



APPENDIX C CRYSTAL BALL ANALYSIS

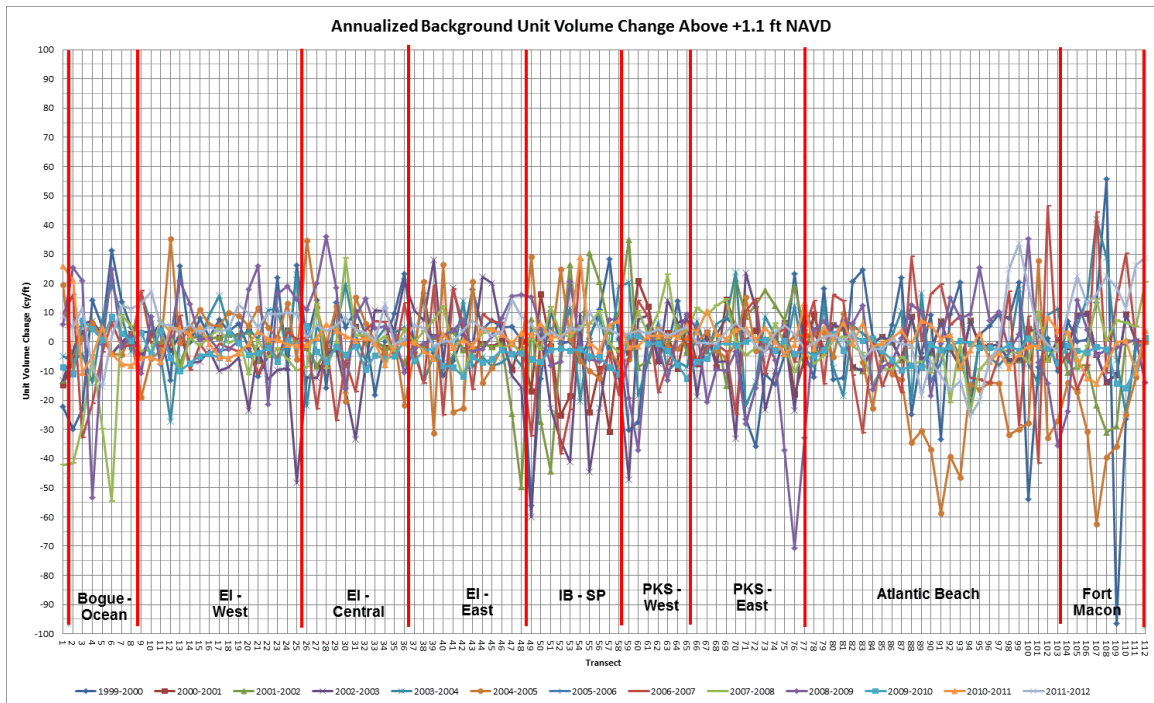
APPENDIX C

BEACH PROFILE VOLUME ANALYSIS

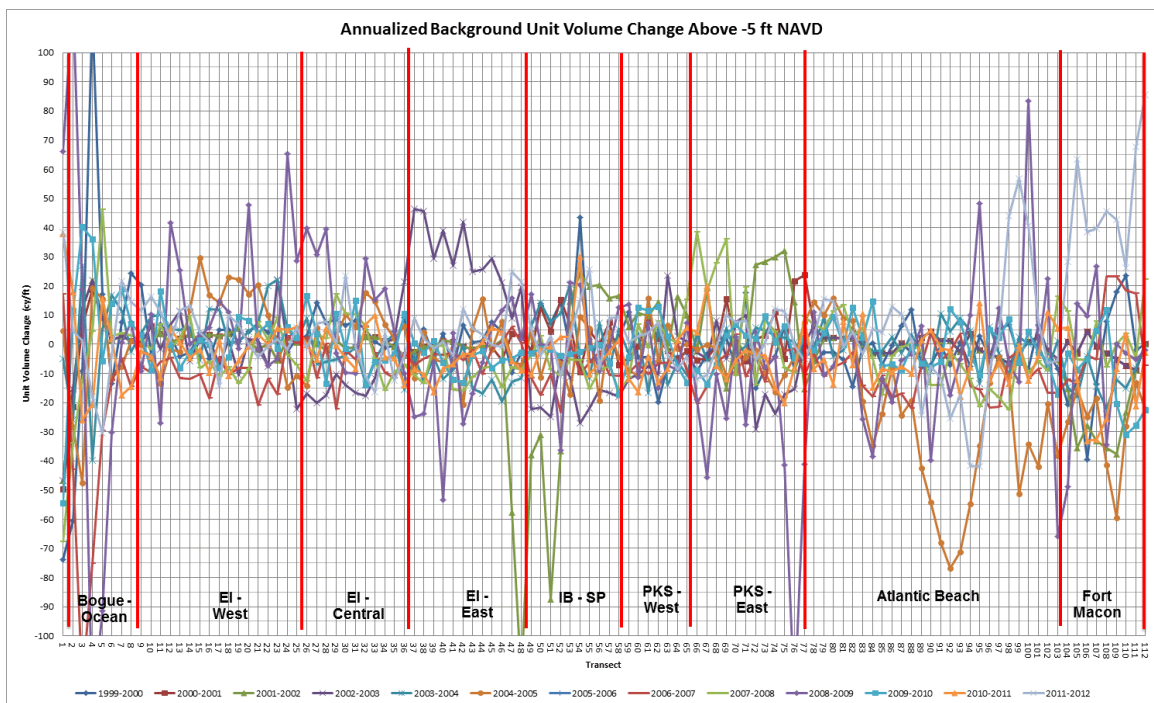
1. Analytical Results
 - a. Unit Volume Change
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 - f. -20 ft NAVD88 Results
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1. Analytical Results

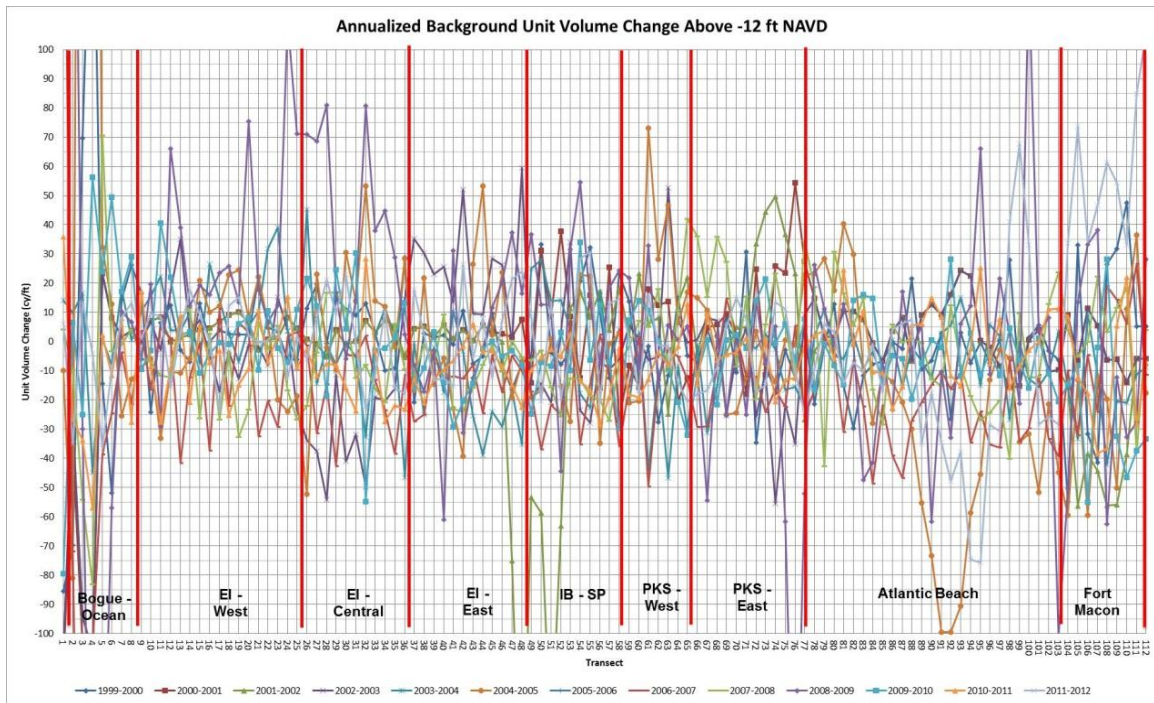
a. Unit Volume Change



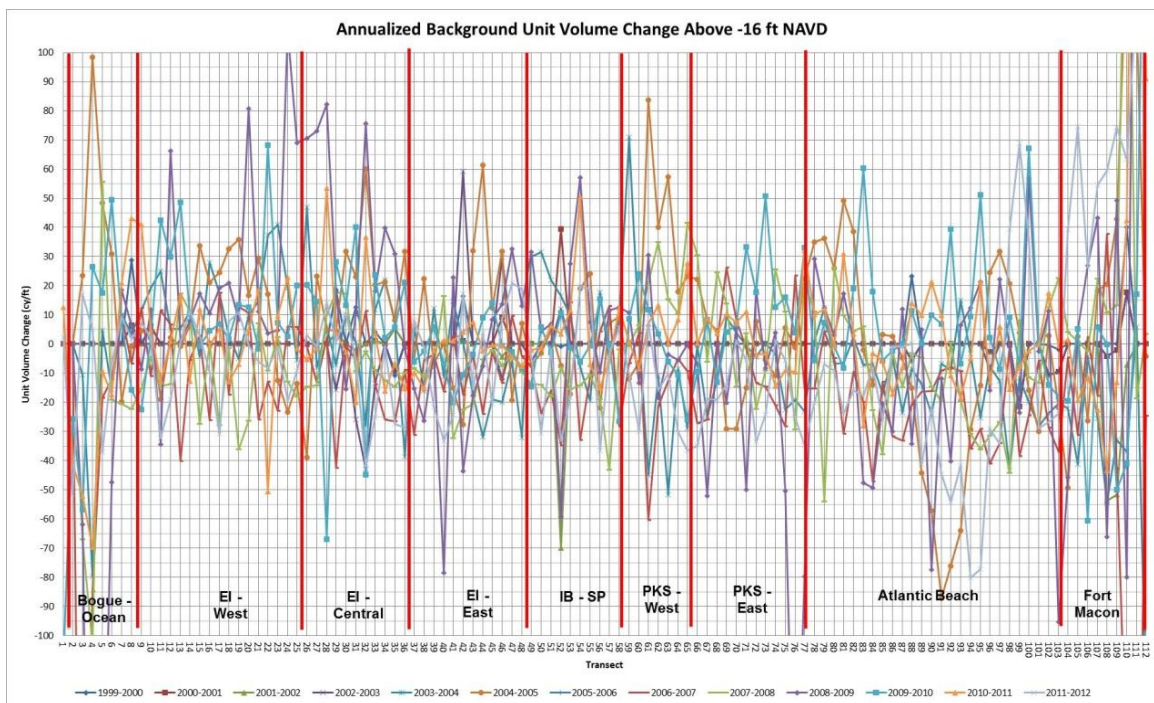
Annualized Background Unit Volume Change (Above +1.1 ft NAVD88)



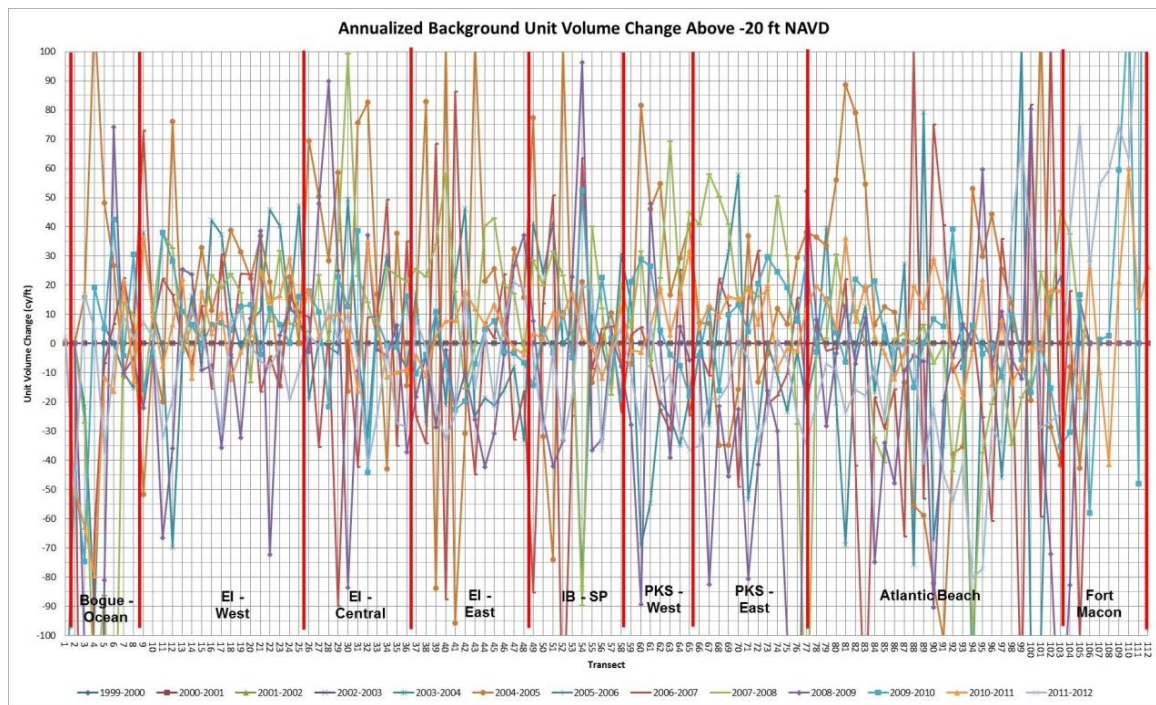
Annualized Background Unit Volume Change (Above -5.0 ft NAVD88)



Annualized Background Unit Volume Change (Above -12.0 ft NAVD88)

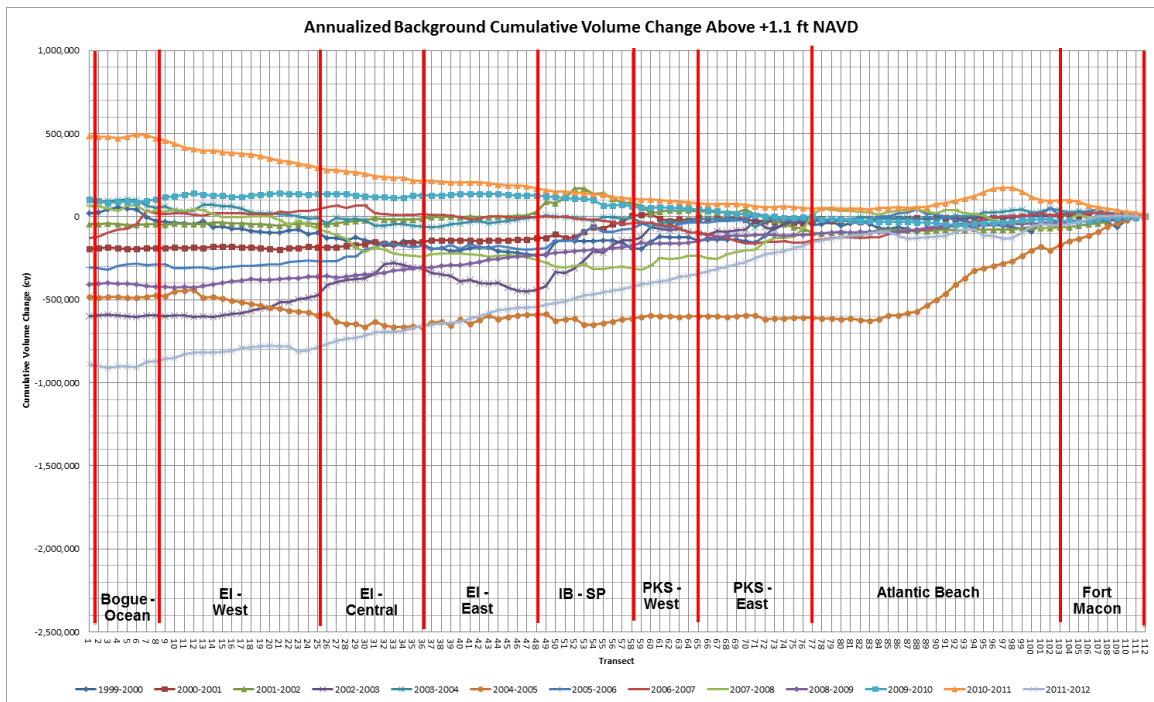


Annualized Background Unit Volume Change (Above -16.0 ft NAVD88)

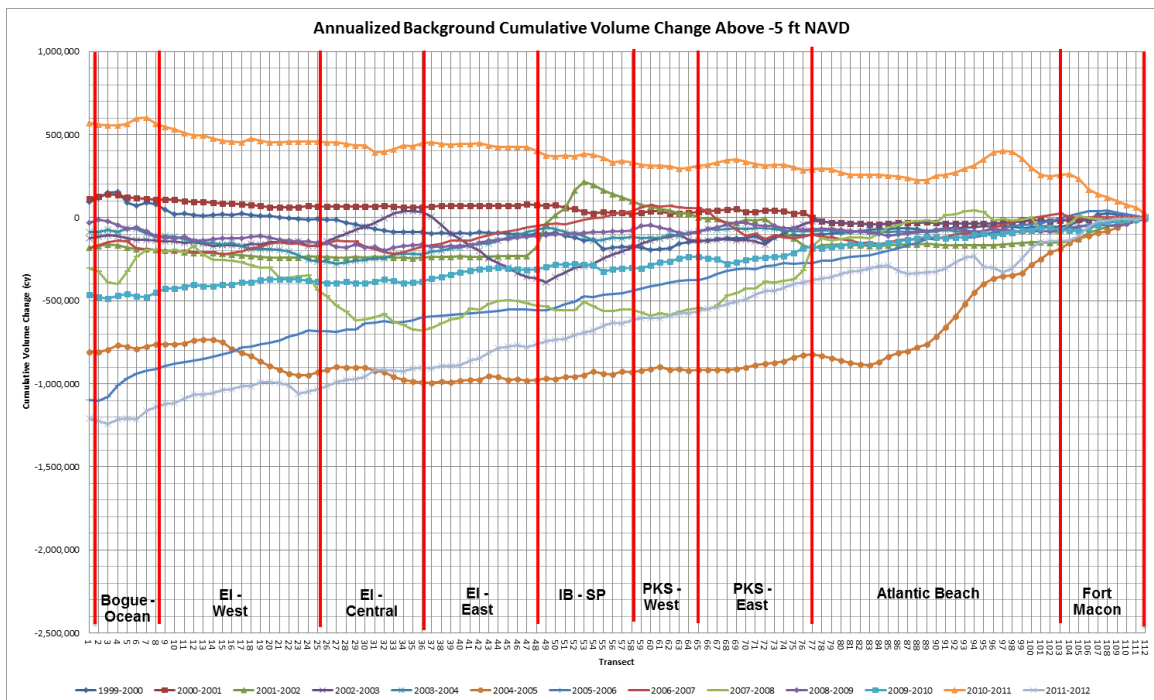


Annualized Background Unit Volume Change (Above -20.0 ft NAVD88)

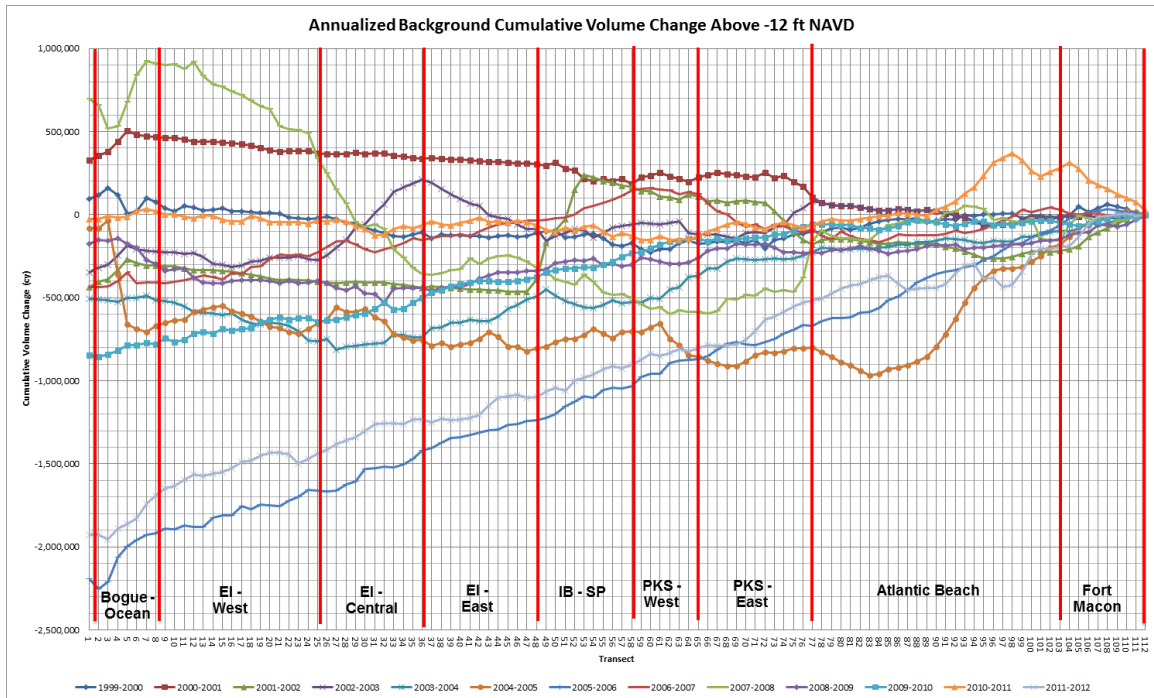
b. Cumulative Volume Change



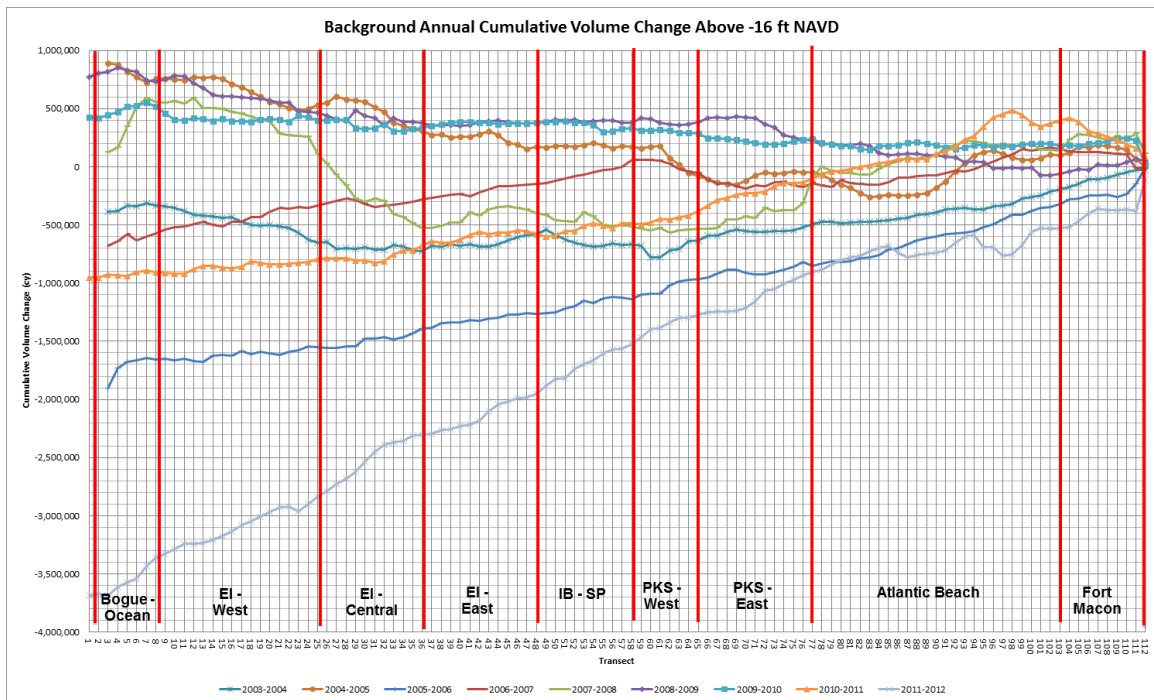
Annualized Background Cumulative Volume Change (Above +1.1 ft NAVD88)



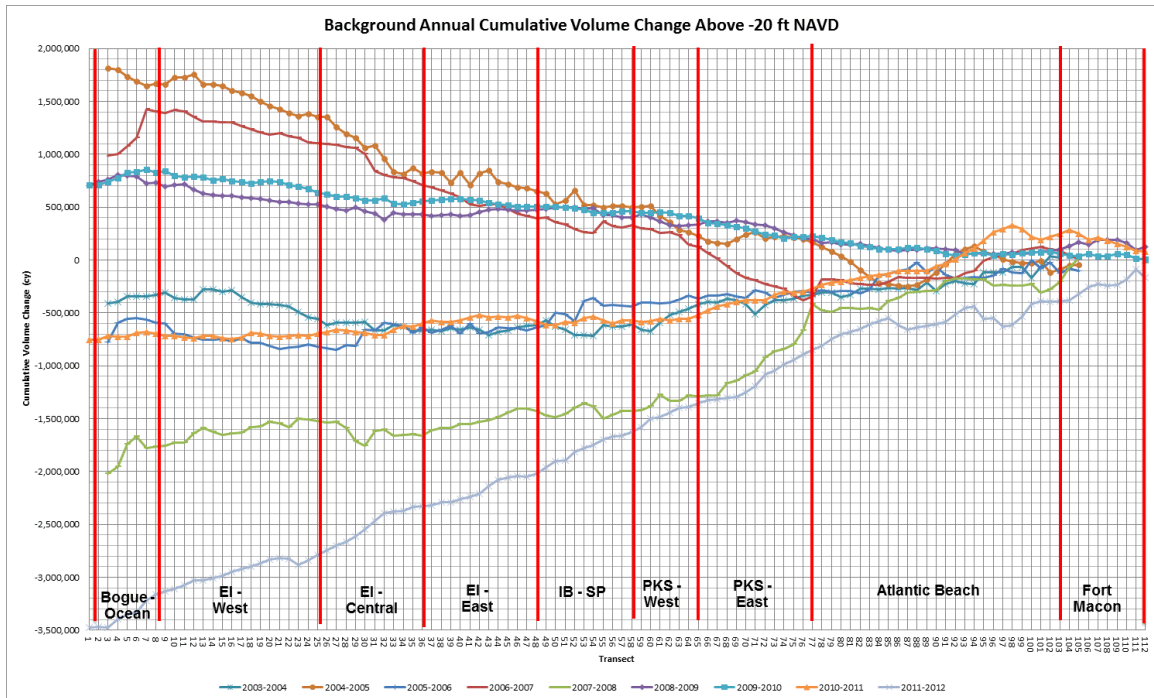
Annualized Background Cumulative Volume Change (Above -5.0 ft NAVD88)



Annualized Background Cumulative Volume Change (Above -12.0 ft NAVD88)



Annualized Background Cumulative Volume Change (Above -16.0 ft NAVD88)



Annualized Background Cumulative Volume Change (Above -20.0 ft NAVD88)

2. Crystal Ball Results

a. Crystal Ball Description

STATISTICAL ANALYSIS - CRYSTAL BALL

In order to develop a more accurate basis of volume loss and ultimately sediment needs over the next 50 years for continued maintenance, an analysis of historical volume losses was performed to capture and statistically quantify the variability inherent within the existing data. After some investigation, it was determined that the Crystal Ball software (a Microsoft Excel Add-in program) would meet this need. A detailed description of the Crystal Ball software and the subsequent analyses can be found in Appendix C.

“Oracle Crystal Ball is the leading spreadsheet-based application for predictive modeling, forecasting, simulation, and optimization. It gives unparalleled insight into the critical factors affecting risk. With Crystal Ball, you can use Monte Carlo simulation to automatically calculate and record the results of thousands of different “what if” cases and leverage analysis of these scenarios which reveal to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where efforts should be focused.” – Taken from Crystal Ball website.

Crystal Ball allows the user to specify a distribution (normal, Gumbel, Ln Pearson III, etc.) for each assumption (in our case – unit volume change for each transect). Any equation in Excel that references an assumption, then becomes a forecast (in our case – volume change per transect/per reach/subreach of beach – depending on the length studied). Through using a Monte Carlo simulation running for hundreds of thousands of trials, the distribution of the forecasts can then be modeled and determined. Therefore, the user can end up with results such as the 50% or 75% probability that the volume change for a given transect will not exceed say 2,000 cy/yr or 3,500 cy/yr respectively. These individual results can then be added over various reaches of beach to study localized erosion/deposition patterns as well as overall volume needs on an annual and longer-term basis. Utilizing this tool gives the user increased confidence in predictions and allows for more informed decision making.

The first decision that has to be made in the modeling is what type of distribution should be used for the assumptions. For this case, the annual volume change was plotted as a histogram for both the -12 ft and -16 ft elevations for all the years data was available. As can be seen in Figure 1 and Figure 2, a normal distribution is reflected by the data and is determined to be valid.

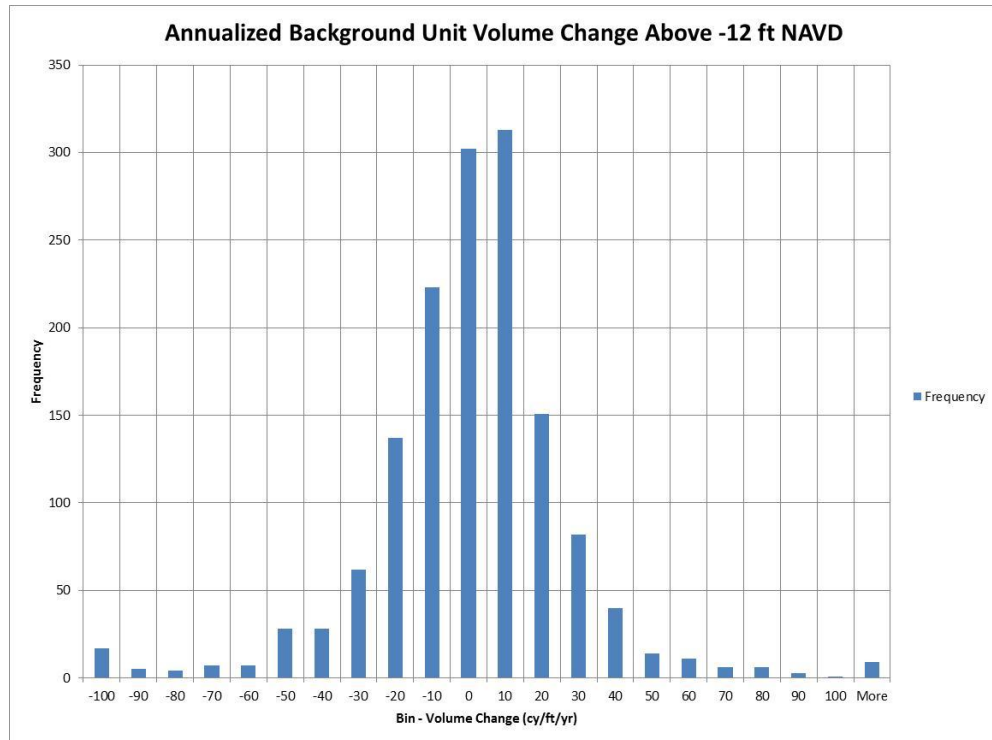


Figure 1: Annualized Background Unit Volume Change (Above -12 ft NAVD88)

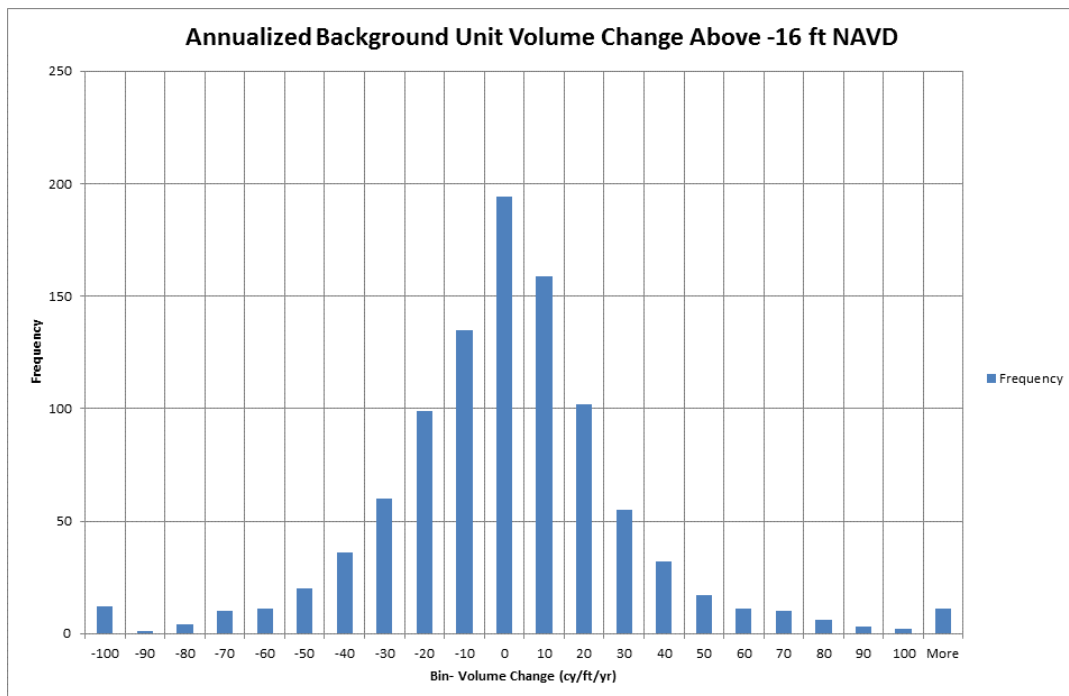


Figure 2: Annualized Background Unit Volume Change (Above -16 ft NAVD88)

Once the distribution type was determined, the calculations for the mean and standard deviation of volume change could be computed for input within the Crystal Ball simulation. These calculations were made for each transect and for each calculation elevation lens (+1.1 ft, -5 ft, -12 ft, -16 ft, -20 ft and -30 ft). Figure 3 through Figure 5 shows the input for representative transects above -12 ft NAVD88.

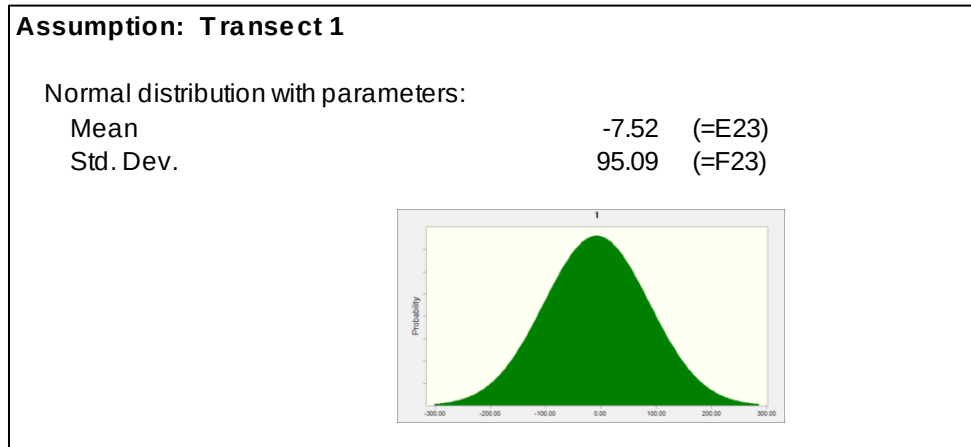


Figure 3: Example Crystal Ball Assumption Input – Transect 1 (-12 ft NAVD88)

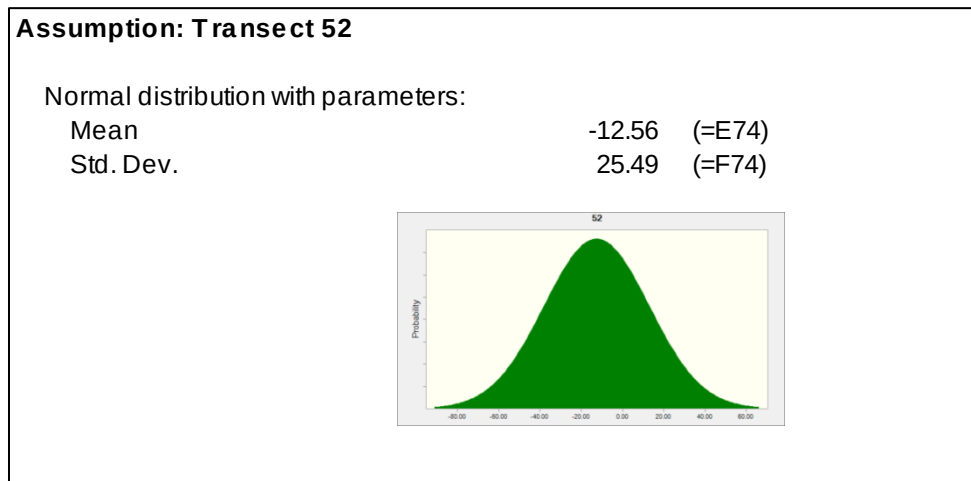


Figure 4: Example Crystal Ball Assumption Input – Transect 52 (-12 ft NAVD88)

Assumption: Transect 101

Normal distribution with parameters:

Mean	-7.32	(=E123)
Std. Dev.	16.79	(=F123)

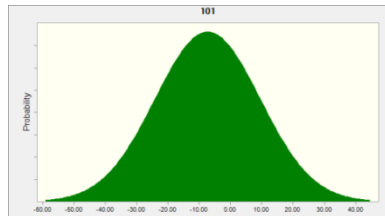


Figure 5: Example Crystal Ball Assumption Input – Transect 101 (-12 ft NAVD88)

The Monte Carlo simulations were then set up to run for 200,000 trials each so that the forecast distributions were developed enough so that interpolations could be confidently made if needed. Figure 6 through Figure 8 shows the resulting annual volume change distributions or exceedance curves for the above representative transects. For example, for Transect 52, the annual volume change will not exceed a loss of 17,105 cy 50% of the time and will not exceed a loss of 46,477 cy 80% of the time.

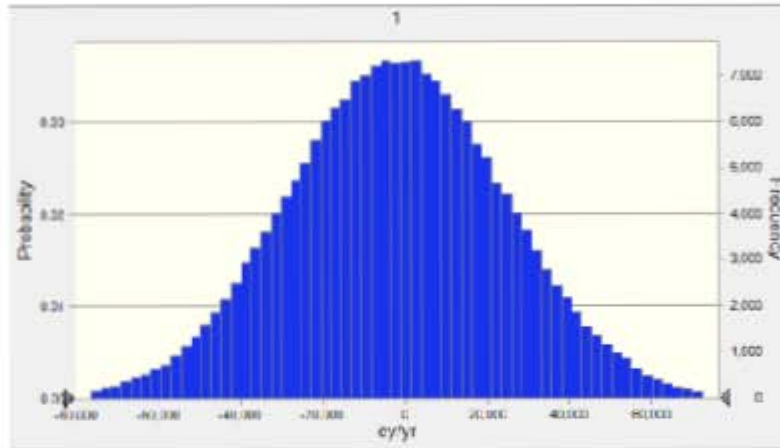
Forecast: Transect 1

Summary:

Entire range is from -113,841 to 106,340

Base case is -2,103

After 200,000 trials, the std. error of the mean is 59



Statistics:	Forecast values
Trials	200,000
Base Case	-2,103
Mean	-2,075
Median	-2,051
Mode	---
Standard Deviation	26,595
Variance	707,276,897
Skewness	-0.0021
Kurtosis	2.99
Coeff. of Variability	-12.81
Minimum	-113,841
Maximum	106,340
Range Width	220,181
Mean Std. Error	59

Forecast: 1 (cont'd)

Percentiles:	Forecast values
100%	-113,841
90%	-36,239
80%	-24,470
70%	-16,025
60%	-8,782
50%	-2,051
40%	4,675
30%	11,862
20%	20,324
10%	32,013
0%	106,340

Figure 6: Example Crystal Ball Forecast Result – Transect 1 (-12 ft NAVD88)

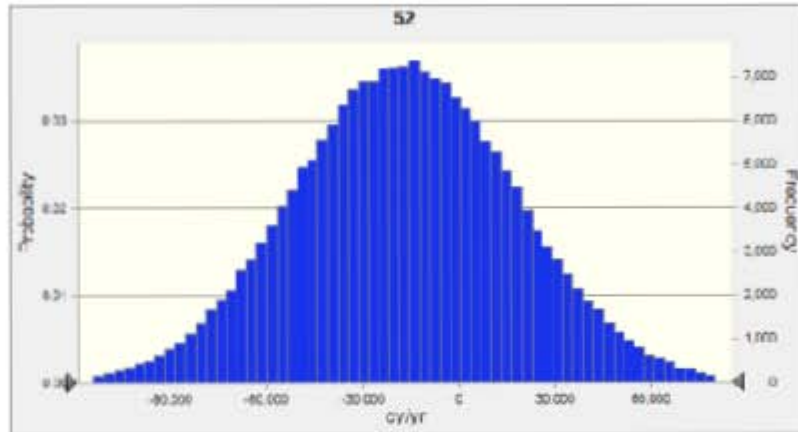
Forecast: Transect 52

Summary:

Entire range is from -212,899 to 135,374

Base case is -17,124

After 200,000 trials, the std. error of the mean is 78



Statistics: Forecast values

Trials	200,000
Base Case	-17,124
Mean	-17,079
Median	-17,104
Mode	---
Standard Deviation	34,785
Variance	1,209,977,139
Skewness	0.0108
Kurtosis	2.98
Coeff. of Variability	-2.04
Minimum	-212,899
Maximum	135,374
Range Width	348,273
Mean Std. Error	78

Forecast: 52 (cont'd)

Percentiles:	Forecast values
100%	-212,899
90%	-61,626
80%	-46,477
70%	-35,407
60%	-26,003
50%	-17,105
40%	-8,299
30%	1,200
20%	12,188
10%	27,523
0%	135,374

Figure 7: Example Crystal Ball Forecast Result – Transect 52 (-12 ft NAVD88)

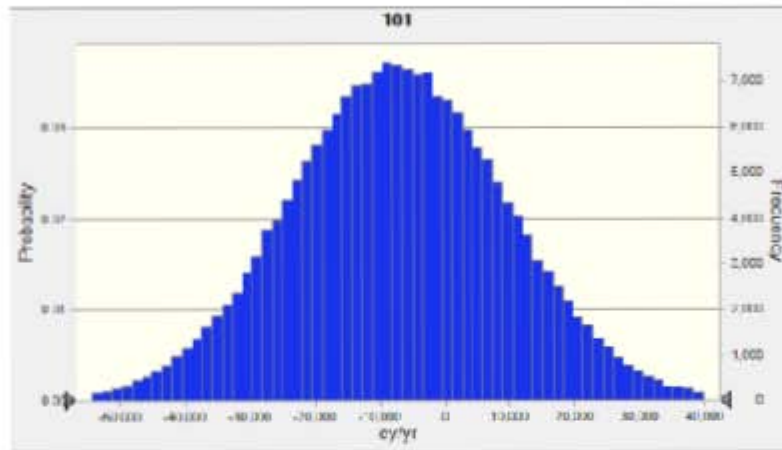
Forecast: Transect 101

Summary:

Entire range is from -86,408 to 63,769

Base case is -7,333

After 200,000 trials, the std. error of the mean is 38



Statistics:	Forecast values
Trials	200,000
Base Case	-7,333
Mean	-7,339
Median	-7,353
Mode	---
Standard Deviation	16,820
Variance	282,901,208
Skewness	-0.0040
Kurtosis	3.01
Coeff. of Variability	-2.29
Minimum	-86,408
Maximum	63,769
Range Width	150,177
Mean Std. Error	38

Forecast: 101 (cont'd)

Percentiles:	Forecast values
100%	-86,408
90%	-28,797
80%	-21,480
70%	-16,130
60%	-11,618
50%	-7,353
40%	-3,101
30%	1,471
20%	6,810
10%	14,202
0%	63,769

Figure 8: Example Crystal Ball Forecast Result – Transect 101 (-12 ft NAVD88)

The above analyses and results were then summed along reaches determined by a combination of volume change behavior, dune and beach shape, and other factors discussed in the Engineering Report. An example of the forecasts for one of the calculation reaches is shown in Figure 9.

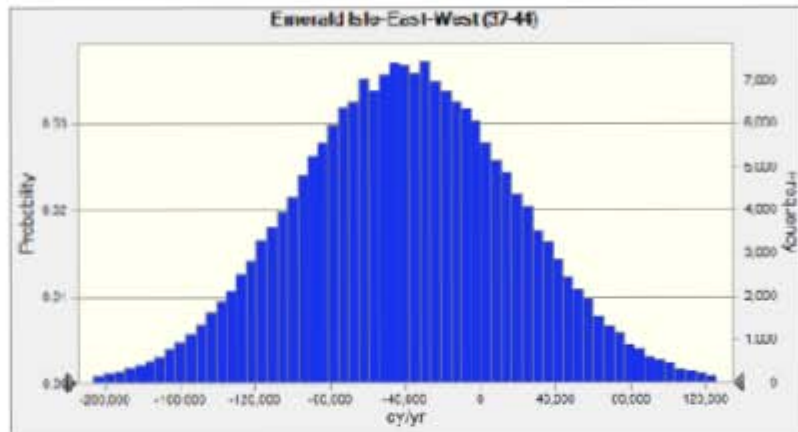
Forecast: Emerald Isle-East-West (37-44)

Summary:

Entire range is from -298,309 to 246,524

Base case is -40,561

After 200,000 trials, the std. error of the mean is 132



Statistics:

Statistics:	Forecast values
Trials	200,000
Base Case	-40,561
Mean	-40,514
Median	-40,472
Mode	---
Standard Deviation	59,227
Variance	3,507,887,598
Skewness	-0.0029
Kurtosis	3.00
Coeff. of Variability	-1.46
Minimum	-298,309
Maximum	246,524
Range Width	544,833
Mean Std. Error	132

Forecast: Emerald Isle-East-West (37-44) (cont'd)

Percentiles:

Percentiles:	Forecast values
100%	-298,309
90%	-116,472
80%	-90,398
70%	-71,639
60%	-55,536
50%	-40,472
40%	-25,557
30%	-9,318
20%	9,404
10%	35,338
0%	246,524

Figure 9: Example Crystal Ball Forecast Result – Emerald Isle East – West (Transects 37-44) (-12 ft NAVD88)

b. +1.1 ft NAVD88 Results

CRYSTAL BALL RESULTS FOR +1.1 FT

Statistics	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
Trials	200000	200000	200000	200000	200000	200000	200000
Base Case	-97,155	-12,961	-49,187	133	-39,895	-10,753	-1,099
Mean	-45,583	-5,863	-15,355	-2,219	-4,175	706	-1,497
Median	-45,628	-5,851	-15,394	-2,248	-4,170	676	-1,377
Mode	---	---	---	---	---	---	---
Standard Deviation	48,345	13,377	41,624	21,757	41,145	22,182	48,235
Variance	2,337,271,246	178,952,288	1,732,562,981	473,387,725	1,692,869,906	492,041,860	2,326,646,061
Skewness	-0.0047	8.208E-04	0.0019	1.5963E-04	-0.0084	3.3699E-04	-0.0045
Kurtosis	2.98	2.99	3.01	2.98	3.00	3.01	3.00
Coeff. of Variability	-1.06	-2.28	-2.71	-9.80	-9.86	31.42	-32.22
Minimum	-274,867	-65,126	-194,213	-97,842	-205,626	-102,348	-226,796
Maximum	161,988	59,628	163,911	93,452	205,392	103,909	212,646
Range Width	436,855	124,754	358,124	191,294	411,019	206,256	439,442
Mean Std. Error	108	30	93	49	92	50	108

Percentiles	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
100%	-274,867	-65,126	-194,213	-97,842	-205,626	-102,348	-226,796
97.5%	-140,705	-31,990	-96,644	-44,817	-84,718	-42,794	-96,397
95%	-125,284	-27,909	-83,579	-37,928	-72,005	-35,698	-81,076
90%	-107,568	-23,048	-68,588	-30,163	-56,861	-27,727	-63,404
85%	-95,556	-19,733	-58,451	-24,822	-46,720	-22,221	-51,382
84%	-93,485	-19,167	-56,791	-23,900	-45,022	-21,268	-49,299
80%	-86,137	-17,100	-50,416	-20,557	-38,830	-17,865	-41,958
75%	-78,094	-14,889	-43,435	-16,930	-31,959	-14,168	-34,039
70%	-70,977	-12,902	-37,209	-13,675	-25,675	-10,891	-26,847
65%	-64,331	-11,037	-31,504	-10,664	-19,973	-7,854	-20,104
60%	-57,916	-9,259	-26,027	-7,757	-14,562	-4,945	-13,740
55%	-51,680	-7,534	-20,623	-5,003	-9,383	-2,099	-7,505
50%	-45,628	-5,851	-15,394	-2,248	-4,170	676	-1,377
45%	-39,527	-4,166	-10,202	525	1,000	3,400	4,731
40%	-33,336	-2,460	-4,827	3,330	6,205	6,268	10,797
35%	-26,946	-701	618	6,219	11,659	9,211	17,206
30%	-20,235	1,166	6,423	9,253	17,410	12,310	23,910
25%	-12,805	3,180	12,723	12,498	23,617	15,651	31,059
20%	-4,762	5,397	19,776	16,133	30,496	19,371	39,029
15%	4,685	8,002	27,960	20,380	38,525	23,695	48,374
14%	6,736	8,601	29,756	21,298	40,382	24,627	50,424
10%	16,686	11,297	38,124	25,629	48,718	29,153	60,058
5%	33,798	16,095	52,974	33,577	63,703	37,310	77,698
2.5%	48,868	20,398	66,134	40,355	76,357	44,273	92,693
0%	161,988	59,628	163,911	93,452	205,392	103,909	212,646

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
200000	200000	200000	200000	200000	200000	200000
-23,136	-40,561	34,039	6,228	-5,316	-63,897	-8,131
-6,611	-7,044	10,854	2,099	-220	-19,270	-9,454
-6,634	-7,074	10,829	2,063	-176	-19,302	-9,396
---	---	---	---	---	---	---
23,777	33,644	36,886	30,380	19,033	35,308	45,091
565,367,446	1,131,904,068	1,360,604,180	922,964,240	362,247,540	1,246,687,720	2,033,223,313
0.0043	0.0053	0.0121	0.0047	-0.0048	0.0059	-6.1978E-04
3.00	3.00	2.99	3.01	3.00	3.01	3.01
-3.60	-4.78	3.40	14.47	-86.51	-1.83	-4.77
-106,629	-154,544	-146,194	-125,295	-87,746	-194,246	-215,154
99,384	149,298	186,764	137,227	80,107	130,889	203,822
206,012	303,842	332,958	262,522	167,853	325,135	418,976
53	75	82	68	43	79	101

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
-106,629	-154,544	-146,194	-125,295	-87,746	-194,246	-215,154
-53,164	-73,030	-61,061	-57,399	-37,559	-88,470	-97,961
-45,731	-62,412	-49,722	-47,840	-31,659	-77,373	-83,857
-37,059	-50,215	-36,356	-36,750	-24,663	-64,518	-67,425
-31,252	-41,959	-27,505	-29,311	-19,995	-55,804	-56,168
-30,258	-40,504	-25,960	-28,063	-19,195	-54,279	-54,313
-26,616	-35,365	-20,304	-23,420	-16,260	-48,908	-47,350
-22,638	-29,757	-14,107	-18,286	-13,038	-43,063	-39,797
-19,124	-24,679	-8,540	-13,856	-10,154	-37,773	-32,982
-15,764	-19,947	-3,480	-9,642	-7,518	-32,865	-26,703
-12,642	-15,531	1,459	-5,633	-4,967	-28,207	-20,773
-9,580	-11,237	6,181	-1,778	-2,563	-23,715	-15,097
-6,634	-7,074	10,828	2,063	-176	-19,302	-9,396
-3,658	-2,840	15,443	5,911	2,209	-14,890	-3,713
-608	1,432	20,106	9,757	4,621	-10,387	1,977
2,545	5,890	24,967	13,774	7,116	-5,696	7,948
5,817	10,603	30,124	17,982	9,769	-883	14,200
9,378	15,648	35,711	22,542	12,614	4,457	20,981
13,405	21,276	41,897	27,638	15,813	10,373	28,373
18,086	27,781	49,019	33,572	19,481	17,352	37,200
19,087	29,279	50,668	34,938	20,292	18,871	39,153
23,815	36,002	58,203	41,017	24,108	26,120	48,191
32,572	48,219	71,764	52,096	31,032	38,833	64,555
40,020	59,139	83,753	61,827	37,077	49,942	78,857
99,384	149,298	186,764	137,227	80,107	130,889	203,822

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)
200000	200000	200000	200000	200000
-54,228	-46,199	-24,498	-13,611	-450,226
-31,071	-24,641	-7,290	-9,296	-175,930
-31,166	-24,631	-7,364	-9,342	-175,754
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49,377	49,098	32,872	40,944	156,708
2,438,128,127	2,410,598,531	1,080,568,149	1,676,443,510	24,557,372,744
6.3607E-04	-0.0024	0.0057	0.0046	0.0027
2.99	3.01	2.99	3.00	2.99
-1.59	-1.99	-4.51	-4.40	-0.8907
-246,509	-256,916	-174,600	-202,354	-907,424
181,073	182,395	143,298	172,704	546,071
427,583	439,312	317,897	375,058	1,453,494
110	110	74	92	350

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)	Total Oceanfront (1-112)	TOTAL-SUM OF INDIVIDUAL
					MINUS Fort Macon	REACHES W/O Fort Macon
-246,509	-256,916	-174,600	-202,354	-907,424	-713,177	-2,882,759
-128,000	-120,753	-71,570	-89,260	-482,097	-393,627	-1,327,822
-112,312	-105,176	-61,296	-76,588	-433,199	-355,826	-1,140,070
-94,446	-87,488	-49,322	-61,798	-377,283	-312,765	-922,882
-82,226	-75,525	-41,347	-51,759	-339,068	-283,264	-775,933
-80,123	-73,510	-40,008	-50,076	-332,382	-278,103	-750,940
-72,544	-66,107	-35,010	-43,746	-307,894	-258,986	-659,584
-64,242	-57,806	-29,554	-36,872	-281,990	-238,927	-559,610
-56,951	-50,354	-24,617	-30,702	-258,136	-220,363	-470,137
-50,037	-43,521	-19,994	-24,965	-236,436	-203,572	-387,038
-43,676	-37,098	-15,779	-19,638	-215,469	-187,263	-308,483
-37,361	-30,755	-11,555	-14,437	-195,302	-171,587	-232,012
-31,167	-24,631	-7,364	-9,343	-175,754	-156,452	-156,886
-24,951	-18,450	-3,189	-4,216	-156,098	-141,207	-81,693
-18,575	-12,197	1,020	973	-136,276	-125,889	-5,517
-12,114	-5,644	5,341	6,402	-116,044	-110,347	73,489
-5,254	1,208	9,993	12,042	-93,835	-92,952	156,719
2,206	8,607	14,910	18,203	-70,764	-75,221	246,724
10,358	16,625	20,531	25,126	-44,068	-54,442	346,484
20,005	26,069	26,948	33,105	-13,168	-30,521	462,886
22,200	28,177	28,337	34,869	-6,404	-25,275	488,822
32,357	38,233	34,946	43,177	25,298	-822	609,715
50,435	55,846	46,590	58,230	81,624	42,791	826,494
66,286	71,711	57,102	71,411	131,542	81,600	1,016,261
181,073	182,395	143,298	172,704	546,071	415,182	2,536,999

c. -5.0 ft NAVD88 Results

CRYSTAL BALL RESULTS FOR -5 FT

Statistics	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
Trials	200000	200000	200000	200000	200000	200000	200000
Base Case	-97,155	-12,961	-49,187	133	-39,895	-10,753	-1,099
Mean	-78,940	-10,386	-25,180	545	-18,573	-6,335	2,972
Median	-78,963	-10,397	-25,278	567	-18,554	-6,347	2,914
Mode	---	---	---	---	---	---	---
Standard Deviation	61,515	18,312	51,485	24,851	68,559	23,551	48,481
Variance	3,784,104,874	335,329,151	2,650,707,023	617,550,027	4,700,283,960	554,648,937	2,350,412,636
Skewness	-1.3867E-05	0.0058	-0.0019	0.0027	-0.0055	0.0053	0.0020
Kurtosis	3.01	3.00	3.02	3.01	3.02	2.98	3.00
Coeff. of Variability	-0.7793	-1.76	-2.04	45.63	-3.69	-3.72	16.31
Minimum	-354,274	-88,507	-287,306	-109,749	-330,459	-115,426	-209,333
Maximum	186,237	76,591	216,294	112,034	279,229	106,923	218,563
Range Width	540,511	165,098	503,600	221,783	609,688	222,349	427,896
Mean Std. Error	138	41	115	56	153	53	108

Percentiles	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
100%	-354,274	-88,507	-287,306	-109,749	-330,459	-115,426	-209,333
97.5%	-199,658	-46,149	-126,377	-48,180	-153,256	-52,406	-92,289
95%	-180,218	-40,466	-109,876	-40,396	-131,289	-45,143	-76,884
90%	-157,989	-33,866	-91,006	-31,265	-106,260	-36,546	-59,152
85%	-142,714	-29,414	-78,328	-25,200	-89,379	-30,791	-47,243
84%	-140,122	-28,665	-76,191	-24,179	-86,516	-29,773	-45,198
80%	-130,649	-25,881	-68,379	-20,298	-76,063	-26,221	-37,732
75%	-120,417	-22,778	-59,797	-16,207	-64,738	-22,242	-29,531
70%	-111,101	-20,047	-52,055	-12,543	-54,490	-18,732	-22,308
65%	-102,501	-17,488	-44,969	-9,085	-44,847	-15,464	-15,671
60%	-94,379	-15,012	-38,257	-5,800	-35,769	-12,334	-9,412
55%	-86,603	-12,669	-31,741	-2,576	-27,044	-9,314	-3,255
50%	-78,963	-10,397	-25,279	567	-18,555	-6,347	2,913
45%	-71,197	-8,069	-18,760	3,707	-10,046	-3,406	8,921
40%	-63,322	-5,718	-12,125	6,875	-1,258	-364	15,249
35%	-55,282	-3,260	-5,321	10,096	7,825	2,747	21,580
30%	-46,827	-744	1,844	13,590	17,261	6,059	28,368
25%	-37,445	1,986	9,440	17,250	27,527	9,655	35,732
20%	-27,209	5,065	17,977	21,436	39,101	13,544	43,838
15%	-15,230	8,576	28,100	26,257	52,335	18,101	53,319
14%	-12,456	9,372	30,379	27,312	55,337	19,137	55,505
10%	-141	12,993	40,834	32,453	69,343	23,813	65,140
5%	22,033	19,677	59,542	41,358	93,971	32,465	82,656
2.5%	41,648	25,617	75,759	49,223	115,443	39,788	97,926
0%	186,237	76,591	216,294	112,034	279,229	106,923	218,563

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
200000	200000	200000	200000	200000	200000	200000
-23,136	-40,561	34,039	6,228	-5,316	-63,897	-8,131
-14,308	-23,913	27,056	7,171	307	-46,642	-5,663
-14,088	-24,000	26,970	7,129	318	-46,676	-5,706
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48,049	46,753	46,288	34,397	24,678	51,969	41,778
2,308,708,658	2,185,864,773	2,142,599,210	1,183,139,100	609,015,797	2,700,787,477	1,745,442,190
-0.0070	0.0039	0.0039	-6.1189E-04	-0.0020	-0.0031	0.0035
3.00	3.00	2.98	3.01	3.01	3.01	3.01
-3.36	-1.96	1.71	4.80	80.43	-1.11	-7.38
-240,600	-223,009	-183,299	-164,302	-120,895	-285,758	-204,819
199,302	184,197	230,104	151,438	119,356	179,350	189,453
439,902	407,206	413,403	315,740	240,250	465,108	394,273
107	105	104	77	55	116	93

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
-240,600	-223,009	-183,299	-164,302	-120,895	-285,758	-204,819
-108,770	-115,207	-63,576	-60,277	-47,909	-148,612	-87,409
-93,382	-100,906	-48,963	-49,504	-40,141	-131,988	-74,293
-76,021	-83,884	-32,103	-36,805	-31,431	-113,104	-59,016
-64,214	-72,336	-21,066	-28,509	-25,283	-100,348	-48,874
-62,150	-70,377	-19,156	-27,059	-24,258	-98,147	-47,160
-54,857	-63,173	-11,992	-21,796	-20,525	-90,379	-40,812
-46,843	-55,372	-4,229	-16,031	-16,371	-81,730	-33,743
-39,581	-48,370	2,574	-10,837	-12,626	-74,000	-27,501
-32,830	-41,830	9,076	-6,088	-9,210	-66,799	-21,765
-26,405	-35,699	15,201	-1,580	-5,938	-59,762	-16,351
-20,163	-29,866	21,131	2,851	-2,780	-53,126	-10,990
-14,088	-24,000	26,970	7,128	318	-46,677	-5,706
-8,136	-18,168	32,832	11,441	3,457	-40,116	-501
-1,969	-12,152	38,806	15,937	6,619	-33,480	4,861
4,271	-6,089	44,987	20,441	9,867	-26,681	10,381
10,972	448	51,470	25,247	13,271	-19,439	16,223
18,120	7,445	58,404	30,355	16,957	-11,617	22,491
26,110	15,403	66,254	36,070	21,084	-2,884	29,408
35,511	24,676	75,103	42,803	25,866	7,363	37,618
37,575	26,746	77,099	44,308	26,930	9,619	39,476
47,220	36,262	86,305	51,293	31,961	20,094	47,915
64,674	53,160	103,074	63,779	40,847	38,802	63,242
79,459	67,663	117,734	74,517	48,572	54,838	76,347
199,302	184,197	230,104	151,438	119,356	179,350	189,453

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)
200000	200000	200000	200000	200000
-54,228	-46,199	-24,498	-13,611	-450,226
-35,062	-27,996	-15,675	-14,858	-285,481
-34,980	-27,929	-15,605	-14,833	-285,433
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46,986	60,970	39,075	31,869	190,692
2,207,712,322	3,717,387,312	1,526,830,464	1,015,651,230	36,363,597,117
-0.0017	-0.0010	-0.0032	-0.0094	0.0066
2.98	3.01	3.01	2.99	3.01
-1.34	-2.18	-2.49	-2.14	-0.6680
-231,177	-311,688	-182,784	-152,495	-1,188,366
172,503	236,228	165,597	118,347	629,465
403,680	547,916	348,382	270,842	1,817,831
105	136	87	71	426

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)	Total Oceanfront (1-112)	TOTAL-SUM OF INDIVIDUAL
					MINUS Fort Macon	REACHES W/O Fort Macon
-231,177	-311,688	-182,784	-152,495	-1,188,366	-902,608	-3,510,123
-127,207	-147,857	-92,229	-77,425	-657,560	-508,947	-1,646,180
-112,263	-128,292	-79,854	-67,293	-598,211	-466,223	-1,419,162
-95,352	-106,123	-65,808	-55,586	-529,772	-416,668	-1,158,211
-83,769	-91,249	-56,294	-47,826	-483,473	-383,125	-982,490
-81,815	-88,671	-54,627	-46,500	-475,533	-377,386	-952,416
-74,626	-79,242	-48,685	-41,675	-446,567	-356,188	-842,604
-66,824	-69,034	-42,087	-36,338	-414,455	-332,725	-722,581
-59,762	-59,839	-36,159	-31,616	-385,962	-311,962	-614,992
-53,181	-51,253	-30,646	-27,212	-359,063	-292,264	-514,964
-46,975	-43,338	-25,464	-22,949	-333,646	-273,884	-420,460
-40,896	-35,587	-20,528	-18,859	-309,581	-256,455	-328,888
-34,982	-27,929	-15,605	-14,833	-285,434	-238,757	-238,788
-29,082	-20,325	-10,659	-10,862	-261,223	-221,106	-148,853
-23,156	-12,740	-5,688	-6,759	-236,892	-203,413	-56,902
-16,965	-4,623	-533	-2,527	-211,783	-185,103	37,594
-10,475	3,992	4,894	1,914	-185,731	-166,292	137,506
-3,478	13,029	10,646	6,666	-157,460	-145,843	244,778
4,447	23,310	17,111	12,031	-125,390	-122,507	364,979
13,704	35,132	24,700	18,273	-87,930	-95,293	504,843
15,799	37,807	26,416	19,664	-79,555	-89,174	536,407
25,301	50,034	34,291	26,041	-40,927	-61,021	681,059
42,253	72,296	48,493	37,583	28,071	-10,731	941,103
57,069	91,570	60,871	47,345	88,900	34,062	1,166,551
172,503	236,228	165,597	118,347	629,465	450,115	2,962,395

d. 12.0 ft NAVD88 Results

CRYSTAL BALL RESULTS FOR -12 FT

Statistics	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
Trials	200000	200000	200000	200000	200000	200000	200000
Base Case	-97,155	-12,961	-49,187	133	-39,895	-10,753	-1,099
Mean	-96,997	-13,005	-49,210	-63	-39,517	-10,844	-1,201
Median	-96,718	-12,948	-49,397	-125	-39,467	-10,890	-982
Mode	---	---	---	---	---	---	---
Standard Deviation	94,276	27,689	68,292	46,099	183,260	49,364	104,276
Variance	8,887,870,522	766,683,383	4,663,769,500	2,125,142,298	33,584,217,027	2,436,844,504	10,873,414,841
Skewness	-0.0128	-0.0023	0.0091	0.0060	-0.0070	0.0035	-0.0056
Kurtosis	2.98	2.99	3.00	2.98	3.01	3.02	3.00
Coeff. of Variability	-0.9719	-2.13	-1.39	-736.38	-4.64	-4.55	-86.85
Minimum	-514,408	-129,379	-365,159	-203,329	-889,792	-242,790	-467,842
Maximum	320,937	114,431	260,038	228,821	765,021	245,066	444,072
Range Width	835,345	243,809	625,197	432,150	1,654,813	487,856	911,914
Mean Std. Error	211	62	153	103	410	110	233

Percentiles	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
100%	-514,408	-129,379	-365,159	-203,329	-889,792	-242,790	-467,842
97.5%	-282,380	-67,355	-182,994	-90,467	-399,491	-107,688	-205,955
95%	-252,178	-58,637	-161,799	-75,906	-341,112	-91,924	-172,853
90%	-218,166	-48,459	-136,881	-59,247	-274,491	-74,061	-135,063
85%	-195,104	-41,734	-119,877	-47,864	-229,299	-61,838	-109,302
84%	-190,973	-40,612	-117,054	-45,872	-221,407	-59,770	-104,948
80%	-176,526	-36,331	-106,642	-38,861	-193,357	-52,350	-88,863
75%	-160,687	-31,748	-95,091	-31,186	-162,743	-44,113	-71,541
70%	-146,365	-27,565	-85,029	-24,174	-135,186	-36,767	-55,716
65%	-133,200	-23,683	-75,442	-17,769	-110,005	-29,912	-41,084
60%	-120,504	-20,027	-66,554	-11,692	-85,932	-23,328	-27,306
55%	-108,582	-16,473	-57,862	-5,881	-62,346	-17,092	-14,093
50%	-96,718	-12,948	-49,398	-125	-39,468	-10,890	-982
45%	-84,827	-9,459	-40,839	5,617	-16,497	-4,673	12,042
40%	-72,894	-5,993	-32,073	11,459	6,806	1,659	25,252
35%	-60,492	-2,314	-23,119	17,594	31,190	8,234	38,971
30%	-47,475	1,620	-13,503	23,942	56,386	15,085	53,373
25%	-33,229	5,736	-3,292	30,962	84,054	22,408	69,297
20%	-17,482	10,325	8,242	38,679	114,762	30,564	86,345
15%	938	15,707	21,682	47,822	150,456	40,136	106,665
14%	5,044	16,899	24,607	49,811	158,744	42,269	111,500
10%	23,978	22,486	38,409	59,270	195,951	52,420	132,324
5%	57,711	32,482	63,242	76,159	261,659	70,315	170,169
2.5%	87,394	41,013	84,959	90,440	318,668	86,055	202,746
0%	320,937	114,431	260,038	228,821	765,021	245,066	444,072

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
200000	200000	200000	200000	200000	200000	200000
-23,136	-40,561	34,039	6,228	-5,316	-63,897	-8,131
-23,223	-40,514	33,871	6,251	-5,429	-64,026	-8,190
-23,272	-40,472	33,886	6,255	-5,383	-63,976	-8,187
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75,583	59,227	73,560	60,924	38,568	74,373	63,011
5,712,787,703	3,507,887,598	5,411,103,101	3,711,676,819	1,487,510,736	5,531,400,834	3,970,323,544
0.0058	-0.0029	-0.0012	-0.0049	0.0065	-0.0083	-0.0023
2.99	3.00	3.00	2.98	3.03	2.99	3.01
-3.25	-1.46	2.17	9.75	-7.10	-1.16	-7.69
-348,895	-298,309	-324,458	-260,876	-181,343	-445,847	-276,861
324,800	246,524	356,917	297,964	178,672	265,201	255,550
673,695	544,833	681,375	558,840	360,015	711,048	532,412
169	132	164	136	86	166	141

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
-348,895	-298,309	-324,458	-260,876	-181,343	-445,847	-276,861
-170,977	-156,394	-109,959	-113,700	-80,802	-210,134	-131,626
-147,577	-137,928	-87,204	-93,972	-68,713	-186,565	-111,790
-120,327	-116,472	-60,602	-71,775	-54,683	-159,234	-88,859
-101,774	-102,017	-42,511	-56,719	-45,377	-141,139	-73,445
-98,545	-99,454	-39,406	-54,183	-43,819	-138,060	-70,764
-86,915	-90,398	-28,114	-45,118	-37,880	-126,777	-61,150
-74,319	-80,431	-15,823	-34,888	-31,505	-114,149	-50,564
-62,864	-71,639	-4,768	-25,762	-25,733	-102,881	-41,229
-52,355	-63,401	5,623	-17,355	-20,182	-92,679	-32,413
-42,457	-55,536	15,288	-9,206	-15,115	-82,890	-24,046
-32,781	-47,855	24,668	-1,566	-10,203	-73,469	-16,083
-23,272	-40,472	33,886	6,254	-5,384	-63,976	-8,187
-13,591	-32,954	43,177	13,934	-646	-54,449	-283
-4,029	-25,557	52,595	21,773	4,241	-44,970	7,718
5,929	-17,639	62,355	29,779	9,243	-35,200	16,123
16,363	-9,318	72,618	38,310	14,645	-24,817	24,847
27,798	-508	83,503	47,564	20,442	-13,715	34,328
40,456	9,404	95,713	57,710	26,936	-1,315	44,793
55,322	20,920	110,125	69,481	34,497	13,123	57,038
58,583	23,436	113,161	72,081	36,215	16,238	59,931
73,681	35,338	127,974	84,333	43,990	31,082	72,456
101,103	56,728	154,838	106,323	58,020	58,108	95,419
125,127	75,137	177,826	125,499	70,568	81,532	115,121
324,800	246,524	356,917	297,964	178,672	265,201	255,550

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)
200000	200000	200000	200000	200000
-54,228	-46,199	-24,498	-13,611	-450,226
-54,306	-46,420	-24,469	-13,822	-451,114
-54,380	-46,360	-24,709	-13,726	-450,720
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77,965	95,830	47,937	70,663	339,546
6,078,498,600	9,183,381,528	2,297,999,436	4,993,312,896	115,291,731,233
0.0017	-0.0066	0.0033	-2.5786E-04	1.6325E-04
2.99	3.00	2.99	2.98	3.00
-1.44	-2.06	-1.96	-5.11	-0.7527
-380,637	-496,329	-245,897	-334,656	-2,158,851
310,824	405,255	180,832	304,996	1,059,800
691,461	901,584	426,730	639,651	3,218,651
174	214	107	158	759

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)	Total Oceanfront (1-112)	TOTAL-SUM OF INDIVIDUAL
					MINUS Fort Macon	REACHES W/O Fort Macon
-380,637	-496,329	-245,897	-334,656	-2,158,851	-1,713,004	-5,960,961
-207,653	-234,764	-118,371	-152,784	-1,118,071	-907,937	-2,813,360
-182,885	-203,967	-103,375	-130,303	-1,009,735	-823,170	-2,422,123
-154,100	-169,192	-85,795	-104,408	-886,883	-727,649	-1,972,582
-135,207	-145,635	-73,981	-87,255	-803,628	-662,489	-1,668,938
-131,946	-141,598	-71,983	-84,280	-789,440	-651,380	-1,616,614
-120,001	-127,053	-64,696	-73,631	-736,702	-609,925	-1,427,887
-106,890	-110,917	-56,841	-61,616	-680,267	-566,117	-1,220,903
-95,275	-96,587	-49,651	-50,898	-629,433	-526,552	-1,035,208
-84,376	-83,229	-43,064	-40,974	-582,317	-489,638	-862,821
-74,002	-70,695	-36,674	-31,627	-537,061	-454,171	-699,414
-64,002	-58,349	-30,637	-22,548	-494,105	-420,636	-541,686
-54,380	-46,360	-24,709	-13,726	-450,720	-386,745	-386,882
-44,526	-34,541	-18,537	-4,825	-408,086	-353,637	-231,428
-34,550	-22,254	-12,420	4,109	-364,553	-319,582	-74,156
-24,255	-9,393	-6,017	13,298	-319,563	-284,363	89,487
-13,349	3,878	718	23,131	-273,124	-248,307	261,271
-1,778	18,452	7,905	33,880	-221,414	-207,699	447,522
11,322	34,488	15,971	45,761	-165,288	-163,973	653,989
26,466	53,076	25,345	59,644	-99,582	-112,704	895,321
29,896	57,118	27,434	62,645	-84,401	-100,639	949,374
45,719	76,413	37,187	76,768	-16,269	-47,351	1,198,698
73,839	110,776	54,488	102,446	106,315	48,207	1,645,717
98,641	140,769	69,636	124,444	214,178	132,645	2,034,044
310,824	405,255	180,832	304,996	1,059,800	794,599	5,240,720

e. -16.0 ft NAVD88 Results

CRYSTAL BALL RESULTS FOR -16 FT

Statistics	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
Trials	200000	200000	200000	200000	200000	200000	200000
Base Case	-97,155	-12,961	-49,187	133	-39,895	-10,753	-1,099
Mean	-150,327	-22,249	-48,461	-4,688	-134,625	-11,223	18,984
Median	-150,103	-22,233	-48,566	-4,475	-134,450	-11,250	19,082
Mode	---	---	---	---	---	---	---
Standard Deviation	107,726	30,377	72,572	66,288	132,313	52,415	128,147
Variance	11,604,965,771	922,742,482	5,266,678,817	4,394,110,782	17,506,754,809	2,747,353,344	16,421,636,583
Skewness	-0.0165	0.0011	6.1165E-04	-0.0030	-0.0026	6.5397E-04	-0.0020
Kurtosis	3.00	2.98	2.99	3.00	2.99	3.00	3.00
Coeff. of Variability	-0.7166	-1.37	-1.50	-14.14	-0.9828	-4.67	6.75
Minimum	-700,751	-160,681	-407,605	-292,694	-693,209	-252,061	-616,297
Maximum	329,744	110,013	272,884	280,042	496,189	233,715	557,674
Range Width	1,030,495	270,694	680,489	572,736	1,189,398	485,777	1,173,971
Mean Std. Error	241	68	162	148	296	117	287

Percentiles	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
100%	-700,751	-160,681	-407,605	-292,694	-693,209	-252,061	-616,297
97.5%	-362,118	-81,703	-190,564	-134,805	-394,364	-114,092	-232,918
95%	-327,617	-72,393	-167,935	-113,982	-352,189	-97,388	-191,950
90%	-288,472	-61,289	-141,639	-89,522	-304,258	-78,486	-145,488
85%	-262,367	-53,815	-123,661	-73,169	-271,931	-65,545	-113,674
84%	-257,763	-52,553	-120,632	-70,403	-266,422	-63,237	-108,340
80%	-240,962	-47,933	-109,493	-60,279	-246,190	-55,286	-88,830
75%	-223,044	-42,779	-97,310	-49,505	-223,903	-46,584	-67,252
70%	-206,772	-38,191	-86,389	-39,580	-204,179	-38,674	-48,125
65%	-191,591	-33,962	-76,318	-30,313	-185,730	-31,421	-30,178
60%	-177,082	-29,950	-66,924	-21,530	-168,174	-24,524	-13,208
55%	-163,414	-26,060	-57,728	-13,033	-151,355	-17,825	3,089
50%	-150,104	-22,234	-48,566	-4,475	-134,450	-11,250	19,080
45%	-136,475	-18,395	-39,441	3,771	-117,901	-4,635	34,929
40%	-122,724	-14,503	-30,316	12,218	-100,800	1,970	51,250
35%	-108,494	-10,446	-20,518	20,980	-83,434	8,981	68,145
30%	-93,677	-6,251	-10,529	30,136	-65,166	16,335	85,999
25%	-77,474	-1,754	496	40,016	-45,323	24,221	105,352
20%	-59,681	3,299	12,611	50,923	-22,995	32,922	126,668
15%	-38,695	9,211	26,848	63,851	2,732	43,108	151,597
14%	-33,962	10,563	30,180	66,786	8,301	45,352	157,509
10%	-12,388	16,723	44,731	80,198	34,777	56,094	183,491
5%	26,778	27,718	71,209	104,524	82,365	74,835	229,893
2.5%	59,733	37,293	94,158	125,310	125,272	91,208	269,794
0%	329,744	110,013	272,884	280,042	496,189	233,715	557,674

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
200000	200000	200000	200000	200000	200000	200000
-23,136	-40,561	34,039	6,228	-5,316	-63,897	-8,131
-12,372	-73,671	45,242	7,261	-3,045	-14,592	-25,327
-12,302	-73,943	45,036	7,218	-3,004	-14,820	-25,397
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40,762	69,328	101,426	78,594	48,764	182,601	69,013
1,661,563,806	4,806,335,566	10,287,219,379	6,177,083,606	2,377,975,811	33,342,972,061	4,762,781,010
-0.0026	0.0085	0.0053	0.0100	0.0013	-0.0048	0.0057
3.02	3.00	3.00	2.99	2.99	2.98	2.99
-3.29	-0.9411	2.24	10.82	-16.01	-12.51	-2.72
-197,655	-368,337	-365,670	-316,081	-235,509	-945,335	-375,005
170,324	229,543	498,925	385,136	208,992	767,993	293,212
367,979	597,879	864,595	701,217	444,501	1,713,328	668,217
91	155	227	176	109	408	154

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
-197,655	-368,337	-365,670	-316,081	-235,509	-945,335	-375,005
-92,299	-209,674	-153,270	-146,369	-98,374	-373,001	-160,714
-79,290	-187,852	-121,165	-122,173	-83,114	-315,120	-138,905
-64,481	-162,662	-84,484	-93,269	-65,650	-248,491	-113,876
-54,613	-145,499	-60,011	-74,144	-53,734	-203,450	-96,690
-52,898	-142,525	-55,697	-70,942	-51,705	-195,840	-93,934
-46,585	-131,793	-40,353	-59,121	-44,242	-168,325	-83,485
-39,855	-120,156	-23,345	-45,770	-35,997	-137,987	-71,889
-33,708	-109,913	-8,058	-34,060	-28,574	-110,321	-61,353
-28,121	-100,475	6,043	-22,971	-21,922	-85,314	-51,838
-22,745	-91,434	19,403	-12,590	-15,439	-60,927	-42,811
-17,449	-82,695	32,406	-2,616	-9,230	-37,700	-34,011
-12,302	-73,944	45,035	7,218	-3,004	-14,821	-25,398
-7,173	-65,042	57,706	17,068	3,091	8,240	-16,663
-2,012	-56,203	70,760	26,967	9,322	31,230	-7,868
3,338	-46,993	84,261	37,434	15,810	55,703	1,174
9,027	-37,243	98,459	48,392	22,611	81,057	10,887
15,079	-26,923	113,737	60,048	29,828	108,515	21,166
21,859	-15,331	130,632	73,481	37,943	139,568	32,440
29,744	-1,892	150,458	88,647	47,538	175,633	46,025
31,588	1,139	154,958	92,113	49,714	183,717	49,013
39,673	15,138	175,313	108,074	59,466	220,287	63,277
54,614	40,382	212,167	136,783	77,193	286,239	88,532
67,654	62,295	244,466	161,989	92,721	343,186	110,445
170,324	229,543	498,925	385,136	208,992	767,993	293,212

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)
200000	200000	200000	200000	200000
-54,228	-46,199	-24,498	-13,611	-450,226
-35,515	-85,212	-32,367	-12,106	-594,293
-35,559	-85,297	-32,204	-12,094	-594,887
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64,771	101,616	53,157	98,132	386,517
4,195,233,240	10,325,902,178	2,825,653,985	9,629,807,369	149,395,117,313
0.0048	-0.0045	0.0047	0.0016	-0.0050
2.99	3.02	3.00	2.99	3.00
-1.82	-1.19	-1.64	-8.11	-0.6504
-337,358	-551,720	-255,592	-478,154	-2,502,605
285,003	363,557	215,373	427,915	1,279,158
622,362	915,277	470,965	906,069	3,781,762
145	227	119	219	864

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)	Total Oceanfront (1-112)	TOTAL-SUM OF INDIVIDUAL
					MINUS Fort Macon	REACHES W/O Fort Macon
-337,358	-551,720	-255,592	-478,154	-2,502,605	-1,557,270	-6,604,379
-162,010	-285,289	-136,499	-203,739	-1,352,186	-979,185	-3,158,802
-142,091	-252,568	-119,702	-172,999	-1,231,767	-916,646	-2,743,314
-118,755	-215,059	-100,416	-138,093	-1,089,576	-841,084	-2,265,899
-102,841	-190,100	-87,547	-114,283	-993,995	-790,545	-1,943,624
-100,138	-186,003	-85,250	-110,065	-978,336	-782,496	-1,888,507
-90,142	-170,478	-77,131	-95,223	-919,260	-750,936	-1,687,527
-79,261	-153,713	-68,352	-78,636	-854,976	-716,989	-1,467,351
-69,570	-138,414	-60,355	-63,571	-796,670	-686,348	-1,269,485
-60,461	-124,068	-52,988	-49,959	-742,073	-656,758	-1,086,272
-52,013	-110,888	-45,835	-37,127	-692,070	-631,143	-912,872
-43,816	-98,002	-38,963	-24,380	-642,607	-604,907	-745,081
-35,560	-85,297	-32,204	-12,095	-594,889	-580,068	-579,551
-27,308	-72,535	-25,580	172	-546,447	-554,687	-414,411
-19,022	-59,674	-18,765	12,985	-496,574	-527,804	-246,415
-10,495	-46,045	-11,805	25,877	-444,992	-500,695	-72,227
-1,642	-31,743	-4,445	39,576	-391,765	-472,823	110,725
8,165	-16,680	3,463	54,117	-333,477	-441,993	307,534
19,124	261	12,337	70,556	-269,211	-408,779	527,048
31,630	20,062	22,605	89,566	-192,770	-368,403	783,034
34,370	24,558	24,917	93,951	-175,674	-359,391	841,049
47,518	45,106	35,677	113,469	-99,295	-319,582	1,106,338
70,996	81,838	55,149	149,331	40,106	-246,133	1,584,307
91,556	113,984	71,674	180,576	162,548	-180,637	2,000,131
285,003	363,557	215,373	427,915	1,279,158	511,165	5,358,240

f. -20.0 ft NAVD88 Results

CRYSTAL BALL RESULTS FOR -20 FT

Statistics	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
Trials	200000	200000	200000	200000	200000	200000	200000
Base Case	-97,155	-12,961	-49,187	133	-39,895	-10,753	-1,099
Mean	-128,493	-19,343	-32,717	-2,990	-163,378	1,773	54,312
Median	-128,398	-19,430	-32,756	-2,924	-163,225	1,712	54,149
Mode	---	---	---	---	---	---	---
Standard Deviation	153,422	54,563	128,722	91,406	159,553	59,693	162,295
Variance	23,538,319,844	2,977,169,771	16,569,333,113	8,355,115,714	25,457,081,765	3,563,304,708	26,339,537,116
Skewness	8.6258E-04	0.0037	0.0085	-0.0058	0.0040	0.0026	-0.0025
Kurtosis	3.00	3.00	2.97	3.01	3.00	2.99	3.00
Coeff. of Variability	-1.19	-2.82	-3.93	-30.57	-0.9766	33.67	2.99
Minimum	-876,165	-251,040	-607,971	-452,784	-882,568	-256,313	-683,104
Maximum	559,879	242,123	576,180	399,653	563,483	278,487	704,242
Range Width	1,436,043	493,163	1,184,151	852,437	1,446,051	534,800	1,387,346
Mean Std. Error	343	122	288	204	357	133	363

Percentiles	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
100%	-876,165	-251,040	-607,971	-452,784	-882,568	-256,313	-683,104
97.5%	-429,179	-126,610	-284,334	-182,552	-475,302	-114,997	-263,837
95%	-380,769	-109,440	-244,496	-153,665	-425,930	-96,142	-212,244
90%	-325,593	-89,296	-197,661	-120,375	-368,231	-74,845	-153,121
85%	-287,573	-75,783	-166,402	-97,457	-328,654	-60,044	-113,200
84%	-280,976	-73,486	-161,107	-93,444	-321,904	-57,514	-106,715
80%	-257,622	-65,114	-141,429	-79,416	-297,931	-48,555	-82,066
75%	-231,953	-56,100	-120,015	-64,314	-271,209	-38,653	-55,080
70%	-208,817	-47,920	-100,771	-50,793	-247,068	-29,756	-30,678
65%	-187,417	-40,305	-82,781	-38,073	-224,969	-21,346	-8,559
60%	-167,322	-33,076	-65,492	-26,080	-203,977	-13,410	12,761
55%	-147,647	-26,197	-48,910	-14,413	-183,425	-5,738	33,715
50%	-128,399	-19,431	-32,756	-2,924	-163,229	1,711	54,148
45%	-109,174	-12,577	-16,543	8,500	-143,139	9,267	74,567
40%	-89,686	-5,582	-225	20,100	-122,775	16,831	95,074
35%	-69,316	1,592	16,716	32,267	-101,958	24,790	116,666
30%	-48,080	9,129	34,807	45,016	-79,871	33,053	139,246
25%	-25,226	17,293	54,184	58,619	-56,198	42,186	163,607
20%	351	26,434	75,825	73,924	-29,249	52,054	191,308
15%	30,662	37,216	100,997	91,614	1,736	63,708	222,792
14%	37,289	39,557	106,694	95,776	8,759	66,410	229,987
10%	68,208	50,630	132,747	113,962	40,622	78,364	262,874
5%	123,476	70,578	179,772	147,262	99,969	99,965	320,740
2.5%	171,607	87,864	219,862	175,788	150,857	119,046	372,269
0%	559,879	242,123	576,180	399,653	563,483	278,487	704,242

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
200000	200000	200000	200000	200000	200000	200000
-23,136	-40,561	34,039	6,228	-5,316	-63,897	-8,131
7,060	-20,915	79,476	19,983	1,298	-16,338	-10,037
7,201	-20,699	79,421	19,898	1,273	-16,121	-9,784
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50,600	123,341	101,860	50,661	70,615	184,257	95,544
2,560,328,287	15,213,035,607	10,375,432,655	2,566,554,332	4,986,445,173	33,950,480,744	9,128,699,713
-0.0128	0.0097	0.0092	0.0043	0.0032	-0.0029	-0.0100
3.01	3.00	3.00	3.00	3.01	3.01	2.99
7.17	-5.90	1.28	2.54	54.40	-11.28	-9.52
-256,578	-663,768	-363,154	-191,640	-346,527	-809,401	-465,148
245,753	541,696	613,211	252,519	322,276	794,565	390,924
502,331	1,205,464	976,365	444,159	668,803	1,603,966	856,072
113	276	228	113	158	412	214

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
-256,578	-663,768	-363,154	-191,640	-346,527	-809,401	-465,148
-92,546	-262,504	-119,201	-79,090	-137,117	-378,558	-198,229
-76,169	-223,759	-87,441	-63,280	-114,955	-319,760	-167,815
-57,727	-179,141	-51,016	-44,894	-89,304	-252,491	-132,726
-45,425	-148,879	-26,189	-32,517	-72,002	-207,081	-109,181
-43,363	-143,540	-21,837	-30,408	-68,937	-199,401	-105,065
-35,554	-124,871	-6,230	-22,762	-58,134	-171,066	-90,396
-26,999	-104,367	10,692	-14,305	-46,333	-140,245	-74,410
-19,409	-85,905	26,047	-6,549	-35,790	-112,426	-60,082
-12,360	-68,584	40,081	445	-25,866	-86,764	-46,800
-5,603	-52,301	53,551	7,122	-16,449	-62,390	-34,277
860	-36,315	66,612	13,518	-7,425	-39,022	-21,862
7,201	-20,702	79,421	19,898	1,273	-16,123	-9,784
13,466	-5,480	92,076	26,327	10,225	6,983	2,261
20,110	10,008	105,110	32,821	19,252	30,342	14,471
26,661	26,284	118,605	39,595	28,515	54,361	27,014
33,657	43,466	132,683	46,545	38,286	79,829	40,367
41,164	62,224	147,810	54,093	48,918	107,301	54,592
49,550	82,790	165,119	62,556	60,606	138,164	70,446
59,500	107,151	184,950	72,496	74,237	174,347	89,064
61,734	112,395	189,492	74,638	77,327	182,530	93,229
71,823	137,223	210,001	84,975	91,567	219,990	112,303
90,177	182,318	247,964	103,495	117,598	286,618	146,695
105,929	220,390	279,781	119,179	140,076	344,285	175,908
245,753	541,696	613,211	252,519	322,276	794,565	390,924

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)
200000	200000	200000	200000	200000
-54,228	-46,199	-24,498	-13,611	-450,226
-19,593	-88,370	-12,749	-11,014	-362,036
-19,498	-88,548	-12,894	-11,182	-361,510
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125,212	136,098	90,391	112,174	489,507
15,678,107,765	18,522,670,742	8,170,543,823	12,583,035,986	239,617,320,379
-3.2844E-05	0.0048	-7.8241E-05	8.7656E-04	-0.0093
2.99	2.99	3.00	3.00	2.98
-6.39	-1.54	-7.09	-10.19	-1.35
-534,731	-654,397	-400,822	-511,929	-2,674,902
524,920	519,781	411,593	498,167	1,828,626
1,059,651	1,174,178	812,415	1,010,096	4,503,528
280	304	202	251	1,095

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)	Total Oceanfront (1-112) MINUS Fort Macon	TOTAL-SUM OF INDIVIDUAL REACHES W/O Fort Macon
-534,731	-654,397	-400,822	-511,929	-2,674,902	-1,865,501	-8,398,640
-264,860	-354,819	-189,739	-231,571	-1,320,678	-942,120	-3,806,486
-225,476	-312,433	-160,990	-195,421	-1,167,831	-848,070	-3,250,424
-180,507	-263,227	-128,429	-154,563	-992,327	-739,837	-2,610,657
-149,117	-229,796	-106,537	-126,926	-869,465	-662,383	-2,175,681
-143,916	-223,919	-102,568	-122,343	-848,434	-649,033	-2,101,041
-125,090	-202,849	-88,920	-105,399	-774,001	-602,935	-1,832,337
-104,225	-180,114	-73,769	-86,843	-693,494	-553,250	-1,537,996
-85,360	-159,745	-60,116	-69,897	-619,480	-507,054	-1,272,609
-67,935	-140,974	-47,746	-54,166	-550,878	-464,114	-1,027,355
-51,405	-122,957	-35,905	-39,349	-486,523	-424,133	-794,170
-35,342	-105,622	-24,312	-25,128	-423,936	-384,914	-567,630
-19,498	-88,549	-12,895	-11,184	-361,511	-345,388	-345,698
-3,649	-71,196	-1,499	3,002	-299,145	-306,128	-123,564
12,180	-53,774	10,131	17,221	-235,025	-265,366	101,266
28,957	-35,926	21,991	32,083	-171,075	-225,436	334,535
46,397	-16,650	34,536	47,975	-102,572	-182,401	580,563
65,116	3,611	48,194	64,637	-29,805	-137,106	844,824
85,738	26,006	63,411	83,485	51,119	-87,045	1,140,356
109,678	52,742	81,060	105,218	145,915	-28,432	1,484,822
115,237	58,591	85,191	110,055	166,815	-15,714	1,562,359
140,555	86,010	103,487	132,518	264,780	44,790	1,917,870
186,895	135,482	136,198	173,457	441,308	154,691	2,562,041
226,229	178,241	164,409	208,754	595,074	250,789	3,116,190
524,920	519,781	411,593	498,167	1,828,626	1,034,061	7,644,885

g. -30.0 ft NAVD88 Results

CRYSTAL BALL RESULTS FOR -30 FT

Statistics	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
Trials	200000	200000	200000	200000	200000	200000	200000
Base Case	-97,155	-12,961	-49,187	133	-39,895	-10,753	-1,099
Mean	10,711	-7,602	-120,572	32,504	-140,725	20,267	61,550
Median	10,718	-7,569	-120,688	32,072	-140,746	20,194	61,836
Mode	---	---	---	---	---	---	---
Standard Deviation	214,138	67,193	471,315	343,757	159,642	82,158	177,681
Variance	45,855,290,533	4,514,858,431	222,138,252,975	118,168,988,941	25,485,679,951	6,749,856,238	31,570,615,153
Skewness	-0.0039	-0.0024	-0.0027	0.0057	-0.0043	0.0025	-7.4034E-04
Kurtosis	3.01	3.00	3.02	3.02	3.02	3.00	2.99
Coeff. of Variability	19.99	-8.84	-3.91	10.58	-1.13	4.05	2.89
Minimum	-970,771	-321,853	-2,450,211	-1,546,803	-878,621	-360,736	-690,326
Maximum	1,033,113	288,183	2,019,823	1,483,526	631,940	374,483	910,105
Range Width	2,003,884	610,036	4,470,033	3,030,330	1,510,561	735,219	1,600,431
Mean Std. Error	479	150	1,054	769	357	184	397

Percentiles	Atlantic Beach-Central (82-96) No 90	Atlantic Beach-Circle (90)	Atlantic Beach-East (97-102)	Atlantic Beach-West (77-81)	Bogue Inlet-Ocean (1-8)	Emerald Isle-Central-East (33-36)	Emerald Isle-Central-West (26-32)
100%	-970,771	-321,853	-2,450,211	-1,546,803	-878,621	-360,736	-690,326
97.5%	-408,875	-138,925	-1,045,781	-640,017	-453,739	-140,869	-287,250
95%	-341,749	-118,353	-897,935	-531,478	-403,486	-115,084	-231,090
90%	-263,566	-93,649	-723,741	-406,946	-345,459	-85,043	-166,598
85%	-210,790	-77,341	-608,179	-322,681	-306,413	-64,747	-122,881
84%	-201,902	-74,515	-588,209	-308,740	-299,641	-61,361	-115,296
80%	-168,899	-64,434	-516,705	-256,128	-275,055	-48,945	-88,029
75%	-133,253	-53,031	-437,065	-199,571	-248,219	-34,969	-58,151
70%	-101,371	-42,901	-366,968	-147,934	-224,535	-22,884	-31,424
65%	-71,979	-33,551	-301,561	-100,193	-201,853	-11,361	-7,169
60%	-43,913	-24,606	-239,391	-55,001	-180,796	-376	16,531
55%	-16,653	-16,031	-179,070	-11,202	-160,766	10,039	39,392
50%	10,717	-7,569	-120,695	32,070	-140,747	20,193	61,836
45%	37,592	925	-61,269	74,988	-120,673	30,461	83,962
40%	64,990	9,419	-1,266	118,403	-100,424	41,047	106,698
35%	93,384	18,402	61,073	164,110	-79,038	51,865	129,889
30%	123,504	27,852	127,064	212,259	-57,128	63,278	154,583
25%	155,018	37,969	196,659	263,952	-32,918	75,551	181,495
20%	190,922	49,050	275,331	321,738	-5,995	89,321	210,820
15%	233,139	62,001	367,033	388,048	24,691	105,218	245,497
14%	242,382	64,881	387,547	403,377	31,636	108,943	253,373
10%	285,126	78,512	482,828	473,302	63,254	125,468	289,467
5%	362,598	102,899	653,818	598,668	121,386	155,772	354,613
2.5%	429,509	123,822	802,198	708,021	171,984	181,302	409,952
0%	1,033,113	288,183	2,019,823	1,483,526	631,940	374,483	910,105

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
200000	200000	200000	200000	200000	200000	200000
-23,136	-40,561	34,039	6,228	-5,316	-63,897	-8,131
14,941	-12,175	104,318	31,486	2,160	-123,278	46,864
15,006	-12,404	104,489	31,411	2,110	-122,365	46,471
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57,756	152,836	120,686	46,865	86,580	1,255,831	293,544
3,335,769,920	23,358,888,483	14,565,193,090	2,196,344,185	7,496,070,752	1,577,112,143,149	86,168,159,911
0.0010	0.0038	-0.0015	0.0072	0.0034	0.0011	-0.0035
3.01	2.99	3.00	2.99	3.00	3.01	3.00
3.87	-12.55	1.16	1.49	40.08	-10.19	6.26
-263,241	-685,973	-455,212	-174,405	-382,215	-5,884,080	-1,403,039
271,397	740,935	623,316	257,213	400,414	5,608,992	1,473,537
534,637	1,426,908	1,078,528	431,619	782,629	11,493,072	2,876,576
129	342	270	105	194	2,808	656

Emerald Isle-East-East (45-48)	Emerald Isle-East-West (37-44)	Emerald Isle-West-Central (12-22)	Emerald Isle-West-East (23-25)	Emerald Isle-West-West (9-11)	Fort Macon State Park (103-112)	Indian Beach-Salter Path-East (53-58)
-263,241	-685,973	-455,212	-174,405	-382,215	-5,884,080	-1,403,039
-98,796	-310,950	-130,747	-59,832	-167,535	-2,587,491	-528,592
-80,006	-263,373	-93,794	-45,247	-140,076	-2,193,079	-435,309
-59,168	-208,501	-50,364	-28,604	-108,655	-1,732,932	-328,872
-44,958	-170,516	-20,985	-17,215	-87,517	-1,427,329	-257,716
-42,565	-164,069	-16,036	-15,243	-83,832	-1,374,577	-245,463
-33,676	-140,470	2,594	-8,112	-70,622	-1,182,508	-199,965
-23,997	-115,378	22,473	-251	-56,253	-968,830	-151,768
-15,294	-92,625	40,678	6,774	-43,292	-781,777	-107,374
-7,288	-71,251	57,664	13,285	-31,348	-603,449	-65,948
440	-50,985	73,548	19,482	-20,003	-437,954	-27,039
7,803	-31,582	89,128	25,560	-8,742	-279,172	10,097
15,006	-12,405	104,488	31,411	2,110	-122,367	46,469
22,188	6,867	119,796	37,310	13,094	37,694	83,451
29,492	26,404	135,037	43,279	24,030	196,607	121,500
37,144	46,761	150,695	49,566	35,434	360,433	159,949
45,181	67,864	167,595	56,218	47,410	532,525	201,150
54,031	90,960	185,850	63,145	60,558	720,497	244,760
63,583	116,539	206,159	71,058	75,094	930,106	294,202
74,628	146,551	229,256	80,194	92,138	1,175,884	351,391
77,238	153,452	234,502	82,233	95,989	1,231,823	364,284
88,827	184,099	258,648	91,591	113,363	1,486,767	423,663
109,654	239,512	303,084	108,578	144,508	1,940,437	528,256
128,243	287,127	341,288	123,405	171,239	2,337,207	623,054
271,397	740,935	623,316	257,213	400,414	5,608,992	1,473,537

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)
200000	200000	200000	200000	200000
-54,228	-46,199	-24,498	-13,611	-450,226
24,756	-33,584	69,964	114,742	96,328
24,926	-33,469	70,109	114,818	99,239
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166,036	153,033	162,763	162,458	1,505,560
27,567,997,866	23,419,189,408	26,491,687,825	26,392,556,314	2,266,712,246,082
0.0061	-0.0042	-0.0103	-0.0010	-0.0028
2.98	2.99	3.01	2.97	3.01
6.71	-4.56	2.33	1.42	15.63
-758,864	-676,229	-672,405	-604,525	-6,720,296
836,157	705,829	800,042	796,284	7,674,470
1,595,021	1,382,058	1,472,447	1,400,810	14,394,766
371	342	364	363	3,367

Indian Beach-Salter Path-West (49-52)	Pine Knoll Shores-East-East (71-76)	Pine Knoll Shores-East-West (66-70)	Pine Knoll Shores-West (59-65)	Total Oceanfront (1-112)	Total Oceanfront (1-112)	TOTAL-SUM OF INDIVIDUAL
					MINUS Fort Macon	REACHES W/O Fort Macon
-758,864	-676,229	-672,405	-604,525	-6,720,296	-836,216	-13,295,428
-299,954	-334,427	-248,942	-203,472	-2,863,414	-275,923	-5,498,704
-248,127	-285,356	-197,268	-152,551	-2,394,521	-201,442	-4,580,284
-187,992	-229,056	-138,326	-93,841	-1,834,238	-101,307	-3,518,378
-147,219	-192,209	-99,017	-53,376	-1,463,471	-36,142	-2,803,760
-140,484	-185,584	-92,280	-46,815	-1,400,209	-25,632	-2,682,036
-115,263	-162,551	-67,440	-22,507	-1,169,907	12,601	-2,236,207
-88,257	-137,193	-39,701	4,411	-913,765	55,065	-1,750,173
-63,272	-113,979	-15,221	29,126	-686,597	95,180	-1,312,494
-39,849	-92,783	7,432	51,727	-478,429	125,020	-906,026
-17,619	-72,598	29,012	73,236	-280,928	157,026	-520,079
4,041	-52,750	49,865	94,526	-90,568	188,604	-146,344
24,925	-33,470	70,108	114,818	99,187	221,554	219,265
45,801	-14,348	90,644	135,346	286,935	249,242	586,135
67,276	5,122	111,375	156,449	476,387	279,779	958,831
88,794	25,725	132,722	177,794	672,508	312,075	1,344,269
111,940	46,744	155,552	200,310	882,545	350,020	1,751,377
137,211	69,736	179,872	225,036	1,110,358	389,861	2,188,884
164,555	95,397	207,288	251,970	1,363,027	432,921	2,677,031
196,941	125,181	238,798	283,192	1,656,020	480,135	3,243,898
203,708	131,899	245,631	290,127	1,719,639	487,816	3,371,201
237,562	162,402	278,195	322,878	2,019,903	533,135	3,959,185
298,232	218,489	337,246	381,784	2,571,188	630,750	5,019,096
351,320	266,765	388,346	433,039	3,041,277	704,070	5,940,613
836,157	705,829	800,042	796,284	7,674,470	2,065,478	13,646,298