimble TSC3 R10 setup"). A legend at the top right states "* indicates required field". At the bottom are "Cancel" and "Submit" buttons.

Figure 7. Add Equipment pop up.

Equipment Types. Equipment types refer to how the GNSS receivers are being used: either as a base station sending out position corrections or as a rover receiving the corrections.

Correction Services. Correction Services are selected if the survey is conducted using a real-time network (RTN) to make real time position corrections. Figure 8 is the pop up that appears to enter the information for a new network correction service. Be sure to include in the summary which station network or individual Continually Operated Reference Stations (CORS) (if using a single baseline) is being utilized for position corrections



The image shows a software dialog box titled "Add Correction Service". It has a close button (X) in the top right corner. Inside the dialog, there is a text input field for "Label" containing the text "ASIS_NTRIP". Below it is another text input field for "Summary" containing the text "RTN using NTRIP, MDAI CORS". To the right of these fields is a small asterisk with the text "* indicates required field". Below the "Summary" field is a checkbox labeled "Active" which is checked. At the bottom of the dialog are two buttons: "Cancel" on the left and "Submit" on the right.

Figure 8. Correction Services pop up.

Locations Tab

The names and locations of monuments and transects used for topographic profiling are found here. Each profile has its own transect label and starting point (physical or virtual transect monument).

Benchmarks. The starting point can be an actual survey control monument, a physical transect monument or a virtual monument. These monuments are positioned to be protected from erosion, ease access from vegetated areas, and promote the usability of the transect over time. The survey control monuments can also be listed as locations for a base station GNSS receiver if the surveyor is using an RTK survey style. Figure 9 is the pop up that appears when entering a new monument into the database. It is important to be complete as possible, including information that can aid in determining how the monument's coordinates were calculated.

Add Benchmark

* indicates required field

* Benchmark ID

BREEZY 2016

* Benchmark Type

Survey Control Monument

Description

Stainless steel rod in greased sleeve

* Park Name

Gateway National Recreation Area

Park Sub Unit

Jamaica Bay

Park Section

Breezy Point

* Northing (meters)

4490048.273

* Easting (meters)

590360.773

* Orthometric Height (meters)

3.759

* Spatial Reference

NAD83_2011_UTMZ18N_NAVD88_GEOID18

* Latitude (degrees)

40.55627

* Longitude (degrees)

-73.88161

* Ellipsoid Height (meters)

-28.545

Field Booklet Page

NGS PID

BBFL14

Datasheet URL

<https://www.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBFL14&ts=17013135443>

Navigate to Datasheet

Date Established

12/07/2016

Date Last Surveyed

Established By

URI-EDC

* Protected Status

Not Protected

* Time Zone

Eastern

In Use

☒

Cancel

Submit

Figure 9. Add Benchmark pop up.

Transects. Each transect originates from a physical or virtual transect monument and extends in a straight line along a given azimuth. Transects extend well beyond the shore to allow for sediment accretion. The dynamics of a section of shoreline may necessitate occasional adjustment to the transect direction. In this case, a new transect should be established with a new transect name. Figure 10 is the pop-up to be populated with the relevant information for a new transect.

Add Transect

* indicates required field

Park Name: Gateway National Recreation Area

* Transect Label: GATE_SH17

* Original Benchmark: SH9 - Physical Transect Monument

Description:

* Azimuth: 72

Original Benchmark Information

Northing (meters): 4481179.25

Easting (meters): 584558.35

Orthometric Height (meters): 3.86

Spatial Reference: NAD83_2011_UTMZ18N_NAVD88_GEOID12B

* Date Established: 03/19/2009

Established By:

Notes: GATE_SHU_PROFILES_V1ASLATLONG

Operational Benchmark: SH17 - Virtual Transect Monument

Related Transect: Select Transect...

Active: ☒

Cancel Submit

Figure 10. Add Transect pop up.

Admin Tab

These administrator utilities define survey parameters within the Coastal Topography application. They should not be changed unless there has been a modification or an update to a utility.

Users. There are two types of users of the Coastal Topography database: contributors/viewers and administrators. The former have the ability to query reports and enter survey data, while the latter have the additional ability to edit any sections under the Admin tab.

Parks. These are the NCBN park units where the Coastal Topography Monitor Protocol is implemented. In the case of GATE, there are additional sub-units (Jamaica Bay, Sandy Hook, Staten Island). The Jamaica Bay sub-unit has two park sections (Breezy Point and Plumb Beach), while the Staten Island sub-unit has three park sections (Fort Wadsworth, Great Kills, and Miller Field).

Survey Seasons. This section specifies the calendar window for each of the survey seasons.

Protocols. This table specifies which version of the Coastal Topography Monitor Protocol – including all methods, procedures, and guidelines – was in effect during any given survey year. The current protocol is the NCBN Coastal Topography v 2.00. Any surveys conducted using a previous protocol version may have used slightly different methods, which should be well understood discussing long term trends of shoreline change. As protocols are updated, a new

protocol name should be added taking note to add the datastore reference code, description, and implementation date (Figure 11).

The screenshot shows a web-based form titled "Edit Protocol". At the top right, it says "* indicates required field". The form has the following fields and values:

- * Name: NCBN Coastal Topography October 2012
- * DataStore Reference Code: 2190640
- * URL: <https://irma.nps.gov/DataStore/Reference/Profile/2190640>
- * Begin Implementation Date: 10/01/2012 (with a calendar icon)
- Description: Northeast Coastal and Barrier Network geomorphological monitoring protocol: Part II - coastal topography
- End Implementation Date: (empty, with a calendar icon)

Below these fields, there is a section for metadata:

- Created By: DSkidds@nps.gov
- Created Date: Wed May 16 2018 02:00:00 GMT-0400 (Eastern Daylight Time)
- Last Modified By: DSkidds@nps.gov
- Last Modified Date: Wed May 16 2018 02:00:00 GMT-0400 (Eastern Daylight Time)

At the bottom, there are two buttons: "Cancel" and "Submit".

Figure 11. Add protocol pop up.

Benchmark Types. There are three types of benchmarks or “monuments” involved in topographic surveys. A survey control monument is a physical marker (disc or deep rod) used for an RTK GNSS base station and/or as a check-in point to ensure correction services are providing accurate information. In some cases, they can also act as the starting point of a survey transect. A physical transect monument is used for locating survey transects but are typically shallow in nature and can be subject to movement. These are not used for survey control (base station or check-in). Lastly, a virtual transect monument represents the point of origin for a survey transect but that exist as coordinates only and not as a physical monument.

Survey Qualifiers. This refers to the ability of the surveyor to complete a planned survey. The two options are either successful or not successful.

Settings. These are the required accuracy parameters used as a quality check for the survey. Any point collected that falls outside the 50 cm transect buffer or outside the 5 cm buffer of the survey monument check-in or transect monument will be automatically flagged. These accuracy settings should not be changed unless a new setting has been determined and documented in a protocol revision.

Spatial References. The two types of references stored here are spatial and geodetic. The spatial reference dictates to what coordinate system the survey data are projected. In this case, the Universal Transverse Mercator (UTM) system is used with the appropriate zone. For NCBN units, GATE, FIIS, ASIS, GEWA, THST, and COLO should choose zone 18N while CACO falls within zone 19N.

The geodetic reference should always be the latest iteration of NAD 1983, which is currently NAD 1983, adjustment 2011, epoch 2010.0. This should not be changed until a new realization

of NAD 83 has been calculated or the National Spatial Reference System (NSRF) is otherwise updated.

Data Entry

After the look-up table values mentioned above have been loaded into the database, the user can now enter new survey event data and upload files. To begin, navigate to the Coastal Topography Front-end Application, click the Surveys tab, and select the Add New Survey Events on the upper right corner of the Survey Events List table (Figure 5). This will open the Add/Edit Survey Event page (Figure 12)

Adding a Survey Event

Survey Event. In the Add/Edit Survey Event page (Figure 12), the user should select the appropriate options from each of the drop-down menus under the Event Information, GNSS-RTK Device, and Accuracy Checks sections. The position offset of the check-in to the accepted coordinates of the benchmark will be automatically calculated. The user should ensure all information is identical to what was written on the field data form before pressing the “Submit” button in the lower right-hand corner.

The screenshot displays the 'Add/Edit Survey Event' web form. At the top, the header includes 'Coastal Topography', 'Northeast Coastal and Barrier Network', and the National Park Service logo. A navigation bar contains links for Home, Reports, Surveys, Look Ups, Locations, Admin, Help, and Contact Us. The form itself has tabs for Survey Event, Survey Notes, Surveyed Transects, Survey Measurements, Survey Artifacts, and Data Processing Level. The 'Survey Event' tab is active, showing fields for Event Information (Survey Date, Park Name, Park Sub Unit, Park Section, Spatial Reference, Start Time, End Time, Observer, Survey Qualifier, Protocol/SOP, Survey Season, Deviation Reason, Last Storm Date), GNSS - RTK Device (Base Benchmark used, Correction Service used, Base Station, Correction Service, Rover), and Accuracy Checks (Pre-Survey Benchmark, Post-Survey Benchmark, Pre-Survey Buffer Status, Post-Survey Buffer Status, Accuracy Notes). The form includes a 'Submit & Exit' button and a 'Submit' button. The footer contains links for US Department of the Interior, FOIA, Privacy Policy, Disclaimer and Ownership, NPS Home, USA.gov, Accessibility, and EXPERIENCE YOUR AMERICA.

Figure 12. Add/Edit Survey Event screen

Data Import Using the Desktop Client Import Application

Importing Survey Measurement Data File

The user should open the Coastal Topography Import Application to upload survey measurement data files, raw data files, photos, and scanned field data forms into the database. Open the application on a laptop or desktop connected to the NPS network (either directly or via VPN) and click on “Import Measurements” on the left-hand navigation bar (Figure 13). On the Select Event dropdown menu, choose the survey event that was recently added using the Coastal Topography Front-end Application (above). To choose a Survey Measurement Data File, navigate to and select the appropriate file that contains the formatted survey data. Enter “Survey Measurement Data” for the description and press the “Upload Measurements” button. A message in red will appear detailing the results of the upload. If the upload was not successful, the user should check the formatted table for errors such as omitting a “Comments” column, northing and easting presented in the wrong order, or a point taken with an unknown point ID or transect ID. Continue the previous step until the upload is successful. Refer to Table 1 for the correct column names and order to ensure a successful upload of a Survey Measurement Data File.

Table 1. Survey Measurement Data File column names

Column	Name
A	TransectLabel
B	PointLabel
C	Attributes
D	Northing_meters
E	Easting_meters
F	Elevation_meters
G	Longitude
H	Latitude
I	EllipsoidHeight_meters
J	HorizontalPrecision
K	VerticalPrecision
L	FromPointID
M	DateTimeStamp
N	Comments

Import Measurements

Import Coastal Topography Survey Measurements

Select Event:

GATE_SIU_GK_2016-04-06_12:00_Katy_Ames

Select Measurement File:

Choose File

GATE_SIU_GK_2D_201604068_formatted.csv

Description:

Formatted Data

Upload Measurements

Successfully Imported 5 Survey Transects and 182 Survey Measurements.

Type	Message
Warning	Buffer Check Warning. 0.53 m exceeds 0.50 m buffer for GATE_SIU_GK1_GK1_18
Warning	Buffer Check Warning. 0.51 m exceeds 0.50 m buffer for GATE_SIU_GK1_GK1_20
Warning	Buffer Check Warning. 0.52 m exceeds 0.50 m buffer for GATE_SIU_GK1_GK1_21
Warning	Buffer Check Warning. 0.58 m exceeds 0.50 m buffer for GATE_SIU_GK1_GK1_23
Warning	Buffer Check Warning. 0.65 m exceeds 0.50 m buffer for GATE_SIU_GK1_GK1_24
Warning	Buffer Check Warning. 0.54 m exceeds 0.50 m buffer for GATE_SIU_GK4_GK4_15

Figure 13. Import Measurements screen used to upload formatted survey data to the database.

Importing Artifacts

Artifacts are supporting files accompanying each transect survey. Such files include: a zipped file of the raw survey data, a scanned copy of the field data form, and a zipped file containing transect photos taken during the survey. To upload an artifact to the database, select the “Import Artifacts” tab on the left-hand navigation bar (Figure 14). Select the desired survey event that corresponds with the artifacts to be uploaded. Survey events that do not yet have any associated artifacts will look like Figure 14. To begin adding artifacts to a survey event, click the “Add Artifact”  button in the upper right-hand corner.

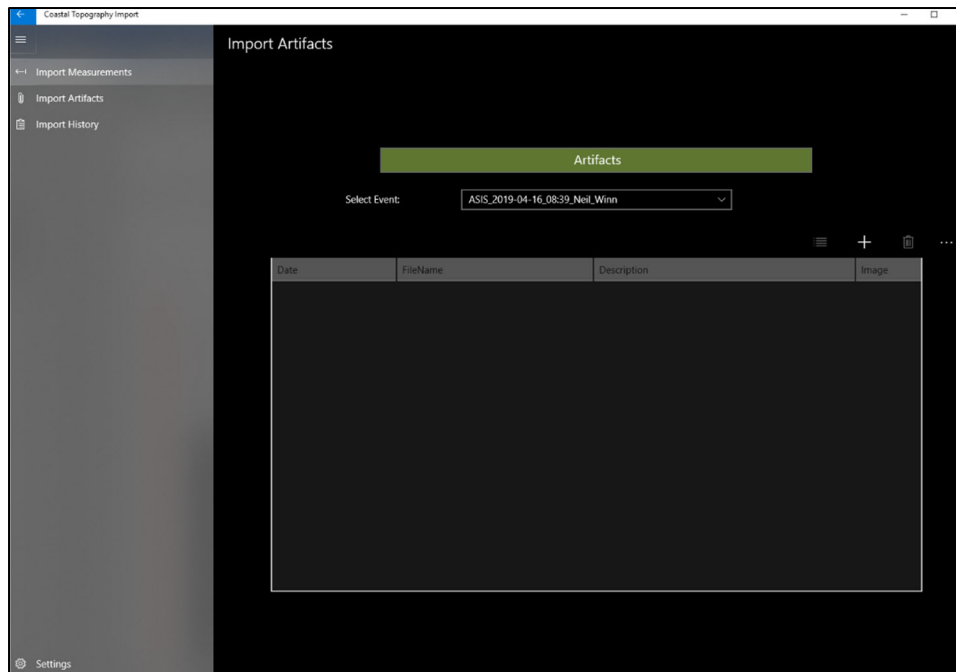


Figure 14. Import Artifacts screen with no artifacts associated with the survey event.

The New Artifact screen appears after the “Add Artifact” button is selected (Figure 15). Navigate to the appropriate file using the “Select Artifact” button. Enter in a description of the artifact and press the “Save” button in the upper right-hand corner. Repeat this step until all artifacts (Field Data Form, zipped raw data files, and zipped photos) have been associated with the survey event (Figure 16).

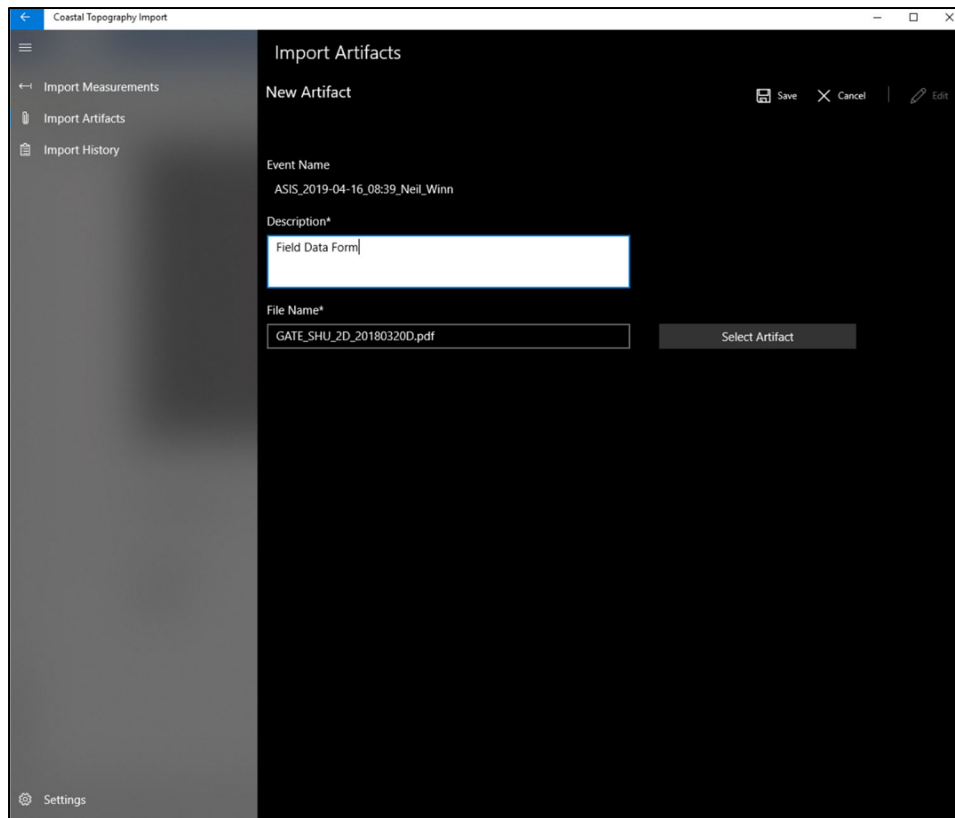


Figure 15. Import Artifacts screen used to add a new artifact to a survey event.

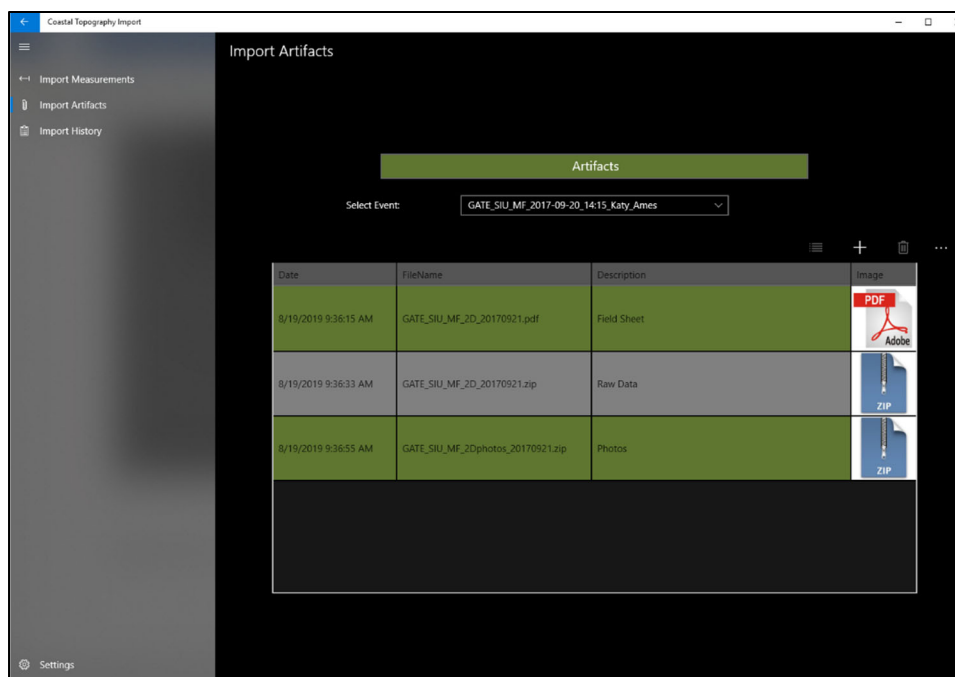
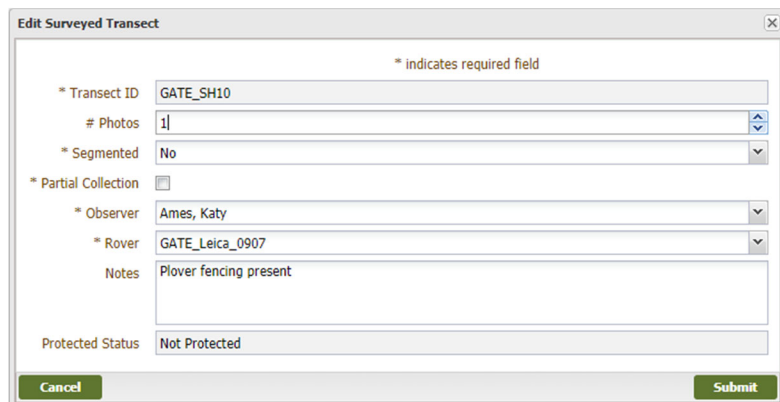


Figure 16. Import Artifacts screen after successfully adding all artifacts to a survey event.

Finalizing a Survey Event

After all artifacts and survey measurements have been uploaded to a survey event, the user should return to the web-based Coastal Topography Front-end App to finalize the remaining information. To add survey notes (if any), press the “Survey Notes” tab and record the time and notes from the field at the bottom of the Field Data Form. Next, select the “Surveyed Transects” tab. The table will list all transects surveyed for that particular survey event. Select the edit  button to add the number of photos taken of that transect along with any survey profile notes (monument condition, aspects of morphology, etc.) as shown in Figure 17.



Edit Surveyed Transect

* indicates required field

* Transect ID: GATE_SH10

Photos: 1

* Segmented: No

* Partial Collection: ☐

* Observer: Ames, Katy

* Rover: GATE_Leica_0907

Notes: Plover fencing present

Protected Status: Not Protected

Cancel Submit

Figure 17. Edit Surveyed Transect table to enter the number of photos taken and any notes pertaining to the transect.

Finally, ensure tabs “Survey Measurements” and “Survey Artifacts” contain the associated data/files uploaded from the Coastal Topography Import tool.

At this point, the “Data Processing Level” (final tab) should be set to “Raw”. This means all data/files have undergone some quality assurance procedures and been entered into the database but have not yet undergone any quality control procedures. The Project Lead sets the Data Processing Level to “Provisional” when all data have undergone all planned quality assurance procedures, have been entered into the system of record, and have passed 100% verification procedures to ensure data in the system of record match the source data. The Project Lead sets the Data Processing Level to “Accepted” when the data have undergone all QA and QC procedures as defined in the latest protocol and are suitable to be published.