

**Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Profile Survey Report  
March 2007**



**Photo: South Nags Head, September 2006**

**Prepared by:  
USACE-ERDC-CHL  
Field Research Facility  
1261 Duck Road  
Duck, NC 27949**

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# Dare County Beaches, Shore Protection Project Physical Monitoring Program Profile Survey Report Fall 2006

## 1. Purpose

This report presents the results from the profile survey conducted in September/October 2006. The intent of this report is to provide a written reference for interpretation of the data. This report begins with a brief overview and list of previous surveys. Next, survey methods and datum's are discussed, followed by the last sections which present the data and dissemination.

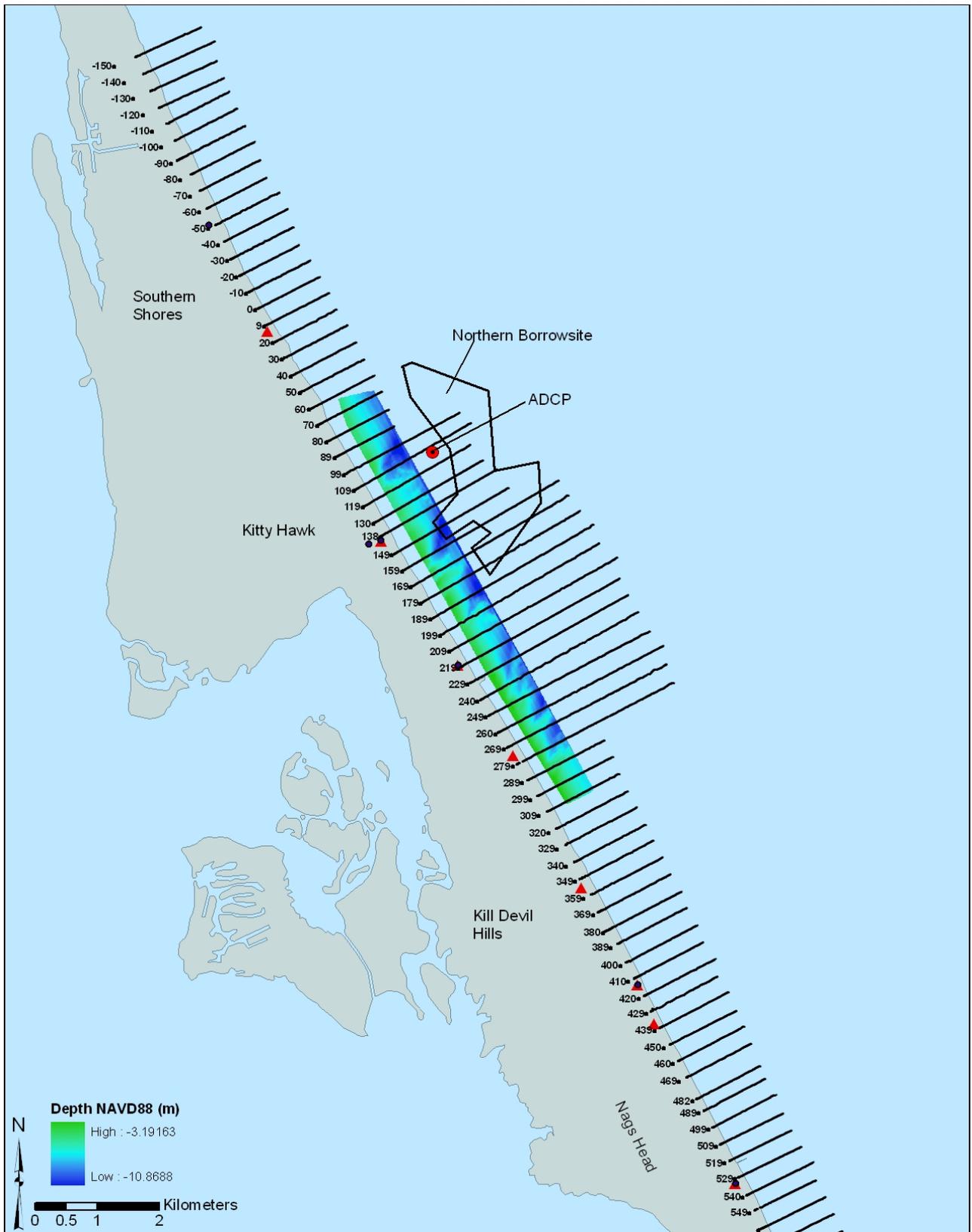
## 2. Overview

The Dare County Beaches (Bodie Island) Shore Protection Project includes the towns of Kitty Hawk, Kill Devil Hills, and Nags Head along the Outer Banks of North Carolina. The design is to construct a 25-ft wide, 13-ft (ref. National Geodetic Vertical Datum of 1929-NGVD) high dune fronted by a 50-ft wide berm at an elevation of 7 ft (NGVD). In 2004, the South Atlantic Division, Wilmington District (SAW) initiated physical and biological monitoring to assess the performance of the project. SAW partnered with the USACE Engineer Research and Development Center, Coastal and Hydraulics Laboratory's Field Research Facility (FRF) located in Duck, NC for the physical monitoring. Data collected under the physical monitoring plan will be used to: (1) assess the beach response to the fill placement and will serve as the basis for maintaining the project; (2) quantify the movement of fill from the project limits to adjacent non-project areas, and (3) provide data in support of the biological monitoring effort. For this reason, the physical monitoring includes areas outside the project limits.

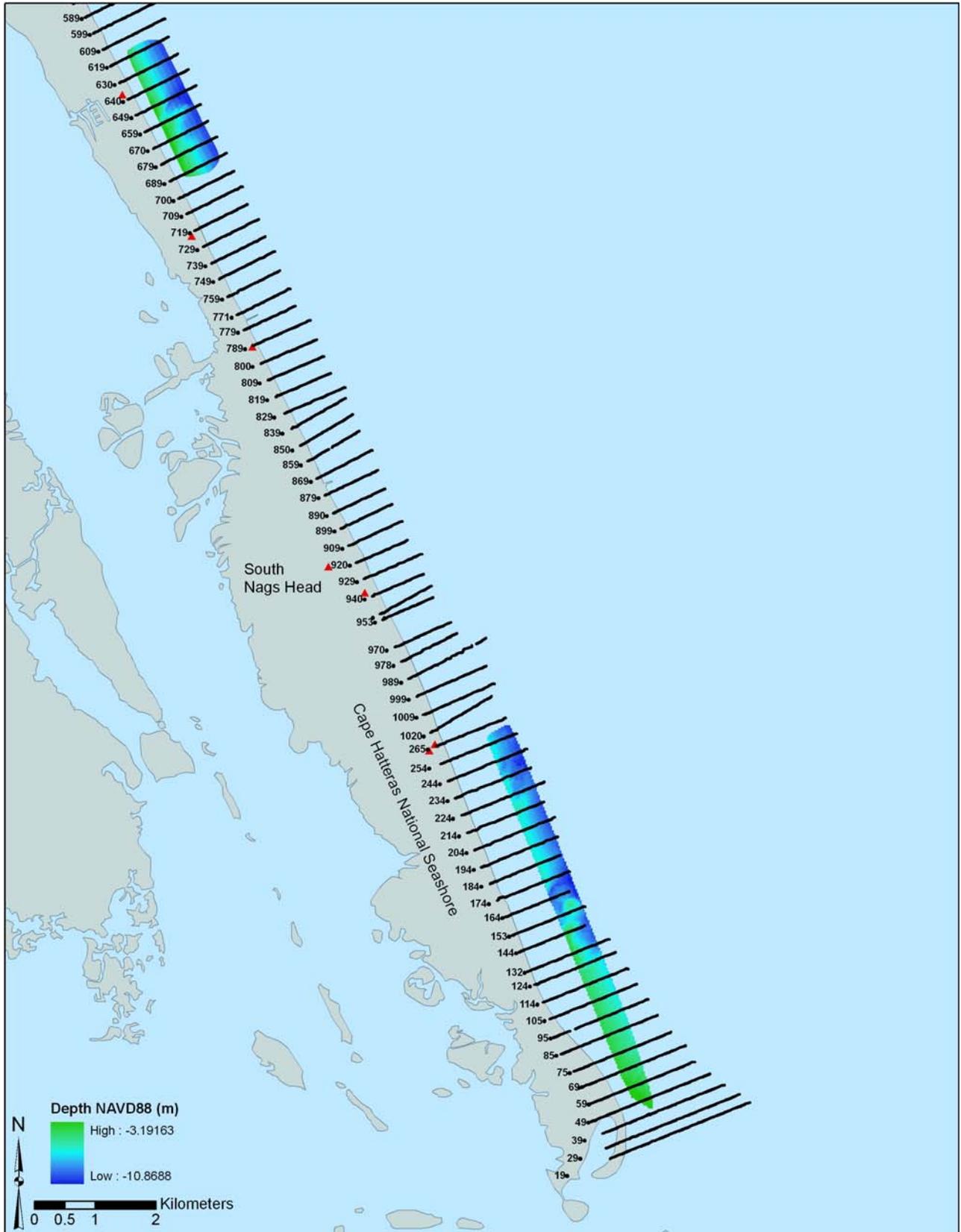
The physical monitoring will cover the pre, during, and post-construction phases of the project. The plan includes continuous operation of a single Acoustic Doppler Current Profiler (ADCP) to measure waves and currents. Summaries of these measurements can be found on the FRF's web site, <http://frf.usace.army.mil/>. This gauge will be used to provide a general wave climate and will be re-located approximately annually to address a number of specific issues. The initial location is in the lee of a northern borrow site, **Figure 1**. The next location will likely be close to where sand is initially placed on the beach. At some point in the future, the gauge will be returned to the initial location to determine if excavation has caused a change in the wave characteristics.

The monitoring plan calls for beach and nearshore profile surveys to be taken every 1000 ft starting in Southern Shores, 3-miles north of the Kitty Hawk town limit, and continuing south to Oregon Inlet, **Figures 1 and 2**. See **Appendix A** for a listing of the profile numbers, origin points, and line azimuths. Each of the 144 profile lines extends from a stable point landward of the dune to the -30 ft depth contour. These profile lines will be surveyed twice per year, scheduled for the spring (Mar-Apr) and fall (Oct-Nov).

The survey plan also calls for swath bathymetry and sediment sampling. Swath bathymetry will be collected across shore and along shore where the isobaths are irregular and will supplement the profiling so that a complete model of the ocean bottom can be obtained. Sediment samples are



**Figure 1.** Profile lines and control locations (red triangles) in Southern Shores, Kitty Hawk, Kill Devil Hills, and Nags Head. Colored bathymetry is from swath data collected in the spring 2006



**Figure 2.** Profile lines and control locations (red triangles) in South Nags Head and Cape Hatteras National Seashore. Colored bathymetry is from swath data collected spring, 2006

collected during selected surveys and taken from 67 profile lines. On each sampled profile, 5 sediment samples will be taken along the onshore portion and 5 along the offshore portion. Sediment sample analysis, the responsibility of SAW, will be used to determine grain size and distribution before the project and any changes during the project. The sediment characteristics can be used to ensure compatibility between the native-beach and fill material over the project life. Grain size and textural properties play a significant role in beach ecology.

### 3. Previous Surveys

The 2004 survey was the first of this monitoring program. The other surveys that exist are listed in **Table 1**. On sixty-two profile lines from Duck to Oregon Inlet, the beach was surveyed monthly from 1974-1977 as part of the USACE Beach Evaluation Program (BEP). In the mid 1990s, SAW established new lines in anticipation of the Dare Co. project. These lines will be referred to as the “DARE” profiles. In 1994, SAW surveyed both the beach and nearshore portion of the DARE profiles. The BEP lines within the project area were then resurveyed by SAW in 1995. In 2001, a subset of the DARE lines, where the anticipated first phase of the project would be located, was surveyed by SAW. The 2001 survey did not include the most northern lines, southern lines, and the middle lines in between the two fill areas. In 2003, the FRF in partnership with the U.S. Geological Society (USGS) surveyed the DARE lines from Southern Shores to Jeannette’s pier in Nags Head. In August 2004, all 144 DARE profiles were surveyed by the FRF. In 2005 92 lines were surveyed by the FRF and 52 lines were surveyed by Mckimm and Creed and in 2006 all 144 profiles were surveyed by the FRF in both April and September.

**Table 1. Previous Dare County Surveys**

<b>Data Set</b>	<b>Lines (# surveyed)</b>	<b>By</b>
1974-1977	BEP	USACE BEP
1994	DARE	SAW
1995	BEP	SAW
2001	DARE	SAW
2003	DARE	FRF/USGS
2004	DARE (144)	FRF
2005	DARE (144)	FRF & McKim & Creed
2006 April	DARE (144)	FRF
2006 Sept.	DARE (144)	FRF

### 4. 2006 Fall Bathymetric and Topographic Surveys

Bathymetric and topographic surveys began on 26 September and were completed by 6 October 2006. The survey schedule **Appendix B**, shows that 4 of the 11 days were lost to inclement weather (wind and waves).

#### 4.1. LARC Profiles.

The bathymetric data were collected with the FRF's LARC 191, a Korean War era Army *Lighter Amphibious Resupply Cargo* amphibious vessel. The survey system consisted of a Real Time Kinematic (RTK) Global Positioning Satellite (GPS) system, single beam echo sounder, and a motion sensor measuring heave, pitch and roll, **Figure 3**. Using input from a base station at a known location, published accuracies for RTK GPS systems are between 1 to 3 inches depending on satellite configurations and distance from the base station. Trimble 4000 dual frequency receivers were used both on the LARC and at the base station. Equipment specifications are given in **Table 2**. Control, datums, and other considerations are provided below.

The echo sounder was a Knudsen 320BP dual frequency fathometer. This unit has been widely used by the USACE. Although equipped with 50 and 200 kHz frequency transducers, in this application, only the 200 kHz was used to provide better resolution at shallow depths, (0-66 ft.) The Knudsen was also equipped with a close proximity option allowing accurate depths as shallow as 0.5 ft. to be obtained. This was valuable since when the LARC wheels stop touching the sand, in depths over 1.5 ft below the transducer, the fathometer signal was required. The VT TSS Ltd DMS Series 3-25 heave, roll, and pitch sensor was used to track the vessel's motion.

Coastal Oceanographic's Hypack Max v.4.3 was used to guide the vessel along the profiles and to collect the position, depth, and motion information. The RTK-GPS signal was sampled at 1 Hz, the sounder at 9 Hz, and the motion sensor at 20 Hz. Custom software developed at the FRF used the RTK GPS information to remove the wave and water level variation. This was accomplished by careful adjustment of the timing between sounder and GPS data streams such that a precise measure of the depth was obtained at the exact moment that the GPS position was acquired. With this sampling rate, data points were acquired, on average, every 10 ft. The sounder depth value was also adjusted for the roll and pitch of the boat and for the variation in the speed of sound through the water column. The speed of sound was determined by measuring the conductivity, temperature, and depth (CTD), with an Ocean Sensors CTD OS200. These CTD casts were performed approximately every 2 hours at the offshore ends of the survey line in approximately 30-ft depth. From the CTD information, the speed of sound was computed. Speed of sound can be important, for example an 80 ft/s error in the speed of sound (nominally 4,950 ft/s) will result in a 5 inch depth error in 30 ft of water.



**Figure 3.** Equipment on LARC

<b>Table 2. Survey Equipment List</b>		
Model	LARC-V	US Army
Length	10.7 meters / 35 feet	
Drive System	Four Wheel plus marine drive	see Figure 1
<b>Echosounder</b>		
Model/Manufacturer	320B/P Portable	Knudsen Engineering
Frequency	50/200 kHz	
Resolution	1cm	0-99.99 meters range
Sound Velocity	1300-1700 m/s	Resolution 1 m/s
Transmit Blanking	0-5 meters	User Selectable
<b>Motion Reference Unit</b>		
Model/Manufacturer	DMS Series 3-25	VT TSS Limited
Heave Accuracy	The greater of 5cm or 5%	Resolution 1 cm
Pitch/Roll Accuracy	+/-0.25 degree	
<b>GPS Receivers</b>		
Model/Manufacturer	4000 SSE, 4700, & 5700	Trimble
Frequency	Dual high precision L1 and L2	
RTK-GPS Accuracy	Dependant on conditions such as multipath, obstructions, satellite geometry, atmospheric parameters and base station control quality.	
Published Horizontal Accuracy	1Hz = 1cm +/-2ppm	
Published Vertical Accuracy	1Hz = 2cm +/-2ppm	
Solution Precision	2 to 5 cm	
<b>Speed of Sound Instrument (CTD)</b>		
Model/Manufacturer	OS-200	Ocean Sensors
Maximum Scan Rate	145 per second	
Pressure Accuracy	dBar = 0.50%	
Temperature	deg C = 0.01	
Conductivity	mS/cm = 0.02	
Salinity	PSU = 0.03	
<b>Computers &amp; Software</b>		
Model/Manufacturer	Inspiron Laptop 730 Mhz	Dell
Collection Software	Hypack Max version 4.3	Coastal Oceanographics
Echosounder	Sounder Suite	Knudsen Engineering
Tablet PC	Stylus Itp-600	Fujitsu
Processing Software	Fathomax	Custom FORTRAN routine
CTD Processing	CTD2SSP	Custom PERL routine

#### 4.2. Topographic Profiles.

Topographic (Topo), or beach, profiles were obtained with backpack mounted Trimble 5700 RTK GPS systems **Figure 4.** The GPS antennas were mounted on the backpacks at a fixed height, and data points were collected every second (approx. every 2ft) as the surveyor continuously walked along the profile. The beach profiles began at a baseline (such as a road) or a stable point behind the primary dune and continued to the waters edge. The surveyor used a Fujitsu Tablet PC with Hypack v. 4.3 for data logging and navigation along the pre-programmed line. All terrain vehicles (ATV) were used to transport the surveyors to each profile location.



**Figure 4.** Backpack survey

The same control was used for both the beach and offshore surveys. For each profile the Topo overlapped the LARC data to ensure homogeneity. The LARC was used to cover the wet portion of the Topo lines extending up onto the beach to the toe of the dune providing much more than required overlap with the walking backpack data collection.

#### 4.3 Control, Datums, and QA/QC.

Horizontal/vertical control and datums are basic ingredients for accurate surveys. Geodesy controls for this survey were the North American Datum of 1983 (NAD83), as adjusted in 2001, North Carolina State Plane for horizontal and the North American Vertical Datum of 1988 (NAVD88), using the 2003 Geoid for the vertical. The survey data were collected using metric units and post processed to English (feet) units.

The 30 miles of coast was broken up into 5 approximately 5-mile-long sections. In each section a base station and separate calibration station locations were established. First order control for the base and calibration stations was provided by SAW.

Both Topo and LARC survey teams occupied calibration stations at least daily to document horizontal and vertical accuracies **Figure 5.** Appendix C contains tables for the 8 calibration stations that summarize the daily evaluations. For all of the calibration stations, both the Topo and LARC systems operated well within the expected vertical RTK-GPS accuracy of 1 to 3 inches.



**Figure 5.** Topographic Calibration check on Juncos MP 19.7

#### 4.4 Field Notes

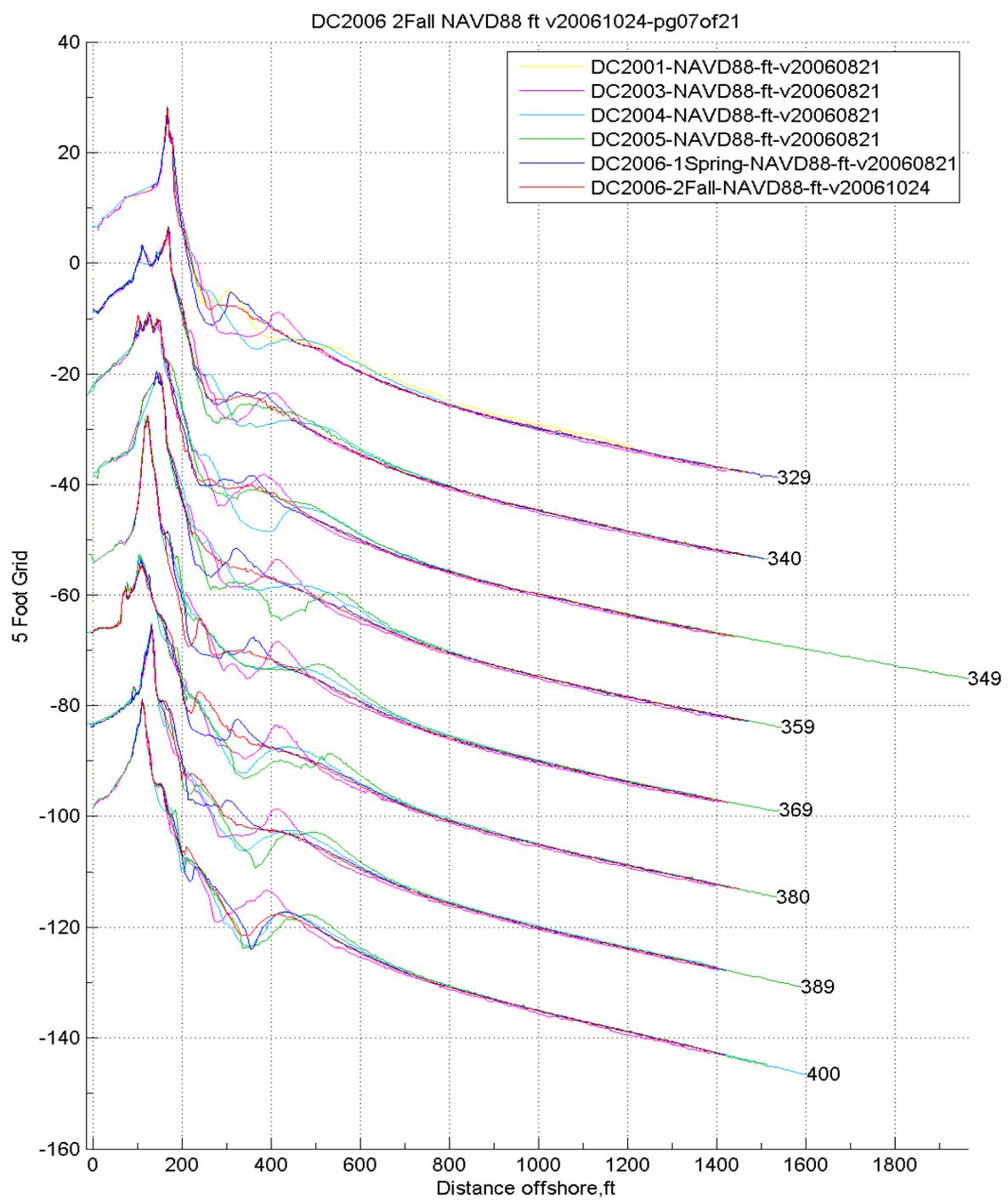
The Topo and LARC digital survey notes are included as **Appendices D** and **E**, respectively. These field notes describe the status of the GPS equipment as each line is surveyed and any notes the survey technician added to better define the field conditions. Topo line notes are particularly valuable during processing to explain variations in point densities due to inaccessibility along the line or loss of GPS signal due to sky-view obstructions. LARC line notes include the locations of where CTD measurements were collected, and any notes to provide insight when post processing the data. Federal Geographic Data Committee approved metadata files have been created for each survey day and are included in the appendices. These metadata files are named with year, month, and day in the following format 20060413.met.

#### 5. Data

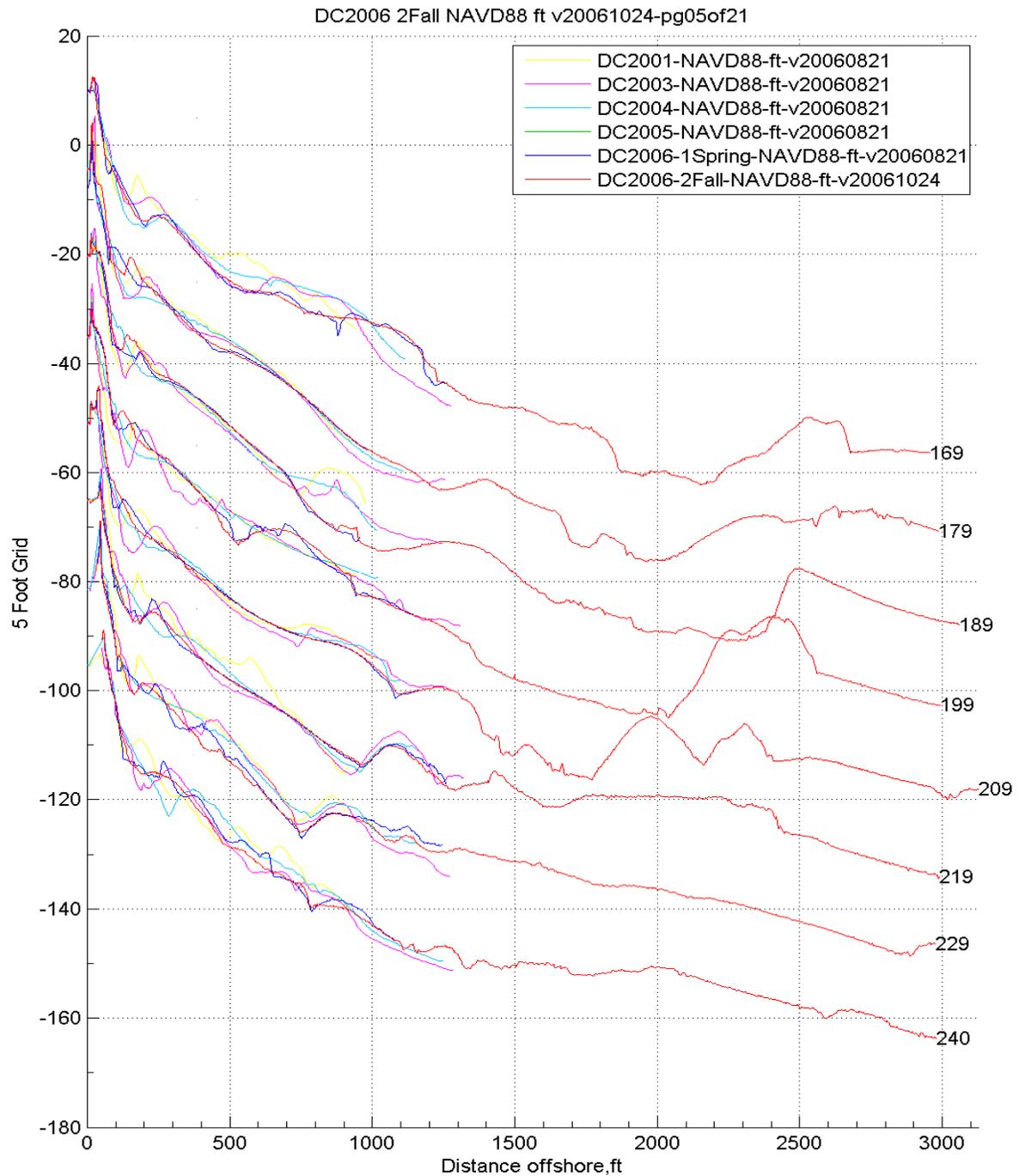
Comparison of the 2006 profiles to prior surveys is useful for quality control and, for determining how the profiles have varied over time. The example “stacked” cross-section plot is shown in **Figure 8**, and the complete set of plots comparing the 2006 profiles to 2005, 2004, and 2003 are in **Appendix F**. The 2006 survey compares well with prior surveys. Though there are, some differences.

One measure of data consistency and, to some extent, quality is to examine changes at the seaward end of the profile; particularly for parallel offsets between successive surveys and between adjacent lines. For the most part, the offshore ends of all the surveys are tight and consistent alongshore, however there are a few areas which display more variable behavior.

Profile lines between 99 and 279 in Kitty Hawk continue to exhibit complex shape between survey years. The 2006 and prior surveys, along with other recent studies including those of Virginia Institute of Marine Science (VIMS) and United States Geological Survey (USGS), have revealed the importance of sand supply and geologic controls which have created complicated morphology within this region. This region is dominated by 3D morphology which these widely spaced profiles do not adequately document. In these regions, slight differences in the position of the LARC when data was collected can result in profiles that are different. The consequence of using profiles in this region is that cross-section change computations along these lines will not be as accurate as on the other lines. Longshore averaging of the changes between these lines may also be less accurate. Profile lines 99 to 279 were extended up to 2 extra kilometers from previous surveys to further investigate the shape and to determine if the seaward limit to significant depth change (closure point) can be observed **Figure 7**. Even at 3km offshore the survey profiles continue to exhibit complex relief. Another area of known 3D morphology is to the south along profile lines 19 through 174 near Oregon Inlet. Not only are the geologic controls a factor in this region, but so is the proximity to Oregon Inlet where the profiles are much more complex. A high resolution swath survey was collected by the FRF at both these areas in May 2006 to supplement the profile dataset. These data and report will be provided under separate cover.



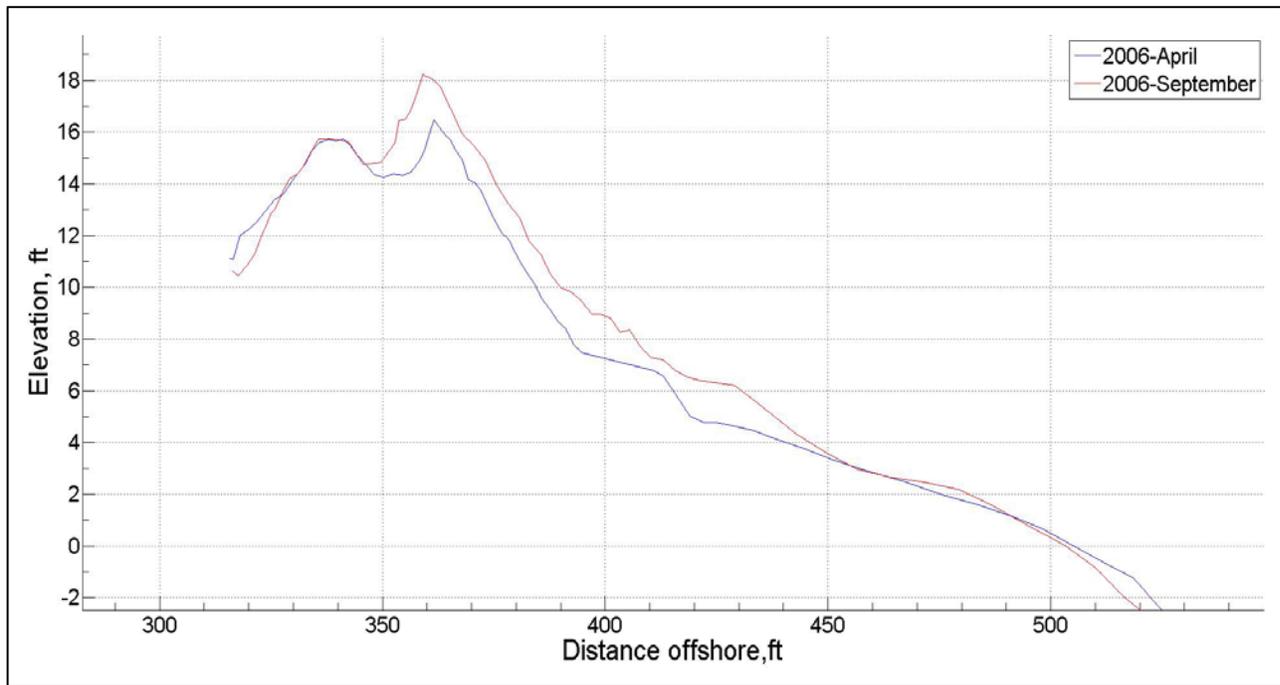
**Figure 6.** Example “stack” plot comparing all surveys for select Kill Devil Hills profiles.



**Figure 7.** Profile lines 169 to 240 in Kitty Hawk displaying complex morphology

Profile line 759 in Nags Head revealed some dune accretion as shown in **Figure 8** that is not related to natural beach processes. This accretion is a result of “beach push”. Beach push is the term used when bulldozers dig the lower beach and push the sand up in front and around houses

creating a temporary berm. This was observed on a few profiles and has been recorded in the Topographic notes **Appendix D**.



**Figure 8.** Profile line 759 in Nags Head showing dune accretion from April to September as a result of a “beach push”.

### 5.1 Data Transfer.

The data products are a 3D file and a BMAP file. The .3D file contains space delimited xyz values. For all of the profiles, each data point is described by 24 columns of information which include: the project location, profile number, survey number, latitude, longitude, northing, easting,

```

BMAP File Example
DC -150 20041013 COMBINED
386
1256.4000      20.2760
1262.1700      18.2810
1268.8000      15.4400
1278.3400      13.4580
1289.2400      11.4800
    
```

where the lines are:  
 location, line number, date  
 number of data points  
 distance along line & depth pairs

distance from baseline, offline distance, depth, date, time and time from midnight. The .bmap file is much simpler and facilitates profile comparisons, see format **example** to the left. These data along with the data report containing all appendices will be transferred via the CHL Guest FTP site at the following link:

[ftp://134.164.34.99/FRF/Dare\\_County/2006\\_Sept/](ftp://134.164.34.99/FRF/Dare_County/2006_Sept/)

This is the fourth in a series of FRF Dare County Beaches, Shore Protection Project Physical Monitoring Program Profile Survey and Sediment Sampling Reports. Future reports will have approximately the same format and content. Suggestions for improving the reports, questions about the contents of this report, and/or about the data should be directed to Mr. Mike Forte, Survey Specialist, at [Michael.f.forte@erdc.usace.army.mil](mailto:Michael.f.forte@erdc.usace.army.mil) or by phone (252) 261-6840 ext 228.

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Appendix A. Profiles numbers, Origins and azimuths

#	LOCATION	STATION	STA Abbrev	SEDIMEN T LINES rev Jun06	ORIGIN		AZIMUT H (deg)
					Easting (ft)	Northing (ft)	
1	<i>SOUTHERN SHORES (CONTROL rev jul04)</i>	-150+00	-150		2,964,665.00	885,364.00	65.31
2		-140+00	-140	S	2,965,116.00	884,444.00	65.31
3		-130+00	-130	S	2,965,239.00	883,452.00	65.31
4		-120+00	-120		2,965,920.00	882,604.00	65.31
5		-110+00	-110	S	2,966,366.00	881,697.00	62.57
6		-100+00	-100	S	2,966,790.00	880,778.00	62.57
7		-90+00	-90		2,967,110.00	879,895.00	62.57
8		-80+00	-80	S	2,967,533.00	878,988.00	62.57
9		-70+00	-70	S	2,967,951.00	878,106.00	62.57
10		-60+00	-60		2,968,381.00	877,175.00	62.57
11		-50+00	-50	S	2,968,838.00	876,228.00	62.57
12		-40+00	-40	S	2,969,249.00	875,440.00	62.57
13		-30+00	-30		2,969,731.60	874,496.08	62.57
14		-20+00	-20	S	2,970,189.67	873,607.16	62.57
15		-10+00	-10	S	2,970,653.00	872,720.97	62.57
1	<i>KITTY HAWK</i>	0+00.00	0		2,971,224.16	871,890.75	62.57
2		9+99.90	9		2,971,685.80	871,003.31	62.57
3		20+02.68	20	S	2,972,153.17	870,116.67	62.16
4		30+05.52	30		2,972,621.69	869,230.04	62.15
5		40+23.88	40		2,973,097.45	868,329.69	62.15
6		50+28.29	50	S	2,973,566.68	867,441.67	62.15
7		60+50.00	60		2,974,044.04	866,538.35	62.15
8		70+02.90	70		2,974,489.14	865,695.84	62.15
9		80+15.19	80	S	2,974,962.02	864,800.83	62.15
10		89+56.91	89		2,975,401.91	863,968.19	62.15
11	<b>START N. PROJ</b>	99+99.71	99		2,975,900.20	863,052.18	61.46
12	<b>STA 108+30</b>	109+99.46	109	S	2,976,406.09	862,189.91	59.60
13		119+99.14	119		2,976,911.94	861,327.71	59.60
14		130+33.04	130		2,977,435.12	860,435.98	59.60
15	<b>BEGIN MAIN FILL</b>	138+27.64	138	S	2,977,811.33	859,735.48	59.60
16	<b>STA 138+30</b>	149+99.46	149		2,978,430.26	858,740.05	59.60
17		159+99.55	159	S	2,978,966.59	857,895.27	59.60
18		169+70.21	169	S	2,979,427.66	857,040.44	59.60
19		179+87.62	179		2,979,942.69	856,163.07	59.59
20	<i>KITTY HAWK</i>	189+87.10	189	S	2,980,448.64	855,301.16	59.59
21	<i>KILL DEVIL HILLS</i>	199+93.01	199	S	2,980,957.84	854,433.71	59.59
22		209+74.44	209		2,981,440.37	853,579.14	60.55
23		219+99.94	219	S	2,981,944.55	852,686.23	60.55
24		229+83.39	229	S	2,982,428.55	851,830.15	60.52
25		240+41.84	240		2,982,949.45	850,908.80	60.52

#	LOCATION	STATION	STA Abbrev	SEDIMEN T LINES rev Jun06	ORIGIN Easting (ft)	Northing (ft)	AZIMUT H (deg)
26		249+81.53	249	S	2,983,384.80	850,076.05	61.91
27		260+17.44	260	S	2,983,879.57	849,165.95	61.91
28		269+49.25	269		2,984,314.02	848,341.66	62.21
29		279+80.81	279	S	2,984,795.03	847,429.13	62.21
30	<b>END MAIN FILL</b>	289+99.14	289	S	2,985,305.30	846,547.02	62.20
31	<b>STA 297+30</b>	299+92.48	299		2,985,733.15	845,649.70	62.20
32		309+71.20	309	S	2,986,193.06	844,785.81	61.97
33	<b>STOP NORTH PROJ.</b>	320+05.37	320		2,986,679.03	843,872.99	61.97
34	<b>STA 327+30</b>	329+88.80	329		2,987,138.95	843,003.79	62.12
35		340+20.02	340	S	2,987,621.23	842,092.34	62.12
36		349+69.94	349		2,988,097.30	841,269.59	62.12
37		359+82.85	359		2,988,539.16	840,357.49	62.12
38		369+89.02	369	S	2,989,042.40	839,485.48	62.12
39		380+71.83	380		2,989,558.45	838,533.55	62.12
40		389+70.36	389		2,989,974.18	837,737.02	62.12
41		400+57.86	400	S	2,990,476.49	836,772.51	62.12
42		410+12.16	410		2,990,890.88	835,912.18	62.12
43		420+89.66	420		2,991,438.01	834,982.69	62.12
44	<i>KILL DEVIL HILLS</i>	429+88.10	429	S	2,991,860.77	834,189.98	62.12
45	<i>NAGS HEAD</i>	439+84.62	439		2,992,280.78	833,284.86	62.12
46		450+18.31	450		2,992,764.13	832,371.20	62.79
47		460+03.41	460	S	2,993,260.87	831,519.62	62.07
48		469+90.51	469		2,993,571.24	830,566.97	62.07
49		482+61.53	483		2,994,282.89	829,505.73	62.14
50	<b>START SOUTH PROJ.</b>	489+92.29	489	S	2,994,624.38	828,859.71	62.14
51	<b>STA 491+60</b>	499+97.64	499		2,995,136.62	827,993.36	62.14
52		509+86.74	509	S	2,995,535.43	827,085.76	63.51
53	<b>START MAIN FILL</b>	519+88.58	519		2,995,982.37	826,189.19	63.51
54	<b>STA 521+90</b>	529+92.45	529	S	2,996,546.90	825,348.12	63.84
55		540+41.58	540		2,996,933.15	824,369.30	63.51
56		549+53.69	549	S	2,997,305.24	823,535.68	63.50
57		559+88.71	559		2,997,767.08	822,609.46	63.50
58		569+88.44	569	S	2,998,213.17	821,714.83	63.50
59		580+06.85	580		2,998,666.77	820,803.08	63.55
60		589+92.95	589	S	2,999,105.97	819,920.26	63.55
61		599+65.00	599		2,999,538.91	819,050.02	63.55
62		609+90.87	609	S	2,999,999.13	818,133.25	63.35
63		619+64.56	619		3,000,464.71	817,277.44	63.51
64		630+09.03	630	S	3,000,899.20	816,327.06	63.51
65		640+20.72	640		3,001,350.40	815,421.63	63.51
66		649+79.72	649	S	3,001,778.10	814,563.41	63.51
67		659+99.80	659		3,002,272.47	813,670.06	63.51

#	LOCATION	STATION	STA Abbrev	SEDIMEN T LINES rev Jun06	ORIGIN Easting (ft)	Northing (ft)	AZIMUT H (deg)
68	<b>START PH-I SO. PROJ. STA 675+00</b>	670+05.57	670	S	3,002,681.61	812,750.29	63.52
69		679+70.59	679		3,003,111.96	811,886.62	63.52
70		689+93.04	689	S	3,003,567.92	810,971.55	63.52
71	<b>START PH-I MAIN FILL STA 705</b>	700+49.12	700		3,004,086.42	810,050.04	63.47
72		709+88.06	709	S	3,004,505.80	809,210.02	63.47
73		719+89.21	719		3,004,952.98	808,314.29	63.47
74		729+74.68	729	S	3,005,344.90	807,408.71	63.43
75		739+87.41	739		3,005,797.93	806,503.04	63.43
76		749+23.69	749	S	3,006,216.77	805,665.74	63.43
77		759+89.41	759		3,006,693.51	804,712.69	63.43
78		771+03.13	771	S	3,007,224.84	803,733.28	63.43
79		779+91.07	779		3,007,566.98	802,912.03	65.00
80		789+52.47	789	S	3,007,945.92	802,028.54	66.12
81		800+05.35	800		3,008,360.92	801,060.98	66.79
82		809+84.88	809	S	3,008,747.00	800,160.83	66.79
83		819+75.72	819		3,009,137.59	799,250.30	66.78
84		829+90.14	829	S	3,009,537.47	798,318.10	66.79
85	<b>END PH-I MAIN FIL. STA 845+00</b>	839+63.41	839		3,009,965.04	797,443.87	60.59
86		850+15.03	850	S	3,010,499.88	796,538.49	59.43
87		859+53.78	859		3,010,977.31	795,730.29	59.43
88	<b>END PH-I PH-I SO PROJ. STA 875+00</b>	869+90.85	869	S	3,011,486.87	794,827.11	62.40
89		879+84.66	879		3,011,915.10	793,930.36	64.48
90		890+49.20	890	S	3,012,373.81	792,969.80	64.48
91		899+74.97	899		3,012,772.72	792,134.44	64.48
92		909+94.51	909	S	3,013,203.68	791,210.53	65.00
93		920+03.57	920		3,013,608.79	790,286.43	66.33
94		929+76.23	929	S	3,013,999.30	789,395.67	66.33
95		940+08.61	940		3,014,413.78	788,450.22	66.33
96		951+00.34	951	S	3,014,852.11	787,450.42	61.23
97	<i>NAGS HEAD</i>	960+00.00	960		3,015,213.29	786,626.57	66.33
98		970+00.70	970	S	3,015,615.10	785,710.08	66.33
99	<b>END MAIN FILL STA 996+50</b>	978+95.72	978		3,015,974.47	784,890.44	63.09
100		989+09.57	989	S	3,016,381.55	783,961.97	62.69
101		999+27.65	999		3,016,790.36	783,029.64	66.33
102	<b>END SOUTH PROJ. STA 1025+00</b>	1009+83.61	1009	S	3,017,214.37	782,062.62	66.33
103		1020+79.29	1020		3,017,623.64	781,046.43	59.32
104	<b>CAPE HATTERAS N. SEASHORE</b>	264+00(ZN)	265	S	3,017,811.35	780,343.61	68.00
105		254+00(YN)	254		3,017,891.89	779,297.62	68.00
106		244+00(XN)	244		3,018,479.41	778,456.45	68.00
107		234+00(WN)	234	S	3,018,896.90	777,546.60	68.00
108		224+00(VN)	224		3,019,207.51	776,593.56	68.00
109		214+00(UN)	214		3,019,520.51	775,641.48	68.00
110		204+00(TN)	204	S	3,019,918.65	774,723.81	68.00
111		194+00(SN)	194		3,020,315.78	773,805.72	68.00

#	LOCATION	STATION	STA Abbrev	SEDIMENT LINES rev Jun06	ORIGIN		AZIMUTH (deg)
					Easting (ft)	Northing (ft)	
112		184+00(RN)	184		3,020,723.12	772,891.76	68.00
113		174+00(QN)	174	S	3,021,118.89	771,973.13	68.00
114		164+00(PN)	164		3,021,859.83	771,193.95	68.00
115		153+00(ON)	153		3,022,228.09	770,198.06	68.00
116		144+00(NNII)	144	S	3,022,602.81	769,299.66	68.00
117		132+00(MN85 )	132		3,023,064.07	768,237.19	68.00
118		124+00(MNI)	124		3,023,354.48	767,492.96	68.00
119		114+00(MNII)	114	S	3,023,763.17	766,514.47	68.00
120		105+00(LN)	105		3,024,145.30	765,615.98	68.00
121		95+00(KN85)	95		3,024,459.99	764,666.72	68.00
122		85+00(JN90)	85	S	3,024,774.23	763,732.18	68.00
123		75+00(IN)	75		3,025,510.04	762,803.28	68.00
124		69+00(HN)	69		3,026,141.46	762,028.59	68.00
125		59+00(GN)	59	S	3,026,535.19	761,110.30	68.00
126		49+00(FN)	49		3,026,509.29	760,111.66	68.00
127		39+00(EN)	39		3,026,307.17	759,129.90	68.00
128		29+00(DN)	29	S	3,026,059.89	758,164.18	68.00
129	OREGON INLET	19+00(CN- 350)	19		3,025,368.41	757,231.36	68.00

## Appendix B. Survey Schedule

<b>Dare County 2006 Profile Survey</b>						
	<b>LARC</b>	<b>TOPO</b>				
<b>Date</b>	<b># of Lines This Day</b>	<b># of Lines This day</b>	<b>LARC % Complete</b>	<b>TOPO % Complete</b>	<b>Job Cum %</b>	<b>Notes</b>
26-Sep-06	27	17	19	12	15	good day
27-Sep-06	0	15	19	22	20	too rough for LARC
28-Sep-06	15	15	29	33	31	good day survey long lines to capture offshore moguls
29-Sep-06	33	15	52	43	48	good day
30-Sep-06	0	0	52	43	48	no survey
1-Oct-06	0	0	52	43	48	no survey Isaac swell
2-Oct-06	0	13	52	52	52	no LARC survey Isaac swell
3-Oct-06	20	16	66	63	65	good day
4-Oct-06	30	16	87	74	81	good day
5-Oct-06	19	19	100	88	94	good day
6-Oct-06	0	18	100	100	100	TOPO only

## Appendix C. Calibration Station Tables

METERS				FEET			DATE	BASE STA
Name	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>NOS 1370 H</b>	274611.5	901800.9	7.372	900954.6	2958658.5	24.186		
FILE: 000_1423	274611.5	901800.9	7.375	900954.7	2958658.6	24.196	26-Sep-06	FRF
Difference	<b>0.0</b>	<b>0.0</b>	<b>0.003</b>	<b>0.1</b>	<b>0.0</b>	<b>0.010</b>		
METERS				FEET			DATE	BASE STA
Name	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>NGS X254</b>	267136.457	904879.665	3.026	876430.220	2968759.461	9.928		
vert order - first FILE: 000_1134.RAW	267135.960	904880.185	3.031	876428.588	2968761.167	9.943	26-Sep-06	FRF
Difference	<b>0.497</b>	<b>0.520</b>	<b>0.005</b>	<b>1.632</b>	<b>1.706</b>	<b>0.015</b>		
METERS				FEET			DATE	BASE STA
Name	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>NGS KITTY</b>	261933.677	907453.526	2.796	859360.766	2977203.870	9.173		
horz order - second vert order - first FILE: 000_0842.RAW	261933.050	907453.889	2.770	859358.708	2977205.060	9.089	27-Sep-06	Black Pelican
FILE: 000_0823.RAW	261933.081	907453.870	2.769	859358.810	2977205.000	9.084	28-Sep-06	Black Pelican
RMS Difference			<b>0.026</b>			<b>0.087</b>		
METERS				FEET			DATE	BASE STA
Name	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>HAYMAN MP 5.4</b>	259954.635	908885.814	3.210	852867.859	2981902.969	10.531		
FILE: 000_1031.RAW	259954.613	908885.780	3.167	852867.787	2981902.858	10.391	28-Sep-06	Black Pelican
FILE: 000_0730.RAW	259954.734	908885.757	3.238	852868.183	2981902.782	10.623	29-Sep-06	Clarion
RMS difference	<b>0.072</b>	<b>0.047</b>	<b>0.036</b>	<b>0.235</b>	<b>0.154</b>	<b>0.119</b>		
METERS				FEET			DATE	BASE STA
Name	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>CURLEW MP 12.4</b>	251501.557	913350.274	2.140	825134.718	2996550.118	7.021		
FILE: 000_1313.RAW	251501.576	913350.270	2.059	825134.780	2996550.105	6.756	29-Sep-06	Clarion
FILE: 000_0833.RAW	251501.538	913350.313	2.083	825134.655	2996550.245	6.834	2-Oct-06	Clarion

FILE: 000_1353.RAW	251501.592	913350.279	2.073	825134.833	2996550.135	6.801	2-Oct-06	Clarion
RMS difference	<b>0.026</b>	<b>0.023</b>	<b>0.069</b>	<b>0.084</b>	<b>0.074</b>	<b>0.226</b>		
<b>METERS</b>				<b>FEET</b>			<b>DATE</b>	<b>BASE STA</b>
<b>Name</b>	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>FORREST MP 15.5</b>	246331.581	915945.544	2.786	808172.887	3005064.767	9.140		
FILE: 000_1504.RAW	246331.538	915945.544	2.744	808172.747	3005064.768	9.003	3-Oct-06	Comfort Inn
FILE: 000_1805.RAW	246331.590	915945.525	2.715	808172.918	3005064.706	8.906	3-Oct-06	Comfort Inn
FILE: 000_0758.RAW	246331.597	915945.540	2.739	808172.939	3005064.753	8.986	4-Oct-06	Comfort Inn
RMS difference	<b>0.027</b>	<b>0.011</b>	<b>0.055</b>	<b>0.088</b>	<b>0.036</b>	<b>0.180</b>		
<b>METERS</b>				<b>FEET</b>			<b>DATE</b>	<b>BASE STA</b>
<b>Name</b>	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>JUNCOS MP 19.7</b>	240434.396	918796.049	1.426	788825.206	3014416.799	4.678		
FILE: 000_1100.RAW	240434.423	918795.979	1.474	788825.294	3014416.569	4.835	4-Oct-06	Comfort Inn
FILE: 000_0816.RAW	240434.408	918796.001	1.434	788825.246	3014416.643	4.705	5-Oct-06	NPS
RMS difference	<b>0.021</b>	<b>0.060</b>	<b>0.034</b>	<b>0.069</b>	<b>0.196</b>	<b>0.112</b>		
<b>METERS</b>				<b>FEET</b>			<b>DATE</b>	<b>BASE STA</b>
<b>Name</b>	Northing Meters	Easting Meters	NAVD88	Northing Feet	Easting Feet	NAVD88		
<b>NPS PK MP 22</b>	237833.62	919857.93	1.380	780292.493	3017900.654	4.528		
FILE: 000_1125.RAW	237833.636	919857.958	1.416	780292.544	3017900.744	4.646	4-Oct-06	Comfort Inn
FILE: 000A1223.RAW	237833.644	919857.976	1.364	780292.571	3017900.806	4.475	5-Oct-06	NPS
FILE: 000_0943.RAW	237833.635	919857.945	1.365	780292.543	3017900.702	4.479	6-Oct-06	NPS
RMS difference	<b>0.019</b>	<b>0.032</b>	<b>0.024</b>	<b>0.061</b>	<b>0.106</b>	<b>0.080</b>		

Appendix D. TOPO Field Notes

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
NOTE: Unable to collect data as far back as the spring survey the vegetation behind the dune is much taller, denser in early Fall.						
<b>SOUTHERN SHORES</b>						
-150	FRF	26-Sep-06	Judy Roughton	Just North of Second Avenue		House & Deck on the crest of Dune! No data collected behind the dune.
-140	FRF	26-Sep-06	Judy Roughton	Just N. of Hickory Tr.		Started collection east of dense vegetation. Vines & Veg. much denser in the fall.
-130	FRF	26-Sep-06	Judy Roughton	South side of Sandpiper Lane beach access		Started collection behind the dune, east of house. Offline to get around patches of dense vegetation
-120	FRF	26-Sep-06	Judy Roughton	226 Ocean Blvd		Started collection east of dense vegetation, paused to get around sand fencing.
-110	FRF	26-Sep-06	Judy Roughton	204 Ocean Blvd	<a href="#">see photo from April 2006</a>	Line goes through the middle of a very large house with fence and swimming pool. Began collection on the east side of pool fence, paused to get around sand fencing.
-100	FRF	26-Sep-06	Judy Roughton	North side of the Dolphin Run beach access		Line goes through a small "flat top" house which sits on top of the dune. Started data collection at the top of dune.
-90	FRF	26-Sep-06	Judy Roughton	2 houses south of the Trout Run Beach Ramp		Started collection on Ocean Blvd. went off line to get around large patches of Prickley Pear cactus
-80	FRF	26-Sep-06	Judy Roughton	Near the Ocean Blvd & Hwy 12 intersection		Started collection near the south east corner of house.
-70	FRF	26-Sep-06	Judy Roughton	North side of 126 Ocean Blvd		Vegetation too dense behind dune - started collection on the crest, offline to get around sand fencing
-60	FRF	26-Sep-06	Judy Roughton	North of the Chicahawk beach access.		Started collection behind dune at dense vegetation.
-50	FRF	26-Sep-06	Judy Roughton	Near BM X254 - Chicahawk stoplight		Started collection behind dune at dense vegetation - offline to go around sandfencing.
-40	FRF	26-Sep-06	Judy Roughton	North of 68 Ocean Blvd		Started collection behind dune, east of dense vegetation.
-30	FRF	26-Sep-06	Judy Roughton	North of Skyline Road		Started collection behind dune, east of dense vegetation.
-20	FRF	26-Sep-	Judy Roughton	South of Skyline Road		Started collection behind dune, east of dense vegetation.

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
		06				
-10	FRF	26-Sep-06	Judy Roughton	Older White house about 5 houses north of the Condos		Started collection behind dune, east of dense vegetation.
<b>KITTY HAWK</b>						
0	FRF	26-Sep-06	Judy Roughton	North side of Kitty Hawk Pier property		Started collection behind dune on top of bulkhead
9	FRF	26-Sep-06	Judy Roughton	South of Kitty Hawk Pier	<a href="#">see photo from April 2006</a>	Sandfencing surrounding house - unable to access, had to survey offline. Paused on top of manmade dune, resumed at toe.
20	FRF	26-Sep-06	Judy Roughton	About 5 houses south of the Byrd Street beach access		SCARP House on line, paused to get around sandfencing and climb down scarp.
30	FRF	26-Sep-06	Judy Roughton	At Maynard Street		South edge of house on line - had to go offline. Started collecting on Hwy 12.
40	Black Pelican	27-Sep-06	Judy Roughton	Just South of Bennett Street	<a href="#">see photo</a>	South edge of house on line - HDOP to high next to house. Started collection on the top of the manmade dune
50	Black Pelican	27-Sep-06	Judy Roughton	South side of the Luke Street beach access		Started collection on Hwy 12
60	Black Pelican	27-Sep-06	Judy Roughton	North of Bleriot Street, South of the Saltaire Motel		High HDOP between houses - could not start collection on Hwy 12.
70	Black Pelican	27-Sep-06	Judy Roughton	North of Wilkins, South of Bleriot	<a href="#">see photo</a>	Started collection on Hwy 12 - Edge of house on line. Collected data up to 2m offline HDOP high next to house.
80	Black Pelican	27-Sep-06	Judy Roughton		<a href="#">see photo</a>	High HDOP between houses - could not start collection on Hwy 12
89	Black Pelican	27-Sep-06	Judy Roughton	North of Historic Street		Started collection on the west side of Hwy 12, HDOP high next to house.
99	Black Pelican	27-Sep-06	Judy Roughton			Started collection on the west side of Hwy 12
109	Black Pelican	27-Sep-06	Judy Roughton			Sandfencing between houses could not find a way to access the Road. Started collection between houses.
119	Black Pelican	27-Sep-06	Judy Roughton			Started data collection on Hwy 12
130	Black	27-	Judy			Started data collection on Hwy 12

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
	Pelican	Sep-06	Roughton			
138	Black Pelican	27-Sep-06	Judy Roughton	N. side of Kitty Hawk Rd across from Black Pelican		Started data collection on Hwy 12. Beach access on line
149	Black Pelican	28-Sep-06	Judy Roughton			Started collection on Hwy 12
159	Black Pelican	28-Sep-06	Judy Roughton	Across from John's Drive-in		Dense Vegetation, started collection on top of manmade dune.
169	Black Pelican	28-Sep-06	Judy Roughton	N. Side of 3631 Va. Dare Trail	see photo	Started collection on the east side of Hwy 12 High HDOP between houses - <b>Data Gap</b>
179	Black Pelican	28-Sep-06	Judy Roughton			Started collection on west side of Hwy 12
189	Black Pelican	28-Sep-06	Judy Roughton	S. Side of 3319 Va. Dare Trail		Started collection on Hwy 12 High HDOP between houses - <b>Data Gap</b>
<b>KILL DEVIL HILLS</b>						
199	Black Pelican	28-Sep-06	Judy Roughton	1 house south of Helga Street		Started collection on Hwy 12 - soft sand, offline climbing backside of dune, offline on beach to go around boat
209	Black Pelican	28-Sep-06	Judy Roughton			Started collection on Hwy 12 - paused to climb backside of dune, paused to get around sandfencing, HDOP high near house.
219	Black Pelican	28-Sep-06	Judy Roughton	Across from Archdale Street	see photo from April 2006	Could not collect data to the Road. High HDOP between houses
229	Black Pelican	28-Sep-06	Judy Roughton	Across from Random St. just N. of Avalon Pier	see photo from April 2006	Could not collect data to the Road. High HDOP between houses. Started collection behind the dune at dense veg. Paused at top - steep - resumed at toe, off line to get around sandfencing
240	Black Pelican	28-Sep-06	Judy Roughton	S. side of the Old Tanarama Hotel which is just south of Avalon Pier		The Tanarama Hotel is now gone (demolished & removed) There is a bulkhead that runs west/east directly on line. Started collection east of where the bulkhead stops.
249	Black Pelican	28-Sep-06	Judy Roughton	2013 Va. Dare Trail		Went 1m+ offline to maneuver around dense vegetation and sandfencing

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
260	Black Pelican	28-Sep-06	Judy Roughton	Across from Drifting Sands Motel		Could not collect data to the Road. High HDOP between houses. Started collection east of dense veg. behind dune. Scarp, paused at top of dune, resumed at toe.
269	Black Pelican	28-Sep-06	Judy Roughton	North of the Sea Ranch		Scarp. Started collection at dense vegetation behind dune.
279	Clarion Hotel	29-Sep-06	Judy Roughton	S. side of Sea Ranch		Could not collect data to the Road. High HDOP between houses
289	Clarion Hotel	29-Sep-06	Judy Roughton	Across from Goombay's Restaurant		Deck, Pool, Pool Fence on Line could not access the Road
299	Clarion Hotel	29-Sep-06	Judy Roughton			Could not collect data to the Road. High HDOP between houses
309	Clarion Hotel	29-Sep-06	Judy Roughton	S. property line at Quagmire's Restaurant		High Bobwire fence around property - The old Papagayo/Quagmires property (soon to be Condos) Could not access the Road
320	Clarion Hotel	29-Sep-06	Judy Roughton			Could not collect data to the Road. High HDOP between houses
329	Clarion Hotel	29-Sep-06	Judy Roughton			Line runs along the north edge of decking - had to go offline - High HDOP near structure
340	Clarion Hotel	29-Sep-06	Judy Roughton	N. Side of Carlow Avenue		Started collection behind dune - HDOP high near structure.
349	Clarion Hotel	29-Sep-06	Judy Roughton	North side of the Ovrille & Wilbur Wright Hotel		Went up to 4m offline to collect data around a deck and wood walkway. <b>Slope changes - may have to delete data up to the west side of deck.</b>
359	Clarion Hotel	29-Sep-06	Judy Roughton	South of the Colington Bch Access on Oregon Street		Started collection at dense vegetation behind dune.
369	Clarion Hotel	29-Sep-06	Judy Roughton	Across from the Thai Room Restaurant at 705 Va. Dare Trail		Very Large new house, decking, pool with fence on line. Wooden walkway over dune is on line. Started collection east of dense veg. - had to go 3m offline to go around deck, stayed on the south side of the walkway but offline 1.5m+.
380	Clarion Hotel	29-Sep-06	Judy Roughton	North beach access next to the Outer Banks Beach Club		Started collection east side of Hwy 12. Beach access, stairs are on the line had to go up to 4m offline to collect data. Bulkhead on line at parking lot

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
389	Clarion Hotel	29-Sep-06	Judy Roughton	Martin Street beach access on the south side of the Outer Banks Beach Club		Started collect just behind dune. Vegetation too dense to get through to the road this time of year.
400	Clarion Hotel	29-Sep-06	Judy Roughton	Just North of the Atlantic Street beach access		Could not collect data to the Road. High HDOP between houses. Started collection east of dense veg. behind dune.
410	Clarion Hotel	29-Sep-06	Judy Roughton	North side of the Outer Banks Motor Lodge and Miller's Restaurant		Could not collect data to the Road. High HDOP between houses. Started collection east of dense veg. behind dune.
420	Clarion Hotel	29-Sep-06	Judy Roughton	South side of the Breakers Condos		Could not collect data to the Road. High HDOP between houses. Started collection east of dense veg. behind dune.
429	Clarion Hotel	29-Sep-06	Judy Roughton	2019 VD Trail on the south side of the Quality Inn		Tallest Dune (30ft) Line goes down the side of dune. Started data collection part way down the side of dune.
<b>NAGS HEAD</b>						
439	Clarion Hotel	29-Sep-06	Judy Roughton			Started collection behind dune - offline going around dense veg.
450	Clarion Hotel	2-Oct-06	Judy Roughton	Oceans Condos on the line		Started collection east of dense veg. behind dune.
460	Clarion Hotel	2-Oct-06	Judy Roughton	Across from the Red Drum Restaurant		South edge of house on line - started collecting beside the house in dense veg.
469	Clarion Hotel	2-Oct-06	Judy Roughton			Decking on line - started collection offline at the NE corner of decking just behind dune
482	Clarion Hotel	2-Oct-06	Judy Roughton	Just north of Seaside Art Gallery near Baltic Street		House, Pool with fence on line
489	Clarion Hotel	2-Oct-06	Judy Roughton	2811 VD Trail - line runs along the south edge of this little old house that was built into the back side of the dune	<a href="#">see photo from April 2006</a>	Steep drop from crest of dune to south edge of house - started collection on top of dune.
499	Clarion Hotel	2-Oct-06	Judy Roughton	Across from Go-Kart track, just N. of Tortuga's		Started collection at dense veg behind dune
509	Clarion Hotel	2-Oct-06	Judy Roughton	North side of the Bladen Street beach access		Line runs between 2 older beach cottages, started collection east of houses.

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
519	Clarion Hotel	2-Oct-06	Judy Roughton	Near Bch access just north of the N.H.pier at E. Bainbridge - bulkhead at multiuse path		Started collection near dense veg. behind dune
529	Clarion Hotel	2-Oct-06	Judy Roughton	Just north of the Curlew Street beach access - S. side of a large green house		Started collection behind dune east of houses
540	Clarion Hotel	2-Oct-06	Judy Roughton	North of Hollowell Street		Southern edge of deck on line - Deck sits on top of dune. Went offline to collect data.
549	Clarion Hotel	2-Oct-06	Judy Roughton	apprx. 150m N. of the Conch St. Beach access.		Started collection behind the dune, sandfencing is on line - offline up to 2m
559	Clarion Hotel	2-Oct-06	Judy Roughton			Started collection on Hwy 12 - offline to go around deck & steps which are on the line.
569	Clarion Hotel	2-Oct-06	Judy Roughton	Across from Jockey's Ridge - near 3901 Va. Dare Trail		Started collection behind dune.
580	Clarion Hotel	2-Oct-06	Judy Roughton			Line runs between the south side of house and steep dune. Started collection on dune as close as possible to the north slope.
589	Clarion Hotel	2-Oct-06	Judy Roughton	4015 Virginia Dare Trail		High HDOP between houses - started collection behind dune east of houses.
599	Clarion Hotel	2-Oct-06	Judy Roughton	4103 Virginia Dare Trail	see photo from April 2006	Line runs through the middle of house - no dune here. Started collection at the seaward side of house
609	Clarion Hotel	2-Oct-06	Judy Roughton			Stopped data collection in dense vegetation
619	Clarion Hotel	2-Oct-06	Judy Roughton			Fence runs directly on line - large new house being built on the north side of this line. GPS antenna got tangled in the surveyors string while climbing the backside of dune - paused collection. Data will need to be edited.
630	Comfort Inn	3-Oct-06	Judy Roughton	North side of Nags Head Inn at house 4511 Virginia Dare Trail		HDOP too high next to house, started collection on dune, east of dense vegetation.
640	Comfort Inn	3-Oct-06	Judy Roughton	Just south of Nags Head Inn		Deck sits on line right behind the dune. Top of dune is very narrow. Started collection between deck

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
						& top of dune.
649	Comfort Inn	3-Oct-06	Judy Roughton	Loggerhead Beach Access		New fencing across the top of the dune, dense vegetation on the backside of steep dune. Started collection on the top of dune.
659	Comfort Inn	3-Oct-06	Judy Roughton			Started collection on dune top east of dense vegetation.
670	Comfort Inn	3-Oct-06	Judy Roughton		see photo from April 2006	Sandfencing, decking and House, Pool with fence on line. Started collection just behind dune.
679	Comfort Inn	3-Oct-06	Judy Roughton	Hawk's Nest Condos		Started collection behind dune, paused collection to get around sandfencing
689	Comfort Inn	3-Oct-06	Judy Roughton	Windjammer Condos		Started collection just behind dune east of dense vegetation.
700	Comfort Inn	3-Oct-06	Judy Roughton		see photo from April 2006	HDOP too high between houses, started collection behind dune.
709	Comfort Inn	3-Oct-06	Judy Roughton			Sandfencing, decking and House, Pool with fence on line. Started collection just behind dune.
719	Comfort Inn	3-Oct-06	Judy Roughton			Started collection behind dune at dense vegetation.
729	Comfort Inn	3-Oct-06	Judy Roughton	6505 Va. Dare Trail - Village of Nags Head		Could not find a way to access behind the dune - tall sandfencing - houses, decks, pools Started as far west as possible.
739	Comfort Inn	3-Oct-06	Judy Roughton			Started at dense vegetation near NE corner of house- went offline to walk around dense patches of yucca plants
749	Comfort Inn	3-Oct-06	Judy Roughton			Started collection offline on top of dune to stay out of thigh-high dense vegetation.
759	Comfort Inn	3-Oct-06	Judy Roughton			"Beach Push" went on here during the spring survey. Started collection next to sandfencing just east of cottage court parking lot.
771	Comfort Inn	3-Oct-06	Judy Roughton	S. side of the Gray Eagle St. Beach Access		Tall, steep dune, started collection just behind the dune.
779	Comfort Inn	3-Oct-06	Judy Roughton			Started collection behind the dune

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
<b>SOUTH NAGS HEAD</b>						
789	Comfort Inn	4-Oct-06	Judy Roughton	N. side of Comfort Inn	<a href="#">See photos</a>	High HDOP close to Hotel. Always a fresh "beach push" on this line.
800	Comfort Inn	4-Oct-06	Judy Roughton	S. side of Comfort Inn	<a href="#">See photo</a>	High HDOP close to building. Started collection behind the manmade dune.
809	Comfort Inn	4-Oct-06	Judy Roughton	N. side of the Holden Street Beach Access		Steep, narrow dune - dense vegetation behind dune. Started collection on top of dune.
819	Comfort Inn	4-Oct-06	Judy Roughton			Started collection east of dense vegetation
829	Comfort Inn	4-Oct-06	Judy Roughton	Aprpx. 40m North of White Cap Street		Started collection behind dune at fence, paused at top of manmade dune, resumed at the toe.
839	Comfort Inn	4-Oct-06	Judy Roughton		<a href="#">See photo</a>	Started collection behind dune, paused to get around sandfencing, paused again to get down steep dune.
850	Comfort Inn	4-Oct-06	Judy Roughton	E. Tides Drive (south end) at the oceanfront house #8629		Started collection behind dune
859	Comfort Inn	4-Oct-06	Judy Roughton			Started collection behind the dune
869	Comfort Inn	4-Oct-06	Judy Roughton	North side of 8811 Old Oregon Inlet Road		Started collection behind the dune
879	Comfort Inn	4-Oct-06	Judy Roughton			Started collection behind the dune
890	Comfort Inn	4-Oct-06	Judy Roughton	South of the Outer Banks Fishing Pier - 2 houses N. of the Indigo Beach Access		House, Fence and Swimming Pool on line, Started collection on top of dune.
899	Comfort Inn	4-Oct-06	Judy Roughton	North side of E. Jay Street beach access		Started collection behind the dune
909	Comfort Inn	4-Oct-06	Judy Roughton	Just north of E. June Street beach access - at #9237 Old Oregon Inlet Road		Started collection behind the dune
920	Comfort Inn	4-Oct-06	Judy Roughton	Line is on E. James Street		Good line started 1 house back in driveway
929	Comfort Inn	4-Oct-06	Judy Roughton	Line runs between 9505 & 9507 Old Oregon Inlet Road		High HDOP between houses - could not collect to Road

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
940	Comfort Inn	4-Oct-06	Judy Roughton	9613 Old Oregon Inlet Road		House on line, South edge of decking on line. Paused at top of dune. Resumed a toe.
951	NPS	5-Oct-06	Judy Roughton	Line is on Camelot Street		Started collection on pavement behind dune
953	NPS	5-Oct-06	Judy Roughton	Line is on E. Surfside Drive		Started collection on pavement, behind dune - suspended logging to go around sandfencing on dune
970	NPS	5-Oct-06	Judy Roughton	South side of E. Limulus Drive		Started collection east of dense vegetation behind dune
978	NPS	5-Oct-06	Judy Roughton	Line is on E. Pelican Street		Started collection on pavement, offline near stairs for beach access.
989	NPS	5-Oct-06	Judy Roughton	Line is on E Altoona Street (south end)		Started collection on pavement, paused collection to get around sandfencing - paused collection to climb down sand bags
999	NPS	5-Oct-06	Judy Roughton	Line is on E. Seagull (south end)		Started collection on road. Paused to climb down sandbags.
1009	NPS	5-Oct-06	Judy Roughton	Line is on an unnamed road "Geri's Cottages"		Started collection in concrete driveway.
1020	NPS	5-Oct-06	Judy Roughton	South side of McCall Ct.		Started collection east of dense vegetation.
<b>NATIONAL PARK SERVICE - BODIE ISLAND</b>						
265	NPS	5-Oct-06	Judy Roughton	Last NH beach access - just south of the Base Station.		Started collection east of vegetation behind dune.
254	NPS	5-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
244	NPS	5-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
234	NPS	5-Oct-06	Judy Roughton	Coquina Beach		Started collection east of vegetation behind dune.
224	NPS	5-Oct-06	Judy Roughton	Coquina Beach		Started collection east of vegetation behind dune.
214	NPS	5-Oct-06	Judy Roughton	Coquina Beach		Started collection east of vegetation behind dune.
204	NPS	5-Oct-06	Judy Roughton	Coquina Beach		Started collection east of vegetation behind dune.
194	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
184	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
174	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
164	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.

LINE	BASE STA.	DATE	SURVEYOR	LOCATION	photo	FALL 2006 FIELD NOTES
153	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
144	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
132	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
124	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
114	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
105	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
95	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
85	NPS	6-Oct-06	Judy Roughton	North side of 4WD entrance ramp at the campground		Started collection east of vegetation behind dune.
75	NPS	6-Oct-06	Judy Roughton	South side of the 4WD entrance ramp.		Started collection east of vegetation behind dune.
69	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
59	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
49	NPS	6-Oct-06	Judy Roughton			Started collection east of vegetation behind dune.
39	NPS		N/A	<b>Could not survey this line - beach roped off by the National Park Service.</b>		
29	NPS		N/A	<b>Could not survey this line - beach roped off by the National Park Service.</b>		
19	NPS		N/A	<b>Could not survey this line - beach roped off by the National Park Service.</b>		

## Appendix E. LARC Field Notes

Line #	Date Surveyed	Hypack Raw file 1	Hypack Raw file 2	vessel (dir)	Notes
-150	20060926	M150A.raw		out	High hdrop paused logging very briefly. took ctd at end of this line. Good line
-140	20060926	M140A.raw		in	good line
-130	20060926	M130A.raw		out	good line
-120	20060926	M120A.raw		in	good line
-110	20060926	M110A.raw		out	good line
-100	20060926	M100A.raw		in	good line
-90	20060926	-090_1035.raw		out	good line
-80	20060926	-080_1046.raw		in	good line
-70	20060926	-070_1057.raw		out	good line
-60	20060926	-060_1108.raw		in	good line ****these lines will need extra smoothing due to surface chop****
-50	20060926	-050_1119.raw		out	good line
-40	20060926	-040_1131.raw		in	good line
-30	20060926	-030_1141.raw		out	good line
-20	20060926	-020_1153.raw	-020_1201.raw	in	lost rtk in surfzone. Redid surfzone part of line *use both files*
-10	20060926	-010_1208.raw		out	good line
0	20060926	000_1219.raw		in	good line
9	20060926	009_1249.raw		out	good line
20	20060926	020_1300.raw		in	good line
30	20060926	030_1313.raw		out	good line
40	20060926	040_1325.raw		in	good line
50	20060926	050_1335.raw		out	took ctd at end of this line. good line
60	20060926	060_1348.raw		in	good line
70	20060926	070_1359.raw		out	good line
80	20060926	080_1411.raw		in	good line
89	20060926	089_1421.raw		out	good line
99	20060926	099_1433.raw		in	end day on this line. good line
99	20060928	099_0838.raw		out	stard day 2 0841. Duplicate line to check base stations. Begin run of long lines here. Took ctd at end of this line.
109	20060928	109_0855.raw		in	good line
119	20060928	119_0913.raw		out	paused logging a couple of times for short periods of high hdrop.

Line #	Date Surveyed	Hypack Raw file 1	Hypack Raw file 2	vessel (dir)	Notes
					Good line
130	20060928	130_0929.raw		in	good line
138	20060928	138_0945.raw		out	good line
149	20060928	149_1002.raw		in	good line
159					took a few waves in the sufzone lost bottom. Good line. Ran to end of survey line and still shoaling.
	20060928	159_1019.raw		out	
169	20060928	169_1041.raw		in	good line
179					generator problems delayed completion of line. Use both files
	20060928	179_1104.raw	179_1146.raw	out	
189	20060928	189_1153.raw		in	good line
199	20060928	199_1216.raw		out	good line
209	20060928	209_1238.raw		in	good line
219	20060928	219_1302.raw		out	good line
229	20060928	229_1323.raw		in	good line
240	20060928	240_1401.raw		out	winds picking up sse.good line
249	20060928	249_1423.raw		in	end day on this line due to very choppy seas. begin survey on this line duplicate for base station change. Choppy offshore. Take ctd at end of this line. Good line offshore segment will need some smoothing.
249					
	20060929	249_0755.raw		out	
260	20060929	260_0820.raw		in	good line
269					lost rtk due to high hdop use both files for entire line. Good line
	20060929	269_0843.raw	269_0856.raw	out	last long line since seas are becoming very rough and data is spikey good line
279					
	20060929	279_0908.raw		in	
289	20060929	289_0930.raw		out	good line
299	20060929	299_0943.raw		in	good line
309	20060929	309_0955.raw		out	good line
320	20060929	320_1006.raw		in	good line
329	20060929	329_1018.raw		out	good line
340	20060929	340_1028.raw		in	good line
349	20060929	349_1040.raw		out	good line
359	20060929	359_1051.raw		in	good line
369	20060929	369_1102.raw		out	good line
380	20060929	380_1114.raw		in	good line
389	20060929	389_1125.raw		out	good line

Line #	Date Surveyed	Hypack Raw file 1	Hypack Raw file 2	vessel (dir)	Notes
400	20060929	400_1137.raw		in	good line
410	20060929	410_1148.raw		out	good line took ctd cast at end of this line
420	20060929	420_1202.raw		in	good line
429	20060929	429_1216.raw		out	good line
439	20060929	439_1227.raw		in	good line
450	20060929	450_1239.raw		out	good line
460	20060929	460_1249.raw		in	good line
469	20060929	469_1300.raw		out	good line
483	20060929	482_1311.raw		in	left agc on partial way onto beach good line
489	20060929	489_1321.raw		out	good line
499	20060929	499_1331.raw		in	good line
509	20060929	509_1341.raw		out	wreck marked on this line. Good line
519	20060929	519_1351.raw		in	good line
529	20060929	529_1405.raw		out	good line took ctd cast at end of this line
540	20060929	540_1417.raw		in	good line fatho plot not working properly
549	20060929	549_1428.raw		out	good line
559	20060929	559_1438.raw		in	left agc on partial way onto beach good line
569	20061003	569_1448.raw		out	good line
580	20061003	580_1458.raw		in	good line
					begin survey at 1430. Redo this line for base station check took ctd at end of this line.. Good line
580	20061003	580_1432.raw		out	line
589	20061003	589_1445.raw		in	good line
599	20061003	599_1456.raw		out	good line
609	20061003	609_1506.raw		in	good line
619	20061003	619_1516.raw		out	good line
630	20061003	630_1526.raw		in	good line
640	20061003	640_1536.raw		out	good line
649	20061003	649_1546.raw		in	good line
659	20061003	659_1556.raw		out	good line
670	20061003	670_1606.raw		in	good line
679	20061003	679_1616.raw		out	good line
689	20061003	689_1626.raw		in	good line
700	20061003	700_1636.raw		out	good line
709	20061003	709_1645.raw		in	good line
719	20061003	719_1655.raw		out	good line
729	20061003	729_1705.raw		in	good line
739	20061003	739_1715.raw		out	good line
749	20061003	749_1724.raw		in	good line

Line #	Date Surveyed	Hypack Raw file 1	Hypack Raw file 2	vessel (dir)	Notes
					high hdop on this line.paused collection watiing for better sat configuration. Use both raw files for complete line.
759	20061003	759_1734.raw	759_1747.raw	out	
771	20061003	771_1752.raw		in	good line.
					begin survey 0750.
779	20061004	779_0747.raw		out	Took ctd at end of this line
789	20061004	789_0758.raw		in	good line
800	20061004	800_0809.raw		out	good line
809	20061004	809_0818.raw		in	good line
819	20061004	819_0827.raw		out	good line
829	20061004	829_0836.raw		in	good line
839	20061004	839_0846.raw		out	good line
850	20061004	850_0855.raw		in	good line
859	20061004	859_0904.raw	859_0908.raw	out	use both files due to high hdop.
869	20061004	869_0914.raw		in	good line
879	20061004	879_0938.raw		out	good line
890	20061004	890_0947.raw		in	good line
899	20061004	899_0956.raw		out	good line
909	20061004	909_1005.raw		in	good line
920	20061004	920_1015.raw		out	good line took ctd cast at end of this line
929	20061004	929_1026.raw		in	good line
					surfzone will need some extra editing. Defined offshore bar on these next few lines. Low tide not helping either.
940	20061004	940_1037.raw		out	
951	20061004	951_1045.raw		in	good line
953	20061004	953_1054.raw		out	good line
970	20061004	970_1104.raw		in	good line
978	20061004	978_1113.raw		out	good line
989	20061004	989_1125.raw		in	good line
999	20061004	999_1140.raw		out	good line
1009	20061004	1009A.raw		in	good line
1020	20061004	1020A.raw		out	good line
265	20061004	265_1213.raw		in	good line
254	20061004	254_1224.raw		out	good line
244	20061004	244_1235.raw		in	good line
234	20061004	234_1254.raw		out	took ctd at end of this line.good line
224	20061004	224_1311.raw		in	good line
214	20061004	214_1323.raw		out	good line

Line #	Date Surveyed	Hypack Raw file 1	Hypack Raw file 2	vessel (dir)	Notes
204	20061004	204_1335.raw		in	end survey on this line base station range maxed out.
204	20061005	204_0728.raw		out	begin survey redo this line for base station verification. Took ctd at end of this line good line
194	20061005	194_0740.raw		in	good line
184	20061005	184_0753.raw		out	good line
174	20061005	174_0804.raw		in	had to stray offline due to fishing tournament cars and people on beach. Good line
164	20061005	164_0816.raw		out	delayed start due to fisherman. Good line
153	20061005	153_0826.raw		in	good line
144	20061005	144_0840.raw		out	good line
132	20061005	132_0851.raw		in	good line
124	20061005	124_0903.raw		out	took ctd at end of this line.good line
114	20061005	114_0917.raw		in	good line
105	20061005	105_0930.raw		out	good line
95	20061005	095_0943.raw		in	paused right outside surzone to wait for rtk fix. Reversed some on line to get back to position where signal was lost. This line may need some additional attention
85	20061005	085_0957.raw		out	good line
75	20061005	075_1010.raw		in	good line
69	20061005	069_1025.raw		out	good line
59	20061005	059_1039.raw		in	good line
49	20061005	049_1053.raw		out	good line
39	20061005	039_1109.raw	039_1122.raw	in	lost rtk need to use both files for processing trawler wreck exposed on this survey.
29	20061005	029_1130.raw		out	took ctd at end of this line.good line
19	20061005	019_1148.raw		in	good line



**Appendix F. TOPO Photos**



Line -110 goes through the middle of 204 Ocean Blvd. Southern Shores



13 April 2006

Scarp on line 9



13 April 2006



Line 189 Kitty Hawk  
28 September 2006



View looking North from Line 90 Kitty Hawk  
27 September 2006





Line 159 Kitty Hawk

28 September 2006



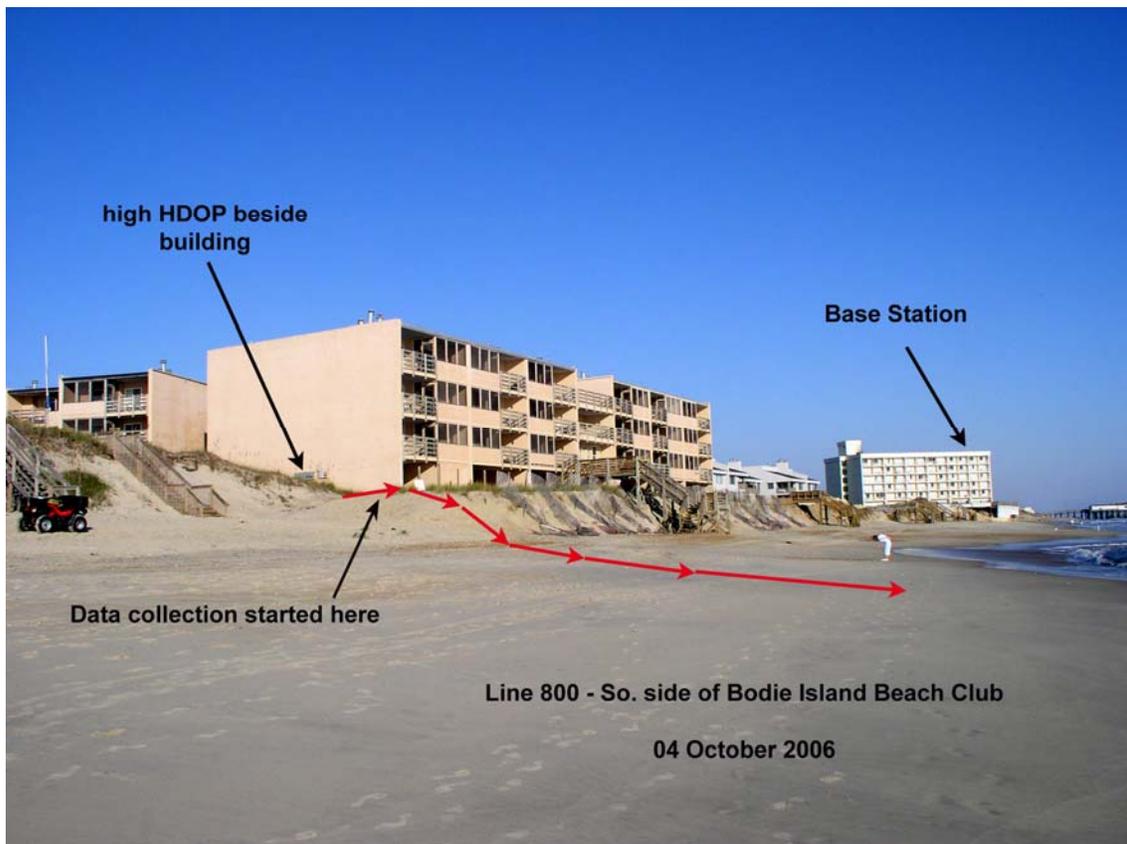
high HDOP beside building

Base Station

Data collection started here

Line 800 - So. side of Bodie Island Beach Club

04 October 2006





Line 219 - HDOP too high between houses - could not survey to the Road



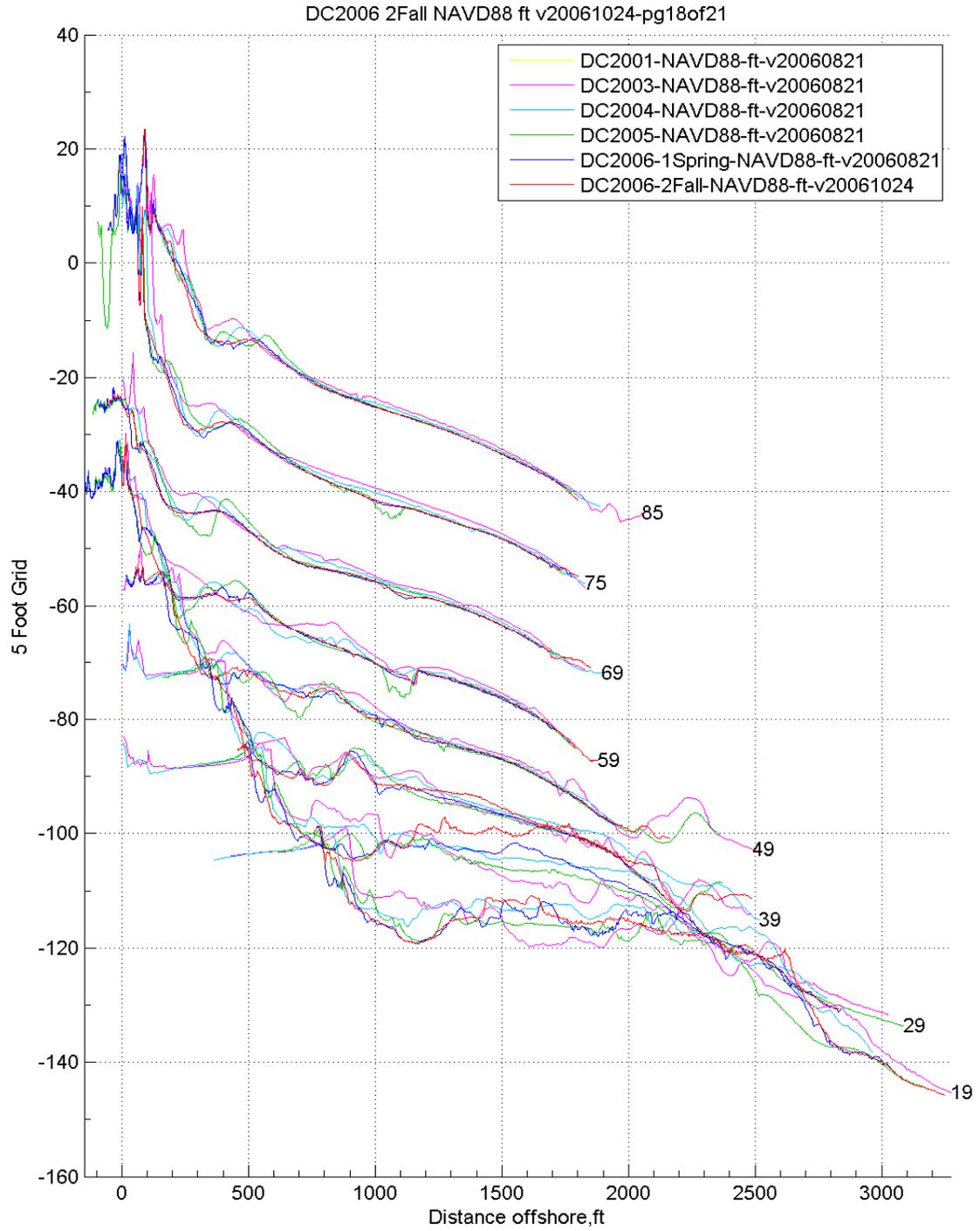
LINE 229



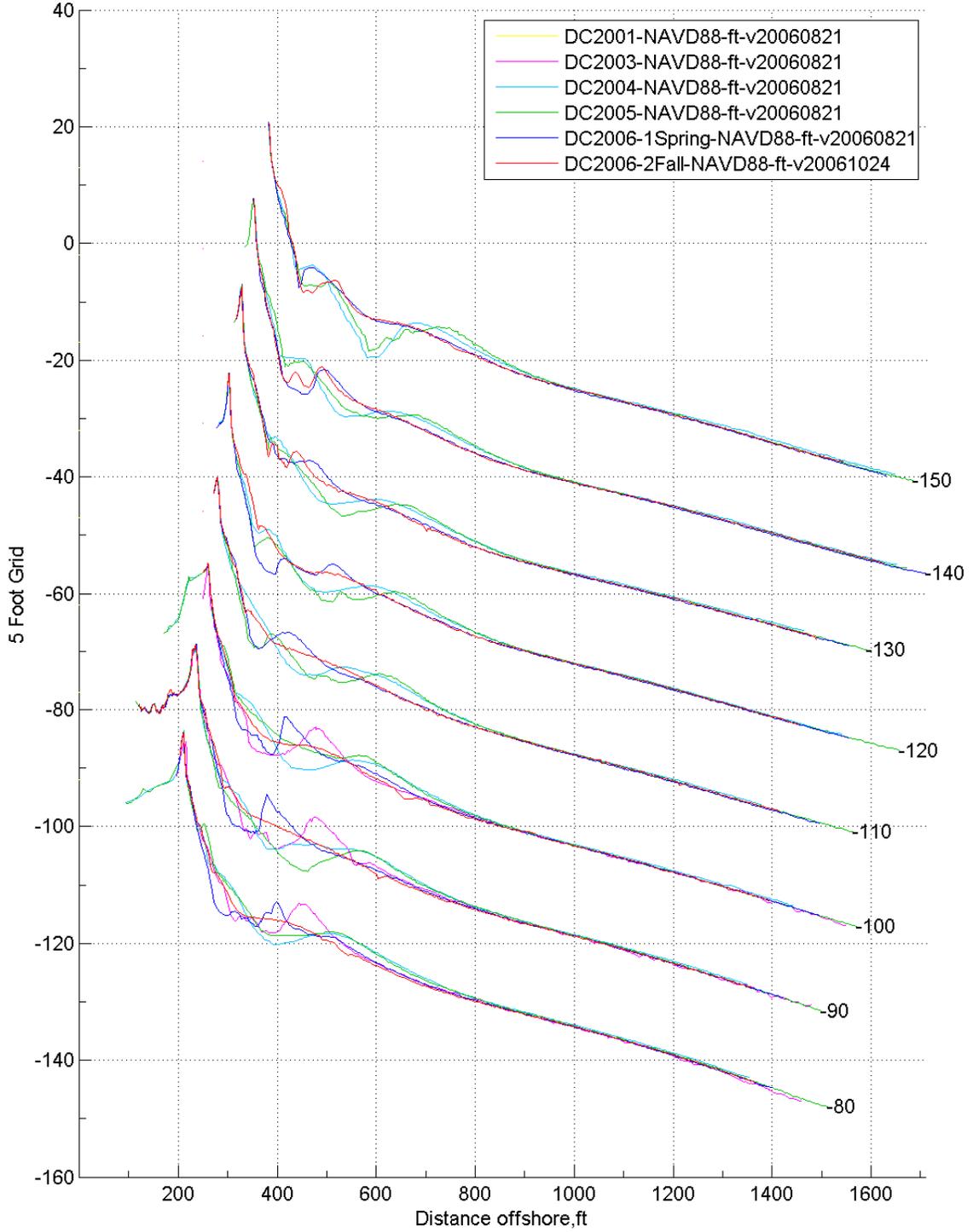




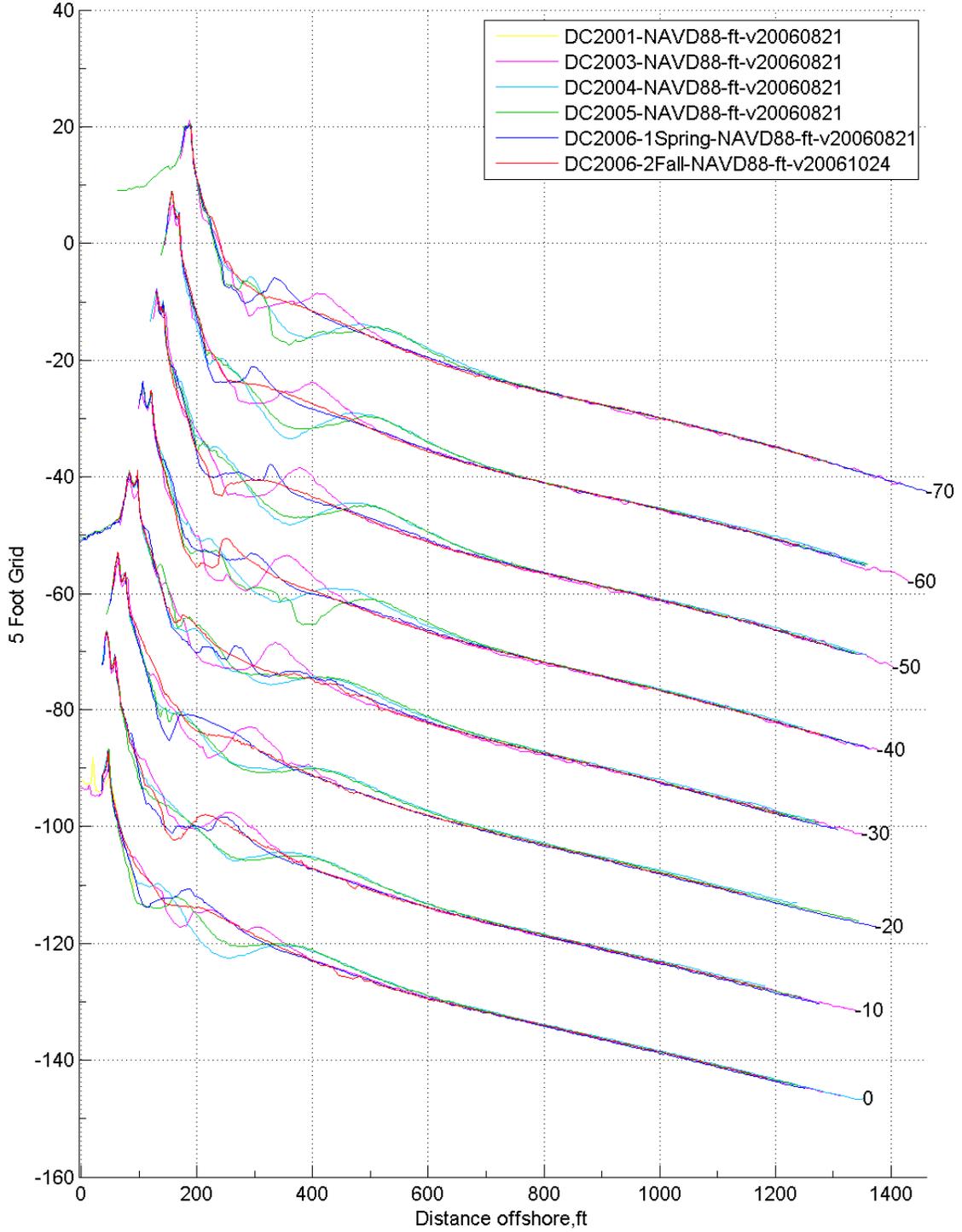
# Appendix G. Profile “Stackplots” 2003 through 2006



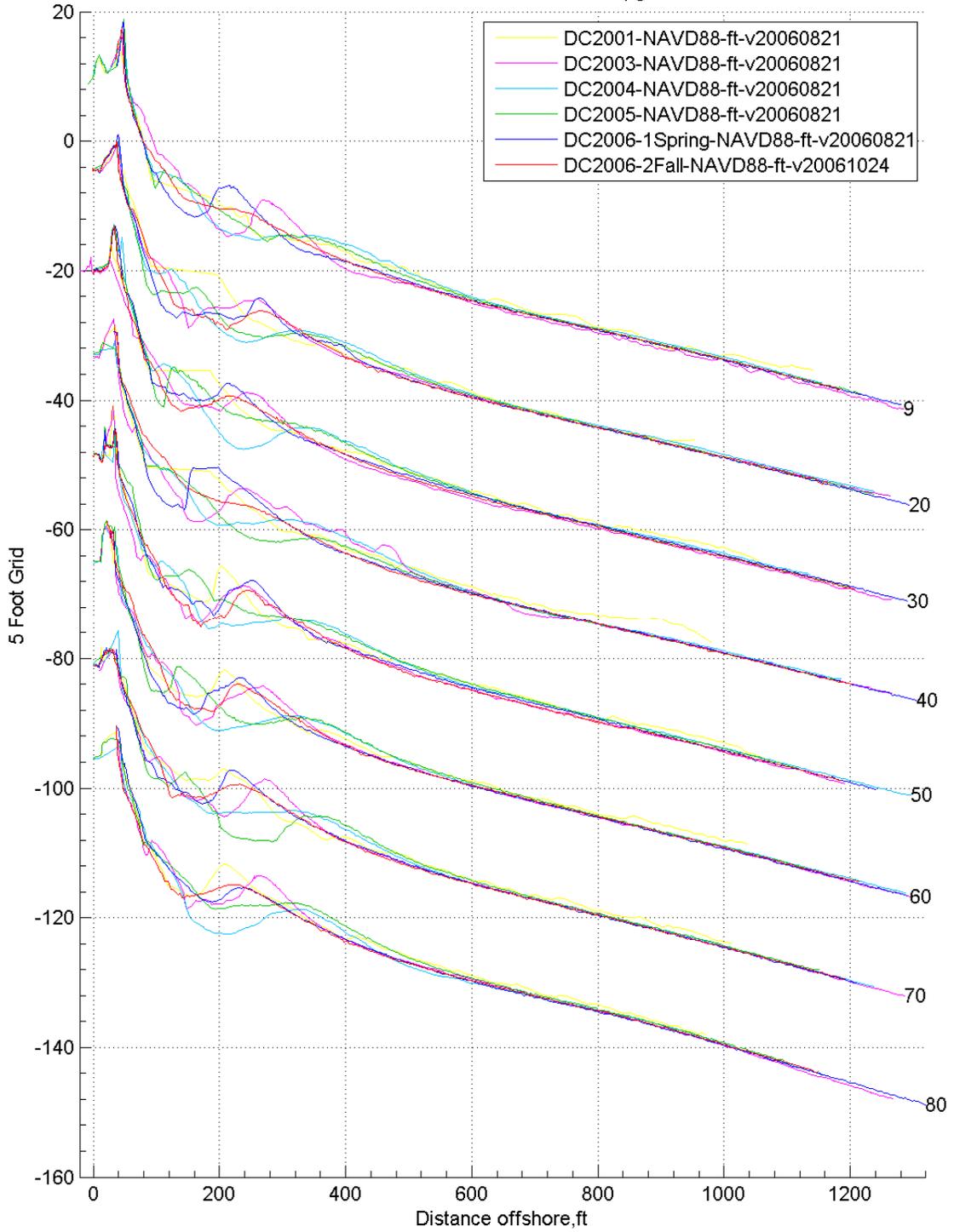
DC2006 2Fall NAVD88 ft v20061024-pg01of21



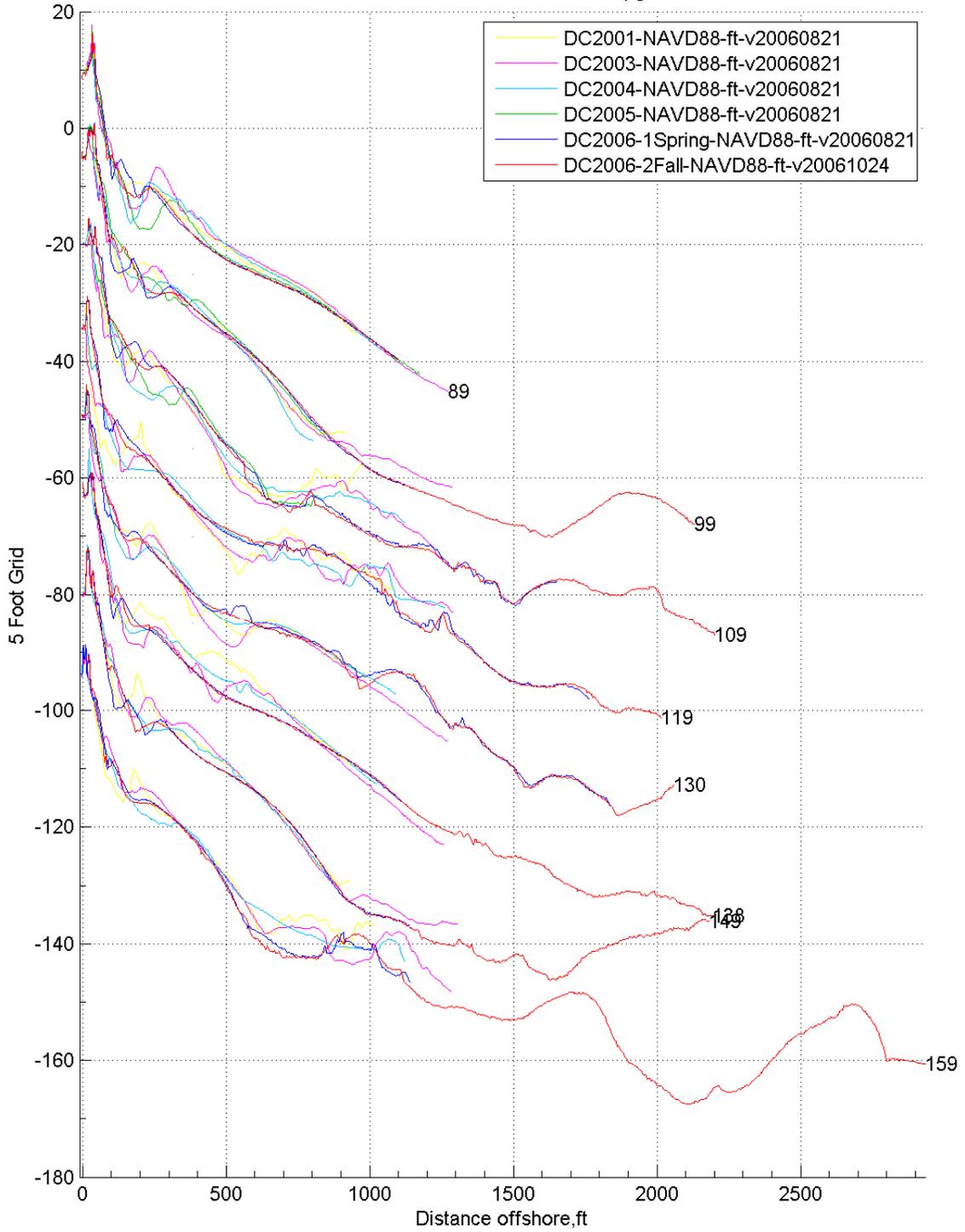
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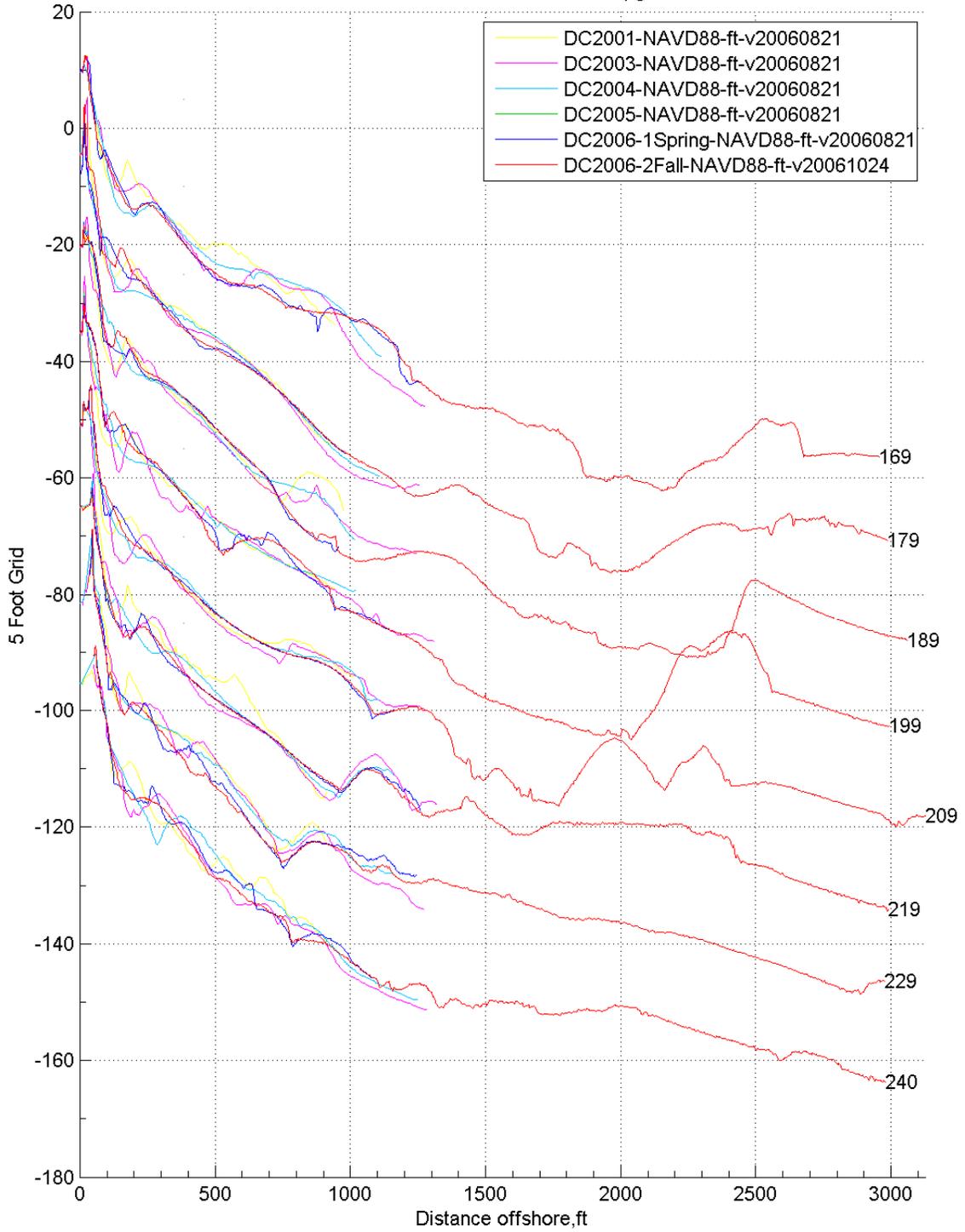
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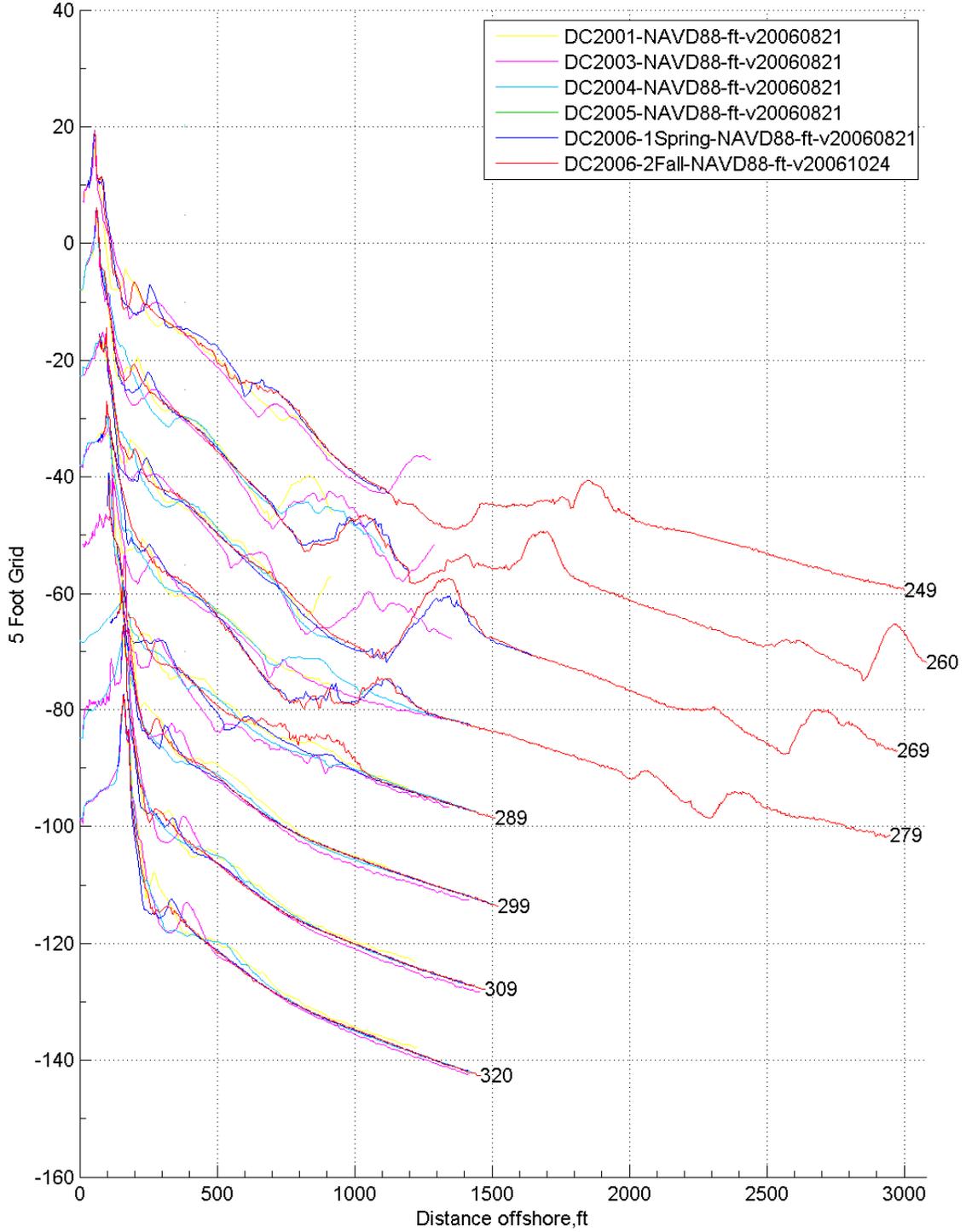
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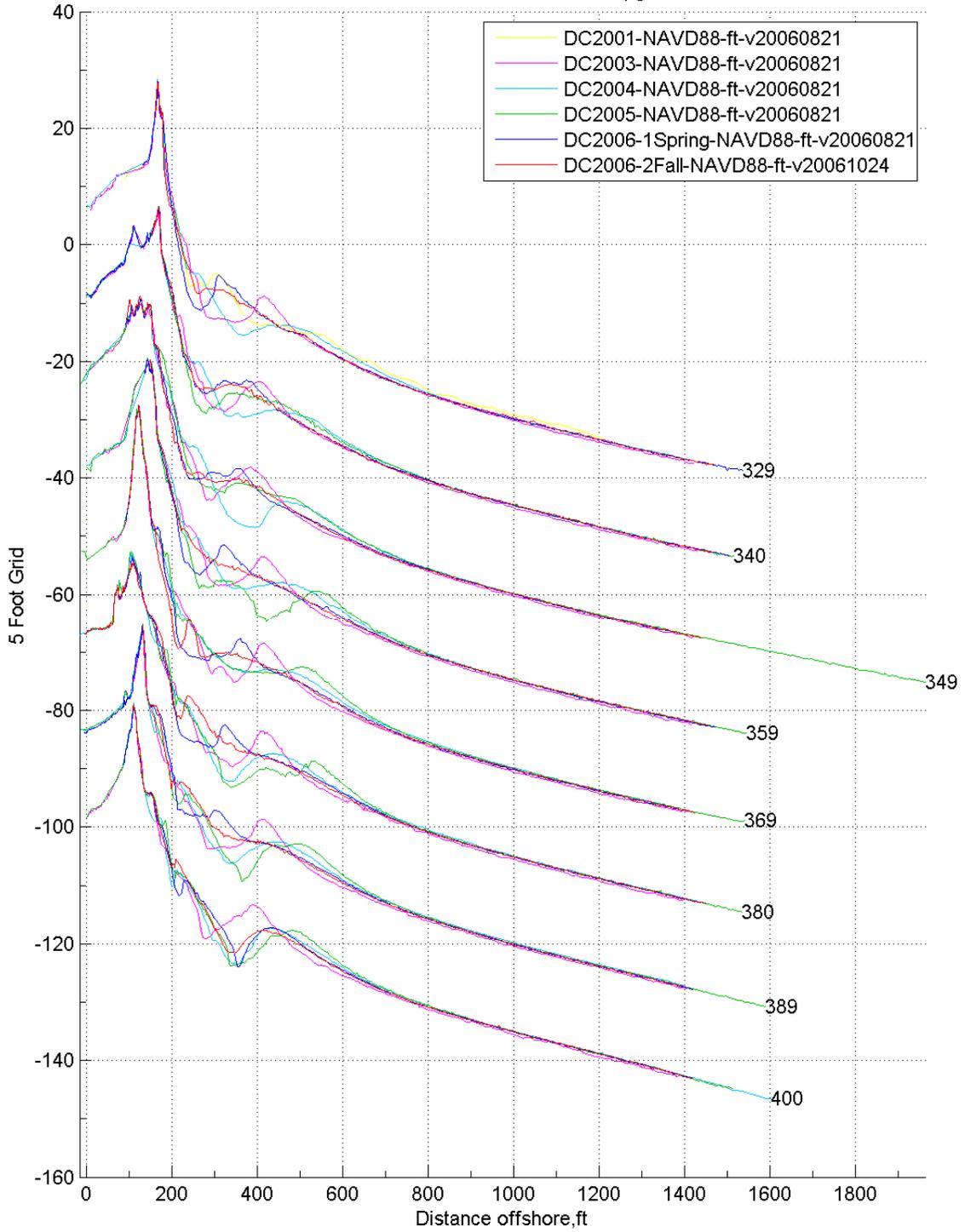
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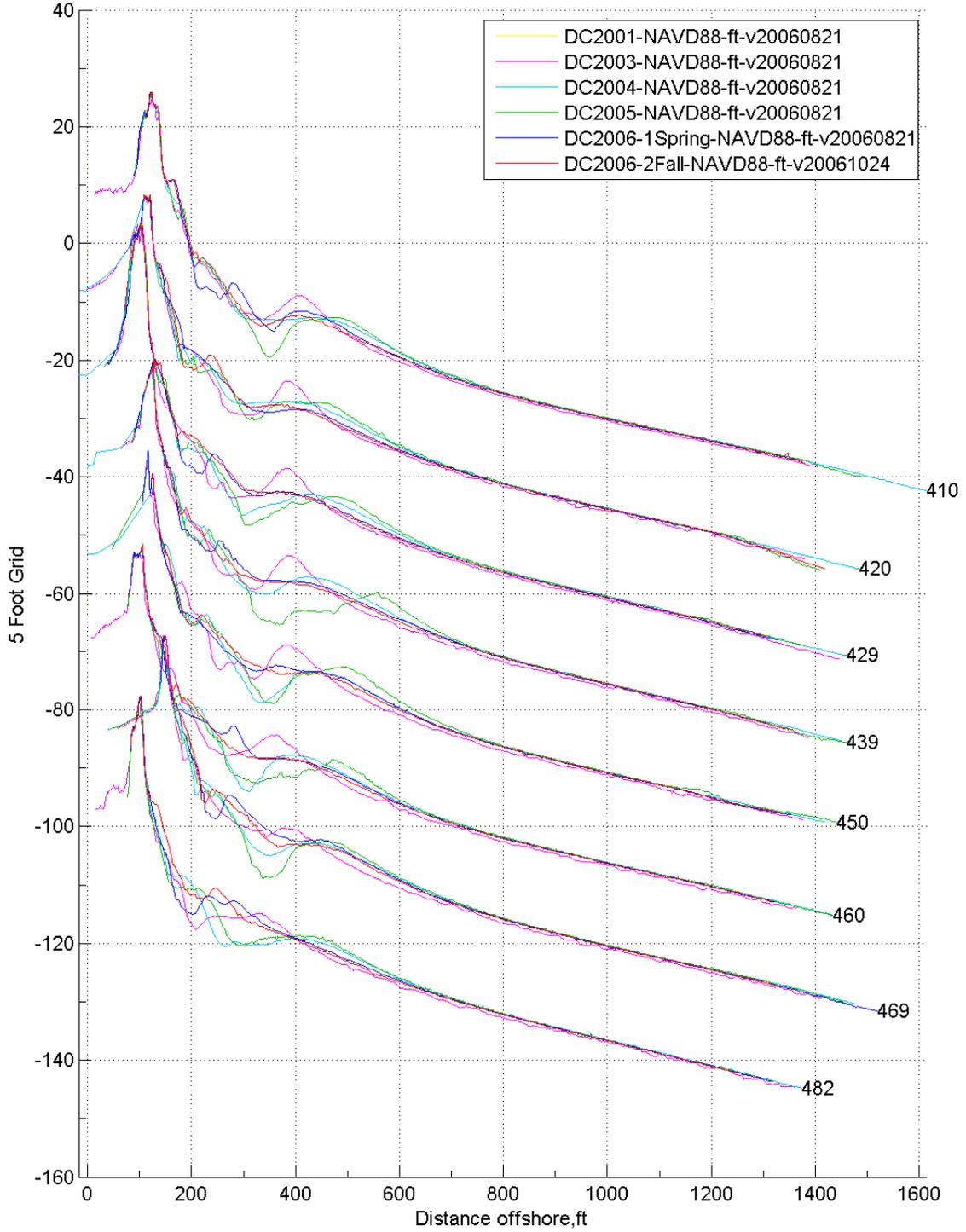
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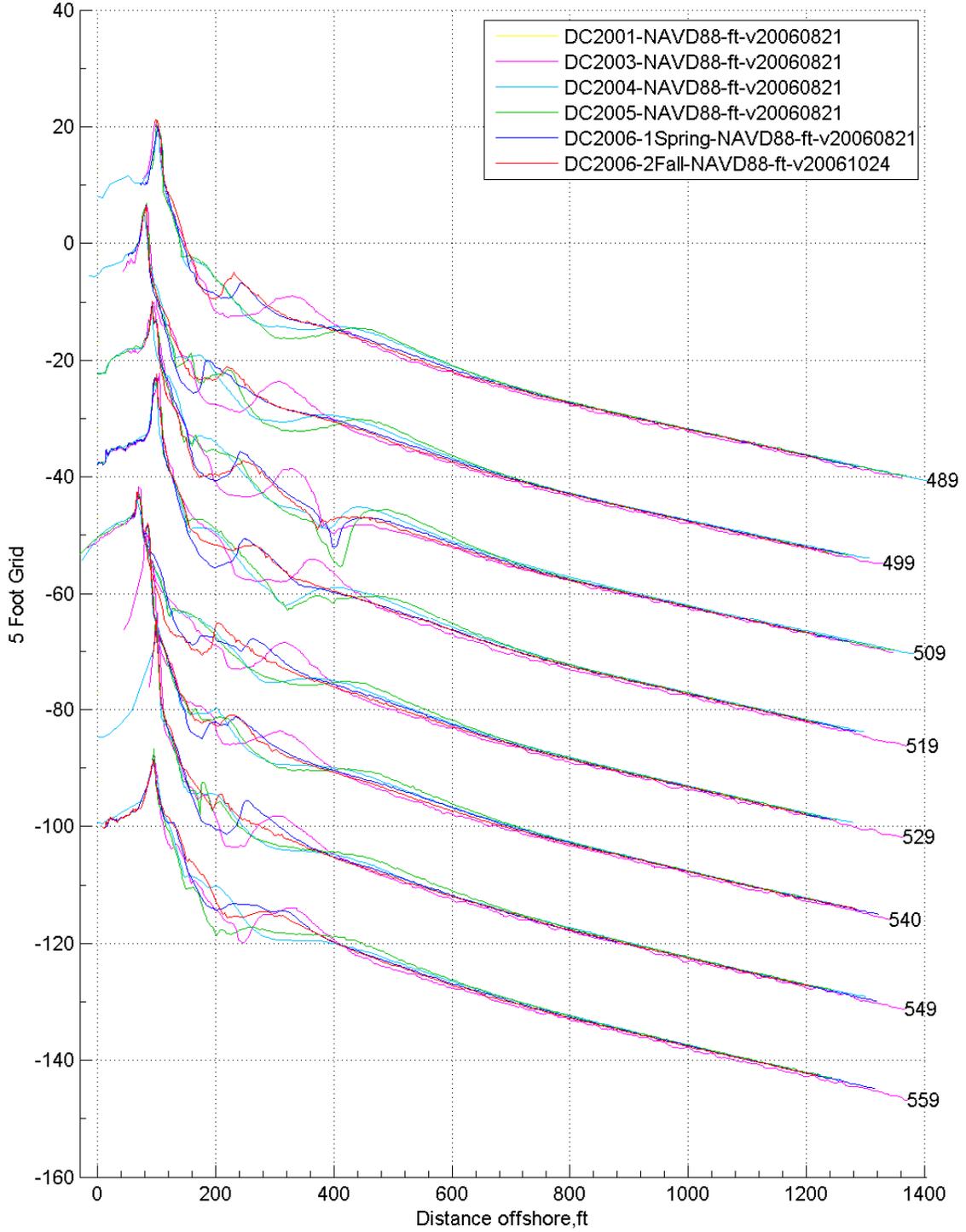
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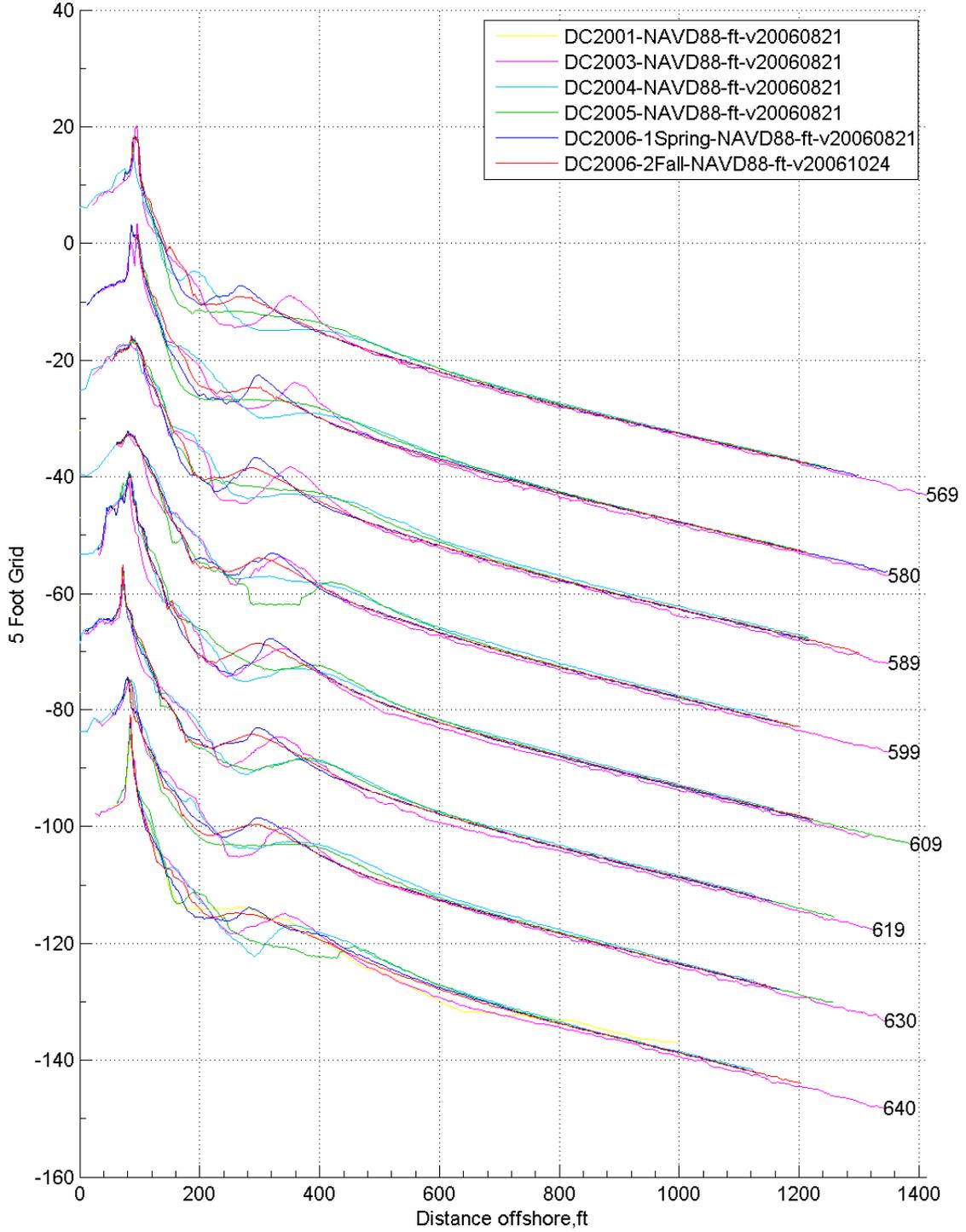
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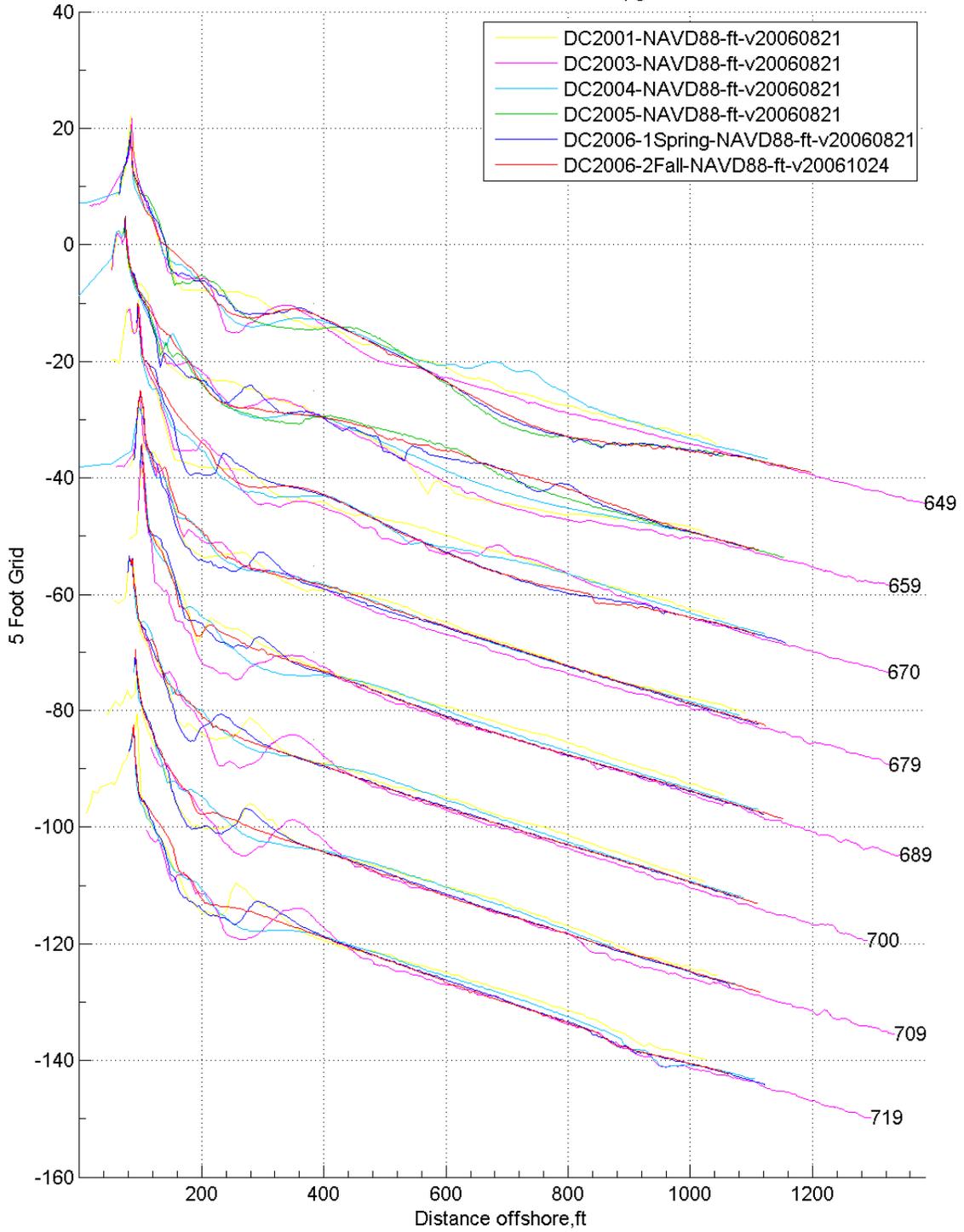
DC2006 2Fall NAVD88 ft v20061024-pg09of21



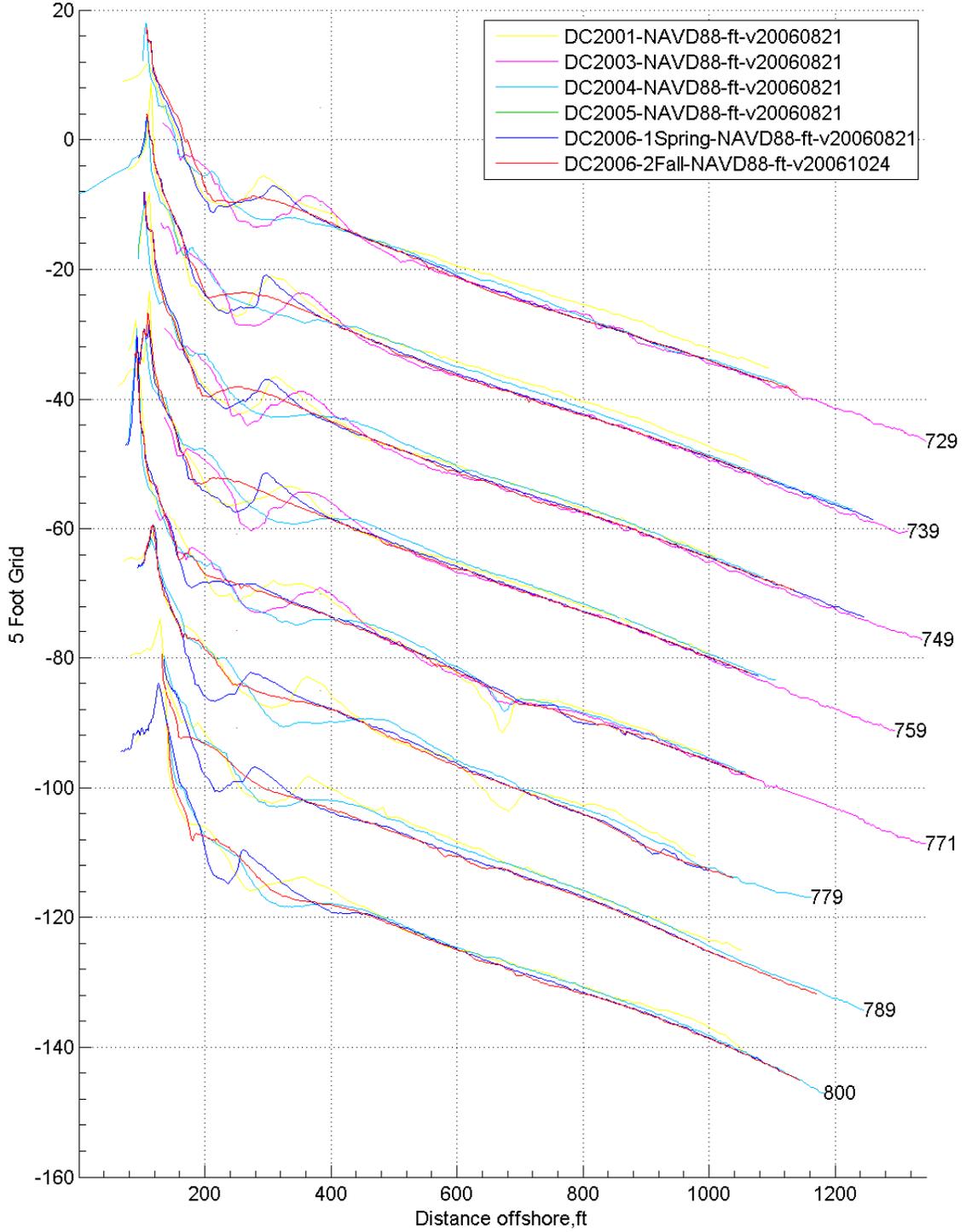
DC2006 2Fall NAVD88 ft v20061024-pg10of21



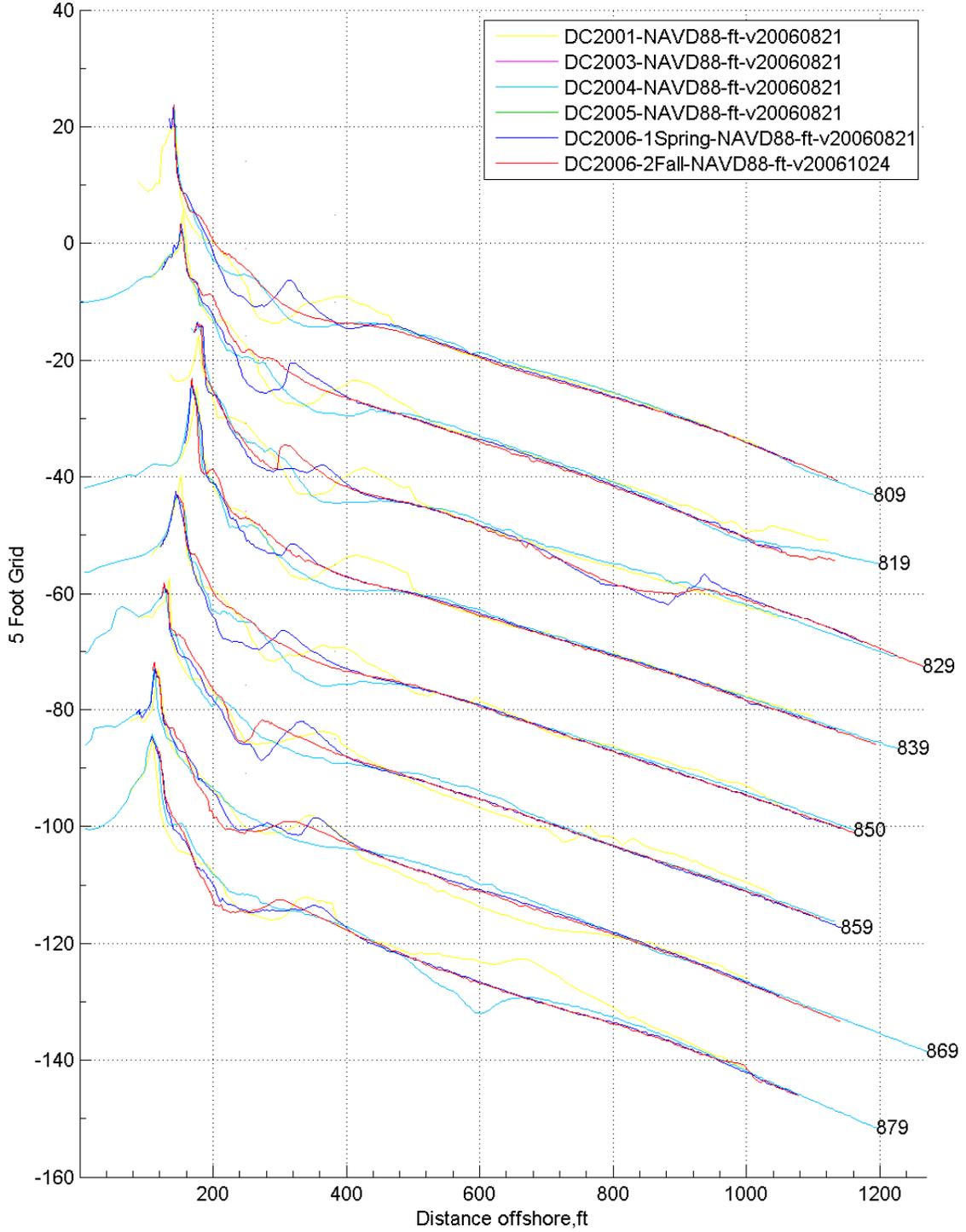
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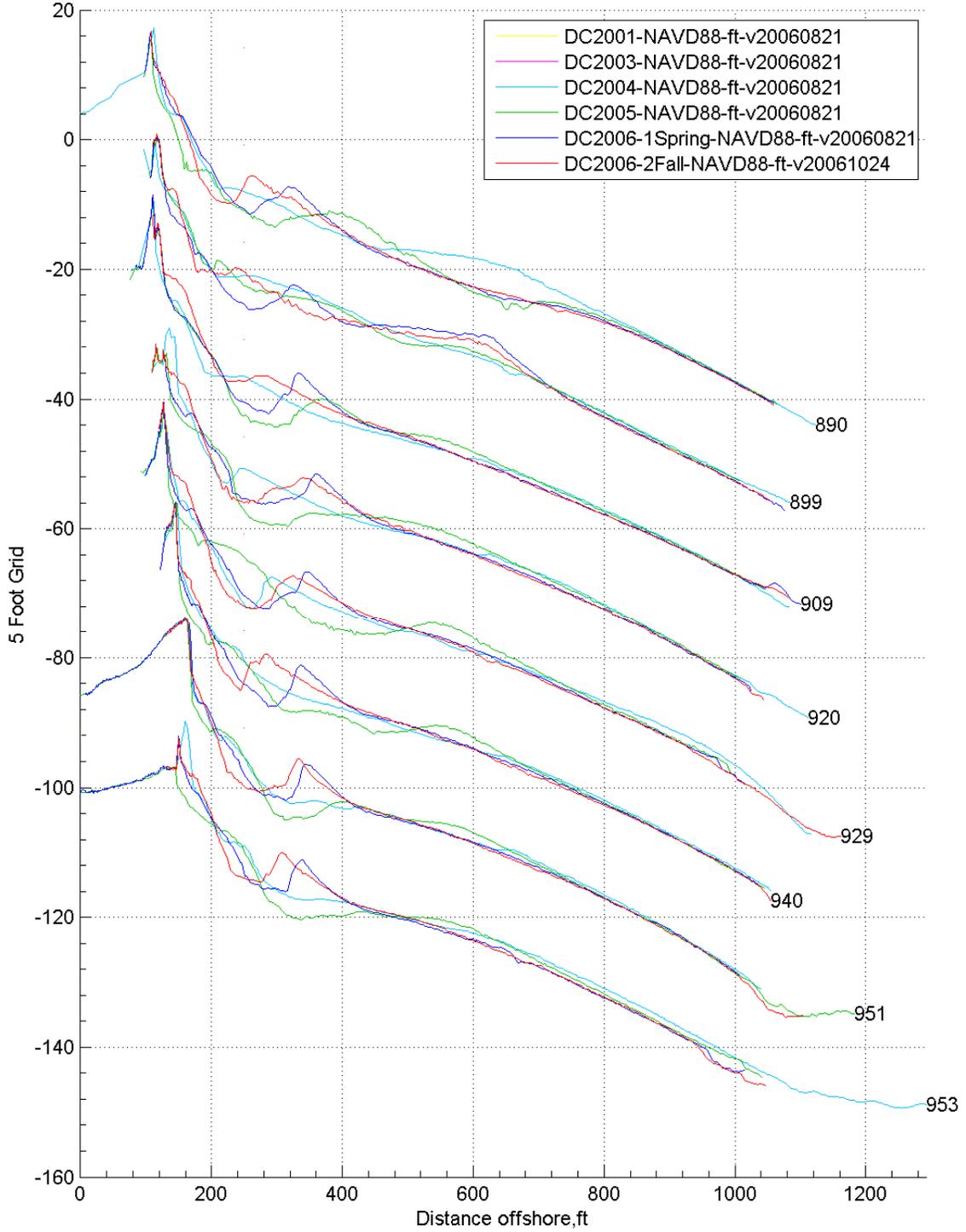
DC2006 2Fall NAVD88 ft v20061024-pg12of21



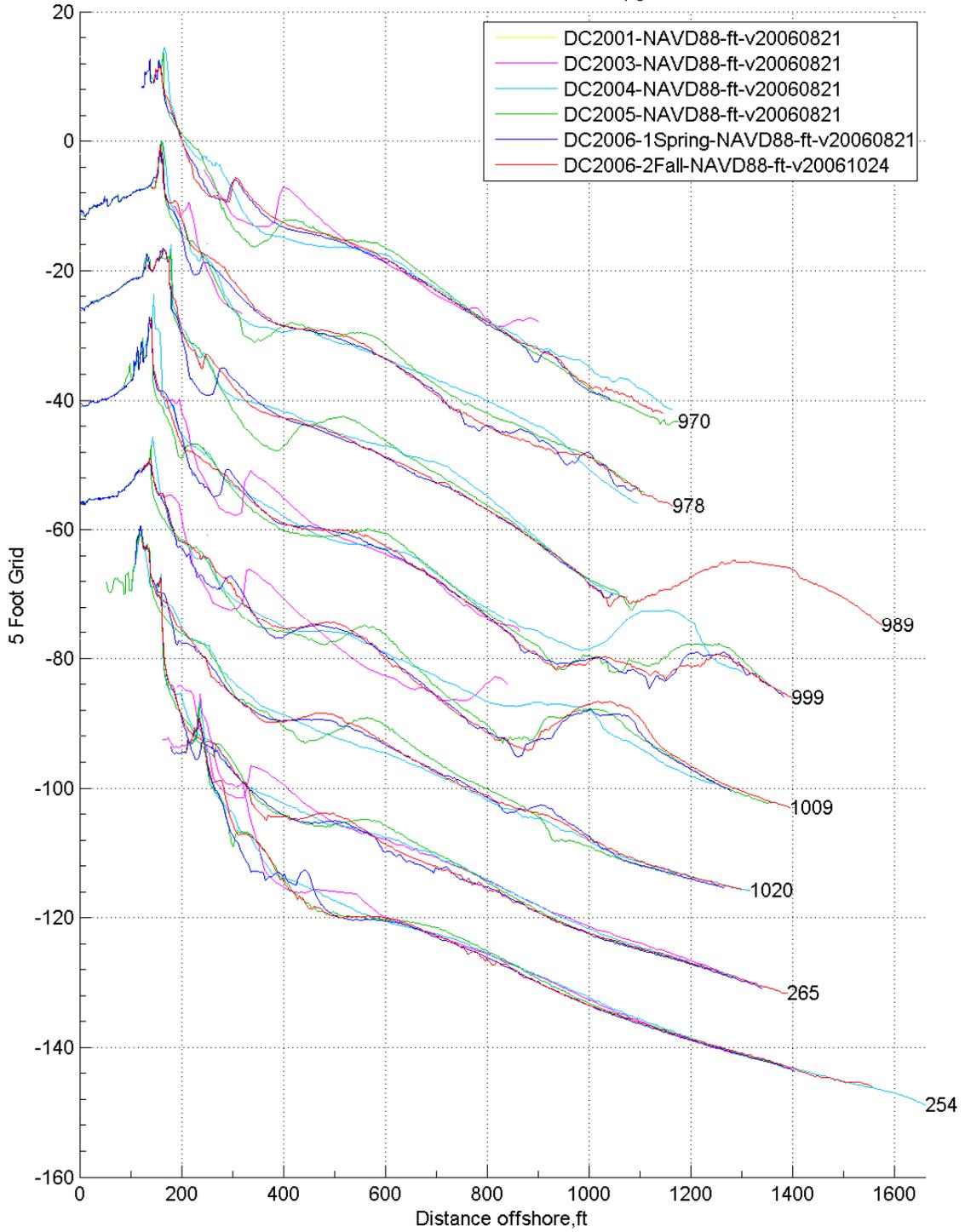
DC2006 2Fall NAVD88 ft v20061024-pg13of21



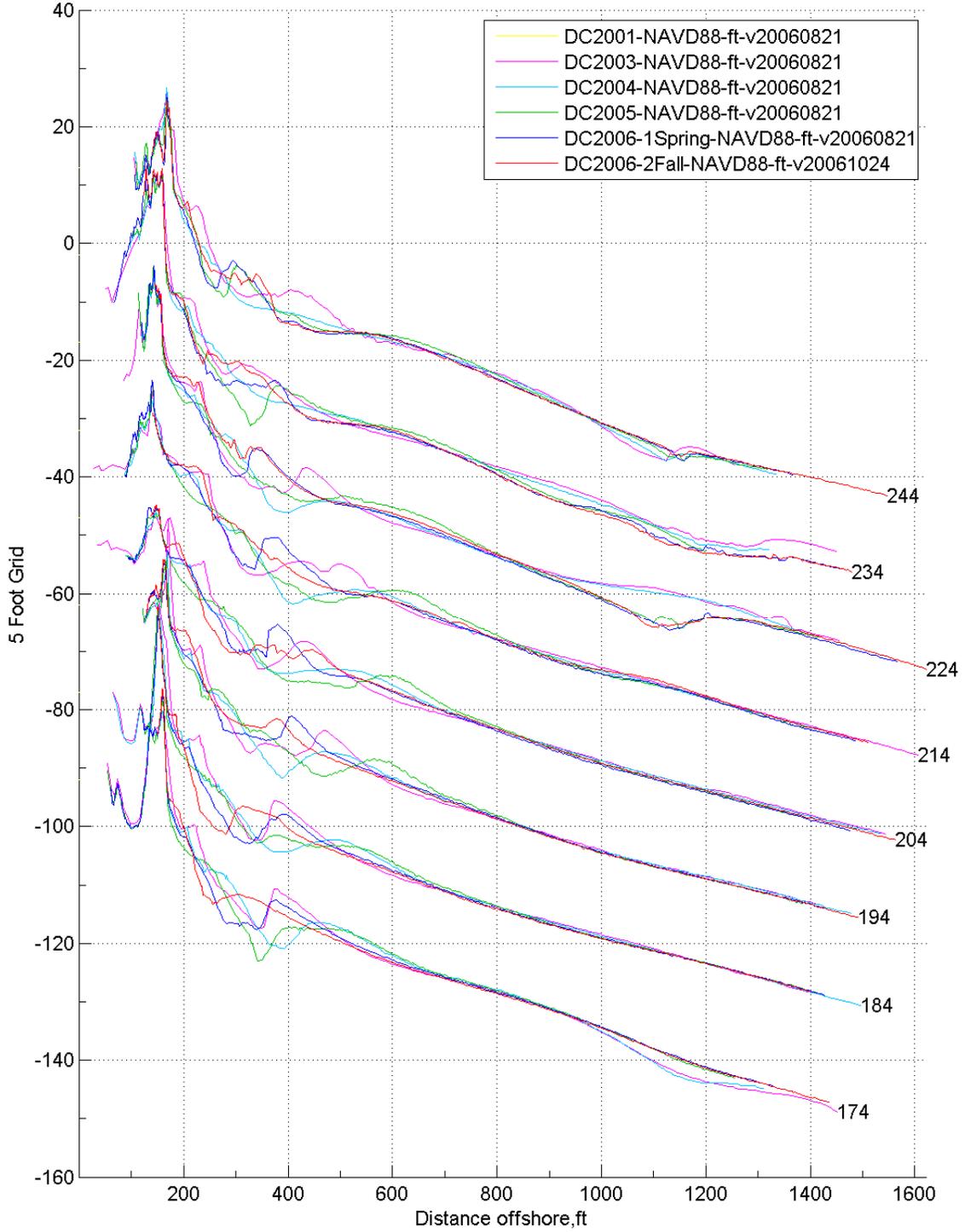
DC2006 2Fall NAVD88 ft v20061024-pg14of21



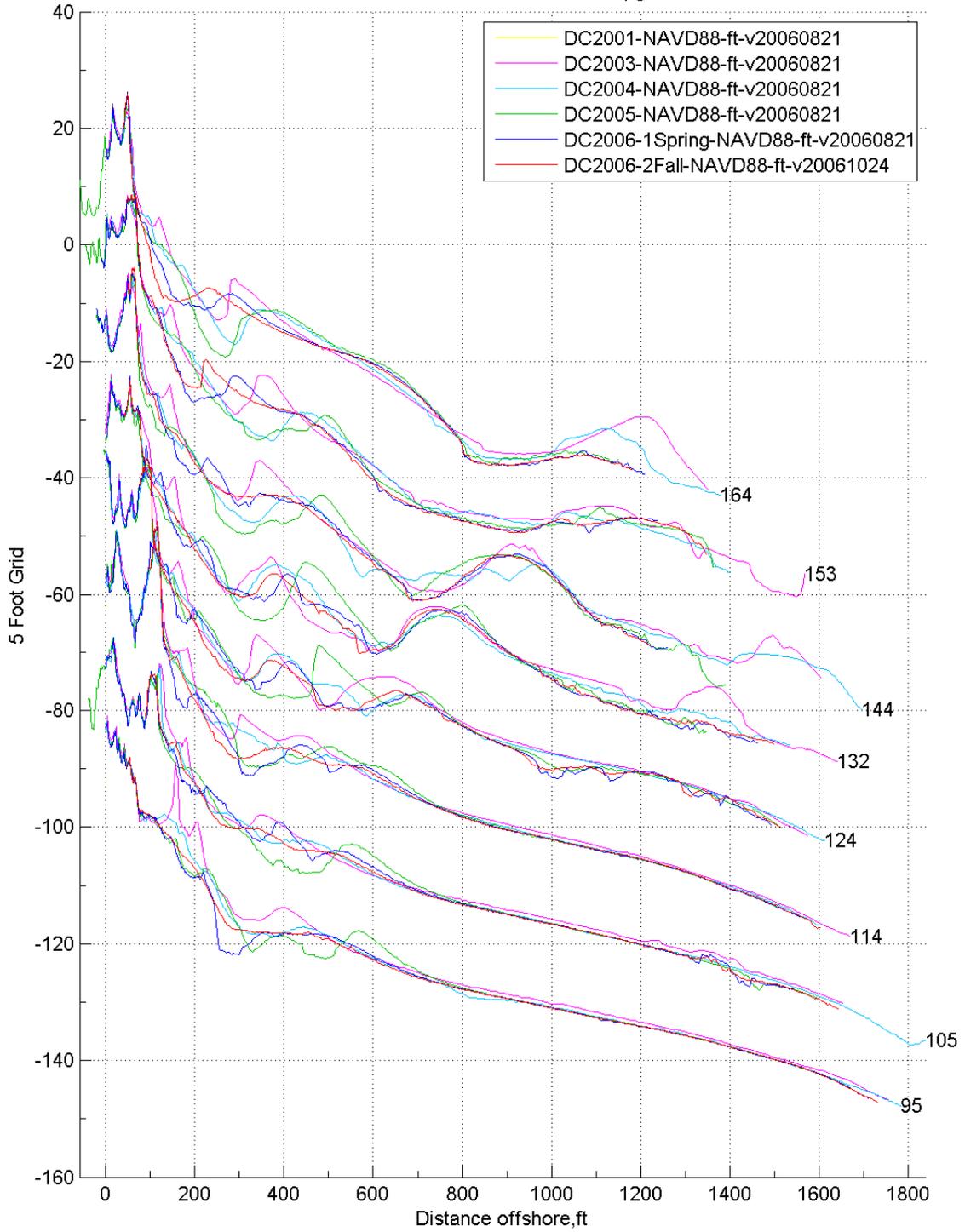
DC2006 2Fall NAVD88 ft v20061024-pg15of21



DC2006 2Fall NAVD88 ft v20061024-pg16of21



DC2006 2Fall NAVD88 ft v20061024-pg17of21



## Appendix H. Metadata files

### Identification\_Information:

#### Citation:

##### Citation\_Information:

Originator: USACE Field Research Facility

Publication\_Date: 20061027

##### Title:

RTK-GPS Shoreface and Nearshore Topographic and  
Bathymetric Data

Geospatial\_Data\_Presentation\_Form: Map

##### Publication\_Information:

Publication\_Place: Duck, North Carolina

Publisher: USACE Field Research Facility

### Larger\_Work\_Citation:

#### Citation\_Information:

Originator: USACE Field Research Facility

Publication\_Date: 20010613

##### Title:

Dare County Beaches, Shore Protection Project  
Physical Monitoring Program

##### Publication\_Information:

Publication\_Place: Duck, North Carolina

Publisher: USACE Field Research Facility

##### Other\_Citation\_Details:

This data is x,y,z of the shoreface  
and nearshore area collected with a Real Time Kinematic GPS  
system.

### Description:

#### Abstract:

The USACE Wilmington District initiated a physical monitoring program associated with the Dare Co Beaches project. The physical monitoring consists of four parts: beach profile surveys, beach sediment sampling, aerial photography and wave/current/water level measurements.

The surveys include 144 profiles starting 3 miles north of Kitty Hawk and extending south 30 miles to Oregon Inlet. Each profile began at a stable location landward of the dune and ended at the -30-ft isobath. Swath surveys were used to supplement the profiles in regions with complicated morphology. Sediment samples were obtained along every other profile. Five samples below MSL and 5 above. The physical monitoring will include pre-, during- and post construction phases of the project.

#### Purpose:

To collect process and analyze data to assess the beach response to the fill placement and serve as the basis for maintaining the project. To also provide data in support of the biological monitoring effort

### Supplemental\_Information:

#### Weather/Survey Conditions:

##### Land based observations:

Sky:Partly Cloudy

Wind:Breezy

Temp:72 deg F  
Precipitation:N/A  
Notes:Thunder Storm expected in the afternoon. Winds pick up and skies darken. Light rain by the end of survey.

Ocean based observations:

Seas:N/A  
Wind:N/A  
Swell Direction:N/A  
Tides:  
low (am):N/A  
low (pm):N/A  
high (am):N/A  
high (pm):N/A

Notes:Base Station NPS DUNE. BM Check: NPS PK Nail DELTA  
Z=0.015. Topo survey lines 194 thru 49.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20061006 0930

Ending\_Date: 20061006 1230

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: None

Theme\_Keyword: Shoreline

Theme\_Keyword: Beach Profiles

Theme\_Keyword: Beach Renourishment

Theme\_Keyword: Erosion

Theme\_Keyword: Beach Data

Theme\_Keyword: Nearshore Bathymetry

Theme\_Keyword: GIS

Theme\_Keyword: GPS

Place:

Place\_Keyword\_Thesaurus: None

Place\_Keyword: North Carolina

Place\_Keyword: Atlantic Coast

Place\_Keyword: Southeast Coast

Access\_Constraints: None

Use\_Constraints: Not for Navigational Purposes

Point\_of\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: USACE Field Research Facility

Contact\_Person: Mike Forte

Contact\_Position: Survey Specialist

Contact\_Address:

Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known  
geodetic benchmark.  
Vertical\_Positional\_Accuracy:  
Vertical\_Positional\_Accuracy\_Report:  
Base station vertical position was determined by Mkimm &  
Creed (2004) and met specifications  
for geometric relative positioning techniques, 1st order.  
This was tested by determining the vertical difference in  
an RTK-GPS baseline solution to a known geodetic benchmark.  
Lineage:  
Source\_Information:  
Source\_Citation:  
Citation\_Information:  
Originator:  
SAW Dare County Beaches Physical Monitoring  
Project  
Publication\_Date: 2003  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Edition:  
Geospatial\_Data\_Presentation\_Form: map  
Publication\_Information:  
Publication\_Place: Kitty Hawk, North Carolina  
Publisher: USACE Field Research Facility  
Source\_Scale\_Denominator:  
Type\_of\_Source\_Media:

Source\_Time\_Period\_of\_Content:  
 Time\_Period\_Information:  
 Range\_of\_Dates/Times:  
 Beginning\_Date: 2003  
 Ending\_Date: Present  
 Source\_Currentness\_Reference: Publication Date  
 Source\_Citation\_Abbreviation:  
 Source\_Contribution:  
 Used to determine erosion rates,  
 volumes, and set-back lines

Process\_Step:  
 Process\_Description:  
 Beach and nearshore (-11m NAVD88) shore-perpendicular  
 survey lines are acquired with Trimble 4000 and  
 4700 dual frequency Real-Time-Kinematic Global Positioning  
 Satellite (RTK-GPS) system. Land-based survey  
 lines are collected with a backpack and rangepole while  
 bathymetric profiles are collected using a Knudsen  
 310 survey-grade fathometer, TSS motion sensor, and  
 RTK-GPS.  
 Processing software consists of a custom built FORTRAN  
 routine that combines the GPS and echosounder data  
 in order to remove the motion of the vessel due to the wave  
 motion. The survey software also adjusts the  
 measurements to the changes in speed of sound over the  
 survey area. This program also correctly aligns the  
 time of the echosounder and GPS data. This is accomplished  
 by dynamically adjusting the time or "latency"  
 of the GPS data, relative to the echosounder data, until a  
 best fit is obtained.

Process\_Date: 20061024  
 Process\_Contact:  
 Contact\_Information:  
 Contact\_Organization\_Primary:  
 Contact\_Organization: USACE Field Research Facility  
 Contact\_Person: Mike Forte  
 Contact\_Position: Survey Specialist  
 Contact\_Address:  
 Address\_Type: mailing and physical address  
 Address: 1261 Duck Road  
 City: Kitty Hawk  
 State\_or\_Province: North Carolina  
 Postal\_Code: 27949  
 Country: USA  
 Contact\_Voice\_Telephone: (252) 261-6840 x.228  
 Contact\_Facsimile\_Telephone: (252) 261-4432  
 Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
 Hours\_of\_Service:  
 Monday-Friday, 8am-5pm, Eastern Standard  
 Time

Spatial\_Reference\_Information:  
 Horizontal\_Coordinate\_System\_Definition:  
 Planar:  
 Grid\_Coordinate\_System:  
 Grid\_Coordinate\_System\_Name:  
 State\_Plane\_Coordinate\_System:  
 SPCS\_Zone\_Identifier: 3200

Lambert\_Conformal\_Conic:  
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     Longitude\_of\_Central\_Meridian:  
     Latitude\_of\_Projection-Origin:  
     False\_Easting:  
     False\_Northing:  
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         Abscissa\_Resolution:  
         Ordinate\_Resolution:  
     Planar\_Distance\_Units:  
     Planar\_Coordinate\_Encoding\_Method:  
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     Horizontal\_Datum\_Name:  
         North American Datum of 1983  
         Elevations are referenced to NAVD88 and recorded in meters  
     Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
     Semi-major\_Axis: 6378.137km  
     Denominator\_of\_Flattening\_Ratio: 1/298.25722  
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             Entity\_Type\_Definition\_Source:  
         Overview\_Description:  
             Entity\_and\_Attribute\_Overview:  
             Entity\_and\_Attribute\_Detail\_Citation:  
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     Distributor:  
         Contact\_Information:  
             Contact\_Organization\_Primary:  
                 Contact\_Organization: USACE Field Research Facility  
                 Contact\_Person: Mike Forte  
             Contact\_Position: Survey Specialist  
             Contact\_Address:  
                 Address\_Type: mailing or physical address  
                 Address: 1261 Kitty Hawk Road  
                 City: Kitty Hawk  
                 State\_or\_Province: North Carolina  
                 Postal\_Code: 27949  
                 Country: USA  
             Contact\_Voice\_Telephone: (252) 261-6840 x.228  
             Contact\_Facsimile\_Telephone: (252) 261-4432  
             Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
             Hours\_of\_Service:  
                 Monday-Friday, 8am-5pm, Eastern Standard  
                 Time  
     Resource\_Description:  
         This dataset is part of the Dare  
         County Beaches, Shore Protection Project  
     Distribution\_Liability:  
         Users must assume responsibility to  
         determine the appropriate use of these data.  
     Standard\_Order\_Process:  
         Digital\_Form:  
         Digital\_Transfer\_Information:

Format\_Name: 3d file containing xyz  
 Digital\_Transfer\_Option:  
   Offline\_Option:  
     Offline\_Media: none  
     Recording\_Format:  
     Compatibility\_Information: unknown  
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 Metadata\_Reference\_Information:  
   Metadata\_Date: 20061027  
   Metadata\_Review\_Date: 20061027  
   Metadata\_Contact:  
     Contact\_Information:  
       Contact\_Organization\_Primary:  
         Contact\_Organization: USACE Field Research Facility  
         Contact\_Position: Survey Specialist  
         Contact\_Address:  
           Address\_Type: mailing and physical address  
           Address: 1261 Duck Road  
           City: Kitty Hawk  
           State\_or\_Province: North Carolina  
           Postal\_Code: 27949  
           Country: USA  
         Contact\_Voice\_Telephone: (252) 261-6840 x.228  
         Contact\_Facsimile\_Telephone: (252) 261-4432  
         Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
         Hours\_of\_Service:  
           Monday-Friday, 8am-5pm, Eastern Standard  
           Time  
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       Geospatial Metadata  
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     Citation\_Information:  
       Originator: USACE Field Research Facility  
       Publication\_Date: 20061027  
       Title:  
         RTK-GPS Shoreface and Nearshore Topographic and  
         Bathymetric Data  
       Geospatial\_Data\_Presentation\_Form: Map  
       Publication\_Information:  
         Publication\_Place: Duck, North Carolina  
         Publisher: USACE Field Research Facility  
     Larger\_Work\_Citation:  
       Citation\_Information:  
         Originator: USACE Field Research Facility  
         Publication\_Date: 20010613  
         Title:  
           Dare County Beaches, Shore Protection Project  
           Physical Monitoring Program  
         Publication\_Information:  
           Publication\_Place: Duck, North Carolina  
           Publisher: USACE Field Research Facility  
       Other\_Citation\_Details:  
         This data is x,y,z of the shoreface  
         and nearshore area collected with a Real Time Kinematic GPS

system.

Description:

Abstract:

The USACE Wilmington District initiated a physical monitoring program associated with the Dare Co Beaches project. The physical monitoring consists of four parts: beach profile surveys, beach sediment sampling, aerial photography and wave/current/water level measurements.

The surveys include 144 profiles starting 3 miles north of Kitty Hawk and extending south 30 miles to Oregon Inlet. Each profile began at a stable location landward of the dune and ended at the -30-ft isobath. Swath surveys were used to supplement the profiles in regions with complicated morphology. Sediment samples were obtained along every other profile. Five samples below MSL and 5 above. The physical monitoring will include pre-, during- and post construction phases of the project.

Purpose:

To collect process and analyze data to assess the beach response to the fill placement and serve as the basis for maintaining the project. To also provide data in support of the biological monitoring effort

Supplemental\_Information:

Weather/Survey Conditions:

Land based observations:

Sky:Sunny

Wind:N 5-10 kts

Temp:75 deg F

Precipitation:N/A

Notes:N/A

Ocean based observations:

Seas:1-2 ft

Wind:N 5-10 kts

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station Roof of the FRF. BM Checks: 1. NOS 1370H DELTA Z=0.003m 2. NGS X254 DELTA Z=0.005m. LARC survey project lines -150 thru 99. Topo survey lines -150 thru 30.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20060926 0930

Ending\_Date: 20060926 1440

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8  
Keywords:  
Theme:  
Theme\_Keyword\_Thesaurus: None  
Theme\_Keyword: Shoreline  
Theme\_Keyword: Beach Profiles  
Theme\_Keyword: Beach Renourishment  
Theme\_Keyword: Erosion  
Theme\_Keyword: Beach Data  
Theme\_Keyword: Nearshore Bathymetry  
Theme\_Keyword: GIS  
Theme\_Keyword: GPS  
Place:  
Place\_Keyword\_Thesaurus: None  
Place\_Keyword: North Carolina  
Place\_Keyword: Atlantic Coast  
Place\_Keyword: Southeast Coast  
Access\_Constraints: None  
Use\_Constraints: Not for Navigational Purposes  
Point\_of\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known

geodetic benchmark.

Vertical\_Positional\_Accuracy:  
 Vertical\_Positional\_Accuracy\_Report:  
 Base station vertical position was determined by Mkimm & Creed (2004) and met specifications for geometric relative positioning techniques, 1st order. This was tested by determining the vertical difference in an RTK-GPS baseline solution to a known geodetic benchmark.

Lineage:  
 Source\_Information:  
 Source\_Citation:  
 Citation\_Information:  
 Originator:  
 SAW Dare County Beaches Physical Monitoring Project  
 Publication\_Date: 2003  
 Title:  
 Dare County Beaches, Shore Protection Project Physical Monitoring Program  
 Edition:  
 Geospatial\_Data\_Presentation\_Form: map  
 Publication\_Information:  
 Publication\_Place: Kitty Hawk, North Carolina  
 Publisher: USACE Field Research Facility

Source\_Scale\_Denominator:  
 Type\_of\_Source\_Media:  
 Source\_Time\_Period\_of\_Content:  
 Time\_Period\_Information:  
 Range\_of\_Dates/Times:  
 Beginning\_Date: 2003  
 Ending\_Date: Present  
 Source\_Currentness\_Reference: Publication Date

Source\_Citation\_Abbreviation:  
 Source\_Contribution:  
 Used to determine erosion rates, volumes, and set-back lines

Process\_Step:  
 Process\_Description:  
 Beach and nearshore (-11m NAVD88) shore-perpendicular survey lines are acquired with Trimble 4000 and 4700 dual frequency Real-Time-Kinematic Global Positioning Satellite (RTK-GPS) system. Land-based survey lines are collected with a backpack and rangepole while bathymetric profiles are collected using a Knudsen 310 survey-grade fathometer, TSS motion sensor, and RTK-GPS.  
 Processing software consists of a custom built FORTRAN routine that combines the GPS and echosounder data in order to remove the motion of the vessel due to the wave motion. The survey software also adjusts the measurements to the changes in speed of sound over the survey area. This program also correctly aligns the time of the echosounder and GPS data. This is accomplished by dynamically adjusting the time or "latency" of the GPS data, relative to the echosounder data, until a best fit is obtained.

Process\_Date: 20061024

Process\_Contact:  
   Contact\_Information:  
     Contact\_Organization\_Primary:  
       Contact\_Organization: USACE Field Research Facility  
       Contact\_Person: Mike Forte  
     Contact\_Position: Survey Specialist  
     Contact\_Address:  
       Address\_Type: mailing and physical address  
       Address: 1261 Duck Road  
       City: Kitty Hawk  
       State\_or\_Province: North Carolina  
       Postal\_Code: 27949  
       Country: USA  
     Contact\_Voice\_Telephone: (252) 261-6840 x.228  
     Contact\_Facsimile\_Telephone: (252) 261-4432  
     Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
     Hours\_of\_Service:  
       Monday-Friday, 8am-5pm, Eastern Standard  
       Time

Spatial\_Reference\_Information:  
   Horizontal\_Coordinate\_System\_Definition:  
     Planar:  
       Grid\_Coordinate\_System:  
         Grid\_Coordinate\_System\_Name:  
         State\_Plane\_Coordinate\_System:  
           SPCS\_Zone\_Identifier: 3200  
           Lambert\_Conformal\_Conic:  
             Standard\_Parallel:  
             Longitude\_of\_Central\_Meridian:  
             Latitude\_of\_Projection\_Origin:  
             False\_Easting:  
             False\_Northing:  
       Planar\_Coordinate\_Information:  
         Coordinate\_Representation:  
           Abscissa\_Resolution:  
           Ordinate\_Resolution:  
         Planar\_Distance\_Units:  
         Planar\_Coordinate\_Encoding\_Method:  
       Geodetic\_Model:  
         Horizontal\_Datum\_Name:  
           North American Datum of 1983  
           Elevations are referenced to NAVD88 and recorded in meters  
         Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
         Semi-major\_Axis: 6378.137km  
         Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
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       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
     Overview\_Description:  
       Entity\_and\_Attribute\_Overview:  
       Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:

Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing or physical address  
Address: 1261 Kitty Hawk Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time

Resource\_Description:  
This dataset is part of the Dare  
County Beaches, Shore Protection Project  
Distribution\_Liability:  
Users must assume responsibility to  
determine the appropriate use of these data.

Standard\_Order\_Process:  
Digital\_Form:  
Digital\_Transfer\_Information:  
Format\_Name: 3d file containing xyz  
Digital\_Transfer\_Option:  
Offline\_Option:  
Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown

Fees: none

Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998  
Identification\_Information:  
Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20061027  
Title:  
RTK-GPS Shoreface and Nearshore Topographic and  
Bathymetric Data  
Geospatial\_Data\_Presentation\_Form: Map  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Larger\_Work\_Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20010613  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Other\_Citation\_Details:  
This data is x,y,z of the shoreface  
and nearshore area collected with a Real Time Kinematic GPS  
system.  
Description:  
Abstract:  
The USACE Wilmington District initiated a physical  
monitoring program associated with the Dare Co  
Beaches project. The physical monitoring consists of four  
parts: beach profile surveys, beach sediment sampling,  
aerial photography and wave/current/water level  
measurements.  
The surveys include 144 profiles starting 3 miles north of  
Kitty Hawk and extending south 30 miles to Oregon Inlet.  
Each profile began at a stable location landward of the  
dune and ended at the -30-ft isobath. Swath surveys were  
used to supplement the profiles in regions with complicated  
morphology. Sediment samples were obtained along every  
other profile. Five samples below MSL and 5 above. The  
physical monitoring will include pre-, during- and post  
construction phases of the project.  
Purpose:  
To collect process and analyze data to assess the beach  
response to the fill placement and serve as the basis for  
maintaining the project. To also provide data in support of  
the biological monitoring effort  
Supplemental\_Information:  
Weather/Survey Conditions:  
Land based observations:  
Sky: Partly Cloudy  
Wind: N/A  
Temp: 78 deg F  
Precipitation: N/A  
Notes: N/A

Ocean based observations:

Seas:N/A

Wind:N/A

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station Roof of the Black Pelican Restaurant. BM  
Check: NGS KITTY DELTA Z=0.026 Topo survey lines 40 thru  
138.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20060927 0930

Ending\_Date: 20060927 1130

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: None

Theme\_Keyword: Shoreline

Theme\_Keyword: Beach Profiles

Theme\_Keyword: Beach Renourishment

Theme\_Keyword: Erosion

Theme\_Keyword: Beach Data

Theme\_Keyword: Nearshore Bathymetry

Theme\_Keyword: GIS

Theme\_Keyword: GPS

Place:

Place\_Keyword\_Thesaurus: None

Place\_Keyword: North Carolina

Place\_Keyword: Atlantic Coast

Place\_Keyword: Southeast Coast

Access\_Constraints: None

Use\_Constraints: Not for Navigational Purposes

Point\_of\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: USACE Field Research Facility

Contact\_Person: Mike Forte

Contact\_Position: Survey Specialist

Contact\_Address:

Address\_Type: mailing and physical address

Address: 1261 Duck Road

City: Kitty Hawk

State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known  
geodetic benchmark.  
Vertical\_Positional\_Accuracy:  
Vertical\_Positional\_Accuracy\_Report:  
Base station vertical position was determined by Mkimm &  
Creed (2004) and met specifications  
for geometric relative positioning techniques, 1st order.  
This was tested by determining the vertical difference in  
an RTK-GPS baseline solution to a known geodetic benchmark.  
Lineage:  
Source\_Information:  
Source\_Citation:  
Citation\_Information:  
Originator:  
SAW Dare County Beaches Physical Monitoring  
Project  
Publication\_Date: 2003  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Edition:  
Geospatial\_Data\_Presentation\_Form: map  
Publication\_Information:  
Publication\_Place: Kitty Hawk, North Carolina  
Publisher: USACE Field Research Facility  
Source\_Scale\_Denominator:  
Type\_of\_Source\_Media:  
Source\_Time\_Period\_of\_Content:  
Time\_Period\_Information:  
Range\_of\_Dates/Times:

Beginning\_Date: 2003  
 Ending\_Date: Present  
 Source\_Currentness\_Reference: Publication Date  
 Source\_Citation\_Abbreviation:  
 Source\_Contribution:  
 Used to determine erosion rates,  
 volumes, and set-back lines  
 Process\_Step:  
 Process\_Description:  
 Beach and nearshore (-11m NAVD88) shore-perpendicular  
 survey lines are acquired with Trimble 4000 and  
 4700 dual frequency Real-Time-Kinematic Global Positioning  
 Satellite (RTK-GPS) system. Land-based survey  
 lines are collected with a backpack and rangepole while  
 bathymetric profiles are collected using a Knudsen  
 310 survey-grade fathometer, TSS motion sensor, and  
 RTK-GPS.  
 Processing software consists of a custom built FORTRAN  
 routine that combines the GPS and echosounder data  
 in order to remove the motion of the vessel due to the wave  
 motion. The survey software also adjusts the  
 measurements to the changes in speed of sound over the  
 survey area. This program also correctly aligns the  
 time of the echosounder and GPS data. This is accomplished  
 by dynamically adjusting the time or "latency"  
 of the GPS data, relative to the echosounder data, until a  
 best fit is obtained.  
 Process\_Date: 20061024  
 Process\_Contact:  
 Contact\_Information:  
 Contact\_Organization\_Primary:  
 Contact\_Organization: USACE Field Research Facility  
 Contact\_Person: Mike Forte  
 Contact\_Position: Survey Specialist  
 Contact\_Address:  
 Address\_Type: mailing and physical address  
 Address: 1261 Duck Road  
 City: Kitty Hawk  
 State\_or\_Province: North Carolina  
 Postal\_Code: 27949  
 Country: USA  
 Contact\_Voice\_Telephone: (252) 261-6840 x.228  
 Contact\_Facsimile\_Telephone: (252) 261-4432  
 Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
 Hours\_of\_Service:  
 Monday-Friday, 8am-5pm, Eastern Standard  
 Time  
 Spatial\_Reference\_Information:  
 Horizontal\_Coordinate\_System\_Definition:  
 Planar:  
 Grid\_Coordinate\_System:  
 Grid\_Coordinate\_System\_Name:  
 State\_Plane\_Coordinate\_System:  
 SPCS\_Zone\_Identifier: 3200  
 Lambert\_Conformal\_Conic:  
 Standard\_Parallel:  
 Longitude\_of\_Central\_Meridian:

Latitude\_of\_Projection\_Origin:  
 False\_Easting:  
 False\_Northing:  
 Planar\_Coordinate\_Information:  
   Coordinate\_Representation:  
     Abscissa\_Resolution:  
     Ordinate\_Resolution:  
   Planar\_Distance\_Units:  
   Planar\_Coordinate\_Encoding\_Method:  
 Geodetic\_Model:  
   Horizontal\_Datum\_Name:  
     North American Datum of 1983  
     Elevations are referenced to NAVD88 and recorded in meters  
   Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
   Semi-major\_Axis: 6378.137km  
   Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
   Overview\_Description:  
     Entity\_and\_Attribute\_Overview:  
     Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:  
       Contact\_Organization\_Primary:  
         Contact\_Organization: USACE Field Research Facility  
         Contact\_Person: Mike Forte  
       Contact\_Position: Survey Specialist  
       Contact\_Address:  
         Address\_Type: mailing or physical address  
         Address: 1261 Kitty Hawk Road  
         City: Kitty Hawk  
         State\_or\_Province: North Carolina  
         Postal\_Code: 27949  
         Country: USA  
       Contact\_Voice\_Telephone: (252) 261-6840 x.228  
       Contact\_Facsimile\_Telephone: (252) 261-4432  
       Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
       Hours\_of\_Service:  
         Monday-Friday, 8am-5pm, Eastern Standard  
         Time

Resource\_Description:  
   This dataset is part of the Dare  
   County Beaches, Shore Protection Project

Distribution\_Liability:  
   Users must assume responsibility to  
   determine the appropriate use of these data.

Standard\_Order\_Process:  
   Digital\_Form:  
     Digital\_Transfer\_Information:  
       Format\_Name: 3d file containing xyz  
     Digital\_Transfer\_Option:  
       Offline\_Option:

Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown  
Fees: none  
Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata  
Metadata\_Standard\_Version: FGDC-STD-001-1998  
Identification\_Information:  
Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20061027  
Title:  
RTK-GPS Shoreface and Nearshore Topographic and  
Bathymetric Data  
Geospatial\_Data\_Presentation\_Form: Map  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Larger\_Work\_Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20010613  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Other\_Citation\_Details:  
This data is x,y,z of the shoreface  
and nearshore area collected with a Real Time Kinematic GPS  
system.  
Description:  
Abstract:

The USACE Wilmington District initiated a physical monitoring program associated with the Dare Co Beaches project. The physical monitoring consists of four parts: beach profile surveys, beach sediment sampling, aerial photography and wave/current/water level measurements.

The surveys include 144 profiles starting 3 miles north of Kitty Hawk and extending south 30 miles to Oregon Inlet. Each profile began at a stable location landward of the dune and ended at the -30-ft isobath. Swath surveys were used to supplement the profiles in regions with complicated morphology. Sediment samples were obtained along every other profile. Five samples below MSL and 5 above. The physical monitoring will include pre-, during- and post construction phases of the project.

Purpose:

To collect process and analyze data to assess the beach response to the fill placement and serve as the basis for maintaining the project. To also provide data in support of the biological monitoring effort

Supplemental\_Information:

Weather/Survey Conditions:

Land based observations:

Sky:Partly Cloudy

Wind:W 5-10 kts

Temp:75 deg F

Precipitation:N/A

Notes:Winds pick up in the afternoon

Ocean based observations:

Seas:2 ft

Wind:W 5-10 kts

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station Roof of the Black Pelican Restaurant. BM

Check: 1. NGS KITTY DELTA Z=0.026 2. Hayman PK Nail DELTA

Z=0.043. LARC lines surveyed 99 thru 249. Topo survey lines

149 thru 269.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20060928 0830

Ending\_Date: 20060928 1500

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8  
Keywords:  
Theme:  
Theme\_Keyword\_Thesaurus: None  
Theme\_Keyword: Shoreline  
Theme\_Keyword: Beach Profiles  
Theme\_Keyword: Beach Renourishment  
Theme\_Keyword: Erosion  
Theme\_Keyword: Beach Data  
Theme\_Keyword: Nearshore Bathymetry  
Theme\_Keyword: GIS  
Theme\_Keyword: GPS  
Place:  
Place\_Keyword\_Thesaurus: None  
Place\_Keyword: North Carolina  
Place\_Keyword: Atlantic Coast  
Place\_Keyword: Southeast Coast  
Access\_Constraints: None  
Use\_Constraints: Not for Navigational Purposes  
Point\_of\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known

geodetic benchmark.

Vertical\_Positional\_Accuracy:  
Vertical\_Positional\_Accuracy\_Report:  
Base station vertical position was determined by Mkimm & Creed (2004) and met specifications for geometric relative positioning techniques, 1st order. This was tested by determining the vertical difference in an RTK-GPS baseline solution to a known geodetic benchmark.

Lineage:  
Source\_Information:  
Source\_Citation:  
Citation\_Information:  
Originator:  
SAW Dare County Beaches Physical Monitoring Project  
Publication\_Date: 2003  
Title:  
Dare County Beaches, Shore Protection Project Physical Monitoring Program  
Edition:  
Geospatial\_Data\_Presentation\_Form: map  
Publication\_Information:  
Publication\_Place: Kitty Hawk, North Carolina  
Publisher: USACE Field Research Facility  
Source\_Scale\_Denominator:  
Type\_of\_Source\_Media:  
Source\_Time\_Period\_of\_Content:  
Time\_Period\_Information:  
Range\_of\_Dates/Times:  
Beginning\_Date: 2003  
Ending\_Date: Present  
Source\_Currentness\_Reference: Publication Date  
Source\_Citation\_Abbreviation:  
Source\_Contribution:  
Used to determine erosion rates, volumes, and set-back lines

Process\_Step:  
Process\_Description:  
Beach and nearshore (-11m NAVD88) shore-perpendicular survey lines are acquired with Trimble 4000 and 4700 dual frequency Real-Time-Kinematic Global Positioning Satellite (RTK-GPS) system. Land-based survey lines are collected with a backpack and rangepole while bathymetric profiles are collected using a Knudsen 310 survey-grade fathometer, TSS motion sensor, and RTK-GPS.  
Processing software consists of a custom built FORTRAN routine that combines the GPS and echosounder data in order to remove the motion of the vessel due to the wave motion. The survey software also adjusts the measurements to the changes in speed of sound over the survey area. This program also correctly aligns the time of the echosounder and GPS data. This is accomplished by dynamically adjusting the time or "latency" of the GPS data, relative to the echosounder data, until a best fit is obtained.

Process\_Date: 20061024

Process\_Contact:  
   Contact\_Information:  
     Contact\_Organization\_Primary:  
       Contact\_Organization: USACE Field Research Facility  
       Contact\_Person: Mike Forte  
     Contact\_Position: Survey Specialist  
     Contact\_Address:  
       Address\_Type: mailing and physical address  
       Address: 1261 Duck Road  
       City: Kitty Hawk  
       State\_or\_Province: North Carolina  
       Postal\_Code: 27949  
       Country: USA  
     Contact\_Voice\_Telephone: (252) 261-6840 x.228  
     Contact\_Facsimile\_Telephone: (252) 261-4432  
     Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
     Hours\_of\_Service:  
       Monday-Friday, 8am-5pm, Eastern Standard  
       Time

Spatial\_Reference\_Information:  
   Horizontal\_Coordinate\_System\_Definition:  
     Planar:  
       Grid\_Coordinate\_System:  
         Grid\_Coordinate\_System\_Name:  
         State\_Plane\_Coordinate\_System:  
           SPCS\_Zone\_Identifier: 3200  
           Lambert\_Conformal\_Conic:  
             Standard\_Parallel:  
             Longitude\_of\_Central\_Meridian:  
             Latitude\_of\_Projection\_Origin:  
             False\_Easting:  
             False\_Northing:  
         Planar\_Coordinate\_Information:  
           Coordinate\_Representation:  
             Abscissa\_Resolution:  
             Ordinate\_Resolution:  
           Planar\_Distance\_Units:  
           Planar\_Coordinate\_Encoding\_Method:  
         Geodetic\_Model:  
           Horizontal\_Datum\_Name:  
             North American Datum of 1983  
             Elevations are referenced to NAVD88 and recorded in meters  
           Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
           Semi-major\_Axis: 6378.137km  
           Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
     Overview\_Description:  
       Entity\_and\_Attribute\_Overview:  
       Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:

Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing or physical address  
Address: 1261 Kitty Hawk Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time

Resource\_Description:  
This dataset is part of the Dare  
County Beaches, Shore Protection Project

Distribution\_Liability:  
Users must assume responsibility to  
determine the appropriate use of these data.

Standard\_Order\_Process:  
Digital\_Form:  
Digital\_Transfer\_Information:  
Format\_Name: 3d file containing xyz  
Digital\_Transfer\_Option:  
Offline\_Option:  
Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown

Fees: none

Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time

Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998  
 Identification\_Information:  
   Citation:  
     Citation\_Information:  
       Originator: USACE Field Research Facility  
       Publication\_Date: 20061027  
       Title:  
         RTK-GPS Shoreface and Nearshore Topographic and  
         Bathymetric Data  
       Geospatial\_Data\_Presentation\_Form: Map  
       Publication\_Information:  
         Publication\_Place: Duck, North Carolina  
         Publisher: USACE Field Research Facility  
       Larger\_Work\_Citation:  
         Citation\_Information:  
           Originator: USACE Field Research Facility  
           Publication\_Date: 20010613  
           Title:  
             Dare County Beaches, Shore Protection Project  
             Physical Monitoring Program  
           Publication\_Information:  
             Publication\_Place: Duck, North Carolina  
             Publisher: USACE Field Research Facility  
           Other\_Citation\_Details:  
             This data is x,y,z of the shoreface  
             and nearshore area collected with a Real Time Kinematic GPS  
             system.

Description:  
   Abstract:  
     The USACE Wilmington District initiated a physical monitoring program associated with the Dare Co Beaches project. The physical monitoring consists of four parts: beach profile surveys, beach sediment sampling, aerial photography and wave/current/water level measurements.  
     The surveys include 144 profiles starting 3 miles north of Kitty Hawk and extending south 30 miles to Oregon Inlet. Each profile began at a stable location landward of the dune and ended at the -30-ft isobath. Swath surveys were used to supplement the profiles in regions with complicated morphology. Sediment samples were obtained along every other profile. Five samples below MSL and 5 above. The physical monitoring will include pre-, during- and post construction phases of the project.

Purpose:  
   To collect process and analyze data to assess the beach response to the fill placement and serve as the basis for maintaining the project. To also provide data in support of the biological monitoring effort

Supplemental\_Information:  
   Weather/Survey Conditions:  
   Land based observations:  
   Sky: Mostly Sunny  
   Wind: NW 10-15 kts  
   Temp: 70 deg F  
   Precipitation: N/A  
   Notes: Seas smooth inshore - choppy offshore

Ocean based observations:

Seas:2 -3 ft  
Wind:NW 10-15 kts  
Swell Direction:N/A  
Tides:  
low (am):N/A  
low (pm):N/A  
high (am):N/A  
high (pm):N/A

Notes:Base Station Roof of the Clarion Hotel. BM Check:  
1.Hayman PK Nail DELTA Z=0.028 2. Curlew PK Nail DELTA  
Z=0.081. LARC lines surveyed 249 thru 580. Topo survey  
lines 279 thru 439.

Time\_Period\_of\_Content:

Time\_Period\_Information:  
Range\_of\_Dates/Times:  
Beginning\_Date: 20060929 0800  
Ending\_Date: 20060929 1500

Currentness\_Reference: Publication Date

Status:

Progress: Complete  
Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:  
West\_Bounding\_Coordinate: 75.71  
East\_Bounding\_Coordinate: 75.52  
North\_Bounding\_Coordinate: 36.1  
South\_Bounding\_Coordinate: 35.8

Keywords:

Theme:  
Theme\_Keyword\_Thesaurus: None  
Theme\_Keyword: Shoreline  
Theme\_Keyword: Beach Profiles  
Theme\_Keyword: Beach Renourishment  
Theme\_Keyword: Erosion  
Theme\_Keyword: Beach Data  
Theme\_Keyword: Nearshore Bathymetry  
Theme\_Keyword: GIS  
Theme\_Keyword: GPS

Place:

Place\_Keyword\_Thesaurus: None  
Place\_Keyword: North Carolina  
Place\_Keyword: Atlantic Coast  
Place\_Keyword: Southeast Coast

Access\_Constraints: None

Use\_Constraints: Not for Navigational Purposes

Point\_of\_Contact:

Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road

City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known  
geodetic benchmark.  
Vertical\_Positional\_Accuracy:  
Vertical\_Positional\_Accuracy\_Report:  
Base station vertical position was determined by Mkimm &  
Creed (2004) and met specifications  
for geometric relative positioning techniques, 1st order.  
This was tested by determining the vertical difference in  
an RTK-GPS baseline solution to a known geodetic benchmark.  
Lineage:  
Source\_Information:  
Source\_Citation:  
Citation\_Information:  
Originator:  
SAW Dare County Beaches Physical Monitoring  
Project  
Publication\_Date: 2003  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Edition:  
Geospatial\_Data\_Presentation\_Form: map  
Publication\_Information:  
Publication\_Place: Kitty Hawk, North Carolina  
Publisher: USACE Field Research Facility  
Source\_Scale\_Denominator:  
Type\_of\_Source\_Media:  
Source\_Time\_Period\_of\_Content:  
Time\_Period\_Information:

Range\_of\_Dates/Times:  
     Beginning\_Date: 2003  
     Ending\_Date: Present  
 Source\_Currentness\_Reference: Publication Date  
 Source\_Citation\_Abbreviation:  
 Source\_Contribution:  
     Used to determine erosion rates,  
     volumes, and set-back lines  
 Process\_Step:  
     Process\_Description:  
         Beach and nearshore (-11m NAVD88) shore-perpendicular  
         survey lines are acquired with Trimble 4000 and  
         4700 dual frequency Real-Time-Kinematic Global Positioning  
         Satellite (RTK-GPS) system. Land-based survey  
         lines are collected with a backpack and rangepole while  
         bathymetric profiles are collected using a Knudsen  
         310 survey-grade fathometer, TSS motion sensor, and  
         RTK-GPS.  
         Processing software consists of a custom built FORTRAN  
         routine that combines the GPS and echosounder data  
         in order to remove the motion of the vessel due to the wave  
         motion. The survey software also adjusts the  
         measurements to the changes in speed of sound over the  
         survey area. This program also correctly aligns the  
         time of the echosounder and GPS data. This is accomplished  
         by dynamically adjusting the time or "latency"  
         of the GPS data, relative to the echosounder data, until a  
         best fit is obtained.  
     Process\_Date: 20061024  
     Process\_Contact:  
         Contact\_Information:  
             Contact\_Organization\_Primary:  
                 Contact\_Organization: USACE Field Research Facility  
                 Contact\_Person: Mike Forte  
             Contact\_Position: Survey Specialist  
             Contact\_Address:  
                 Address\_Type: mailing and physical address  
                 Address: 1261 Duck Road  
                 City: Kitty Hawk  
                 State\_or\_Province: North Carolina  
                 Postal\_Code: 27949  
                 Country: USA  
             Contact\_Voice\_Telephone: (252) 261-6840 x.228  
             Contact\_Facsimile\_Telephone: (252) 261-4432  
             Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
             Hours\_of\_Service:  
                 Monday-Friday, 8am-5pm, Eastern Standard  
                 Time  
 Spatial\_Reference\_Information:  
     Horizontal\_Coordinate\_System\_Definition:  
         Planar:  
             Grid\_Coordinate\_System:  
                 Grid\_Coordinate\_System\_Name:  
                 State\_Plane\_Coordinate\_System:  
                     SPCS\_Zone\_Identifier: 3200  
                     Lambert\_Conformal\_Conic:  
                         Standard\_Parallel:

Longitude\_of\_Central\_Meridian:  
 Latitude\_of\_Projection\_Origin:  
 False\_Easting:  
 False\_Northing:  
 Planar\_Coordinate\_Information:  
   Coordinate\_Representation:  
     Abscissa\_Resolution:  
     Ordinate\_Resolution:  
   Planar\_Distance\_Units:  
   Planar\_Coordinate\_Encoding\_Method:  
 Geodetic\_Model:  
   Horizontal\_Datum\_Name:  
     North American Datum of 1983  
     Elevations are referenced to NAVD88 and recorded in meters  
   Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
   Semi-major\_Axis: 6378.137km  
   Denominator\_of\_Flattening\_Ratio: 1/298.25722  
 Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
   Overview\_Description:  
     Entity\_and\_Attribute\_Overview:  
     Entity\_and\_Attribute\_Detail\_Citation:  
 Distribution\_Information:  
   Distributor:  
     Contact\_Information:  
       Contact\_Organization\_Primary:  
         Contact\_Organization: USACE Field Research Facility  
         Contact\_Person: Mike Forte  
       Contact\_Position: Survey Specialist  
       Contact\_Address:  
         Address\_Type: mailing or physical address  
         Address: 1261 Kitty Hawk Road  
         City: Kitty Hawk  
         State\_or\_Province: North Carolina  
         Postal\_Code: 27949  
         Country: USA  
       Contact\_Voice\_Telephone: (252) 261-6840 x.228  
       Contact\_Facsimile\_Telephone: (252) 261-4432  
       Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
       Hours\_of\_Service:  
         Monday-Friday, 8am-5pm, Eastern Standard  
         Time  
   Resource\_Description:  
     This dataset is part of the Dare  
     County Beaches, Shore Protection Project  
   Distribution\_Liability:  
     Users must assume responsibility to  
     determine the appropriate use of these data.  
   Standard\_Order\_Process:  
     Digital\_Form:  
       Digital\_Transfer\_Information:  
         Format\_Name: 3d file containing xyz  
       Digital\_Transfer\_Option:

Offline\_Option:  
     Offline\_Media: none  
     Recording\_Format:  
     Compatibility\_Information: unknown  
 Fees: none  
 Metadata\_Reference\_Information:  
     Metadata\_Date: 20061027  
     Metadata\_Review\_Date: 20061027  
     Metadata\_Contact:  
         Contact\_Information:  
             Contact\_Organization\_Primary:  
                 Contact\_Organization: USACE Field Research Facility  
                 Contact\_Position: Survey Specialist  
                 Contact\_Address:  
                     Address\_Type: mailing and physical address  
                     Address: 1261 Duck Road  
                     City: Kitty Hawk  
                     State\_or\_Province: North Carolina  
                     Postal\_Code: 27949  
                     Country: USA  
                 Contact\_Voice\_Telephone: (252) 261-6840 x.228  
                 Contact\_Facsimile\_Telephone: (252) 261-4432  
                 Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
                 Hours\_of\_Service:  
                     Monday-Friday, 8am-5pm, Eastern Standard  
                     Time  
     Metadata\_Standard\_Name:  
         Content Standard for Digital  
         Geospatial Metadata  
     Metadata\_Standard\_Version: FGDC-STD-001-1998  
 Identification\_Information:  
     Citation:  
         Citation\_Information:  
             Originator: USACE Field Research Facility  
             Publication\_Date: 20061027  
             Title:  
                 RTK-GPS Shoreface and Nearshore Topographic and  
                 Bathymetric Data  
             Geospatial\_Data\_Presentation\_Form: Map  
             Publication\_Information:  
                 Publication\_Place: Duck, North Carolina  
                 Publisher: USACE Field Research Facility  
         Larger\_Work\_Citation:  
             Citation\_Information:  
                 Originator: USACE Field Research Facility  
                 Publication\_Date: 20010613  
                 Title:  
                     Dare County Beaches, Shore Protection Project  
                     Physical Monitoring Program  
                 Publication\_Information:  
                     Publication\_Place: Duck, North Carolina  
                     Publisher: USACE Field Research Facility  
             Other\_Citation\_Details:  
                 This data is x,y,z of the shoreface  
                 and nearshore area collected with a Real Time Kinematic GPS  
                 system.  
 Description:

Abstract:

The USACE Wilmington District initiated a physical monitoring program associated with the Dare Co Beaches project. The physical monitoring consists of four parts: beach profile surveys, beach sediment sampling, aerial photography and wave/current/water level measurements.

The surveys include 144 profiles starting 3 miles north of Kitty Hawk and extending south 30 miles to Oregon Inlet. Each profile began at a stable location landward of the dune and ended at the -30-ft isobath. Swath surveys were used to supplement the profiles in regions with complicated morphology. Sediment samples were obtained along every other profile. Five samples below MSL and 5 above. The physical monitoring will include pre-, during- and post construction phases of the project.

Purpose:

To collect process and analyze data to assess the beach response to the fill placement and serve as the basis for maintaining the project. To also provide data in support of the biological monitoring effort

Supplemental\_Information:

Weather/Survey Conditions:

Land based observations:

Sky:Sunny

Wind:N/A

Temp:75 deg F

Precipitation:N/A

Notes:Seas too rough for the LARC to survey

Ocean based observations:

Seas:N/A

Wind:N/A

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station Roof of the Clarion Hotel. BM Check:

1. Curlew PK Nail DELTA Z=0.057 2. Curlew 0.067. Topo survey lines 450 thru 619.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20061002 0830

Ending\_Date: 20061002 1400

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8  
Keywords:  
Theme:  
Theme\_Keyword\_Thesaurus: None  
Theme\_Keyword: Shoreline  
Theme\_Keyword: Beach Profiles  
Theme\_Keyword: Beach Renourishment  
Theme\_Keyword: Erosion  
Theme\_Keyword: Beach Data  
Theme\_Keyword: Nearshore Bathymetry  
Theme\_Keyword: GIS  
Theme\_Keyword: GPS  
Place:  
Place\_Keyword\_Thesaurus: None  
Place\_Keyword: North Carolina  
Place\_Keyword: Atlantic Coast  
Place\_Keyword: Southeast Coast  
Access\_Constraints: None  
Use\_Constraints: Not for Navigational Purposes  
Point\_of\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known

geodetic benchmark.

Vertical\_Positional\_Accuracy:  
 Vertical\_Positional\_Accuracy\_Report:  
 Base station vertical position was determined by Mkimm & Creed (2004) and met specifications for geometric relative positioning techniques, 1st order. This was tested by determining the vertical difference in an RTK-GPS baseline solution to a known geodetic benchmark.

Lineage:  
 Source\_Information:  
 Source\_Citation:  
 Citation\_Information:  
 Originator:  
 SAW Dare County Beaches Physical Monitoring Project  
 Publication\_Date: 2003  
 Title:  
 Dare County Beaches, Shore Protection Project Physical Monitoring Program  
 Edition:  
 Geospatial\_Data\_Presentation\_Form: map  
 Publication\_Information:  
 Publication\_Place: Kitty Hawk, North Carolina  
 Publisher: USACE Field Research Facility

Source\_Scale\_Denominator:  
 Type\_of\_Source\_Media:  
 Source\_Time\_Period\_of\_Content:  
 Time\_Period\_Information:  
 Range\_of\_Dates/Times:  
 Beginning\_Date: 2003  
 Ending\_Date: Present  
 Source\_Currentness\_Reference: Publication Date

Source\_Citation\_Abbreviation:  
 Source\_Contribution:  
 Used to determine erosion rates, volumes, and set-back lines

Process\_Step:  
 Process\_Description:  
 Beach and nearshore (-11m NAVD88) shore-perpendicular survey lines are acquired with Trimble 4000 and 4700 dual frequency Real-Time-Kinematic Global Positioning Satellite (RTK-GPS) system. Land-based survey lines are collected with a backpack and rangepole while bathymetric profiles are collected using a Knudsen 310 survey-grade fathometer, TSS motion sensor, and RTK-GPS.  
 Processing software consists of a custom built FORTRAN routine that combines the GPS and echosounder data in order to remove the motion of the vessel due to the wave motion. The survey software also adjusts the measurements to the changes in speed of sound over the survey area. This program also correctly aligns the time of the echosounder and GPS data. This is accomplished by dynamically adjusting the time or "latency" of the GPS data, relative to the echosounder data, until a best fit is obtained.

Process\_Date: 20061024

Process\_Contact:  
   Contact\_Information:  
     Contact\_Organization\_Primary:  
       Contact\_Organization: USACE Field Research Facility  
       Contact\_Person: Mike Forte  
     Contact\_Position: Survey Specialist  
     Contact\_Address:  
       Address\_Type: mailing and physical address  
       Address: 1261 Duck Road  
       City: Kitty Hawk  
       State\_or\_Province: North Carolina  
       Postal\_Code: 27949  
       Country: USA  
     Contact\_Voice\_Telephone: (252) 261-6840 x.228  
     Contact\_Facsimile\_Telephone: (252) 261-4432  
     Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
     Hours\_of\_Service:  
       Monday-Friday, 8am-5pm, Eastern Standard  
       Time

Spatial\_Reference\_Information:  
   Horizontal\_Coordinate\_System\_Definition:  
     Planar:  
       Grid\_Coordinate\_System:  
         Grid\_Coordinate\_System\_Name:  
         State\_Plane\_Coordinate\_System:  
           SPCS\_Zone\_Identifier: 3200  
           Lambert\_Conformal\_Conic:  
             Standard\_Parallel:  
             Longitude\_of\_Central\_Meridian:  
             Latitude\_of\_Projection\_Origin:  
             False\_Easting:  
             False\_Northing:  
         Planar\_Coordinate\_Information:  
           Coordinate\_Representation:  
             Abscissa\_Resolution:  
             Ordinate\_Resolution:  
           Planar\_Distance\_Units:  
           Planar\_Coordinate\_Encoding\_Method:  
           Geodetic\_Model:  
             Horizontal\_Datum\_Name:  
               North American Datum of 1983  
               Elevations are referenced to NAVD88 and recorded in meters  
             Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
             Semi-major\_Axis: 6378.137km  
             Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
     Overview\_Description:  
       Entity\_and\_Attribute\_Overview:  
       Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:

Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing or physical address  
Address: 1261 Kitty Hawk Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time

Resource\_Description:  
This dataset is part of the Dare  
County Beaches, Shore Protection Project  
Distribution\_Liability:  
Users must assume responsibility to  
determine the appropriate use of these data.

Standard\_Order\_Process:  
Digital\_Form:  
Digital\_Transfer\_Information:  
Format\_Name: 3d file containing xyz  
Digital\_Transfer\_Option:  
Offline\_Option:  
Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown

Fees: none

Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998  
Identification\_Information:  
Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20061027  
Title:  
RTK-GPS Shoreface and Nearshore Topographic and  
Bathymetric Data  
Geospatial\_Data\_Presentation\_Form: Map  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Larger\_Work\_Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20010613  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Other\_Citation\_Details:  
This data is x,y,z of the shoreface  
and nearshore area collected with a Real Time Kinematic GPS  
system.  
Description:  
Abstract:  
The USACE Wilmington District initiated a physical  
monitoring program associated with the Dare Co  
Beaches project. The physical monitoring consists of four  
parts: beach profile surveys, beach sediment sampling,  
aerial photography and wave/current/water level  
measurements.  
The surveys include 144 profiles starting 3 miles north of  
Kitty Hawk and extending south 30 miles to Oregon Inlet.  
Each profile began at a stable location landward of the  
dune and ended at the -30-ft isobath. Swath surveys were  
used to supplement the profiles in regions with complicated  
morphology. Sediment samples were obtained along every  
other profile. Five samples below MSL and 5 above. The  
physical monitoring will include pre-, during- and post  
construction phases of the project.  
Purpose:  
To collect process and analyze data to assess the beach  
response to the fill placement and serve as the basis for  
maintaining the project. To also provide data in support of  
the biological monitoring effort  
Supplemental\_Information:  
Weather/Survey Conditions:  
Land based observations:  
Sky: Sunny  
Wind: SSE 5-10 kts  
Temp: 80 deg F  
Precipitation: N/A  
Notes:

Ocean based observations:

Seas:2-3 ft

Wind:SSE 5-10 kts

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station Roof of the Comfort Inn. BM Check:

1.Forrest PK Nail DELTA Z=0.042 2. Forrest 0.071. LARC  
survey lines 580 thru 771. Topo survey lines 630 thru 779.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20061003 1440

Ending\_Date: 20061003 1740

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: None

Theme\_Keyword: Shoreline

Theme\_Keyword: Beach Profiles

Theme\_Keyword: Beach Renourishment

Theme\_Keyword: Erosion

Theme\_Keyword: Beach Data

Theme\_Keyword: Nearshore Bathymetry

Theme\_Keyword: GIS

Theme\_Keyword: GPS

Place:

Place\_Keyword\_Thesaurus: None

Place\_Keyword: North Carolina

Place\_Keyword: Atlantic Coast

Place\_Keyword: Southeast Coast

Access\_Constraints: None

Use\_Constraints: Not for Navigational Purposes

Point\_of\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: USACE Field Research Facility

Contact\_Person: Mike Forte

Contact\_Position: Survey Specialist

Contact\_Address:

Address\_Type: mailing and physical address

Address: 1261 Duck Road

City: Kitty Hawk

State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known  
geodetic benchmark.  
Vertical\_Positional\_Accuracy:  
Vertical\_Positional\_Accuracy\_Report:  
Base station vertical position was determined by Mkimm &  
Creed (2004) and met specifications  
for geometric relative positioning techniques, 1st order.  
This was tested by determining the vertical difference in  
an RTK-GPS baseline solution to a known geodetic benchmark.  
Lineage:  
Source\_Information:  
Source\_Citation:  
Citation\_Information:  
Originator:  
SAW Dare County Beaches Physical Monitoring  
Project  
Publication\_Date: 2003  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Edition:  
Geospatial\_Data\_Presentation\_Form: map  
Publication\_Information:  
Publication\_Place: Kitty Hawk, North Carolina  
Publisher: USACE Field Research Facility  
Source\_Scale\_Denominator:  
Type\_of\_Source\_Media:  
Source\_Time\_Period\_of\_Content:  
Time\_Period\_Information:  
Range\_of\_Dates/Times:

Beginning\_Date: 2003  
 Ending\_Date: Present  
 Source\_Currentness\_Reference: Publication Date  
 Source\_Citation\_Abbreviation:  
 Source\_Contribution:  
 Used to determine erosion rates,  
 volumes, and set-back lines  
 Process\_Step:  
 Process\_Description:  
 Beach and nearshore (-11m NAVD88) shore-perpendicular  
 survey lines are acquired with Trimble 4000 and  
 4700 dual frequency Real-Time-Kinematic Global Positioning  
 Satellite (RTK-GPS) system. Land-based survey  
 lines are collected with a backpack and rangepole while  
 bathymetric profiles are collected using a Knudsen  
 310 survey-grade fathometer, TSS motion sensor, and  
 RTK-GPS.  
 Processing software consists of a custom built FORTRAN  
 routine that combines the GPS and echosounder data  
 in order to remove the motion of the vessel due to the wave  
 motion. The survey software also adjusts the  
 measurements to the changes in speed of sound over the  
 survey area. This program also correctly aligns the  
 time of the echosounder and GPS data. This is accomplished  
 by dynamically adjusting the time or "latency"  
 of the GPS data, relative to the echosounder data, until a  
 best fit is obtained.  
 Process\_Date: 20061024  
 Process\_Contact:  
 Contact\_Information:  
 Contact\_Organization\_Primary:  
 Contact\_Organization: USACE Field Research Facility  
 Contact\_Person: Mike Forte  
 Contact\_Position: Survey Specialist  
 Contact\_Address:  
 Address\_Type: mailing and physical address  
 Address: 1261 Duck Road  
 City: Kitty Hawk  
 State\_or\_Province: North Carolina  
 Postal\_Code: 27949  
 Country: USA  
 Contact\_Voice\_Telephone: (252) 261-6840 x.228  
 Contact\_Facsimile\_Telephone: (252) 261-4432  
 Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
 Hours\_of\_Service:  
 Monday-Friday, 8am-5pm, Eastern Standard  
 Time  
 Spatial\_Reference\_Information:  
 Horizontal\_Coordinate\_System\_Definition:  
 Planar:  
 Grid\_Coordinate\_System:  
 Grid\_Coordinate\_System\_Name:  
 State\_Plane\_Coordinate\_System:  
 SPCS\_Zone\_Identifier: 3200  
 Lambert\_Conformal\_Conic:  
 Standard\_Parallel:  
 Longitude\_of\_Central\_Meridian:

Latitude\_of\_Projection\_Origin:  
 False\_Easting:  
 False\_Northing:  
 Planar\_Coordinate\_Information:  
   Coordinate\_Representation:  
     Abscissa\_Resolution:  
     Ordinate\_Resolution:  
   Planar\_Distance\_Units:  
   Planar\_Coordinate\_Encoding\_Method:  
 Geodetic\_Model:  
   Horizontal\_Datum\_Name:  
     North American Datum of 1983  
     Elevations are referenced to NAVD88 and recorded in meters  
   Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
   Semi-major\_Axis: 6378.137km  
   Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
   Overview\_Description:  
     Entity\_and\_Attribute\_Overview:  
     Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:  
       Contact\_Organization\_Primary:  
         Contact\_Organization: USACE Field Research Facility  
         Contact\_Person: Mike Forte  
       Contact\_Position: Survey Specialist  
       Contact\_Address:  
         Address\_Type: mailing or physical address  
         Address: 1261 Kitty Hawk Road  
         City: Kitty Hawk  
         State\_or\_Province: North Carolina  
         Postal\_Code: 27949  
         Country: USA  
       Contact\_Voice\_Telephone: (252) 261-6840 x.228  
       Contact\_Facsimile\_Telephone: (252) 261-4432  
       Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
       Hours\_of\_Service:  
         Monday-Friday, 8am-5pm, Eastern Standard  
         Time

Resource\_Description:  
   This dataset is part of the Dare  
   County Beaches, Shore Protection Project

Distribution\_Liability:  
   Users must assume responsibility to  
   determine the appropriate use of these data.

Standard\_Order\_Process:  
   Digital\_Form:  
     Digital\_Transfer\_Information:  
       Format\_Name: 3d file containing xyz  
     Digital\_Transfer\_Option:  
       Offline\_Option:

Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown  
Fees: none  
Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
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Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata  
Metadata\_Standard\_Version: FGDC-STD-001-1998  
Identification\_Information:  
Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20061027  
Title:  
RTK-GPS Shoreface and Nearshore Topographic and  
Bathymetric Data  
Geospatial\_Data\_Presentation\_Form: Map  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Larger\_Work\_Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20010613  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Other\_Citation\_Details:  
This data is x,y,z of the shoreface  
and nearshore area collected with a Real Time Kinematic GPS  
system.  
Description:  
Abstract:

The USACE Wilmington District initiated a physical monitoring program associated with the Dare Co Beaches project. The physical monitoring consists of four parts: beach profile surveys, beach sediment sampling, aerial photography and wave/current/water level measurements.

The surveys include 144 profiles starting 3 miles north of Kitty Hawk and extending south 30 miles to Oregon Inlet. Each profile began at a stable location landward of the dune and ended at the -30-ft isobath. Swath surveys were used to supplement the profiles in regions with complicated morphology. Sediment samples were obtained along every other profile. Five samples below MSL and 5 above. The physical monitoring will include pre-, during- and post construction phases of the project.

Purpose:

To collect process and analyze data to assess the beach response to the fill placement and serve as the basis for maintaining the project. To also provide data in support of the biological monitoring effort

Supplemental\_Information:

Weather/Survey Conditions:

Land based observations:

Sky:Sunny

Wind:SW 5 kts

Temp:70 deg F

Precipitation:N/A

Notes:

Ocean based observations:

Seas:2-3 ft

Wind:SW 5 kts

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station Roof of the Comfort Inn. BM Check:

1.Forrest PK Nail DELTA Z=0.047 2. Juncos PK Nail DELTA Z=0.048 3. NPS PK Nail DELTA Z=0.036. LARC survey lines 779 thru 204. Topo survey lines 789 thru 940.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20061004 0800

Ending\_Date: 20061004 1400

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8  
Keywords:  
Theme:  
Theme\_Keyword\_Thesaurus: None  
Theme\_Keyword: Shoreline  
Theme\_Keyword: Beach Profiles  
Theme\_Keyword: Beach Renourishment  
Theme\_Keyword: Erosion  
Theme\_Keyword: Beach Data  
Theme\_Keyword: Nearshore Bathymetry  
Theme\_Keyword: GIS  
Theme\_Keyword: GPS  
Place:  
Place\_Keyword\_Thesaurus: None  
Place\_Keyword: North Carolina  
Place\_Keyword: Atlantic Coast  
Place\_Keyword: Southeast Coast  
Access\_Constraints: None  
Use\_Constraints: Not for Navigational Purposes  
Point\_of\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252)261-6840 x.228  
Contact\_Facsimile\_Telephone: (252)261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Native\_Data\_Set\_Environment:  
Data\_Quality\_Information:  
Attribute\_Accuracy:  
Attribute\_Accuracy\_Report:  
GPS quality was checked by  
determining the difference in RTK-GPS baseline solution to  
a known geodetic benchmark.  
Logical\_Consistency\_Report:  
GPS data was overlaid with  
previous Dare County profile data and aerial imagery to  
visualize logical consistency.  
Completeness\_Report:  
Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy:  
Horizontal\_Positional\_Accuracy\_Report:  
Base station horizontal position was established by MKimm &  
Creed (2004)  
Control points were tested by determining the horizontal  
difference in an RTK-GPS baseline solution to a known

geodetic benchmark.

Vertical\_Positional\_Accuracy:  
Vertical\_Positional\_Accuracy\_Report:  
Base station vertical position was determined by Mkimm & Creed (2004) and met specifications for geometric relative positioning techniques, 1st order. This was tested by determining the vertical difference in an RTK-GPS baseline solution to a known geodetic benchmark.

Lineage:  
Source\_Information:  
Source\_Citation:  
Citation\_Information:  
Originator:  
SAW Dare County Beaches Physical Monitoring Project  
Publication\_Date: 2003  
Title:  
Dare County Beaches, Shore Protection Project Physical Monitoring Program  
Edition:  
Geospatial\_Data\_Presentation\_Form: map  
Publication\_Information:  
Publication\_Place: Kitty Hawk, North Carolina  
Publisher: USACE Field Research Facility  
Source\_Scale\_Denominator:  
Type\_of\_Source\_Media:  
Source\_Time\_Period\_of\_Content:  
Time\_Period\_Information:  
Range\_of\_Dates/Times:  
Beginning\_Date: 2003  
Ending\_Date: Present  
Source\_Currentness\_Reference: Publication Date  
Source\_Citation\_Abbreviation:  
Source\_Contribution:  
Used to determine erosion rates, volumes, and set-back lines

Process\_Step:  
Process\_Description:  
Beach and nearshore (-11m NAVD88) shore-perpendicular survey lines are acquired with Trimble 4000 and 4700 dual frequency Real-Time-Kinematic Global Positioning Satellite (RTK-GPS) system. Land-based survey lines are collected with a backpack and rangepole while bathymetric profiles are collected using a Knudsen 310 survey-grade fathometer, TSS motion sensor, and RTK-GPS.  
Processing software consists of a custom built FORTRAN routine that combines the GPS and echosounder data in order to remove the motion of the vessel due to the wave motion. The survey software also adjusts the measurements to the changes in speed of sound over the survey area. This program also correctly aligns the time of the echosounder and GPS data. This is accomplished by dynamically adjusting the time or "latency" of the GPS data, relative to the echosounder data, until a best fit is obtained.

Process\_Date: 20061024

Process\_Contact:  
   Contact\_Information:  
     Contact\_Organization\_Primary:  
       Contact\_Organization: USACE Field Research Facility  
       Contact\_Person: Mike Forte  
     Contact\_Position: Survey Specialist  
     Contact\_Address:  
       Address\_Type: mailing and physical address  
       Address: 1261 Duck Road  
       City: Kitty Hawk  
       State\_or\_Province: North Carolina  
       Postal\_Code: 27949  
       Country: USA  
     Contact\_Voice\_Telephone: (252) 261-6840 x.228  
     Contact\_Facsimile\_Telephone: (252) 261-4432  
     Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
     Hours\_of\_Service:  
       Monday-Friday, 8am-5pm, Eastern Standard  
       Time

Spatial\_Reference\_Information:  
   Horizontal\_Coordinate\_System\_Definition:  
     Planar:  
       Grid\_Coordinate\_System:  
         Grid\_Coordinate\_System\_Name:  
         State\_Plane\_Coordinate\_System:  
           SPCS\_Zone\_Identifier: 3200  
           Lambert\_Conformal\_Conic:  
             Standard\_Parallel:  
             Longitude\_of\_Central\_Meridian:  
             Latitude\_of\_Projection\_Origin:  
             False\_Easting:  
             False\_Northing:  
         Planar\_Coordinate\_Information:  
           Coordinate\_Representation:  
             Abscissa\_Resolution:  
             Ordinate\_Resolution:  
           Planar\_Distance\_Units:  
           Planar\_Coordinate\_Encoding\_Method:  
         Geodetic\_Model:  
           Horizontal\_Datum\_Name:  
             North American Datum of 1983  
             Elevations are referenced to NAVD88 and recorded in meters  
           Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
           Semi-major\_Axis: 6378.137km  
           Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
     Overview\_Description:  
       Entity\_and\_Attribute\_Overview:  
       Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:

Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing or physical address  
Address: 1261 Kitty Hawk Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time

Resource\_Description:  
This dataset is part of the Dare  
County Beaches, Shore Protection Project

Distribution\_Liability:  
Users must assume responsibility to  
determine the appropriate use of these data.

Standard\_Order\_Process:  
Digital\_Form:  
Digital\_Transfer\_Information:  
Format\_Name: 3d file containing xyz  
Digital\_Transfer\_Option:  
Offline\_Option:  
Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown

Fees: none

Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time

Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998  
Identification\_Information:  
Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20061027  
Title:  
RTK-GPS Shoreface and Nearshore Topographic and  
Bathymetric Data  
Geospatial\_Data\_Presentation\_Form: Map  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Larger\_Work\_Citation:  
Citation\_Information:  
Originator: USACE Field Research Facility  
Publication\_Date: 20010613  
Title:  
Dare County Beaches, Shore Protection Project  
Physical Monitoring Program  
Publication\_Information:  
Publication\_Place: Duck, North Carolina  
Publisher: USACE Field Research Facility  
Other\_Citation\_Details:  
This data is x,y,z of the shoreface  
and nearshore area collected with a Real Time Kinematic GPS  
system.  
Description:  
Abstract:  
The USACE Wilmington District initiated a physical  
monitoring program associated with the Dare Co  
Beaches project. The physical monitoring consists of four  
parts: beach profile surveys, beach sediment sampling,  
aerial photography and wave/current/water level  
measurements.  
The surveys include 144 profiles starting 3 miles north of  
Kitty Hawk and extending south 30 miles to Oregon Inlet.  
Each profile began at a stable location landward of the  
dune and ended at the -30-ft isobath. Swath surveys were  
used to supplement the profiles in regions with complicated  
morphology. Sediment samples were obtained along every  
other profile. Five samples below MSL and 5 above. The  
physical monitoring will include pre-, during- and post  
construction phases of the project.  
Purpose:  
To collect process and analyze data to assess the beach  
response to the fill placement and serve as the basis for  
maintaining the project. To also provide data in support of  
the biological monitoring effort  
Supplemental\_Information:  
Weather/Survey Conditions:  
Land based observations:  
Sky: Sunny  
Wind: W 5-10 kts  
Temp: 70 deg F  
Precipitation: N/A  
Notes:

Ocean based observations:

Seas:1-2 ft

Wind:W 5-10 kts

Swell Direction:N/A

Tides:

low (am):N/A

low (pm):N/A

high (am):N/A

high (pm):N/A

Notes:Base Station NPS DUNE. BM Check: 1. Juncos PK Nail  
DELTA Z=0.008 2. NPS PK Nail DELTA Z=0.016. LARC survey  
lines 204 thru 19. Topo survey lines 951 thru 204.

Time\_Period\_of\_Content:

Time\_Period\_Information:

Range\_of\_Dates/Times:

Beginning\_Date: 20061005 0730

Ending\_Date: 20061005 1230

Currentness\_Reference: Publication Date

Status:

Progress: Complete

Maintenance\_and\_Update\_Frequency: Unknown

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: 75.71

East\_Bounding\_Coordinate: 75.52

North\_Bounding\_Coordinate: 36.1

South\_Bounding\_Coordinate: 35.8

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: None

Theme\_Keyword: Shoreline

Theme\_Keyword: Beach Profiles

Theme\_Keyword: Beach Renourishment

Theme\_Keyword: Erosion

Theme\_Keyword: Beach Data

Theme\_Keyword: Nearshore Bathymetry

Theme\_Keyword: GIS

Theme\_Keyword: GPS

Place:

Place\_Keyword\_Thesaurus: None

Place\_Keyword: North Carolina

Place\_Keyword: Atlantic Coast

Place\_Keyword: Southeast Coast

Access\_Constraints: None

Use\_Constraints: Not for Navigational Purposes

Point\_of\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: USACE Field Research Facility

Contact\_Person: Mike Forte

Contact\_Position: Survey Specialist

Contact\_Address:

Address\_Type: mailing and physical address

Address: 1261 Duck Road

City: Kitty Hawk

State\_or\_Province: North Carolina  
 Postal\_Code: 27949  
 Country: USA  
 Contact\_Voice\_Telephone: (252)261-6840 x.228  
 Contact\_Facsimile\_Telephone: (252)261-4432  
 Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
 Hours\_of\_Service:  
     Monday-Friday, 8am-5pm, Eastern Standard  
     Time  
 Native\_Data\_Set\_Environment:  
 Data\_Quality\_Information:  
     Attribute\_Accuracy:  
         Attribute\_Accuracy\_Report:  
             GPS quality was checked by  
             determining the difference in RTK-GPS baseline solution to  
             a known geodetic benchmark.  
     Logical\_Consistency\_Report:  
         GPS data was overlaid with  
         previous Dare County profile data and aerial imagery to  
         visualize logical consistency.  
     Completeness\_Report:  
     Positional\_Accuracy:  
         Horizontal\_Positional\_Accuracy:  
             Horizontal\_Positional\_Accuracy\_Report:  
                 Base station horizontal position was established by MKimm &  
                 Creed (2004)  
                 Control points were tested by determining the horizontal  
                 difference in an RTK-GPS baseline solution to a known  
                 geodetic benchmark.  
         Vertical\_Positional\_Accuracy:  
             Vertical\_Positional\_Accuracy\_Report:  
                 Base station vertical position was determined by Mkimm &  
                 Creed (2004) and met specifications  
                 for geometric relative positioning techniques, 1st order.  
                 This was tested by determining the vertical difference in  
                 an RTK-GPS baseline solution to a known geodetic benchmark.

Lineage:  
     Source\_Information:  
         Source\_Citation:  
             Citation\_Information:  
                 Originator:  
                     SAW Dare County Beaches Physical Monitoring  
                     Project  
                 Publication\_Date: 2003  
                 Title:  
                     Dare County Beaches, Shore Protection Project  
                     Physical Monitoring Program  
                 Edition:  
                 Geospatial\_Data\_Presentation\_Form: map  
                 Publication\_Information:  
                     Publication\_Place: Kitty Hawk, North Carolina  
                     Publisher: USACE Field Research Facility  
     Source\_Scale\_Denominator:  
     Type\_of\_Source\_Media:  
     Source\_Time\_Period\_of\_Content:  
         Time\_Period\_Information:  
             Range\_of\_Dates/Times:

Beginning\_Date: 2003  
Ending\_Date: Present  
Source\_Currentness\_Reference: Publication Date  
Source\_Citation\_Abbreviation:  
Source\_Contribution:  
Used to determine erosion rates,  
volumes, and set-back lines  
Process\_Step:  
Process\_Description:  
Beach and nearshore (-11m NAVD88) shore-perpendicular  
survey lines are acquired with Trimble 4000 and  
4700 dual frequency Real-Time-Kinematic Global Positioning  
Satellite (RTK-GPS) system. Land-based survey  
lines are collected with a backpack and rangepole while  
bathymetric profiles are collected using a Knudsen  
310 survey-grade fathometer, TSS motion sensor, and  
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Processing software consists of a custom built FORTRAN  
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in order to remove the motion of the vessel due to the wave  
motion. The survey software also adjusts the  
measurements to the changes in speed of sound over the  
survey area. This program also correctly aligns the  
time of the echosounder and GPS data. This is accomplished  
by dynamically adjusting the time or "latency"  
of the GPS data, relative to the echosounder data, until a  
best fit is obtained.  
Process\_Date: 20061024  
Process\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Person: Mike Forte  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
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City: Kitty Hawk  
State\_or\_Province: North Carolina  
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Country: USA  
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Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Spatial\_Reference\_Information:  
Horizontal\_Coordinate\_System\_Definition:  
Planar:  
Grid\_Coordinate\_System:  
Grid\_Coordinate\_System\_Name:  
State\_Plane\_Coordinate\_System:  
SPCS\_Zone\_Identifier: 3200  
Lambert\_Conformal\_Conic:  
Standard\_Parallel:  
Longitude\_of\_Central\_Meridian:

Latitude\_of\_Projection\_Origin:  
 False\_Easting:  
 False\_Northing:  
 Planar\_Coordinate\_Information:  
   Coordinate\_Representation:  
     Abscissa\_Resolution:  
     Ordinate\_Resolution:  
   Planar\_Distance\_Units:  
   Planar\_Coordinate\_Encoding\_Method:  
 Geodetic\_Model:  
   Horizontal\_Datum\_Name:  
     North American Datum of 1983  
     Elevations are referenced to NAVD88 and recorded in meters  
   Ellipsoid\_Name: WGS 1984 (Geoid 2003)  
   Semi-major\_Axis: 6378.137km  
   Denominator\_of\_Flattening\_Ratio: 1/298.25722

Entity\_and\_Attribute\_Information:  
   Detailed\_Description:  
     Entity\_Type:  
       Entity\_Type\_Label: profiles, shoreface and nearshore  
       Entity\_Type\_Definition:  
       Entity\_Type\_Definition\_Source:  
   Overview\_Description:  
     Entity\_and\_Attribute\_Overview:  
     Entity\_and\_Attribute\_Detail\_Citation:

Distribution\_Information:  
   Distributor:  
     Contact\_Information:  
       Contact\_Organization\_Primary:  
         Contact\_Organization: USACE Field Research Facility  
         Contact\_Person: Mike Forte  
       Contact\_Position: Survey Specialist  
       Contact\_Address:  
         Address\_Type: mailing or physical address  
         Address: 1261 Kitty Hawk Road  
         City: Kitty Hawk  
         State\_or\_Province: North Carolina  
         Postal\_Code: 27949  
         Country: USA  
       Contact\_Voice\_Telephone: (252) 261-6840 x.228  
       Contact\_Facsimile\_Telephone: (252) 261-4432  
       Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
       Hours\_of\_Service:  
         Monday-Friday, 8am-5pm, Eastern Standard  
         Time

Resource\_Description:  
   This dataset is part of the Dare  
   County Beaches, Shore Protection Project

Distribution\_Liability:  
   Users must assume responsibility to  
   determine the appropriate use of these data.

Standard\_Order\_Process:  
   Digital\_Form:  
     Digital\_Transfer\_Information:  
       Format\_Name: 3d file containing xyz  
     Digital\_Transfer\_Option:  
       Offline\_Option:

Offline\_Media: none  
Recording\_Format:  
Compatibility\_Information: unknown  
Fees: none  
Metadata\_Reference\_Information:  
Metadata\_Date: 20061027  
Metadata\_Review\_Date: 20061027  
Metadata\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: USACE Field Research Facility  
Contact\_Position: Survey Specialist  
Contact\_Address:  
Address\_Type: mailing and physical address  
Address: 1261 Duck Road  
City: Kitty Hawk  
State\_or\_Province: North Carolina  
Postal\_Code: 27949  
Country: USA  
Contact\_Voice\_Telephone: (252) 261-6840 x.228  
Contact\_Facsimile\_Telephone: (252) 261-4432  
Contact\_Electronic\_Mail\_Address: Michael.F.Forte@erdc.usace.army.mil  
Hours\_of\_Service:  
Monday-Friday, 8am-5pm, Eastern Standard  
Time  
Metadata\_Standard\_Name:  
Content Standard for Digital  
Geospatial Metadata  
Metadata\_Standard\_Version: FGDC-STD-001-1998