

**USFWS NATIONAL WILDLIFE REFUGE COMPANION GUIDE
TO THE
NATIONAL PARK SERVICE (NCBN) COASTAL SHORELINE MONITORING
PROTOCOL AND STANDARD OPERATING PROCEDURES**

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This document is intended to consolidate the information critical for USFWS to begin conducting coastal shoreline surveys. The following will identify specifics for refuges in terms of needed data, ArcPad settings, tide stations, refuge codes and file naming, geodatabase structure, data collection, post processing, and data submission procedures. This is intended to compliment National Park Service’s NCBN Coastal Shoreline Monitoring Protocol and is not intended to be a standalone document. The exception being the section titled “**Breaking down the data collection, post processing, and data submission process**” which is a standalone version of NPS’s Standard Operating Procedure #6 that is specific to refuge data collection, post processing, and data submission.

The Table of Contents is hyperlinked to provides a quick way to navigate within this document. To do this:

If you have any questions, contact Kelly Chadbourne at:
kelly_chadbourne@fws.gov or 207.781.8364 ext. 16

Hover the mouse over the blue text, and Press <ctrl> and click your left-mouse button.

TABLE OF CONTENTS:

Prior to Surveys:

1. [Install GPSCorrect following Installation Instructions from Laura Mitchell](#).....page 2
2. Install PDOP Prediction Software onto your computer (*instructions are not included within this document, see .pdf titled “PDOP_InstallInstructions.pdf”*)
3. [Determine Predicted Tides for the six-week survey window](#).....page 3
4. Configure GPS Setting according to **NPS Standard Operation Procedure #4 – Basic GPS Settings for Position Collection (page 61** of the Coastal Shoreline Protocol Document).
[In the CRITICAL SETTINGS –GEOXH/XT IN ARCPAD TABLE 1 AND TABLE 2 Dennis Skidds \(NPS\) provides a step-by-step guide to configure your ArcPad](#).....page 4
5. [Filling Out the Field Data Form](#).....page 8
6. [Blank Field Data Form \(a fillable .pdf is also available but is not included within this document, see .pdf titled “field_form_fillable.pdf”\)](#).....page 9
7. [Example Field Data Form](#).....page 10
8. [Field Data Collection Cheat Sheet for ArcPad 10.0](#).....page 11
9. [Refuge File Naming Conventions](#).....page 19
10. [Geodatabase Structure](#).....page 19

Post Survey:

11. [Breaking down the data collection, post processing, and data submission process](#).....page 20

Additional Information:

12. [Contact Information and National Park Service NCBN ftp site](#).....page 28

Install GPSCorrect (following Laura's GPSCorrect Installation Instructions)

Steps to Install GPSCorrect Extension for ArcPad 10 on a GPS Mobile Device

*If there is no one at your station that has elevated privileges, you will need to work with IT to complete the installation of GPSCorrect onto your Trimble device. Be sure to use the most current version of GPSCorrect available for your Trimble device.

If you have received a GPSCorrect POPN (Proof of Purchase Number), you must first log onto the Trimble website and register the POPN. Once registered, you can do the GPSCorrect download and installation that is specific to your Trimble device. The installation is complete when the serial number of your Trimble unit pops up on the screen letting you know that GPSCorrect license is now specific to your device. Click on the link below to access the installation instructions (aka. Getting Started Guides) for all GPSCorrect versions.

http://www.trimble.com/gpscorrect_ts.asp -> Select "Documentation"

The following are more detailed install instructions from Laura Mitchell (3/28/2011):

1. First, I removed ArcPad 7.1 from my laptop, using Start>Settings>Control Panel>Add or Remove Programs> ArcPad 7.1 "Remove"
2. Second, I removed ArcPad 7.1 from my Trimble GeoXT Mobile GPS unit, using Start>Settings>System>Remove Programs

Note: *this is because GPSCorrect extension will not function if there is more than one version of ArcPad on the Trimble device; and the latest versions of GPSCorrect work best with ArcPad 10*

3. Third, I installed ArcPad 10 on my desktop.
4. Once ArcPad 10 was installed on my desktop, I deployed ArcPad10 to my Trimble GeoXT:
 - a. Connected Trimble GeoXT to laptop
 - b. Programs>ArcGIS>ArcPad Deployment Manager
 - c. Check "Install ArcPad for Windows Mobile"
 - d. Hit "Deploy", and ArcPad10 was installed on the Trimble
5. Fourth, I downloaded and installed GPSCorrect to my desktop:
 - a. Website: http://www.trimble.com/gpscorrect_ts.asp?Nav=Collection-77396
 - b. Select: Software (GPSCorrect , Software for Windows Mobile) and download
6. Finally, I installed GPSCorrect to my Trimble GeoXT:
 - a. Connect GeoXT mobile device to desktop
 - b. Ran InstallWizard on downloaded GPSCorrect
 - c. Wizard prompts for an Installation Code, enter either trial version Installation Code provided by Les Vilchek, or New license Installation Code for newly purchased GPSCorrect (sixteen digits, plus 8 characters)
 - d. When the program is successfully installed on the GeoXT an "Activation Wizard" starts on the desktop
 - e. The Activation Wizard requests the Installation Code.
 - f. The Activation Wizard requests an Activation Method; select "I wish to activate the Trimble GPSCorrect extension over the Internet".
 - g. Enter Device Name (e.g. Trimble GeoExplorer Series), and Device Serial Number.
 - h. When the online activation is complete, the Activation Wizard will say "The Trimble GPSCorrect extension installed on your Windows Mobile Device has been activated".
7. The GPS Mobile Device will need to be restarted to activate GPSCorrect extension in ArcMap 10.
8. Check install by starting ArcPad, tap the GPS Dropdown, and select "GPS Tools">TrimbleGPSCorrect .

Refuge Companion Guide to Standard Operating Procedure #3 – Survey and GPS Mission Planning (page 53 or NPS Coastal Shoreline Monitoring Survey Protocol):

The following is taken directly from SOP #3 and is step-by-step guide on how determine the predicted tides within the six-week survey window. The only difference is that this guide lists Tide Station information specific to National Wildlife Refuges participating in the coastal shoreline surveys. The step-by-step instructions are identical to SOP#3 so you can either follow the instructions here or use the NPS Coastal Shoreline Survey Protocol – SOP#3 page 55.

To Determine Predicted Tides for the six-week survey window:

1. Go to the predicted tide calculations available at the following NOAA website:
<http://co-ops.nos.noaa.gov>
2. Select Products → Tides → Observed Data-Active Stations
3. Select the station according to its Station ID:

Park_Code	Park_Name	Tide Station ID	Tide Station
BKB	Back Bay	8639428	Sandbridge Tide Station
BMH	Bombay Hook	8553501	Woodland Beach Tide Station
CPY_TMB	Cape May-Two Mile Beach	8535835	Wildwood Crest, Ocean Pier
CPY_DBD	Cape May-Delaware Bay Division	8536449	Dias Creek
EBF_LBI	Edwin B. Forsythe – Long Beach Island	8534720	Atlantic City Tide Station
EBF_LTB	Edwin B. Forsythe – Little Beach Island	8534720	Atlantic City Tide Station
FSH	Fisherman Island	8632085	Fisherman Island Tide Station
ESV	Eastern Shore of Virginia	8632200	Kiptopeke Tide Station
MNY	Monomoy	8447435	Chatham Tide Station
PKR	Parker River		Plum Island, Merrimack River Tide Gauge
PMH	Prime Hook	8557380	Lewes Tide Station
RHC	Rachel Carson	8419317	Wells Tide Station
AMG	Amagansett	8515671	Shinnecock Tide Station
MOR	Elizabeth A. Morton	8511779	Noyack Bay Tide Station
STK	Seatuck	8515102	Bayshore Tide Station

4. Set “Data Units” to feet
5. Set “Time Zone” to LST (local standard time)
6. Select MLLW as the datum
7. Tide data can only be displayed in 31-day increments. Set Begin Date to one week prior to the first day of the six-week survey window, and the End date to one month following that date.
8. Select View Plot for graphical form or View Data for tabular form.
9. Repeat the process, advancing the Begin date forward by one month until the End Date encompasses one week after the last week of the six-week survey window.

Within each of the six-week survey windows designated for the spring and fall surveys, there will be many available survey days around the dates of the neap tide water levels. The selected survey day should be the earliest convenient day in the window to allow for rescheduling if necessary.

CRITICAL SETTINGS – GEOXH/GEOXT IN ARCPAD
TABLE 1: COMMUNICATIONS & DATA QUALITY SETTINGS
Settings for GPS Preferences in ArcPad

PURPOSE	WHERE	SETTINGS
Configure Communications	 GPS Active button dropdown > GPS Preferences > GPS Tab	Protocol: Trimble GPSCorrect Port: COM3: TSIP Serial Port Also check boxes next to Show GPS Activity in System Tray and Automatically Pan View
Specify position averaging and collection interval	 GPS Active Button dropdown > GPS Preferences > Capture Tab	Check box for Enable Averaging Points: # of positions to average per point (12) Vertices: # of positions to average per vertex (12) Streaming Position Interval: 1 Streaming Distance Interval: 5m (only positions 3 m from previous position)
Accuracy settings	 GPS Active Button dropdown > GPS Preferences > Quality Tab	Leave this at “No warnings” and change no settings here. Data quality settings are controlled through the GPS Correct Extension.
Set Antenna Height	 GPS Active Button dropdown >GPS Preferences>GPS Height Tab	Set the antenna height (i.e. distance above ground)
Select Datum	 GPS Active Button dropdown >GPS Preferences>Datum Tab	Select the datum for incoming positions. For Trimble units always leave this at default: WGS84 (D_WGS_1984)
Set Alert Signals	 GPS Active Button dropdown >GPS Preferences>Alerts	select visual and sonic signals for certain data collection conditions

<p>Set Starting Location, Display current Location, Set when/where to start navigation alert.</p>	<p> GPS Active Button dropdown >GPS Preferences>Location</p>	<p>Latitude/.Longitude: last known fix Altitude: last known fix Restore Location: uncheck DST Distance Alert: minimum distance from target location before displaying navigation alert (in nav mode)</p>
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CRITICAL SETTINGS – GEOXH/GEOXT IN GPS CORRECT EXTENSION
TABLE 2: DATA QUALITY, DIFFERENTIAL CORRECTION AND REAL-TIME SETTINGS
 (note that we will not use Real Time Differential Correction in this class)

PURPOSE	WHERE	SETTINGS
Log Data for Differential Correction	 GPS Active Button dropdown> GPS Tools> Trimble GPSCorrect> Choose “set-up” from picklist> Logging Settings tab	Log GPS to SSF: on Log H-Star Data: Auto Antenna Height: 1.5 m (set this in ArcPad GPS Preferences, above)
Set Antenna Type	 GPS Active Button dropdown> GPS Tools> Trimble GPSCorrect> Choose “set-up” from picklist> Logging Settings tab> Wrench button	Antenna Settings: Type: GeoXT Internal/GeoXH Internal or external antenna, if applicable
Set Data Quality Parameters	 GPS Active Button dropdown> GPS Tools> Trimble GPSCorrect> Choose “set-up” from picklist> GPS Settings tab	Uncheck box by slider bar. DOP Type: PDOP Max PDOP: 6 Min SNR: 39 (4.0 if using older scale) Min Elevation: 15 degrees Velocity Filter: off Use GLONASS: Auto
Specify Data will be post-processed for Differential Correction	 GPS Active Button dropdown> GPS Tools> Trimble GPSCorrect>	Choice 1: Use uncorrected GPS

	Choose "set-up" from picklist>	
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	Real-time Settings tab	
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FILLING OUT THE FIELD DATA FORM (FDF):

The Field Data Form (FDF) is used for all field notations (Figure S5.4). This information is necessary for post-processing of the data and facilitates the generation of accurate metadata. Once the shoreline has been visually identified on the beach face, fill in all fields (except for End time) in the “Event Information” and “GPS Device” sections of the FDF using the following formats:

1. Survey Data (mm/dd/yyyy) – Write the date in the format shown. Include the forward slash. Examples are 05/05/2005 and 12/31/2005.
2. Park Unit – For Refuges, this will be the 3 character Literal Code. See table below for your Refuge’s Literal Code:

Park_Code	Park_Name
BKB	Back Bay
BMH	Bombay Hook
CPY	Cape May
EBF	Edwin B. Forsythe
FSH	Fisherman Island
ESV	Eastern Shore of Virginia
MNY	Monomoy

Park_Code	Park_Name
PKR	Parker River
PMH	Prime Hook
RHC	Rachel Carson
TPD	Rhode Island – Trustom Pond
AMG	Amagansett
MOR	Elizabeth A. Morton
STK	Seatuck

3. Observers Name (First Last) – Write the surveyor’s full name.
4. Protocol/SOP Version (GMP version #/SOP version #) – Version of the protocol used to guide field data collection. Example is GMP v1.0/SOP#5 v 1.1
5. Time of last High Tide – Write in the time along with AM/PM.
6. Date of closest Neap Tide (mm/dd/yyyy) – Write the date in the format shown. Include the forward slash.
7. Date of last storm event – This information should have been gathered during mission planning (see SOP#3 – Survey Timing and GPS Mission Planning).

Many of these initial values may be entered prior to going into the field. Additional items on the FDF (e.g., Start Time, End Time, Survey Notes, Download options) will be logged later in the survey or can be derived from the GPS file in the post-processing phase. Any notes regarding equipment problems, obstacles encountered, etc., should be logged in the Survey Notes section, and the time from the GPS unit noted. Either the FDF or the comment/note function of the datalogger will be used to record observations and notes during the survey. If stored on the GPS unit, a copy of all comments should be attached to the FDF (either digitally or with a hard copy) prior to submitting all data products to the data manager or GIS specialist.

**You’ll notice the Field Data Form is slightly different than the one listed in the protocol. This is an updated version that we were able to turn into a fillable .pdf in order to give the user the option to electronically enter values prior to going into the field. The use of either the Field Data Form presented here or the Form in the NPS Coastal Shoreline Protocol is perfectly acceptable.*

Field Data Form –GPS Shoreline Survey

Event Information

Survey Date:	_____	Protocol/SOP Version:	_____
Park Unit:	_____	Date of last storm event (<i>High Tide > 1ft above predicted</i>):	_____
Start time:	_____	Time of last high tide:	_____
End time:	_____	Date of closest neap tide:	_____
Observer's Name:	_____		

GPS Device / Settings

Make (e.g., Garmin, Trimble):	_____	Maximum PDOP (≤ 6):	_____
Model (e.g., GeoXT, ProXR, etc.):	_____	Maximum SNR (≤ 5):	_____
Accuracy w/ differential correction (should be sub-meter):	_____	Minimum SV's (≥ 4):	_____
Coordinate System (Projection [e.g., UTM, State Plane] or Geographic [specify decimal degrees or dd.mm.ss]):	_____	EHE ($\leq 12m$):	_____
Datum (e.g., NAD83, NAD27, WGS84):	_____	Measurement interval / Epoch ($\leq 1sec.$):	_____
		Real-time correction signal, if used (e.g., CORS, WAAS):	_____

PDOP = Positional Dilution of Precision, SNR = Signal-to-Noise Ratio, SV = Satellite Vehicles, EHE = Estimated Horizontal Error

Survey notes: (any equipment problems, obstacles encountered, etc.)

Time of incident (from GPS unit):	Notes:

Data Download

Software used to download data (include version): _____

Park Unit: If differentially corrected after downloading, list all base stations used: _____

Describe any editing of data: _____

Field Data Form –Coastal Shoreline Survey (EXAMPLE)

Event Information

Survey Date:	<u>9/14/2010 – 10/13/2010</u>	Protocol/SOP Version:	<u>v. 1.0</u>
Park Unit:	<u>CACO</u>	Date of last storm event (<i>High Tide > 1ft above predicted</i>):	<u>9/10/2010 (see comments)</u>
Start time:	<u>13:15</u>	Time of last high tide:	<u>07:03</u>
End time:	<u>13:57</u>	Date of closest neap tide:	<u>4/6/2010</u>
Observer's Name:	<u>Mark Adams</u>		

GPS Device / Settings

Make (e.g., Garmin, Trimble):	<u>Trimble</u>	Maximum PDOP (≤ 6):	<u>6</u>
Model (e.g., GeoXT, ProXR, etc.):	<u>GeoXT, ProXR</u>	Maximum SNR (≤ 5):	<u>5</u>
Accuracy w/ differential correction (should be sub-meter):	<u>1m</u>	Minimum SV's (≥ 4):	<u>4</u>
Coordinate System (Projection [e.g., UTM, State Plane] or Geographic [specify decimal degrees or dd.mm.ss]):	<u>UTM Zone 19N</u>	EHE ($\leq 12m$):	<u>-</u>
Datum (e.g., NAD83, NAD27, WGS84):	<u>NAD1983</u>	Measurement interval / Epoch ($\leq 1sec.$):	<u>1 s</u>
		Real-time correction signal, if used (e.g., CORS, WAAS):	<u>Chatham USCG CORS</u>

PDOP = Positional Dilution of Precision, SNR = Signal-to-Noise Ratio, SV = Satellite Vehicles, EHE = Estimated Horizontal Error

Survey notes: (any equipment problems, obstacles encountered, etc.)

Time of incident (from GPS unit):	Notes: Multiple storm events prior and during collection period. Unavoidable due to length of time needed to collect data.

Data Download

Software used to download data (include version):	<u>Trimble Pathfinder Office 4.1</u>
Park Unit: If differentially corrected after downloading, list all base stations used:	<u>Acushnet CORS</u>
Describe any editing of data:	<u>resulting shapefiles edited to remove spurious start and end dangles as needed; shapefiles merged in ArcGIS</u>

Field Data Collection Cheat Sheet for ArcPad 10.0

Mounting the GPS Equipment

If using an external antenna, securely attach the antenna pole to one corner of the vehicle (which will be driven over the neap high-tide swash line), attach the antenna to the pole, and connect the antenna cable from the GPS unit.

If using the GPS unit's internal antenna, secure the unit to a part of the vehicle such that the receiver's access to satellite signals is minimally impeded.

Initiating the Field Data Form

The Field Data Form is used for all field notations and records information necessary for post-processing the data and generating accurate metadata. Before collecting data, fill in all fields (except for End time) in the "Event Information" and "GPS Device / Settings" sections. Desired formatting includes:

1. Date (mm/dd/yyyy) - Write the date in the format shown. Include the forward slash. Examples are 05/05/2005 and 12/31/2005.
2. Park Unit – FIIS
3. Observers Name (First Middle Last)
4. Version of the protocol used to guide field data collection. Example is GMP v1.0 / SOP#6 v1.1
5. Date of last storm event (observed water levels >1ft above predicted) – This information would have been gathered during mission planning above. Indicate > 1 week, etc., if the last storm occurred was before the first date examined on the NOAA website.

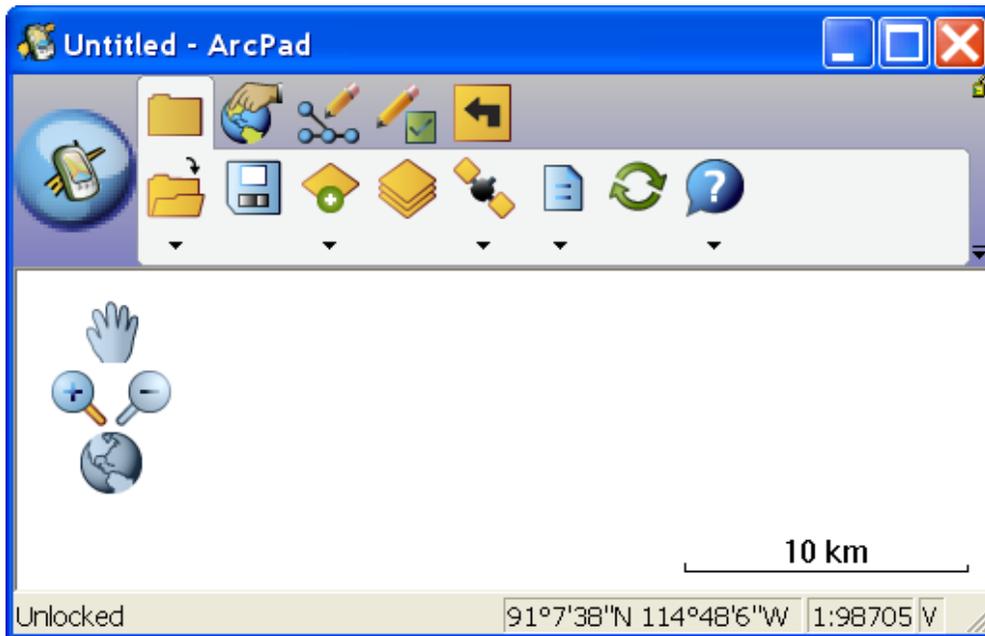
Many of the values on the form may be entered prior to going into the field. Additional items (e.g., Start Time, End time, Survey Notes, Download options) will be logged later in the survey or can be derived from the GPS file in the post-processing phase.

Any notes regarding equipment problems, obstacles encountered, etc., should be logged in the Survey Notes section, and the time from the GPS unit noted.

Data Collection in ArcPad 10

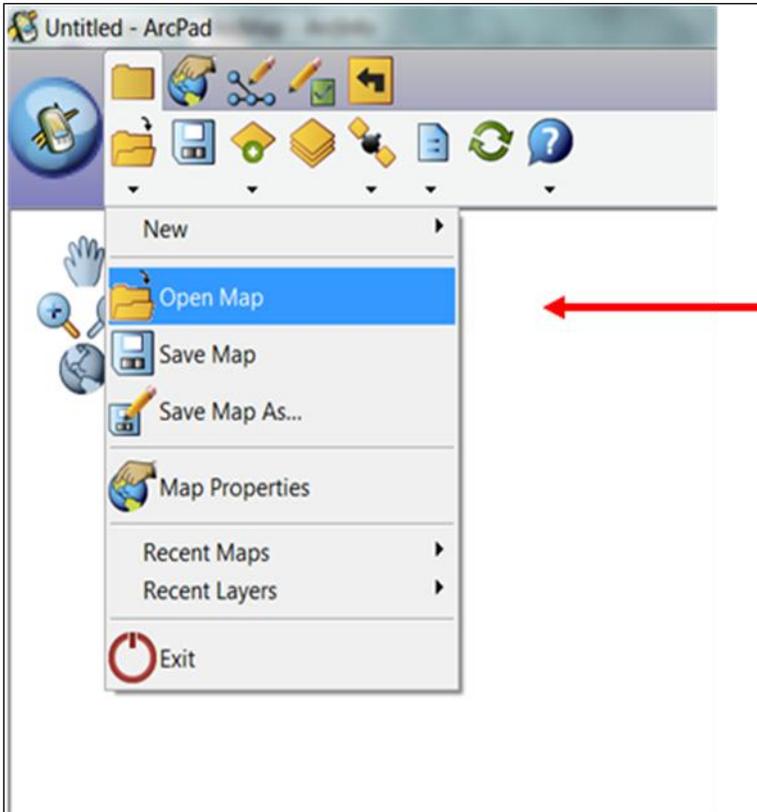
1. Lock/Unlock: ArcPad allows you to lock the application so no tools can be accidentally selected. When locked it cannot receive input from mouse or pen, but the keyboard is NOT locked. You can still access other applications on the device.

Note the location of the lock/unlock icon at the upper right of the screen



2. Create a new shapefile (polyline example): Tap the Main Toolbar button and select the folder icon.

- Choose Open Map

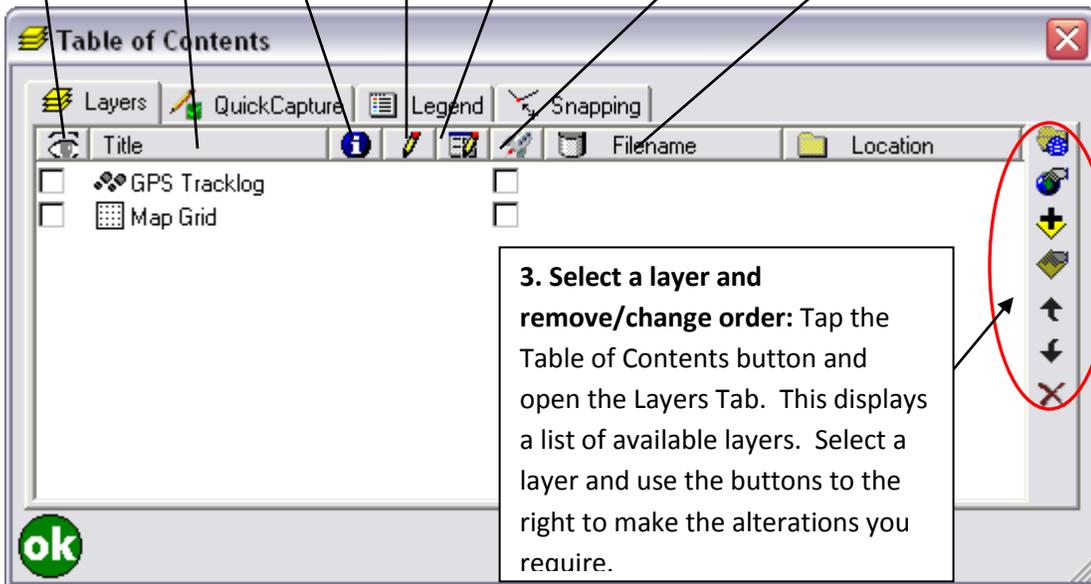


3. Select the layer to display, see attribute table, add data (“edit”):

- Tap the Main Toolbar button and open the Table of Contents. This displays a list of available layers and information about them:

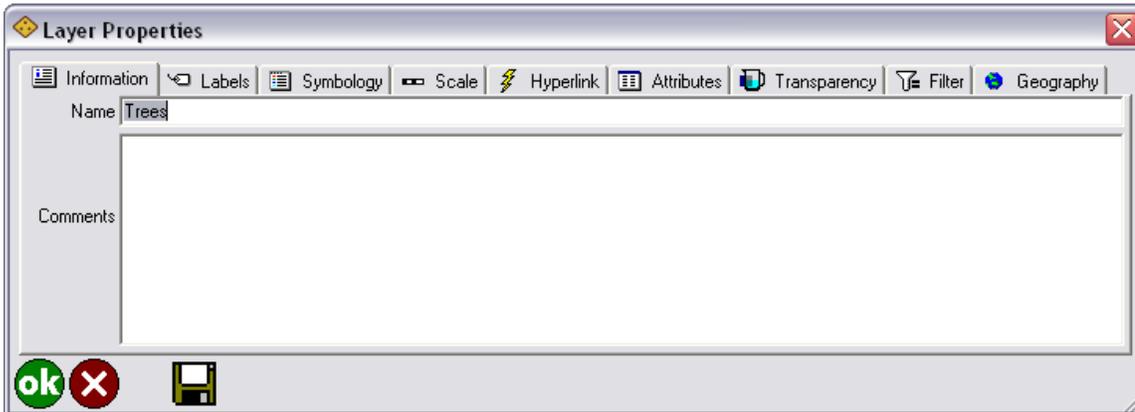


visible if checked title attribute table edit on/off display edit form quick draw mode filename



- Please have only one file on for editing at a time for now!

4. Layer Properties (labels, transparency, symbology, attributes, display scale, etc.): Tap the table of contents button. Tap the layer of interest. Open the layer properties box by double tapping the layer or using the layer properties button  to the right.



5. Collect Field Data:

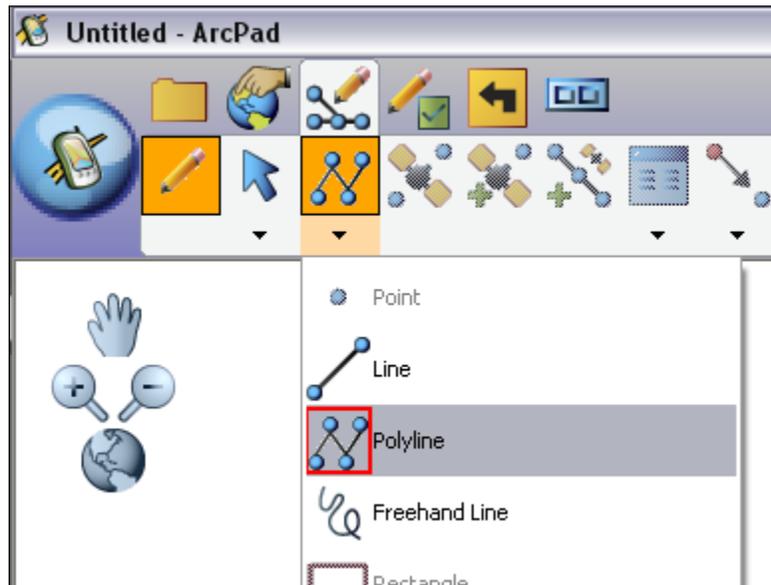
A. Activate GPS

- The GPS needs to be activated before any of the GPS buttons on the Edit toolbar are enabled. In addition, the GPS Point button is only enabled when a point layer is active for editing. The Add GPS Vertex and Add GPS Vertices Continuously buttons are only enabled when either the polyline or polygon feature type are active for editing.
- The GPS can only be activated if there is a projection defined for the current ArcPad map.
- Activate the GPS by tapping the  GPS Active Button dropdown and tapping “GPS Active”.

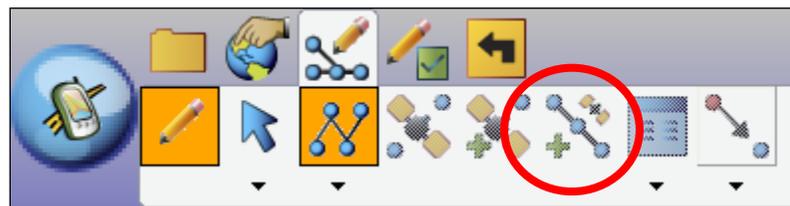


B. Create a Complex or Curved Line Feature

- Select a line layer for editing via the Table of Contents button (section 3, above).
- Select the Polyline button to start capturing a line feature (note: the Line option is not for GPS collection).



- Tap the Add GPS Vertices Continuously button to begin streaming data collection.



- As needed, pause and restart the data collection by tapping the button once.
- When all geometry is collected tap the Proceed button at the bottom of the screen to complete the feature.



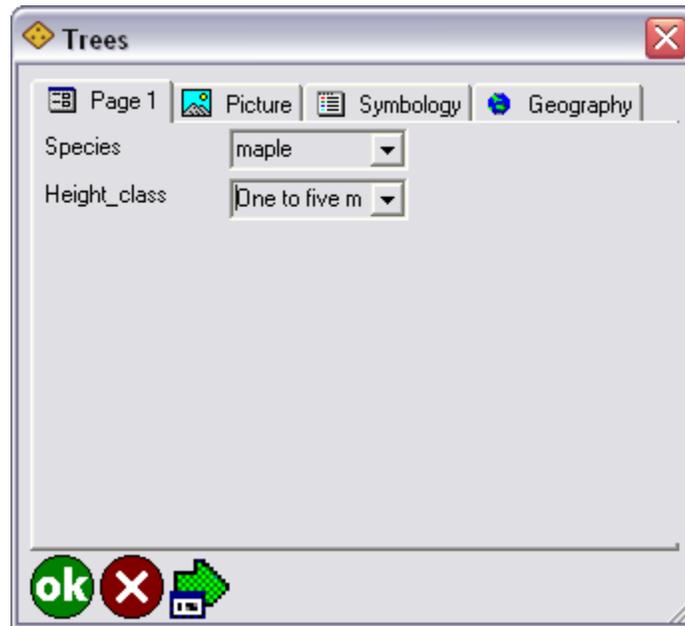
- Enter any attribute data for the line feature.
- Tap "OK" to save the new feature.

C. Create a Point Feature

- Select a point layer for editing via the Table of Contents button (or create one if one does not already exist.) Only one layer at a time should be selected for editing.
- Tap the GPS Point button on the Edit toolbar to create a point feature (note: GPS must be active).



- Enter attributes for the new point feature by tapping the Proceed button at the bottom of the screen.



- Tap "OK" to save the new feature.

6. Save Map and Exit ArcPad

- ArcPad automatically appends a file extension (.apm) to your map document name when saved.
- Each time you store a feature, the shapefile and shapefile table are automatically updated.
- Saving an ArcPad map preserves changes in the data appearance (symbolology, labels, etc.).
- To save a map, tap the Open Map button and tap Save Map As. Provide a name.



REFUGE FILE NAMING CONVENTIONS:

To ensure consistency and to aid in data retrieval, the following naming conventions have been established for the corresponding file types above:

- [Park/location code]_[date mm/dd/yy] (date started, if multiple)_pts.shp
Example: PKR_040111_pts.shp
- [Park/location code]_[date mm/dd/yy] (date started, if multiple)_line.ssf
Example: MNY_040111_line.shp

GEODATABASE STRUCTURE:

If you will be organizing your data within a geodatabase, see below for the recommended file structure.



BREAKING DOWN THE DATA COLLECTION, POST PROCESSING, AND DATA SUBMISSION PROCESS:

The following is a Refuge Companion Guide to the NPS Coastal Shoreline Protocol Standard Operating Procedure (SOP) #6-Initial Post-Survey Processing, which identifies responsibilities of data collection, post-processing, QA/QC, and data storage.

The objective of this protocol is to convert the collected shoreline position data into a useable dataset that is in the correct format and has undergone initial quality control (QA/QC) checks. Quality control checks ensure that the data collected are of the maximum quality possible. Download and QA/QC of the survey data are to occur immediately following the field data collection to ensure that no data are lost due to equipment failure. In addition, prompt data processing immediately informs the surveyor if a repeat survey day is required due to equipment issues.

This protocol summarizes the data download procedures and initial quality control steps necessary for accurate and systematic processing. It demonstrates how to connect the Trimble GeoXT/XH datalogger to a computer running Pathfinder Office software (for example), how to perform initial quality checks, and how to set up appropriate output specifications. It describes the process for converting the evaluated point shapefile into a single shoreline feature (polyline shapefile), generating FGDC-compliant metadata for that polyline file; and assembling all original, corrected, and processed data products for delivery to the NCBN for storage and analysis.

Connection of the datalogger to the computer for survey transfer (Responsibility: Refuge Staff)

The transferred files will be in “.ssf” format. If using a computer which has a version of Microsoft ActiveSync installed (<http://www.microsoft.com/windowsmobile/activesync/default.mspx>), a connection to the GeoXT may be automatically established upon plugging the datalogger into the machine. In this case, the .ssf file can be directly dragged-and-dropped from the GeoXT onto the computer’s hard drive. Note: if the shoreline survey data were collected using a shapefile uploaded to the GeoXT, be sure to also transfer that file along with the .ssf file.

Do not rename the .ssf file. The file you send should have the original file name of “GPSCorrect.ssf”. After the files are corrected, the .ssf and .cor file will be renamed to match the following File Naming Convention:

[Park/location code]_[date mm/dd/yy] (date started, if multiple).ssf

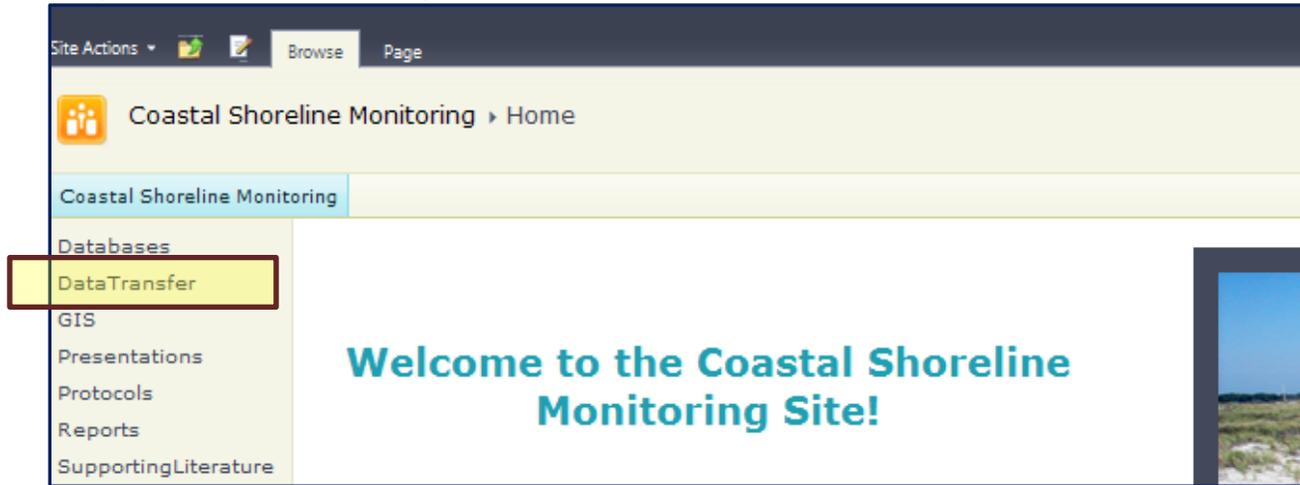
Example: RHC_040111.ssf

Post-processing

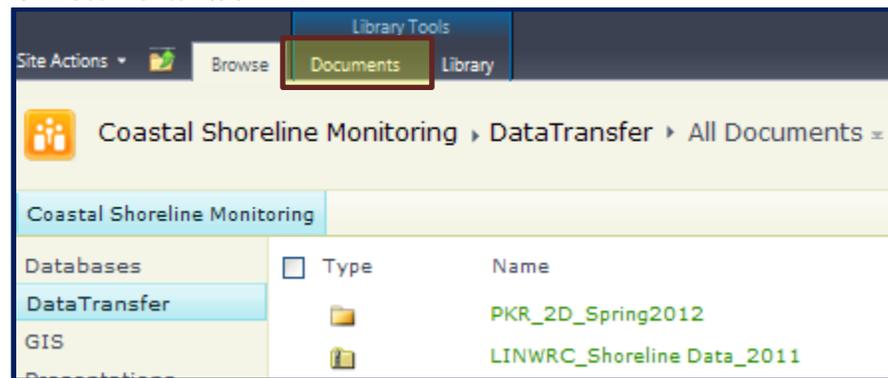
Submit .ssf and all associated files using the following steps:

1. Zip up all files into a folder that has the following Folder Naming Convention:
[Park/location code]_[data mm/dd/yy of survey]
Example: RHC_040111
2. Open the Coastal Shoreline SharePoint site: <https://connect.doi.gov/fws/Portal/csm/>
3. Enter AD UserName and Password.

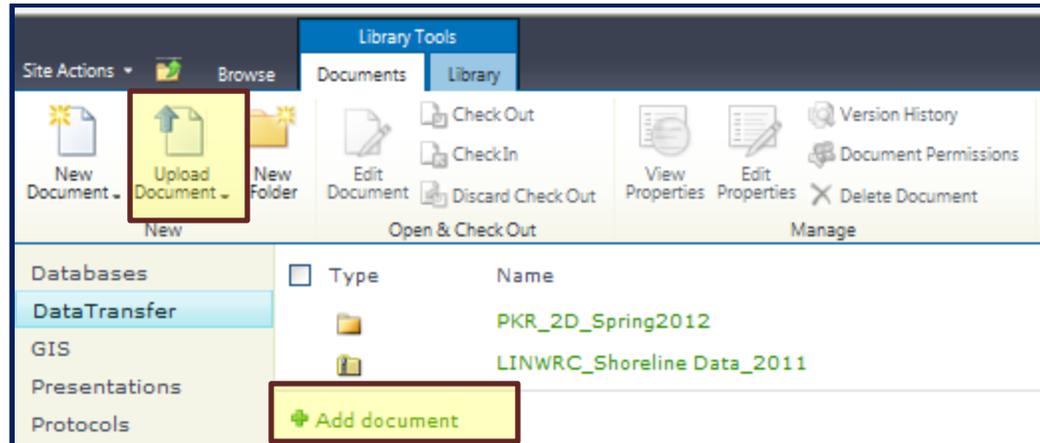
- Click **DataTransfer** to open the DataTransfer library.



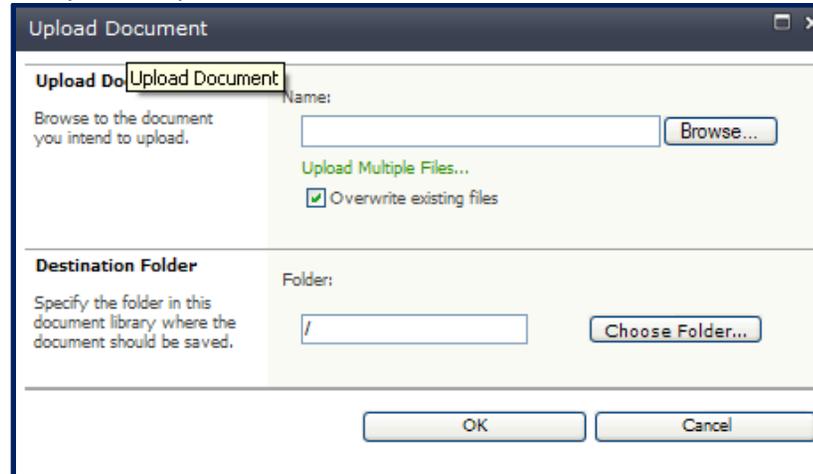
- Under the "Library Tools" tab, select the **Documents** tab.



- Select **Upload Document**, located within the "New" section. Or click **Add Document**, located within the pages white space underneath already uploaded documents.



7. Browse to the location of the zipped folder on your computer and select it.



8. Click “OK” to upload the zipped folder to the site.

Contact Kelly Chadbourne if you need assistance (kelly_chadbourne@fws.gov).

Differential Correction of the Shoreline Survey (unless accomplished in real-time collection with Beacon) (Responsibility: Regional I&M Data Manager)

The .ssf file will be differentially corrected and exported into .shp file format. Instructions for differential correction and data export to .shp file format are listed in SOP #6: pages 78-80.

The raw data downloaded in steps 1-4 of this SOP need to be differentially corrected to reach the maximum accuracy possible for the Trimble GeoXT equipment. The process of differential correction compares the records received at one or more local known GPS base stations to those received in the field.

Use the "Differential Correction" tool in Pathfinder Office and chose the reference station(s) closer to the location of the survey site to guarantee the most accurate differential correction. Wait 24 hours after data collection to post-process the data to ensure that all base files have been posted. The post-corrected output file has the extension “.cor”. A log file will also be saved with the “.cor” file detailing the differential correction process and any errors that have occurred. Typically, 100% of the points will be corrected.

Use the following File Naming Convention for differentially corrected files:

[Park/location code]_[date mm/dd/yy] (date started, if multiple).cor

Example: AMG_040111.cor

Data Export

Once the data have been downloaded, differentially corrected, and passed through initial QA/QC, they should be backed up. Making duplicate copies of the data should be a standard practice to prevent problems associated with loss of files and possible data corruption. Use the "Export" tool in Pathfinder Office to export the ".cor" file to a file with the "ESRI Shapefile" format. Make sure that the "Export Setup" properties are as follows:

- i. Data
 1. Features – Positions and Attributes – selected
 - a. Export all Features
 2. Notes – checked
 3. Velocity Records – unchecked
 4. Sensor Records – unchecked

- ii. Output
 1. Select “Combine all input files and output to the project export folder”
 2. Select DOS files

- iii. Attributes – Export Menu Attributes As – Select “Attribute Value”
 1. All Feature Types – select ONLY
 - a. PDOP
 - b. Date Recorded
 - c. Time Recorded
 2. Point Features – select ONLY
 - a. Position
 - b. Horizontal Precision
 3. Line Features – select ONLY
 - a. Length (2d)
 - b. Avg Horizontal Precision
 4. Area Features – select NONE

- iv. Units
 1. Use Export Units – select:
 - a. Meters
 - b. Square Meters
 - c. Meters per second
 2. Decimal Places

- a. Lat/Long – 9
- b. North/east – 3
- c. Height – 3
- d. Distance – 3
- e. Area – 3
- f. Velocity – 3
- g. Precision – 1
- h. Time – 0

v. Position Filter – Select Filter by GPS Position Info

- 1. Minimum Satellites – 2D (four or more SVs)
- 2. Maximum PDOP (any)
- 3. Maximum HDOP (any)
- 4. Include positions that are – select ONLY
 - a. Real-time Differential
 - b. Differential
 - c. RTK (fixed)
 - d. Phase Processed (fixed)

vi. Coordinate System – UTM 18 North/19 North (CACO Only)

vii. Arcview Shapefile – select NONE

Use the following File Naming Convention for exported .shp files:

[Park/location code]_[date mm/dd/yy] (date started, if multiple)_pts.shp

Example: PKR_040111_pts.shp

Copy the exported data, along with the original “.ssf”, the initial “.cor”, any supporting text log files, and an image scan of the Field Data Form, to an external media (CD or external drive) so that there are separate backup locations (one on the hard disk drive and one on the removable media). Place all files in a folder labeled with the survey location and time.

Initial QA/QC (Responsibility: Refuge Staff)

QA/QC (Quality Assurance/Quality Control) is a verification step that ensures the data collected have had obvious errors removed and that the remaining data are likely to accurately represent the shoreline. Verification of the known benchmarks embedded in the survey adds credence to the collected shoreline positions.

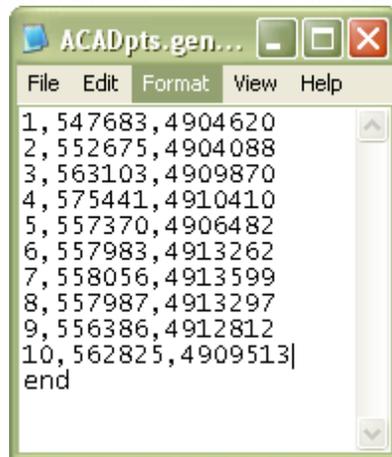
- 1. Using GIS software such as ESRI ArcGIS, open the “.shp” file exported above.
- 2. Add current orthophotography and other available base data to the view and the known benchmarks (points) with their known values.

3. During this procedure the surveyor should be present, along with the notes on the Field Data Form. Visually compare the expected feature locations with the recorded locations. If any features have obvious errors, they should be corrected.
4. Compare the collected benchmarks with their known values. If the difference between the recorded position and its known value is greater than one meter, the shoreline may need to be re-surveyed.

Generating the Shoreline Line Shapefile from a Point Shapefile (Responsibility: Refuge Staff)

The utilization of some combinations of GPS units and software may necessitate the shoreline be collected as a point dataset rather than a line. In such a case, once the “cleaned” point shapefile has been exported, it must be converted into a continuous line feature in order to be analyzed by shoreline-change analysis software (see SOP #7 - Change Calculation, Data Analysis, and Reporting). This general procedure can be accomplished using any number of GIS software packages capable of rendering and editing shapefiles. The following steps describe the process of generating a line feature from a point shapefile using ESRI ArcMap software, the most common product used by NPS GIS personnel.

1. If for some reason x and y coordinates are not present in the point shapefile’s attribute table, use the “Add XY Coordinates” tool to create these fields, or use the “addxy_management” command at the command line.
2. Open the attribute table of the point shapefile.
3. Under ‘Options’ choose ‘Export’; save the attribute table as a dbf file.
4. Using Microsoft Excel, Word, or another spreadsheet or word processing program, generate a text file in which each point is represented with a line of text in the following format: ID number, x-coordinate, y-coordinate. The last line should simply contain the word “end.”



4. Save the file with the extension “.gen” (e.g., points.gen).
5. Use the “Generate” tool in ArcMap to create the line shapefile.
7. View both the point and line shapefiles together in ArcMap to assure that the conversion completed successfully*.

* Alternatively, there are many free ArcMap extensions capable of converting point shapefiles into line features with a single step. An excellent example is the [Convert Locations To Paths](http://www.spatial ecology.com/htools/tool desc.php) tool found in the HawthTools suite (<http://www.spatial ecology.com/htools/tool desc.php>).

Creating Metadata for the Shoreline Shapefile ((Responsibility: Regional I&M Data Manager)

The NCBN has created a metadata template for the Shoreline Change Protocol that already contains much of the relevant information regarding creation of the line shapefile. Most of the remaining information to be included will be derived directly from the field sheet completed prior-to and during the data collection process. Table S6.1 summarizes where this information should be included in the metadata file. At a minimum, the metadata should be parsed and exported in XML format using the NPS Metadata Tools available at <http://www.nature.nps.gov/im/units/mwr/gis/> .

Final Product Delivery (Responsibility: Refuge Staff)

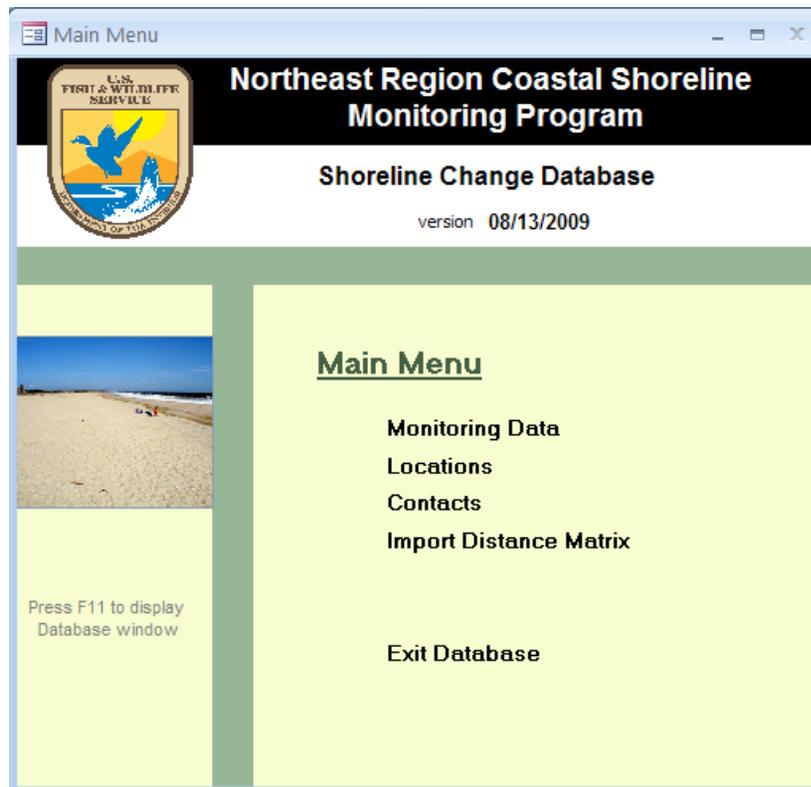
The following raw data products should be delivered to the USFWS R5 I&M Data Manager for storage, analysis, and archiving in the Shoreline Change Database:

1. All original GPS data files (.ssf) downloaded from the GPS unit
2. All differentially corrected GPS data files (.cor), if real-time correction was not employed
3. Cleaned, exported ESRI point shapefile (.shp)
4. Cleaned, continuous shoreline line-feature shapefile (.shp)
5. Hard or scanned (.pdf format) copies of all field data sheets.
7. Photographs taken during survey.

These final datasets should be posted to the Coastal Shoreline Monitoring SharePoint site (<https://connect.doi.gov/fws/Portal/csm/DataTransfer/>), or emailed to the USFWS Region 5 Inventory and Monitoring (I&M) Data Manager (kelly_chadbourne@fws.gov), or saved to a disc and mailed to:

Kelly Chadbourne
United States Fish and Wildlife Service
Gulf of Maine Coastal Program
4R Fundy Road
Falmouth, ME 04105

All products will be stored by the I&M data manager in the Shoreline Change Database, which is compatible with National Park Service's Database:



SUPPORT CONTACT INFORMATION AND NATIONAL PARK SERVICE FTP SITE:

United States Fish and Wildlife Service Contacts:

Regional Coordinator:

Jan D. Taylor
Great Bay National Wildlife Refuge
100 Merrimac Drive
Newington, NH
Phone: 604.431.5581
Email: jan_d_taylor@fws.gov

Regional Inventory and Monitoring Data Manager:

Kelly Chadbourne
Great Bay National Wildlife Refuge
100 Merrimac Drive
Newington, NH
Phone: 207.781.8364 ext. 16
Mobile: 603.498.7406
Email: kelly_chadbourne@fws.gov

National Park Service Contacts:

Data Manager, Northeast Coastal & Barrier Network:

Dennis Skidds, GISP
National Park Service
University of Rhode Island
Rm. 105, 1 Greenhouse Rd.
Kingston, RI 02881
Office: 401-874-4305
Fax: 401-874-4561
Dennis_Skidds@nps.gov

Rutger's University Coastal Geomorphologist and Support:

Dr. Norbert P. Psuty, Professor Emeritus
Sandy Hook Cooperative Research Programs
74 Magruder Road
Sandy Hook, New Jersey 07732
Phone: 732.708.1462 (Sandy Hook)
Phone: 732.238.1443 (East Brunswick)
Email: psuty@marine.rutgers.edu

Andrea Spahn:
Sandy Hook Cooperative Research Programs
74 Magruder Road
Sandy Hook, New Jersey 07732
Phone: 732.708.1462
Email: spahn@marine.rutgers.edu

NATIONAL PARK SERVICE ftp SITE:

Contains training handouts and references.

<ftp://ftp.edc.uri.edu/outgoing/NCBN>

Login: ftpguest

Password: eye0nwq