Montauk to Nantucket Shoals - 30m Bathymetric Grid
March 31 2014

Prepared for:
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1. INTRODUCTION

Bathymetry data is used by the maritime community to support navigation safety, ocean planning, renewable energy development, scientific research and fisheries management. This data product is composed of over 200 surveys that were collected in the northeast United States since 1887 principally for the purpose of navigation safety. This product includes only historic point soundings collected prior to the established use of multi-beam survey methods by the NOAA Office of Coast Survey.

2. PURPOSE

To support coastal and ocean planning and other activities pursuant to the Coastal Zone Management Act, Energy Policy Act, Magnuson-Stevens Fishery Conservation and Management Act, National Environmental Policy Act, Rivers and Harbors Act and the Submerged Lands Act.

3. SOURCES AND AUTHORITIES

- Executive Order 13547 – Stewardship of the Ocean, Our Coasts, and the Great Lakes
- National Oceanic and Atmospheric Administration, Office of Coast Survey
- http://surveys.ngdc.noaa.gov/mgg/NOS/coast/
- http://maps.ngdc.noaa.gov/arcgis/rest/services/web_mercator/nos_hydro_dynamic/MapServer/0
- Please see the Appendix for a complete listing of hydrographic survey registry identifiers

4. DATABASE DESIGN AND CONTENT

Native storage format: ArcGIS File GeoDatabase Raster Dataset

Columns and Rows: 8558, 6000
Number of Bands: 1
Cell Size: 30, 30
Pixel Type: floating point
Pixel Depth: 32 bit
Size: 267 MB

Name of raster data set: MontaukToNantucketShoals_30m

Range of valid values: 0 to -206.75m

Total Number of Unique Features: 51,348,000

5. SPATIAL REPRESENTATION

Geometry Type: raster

Reference System: Projected Coordinate Reference System
Horizontal Datum: NAD_1983_UTM_Zone_19N
Ellipsoid: GRS 80

XY Resolution: 0.000000001
Tolerance: 0.000000008983153

Vertical Datum: Principally MLLW. No changes were made to the original vertical datum to account for small variations in source datum use, nor to account for different epochs. Please see original survey Descriptive Reports for additional documentation related to source data management.

Geographic extent: northing 4454014.6055 to 4634014.6053, easting 244282.2692 to 501022.2692

ISO 19115 Topic Category: environment, oceans, elevation

Place Names:
Atlantic, Block Island Sound, Buzzards Bay, Cape Cod Bay, Connecticut, Long Island Sound, Massachusetts, Montauk Point, Nantucket Shoals, Nantucket Sound, Narragansett Bay, New York, Rhode Island, Rhode Island Sound, United States, Vineyard Sound

Recommended Cartographic Properties: (Using ArcGIS methods and nomenclature)

Generate a 30m hill-shade raster using the bathymetric raster as source, set Z factor to 2, and set symbology stretch type to a Minimum and Maximum and use a blue range palette. Place the hill-shade beneath the bathymetry raster and make the following settings to the bathymetric raster. Transparency 60%, classified renderer with 2m ranges and 30 entries beginning at ‘0’, light to dark blue palette.

Scale range for optimal visualization: 80,000 to 1,000,000.

6. DATA PROCESSING

Processing environment: ArcGIS 10.2, Windows 7 Professional, Intel Core i7 CPU

	Process Step Description
1	Develop a GEODAS survey index feature class using source material provided by the NGDC web service
2	Extract GEODAS files from NGDC archive, reformat and load into File GeoDatabase
3	Determine MEAN NEAR DISTANCE (average point spacing) and END_YEAR for each survey
4	Delineate the outline for each survey using a TIN and TINDELINEATEAREA function with a TIN edge setting 4 times the MEAN NEAR DISTANCE; BUFFER by 10m
5	Group all surveys by year, group all survey indexes by year
6	Remove outdated or super-ceded soundings through a series of ERASE functions on each survey year using the survey index masks for all newer years
7	MERGE all filtered survey year files and clip to collection area
8	Generate an interpolated surface using the SPLINE function with a Tension Weight of 0.1, and a neighborhood sample count of 12. Used ArcMap interactive edit tools to remove out of range values from the mass points feature class through visual inspection at scales ranging from 1:5,000 to 1:80,000
9	Generate new interpolated surface using edited mass point feature class, the SPLINE function with a Tension Weight of 0.1, and a neighborhood sample count of 12
10	Visual inspection of all features in combination with original feature point locations and Raster Navigational Charts

7. QUALITY PROCESS

Attribute Accuracy: Original content was acquired from authorized and verified sources – no new testing was done to cross reference or confirm otherwise the field or geometry values. Only values below sea level, those with negative values, should be considered valid. Positive values exist in the upland area as a result of the interpolation process only, none of those values have been removed and are intended to be masked or erased with a shoreline boundary compatible with the intended use the bathymetry.

Logical Consistency: Tested through visual inspection of the geometry at an average scale of 1:10,000 and through the analysis of summary statistics on field values.

Completeness: All known records acquired from the NOAA National Geophysical Data Center.

Positional Accuracy: Intended for use at an average scale not to exceed 1:80,000. Position values are determined using various methods and have been transposed several times prior to final publishing.

Timeliness: Observed conditions between 1887 and 2004. No updates are planned for this data set.

Use restrictions: Not for navigation.

APPENDIX 1: Hydrographic Survey Registration Identification Codes for source data

SURVEYID	FREQUENCY	MEAN POINT DISTANCE(m)	END YEAR
H01802	17537	63.98	1887
H01948	24717	54.55	1889
H05141	13963	52.62	1931
H05227	4995	134.27	1932
H05249	3335	125.46	1932
H05274	11392	300.68	1932
H05275	8213	420.41	1932
H05276	2755	364.71	1932
H05325	11705	69.55	1933
H05326	5946	13.75	1933
H05344	9608	66.23	1933
H05401	10737	45.22	1933
H05515	11965	77.23	1934
H05516	5284	28.43	1934
H05543	28076	58.28	1934
H05554	5322	22.18	1934
H05588	11082	72.11	1934
H05589	17035	19.88	1934
H05621	10037	13.29	1934
H05629	4791	23.80	1934
H05553	4344	50.94	1935
H05622	10865	45.98	1935
H05628	7451	17.11	1935
H05630	11678	35.04	1935
H05880	17216	31.66	1935
H05882	9934	33.44	1935
H05883	6619	34.14	1935
H05881	6807	15.40	1936
H06329	7223	203.43	1938
H06330	8574	131.04	1938
H06331	15461	271.21	1938
H06347	12357	339.31	1938
H06348	11739	19.89	1938
H06439	23573	152.87	1939
H06440	15545	327.88	1939
H06441	20353	316.02	1939
H06442	7668	31.75	1939
H06443	12964	134.36	1939
H06444	12103	137.01	1939
H06445	17654	131.92	1939
H06446	13064	149.14	1939
H06447	13438	285.39	1939
H06470	23176	32.21	1939
H06471	17987	32.49	1939

H06472	17473	32.67	1939
H06473	11415	32.15	1939
H06528	1032	20.56	1939
H06531	18310	37.35	1939
H06532	2556	62.23	1939
H06534	14310	65.75	1939
H06558	13074	114.18	1940
H06559	57983	80.26	1940
H06561	7013	41.07	1940
H06562	5142	46.10	1940
H06563	14254	132.48	1940
H06712	9900	73.57	1940
H06713	20953	76.66	1940
H06714	4546	83.99	1940
H06659	9983	161.24	1941
H06668	756	6.57	1941
H06349	6379	36.79	1942
H06350	10195	61.38	1942
H06468	10015	28.44	1942
H06469	25120	25.62	1942
H06533	19095	62.22	1942
H06742	4422	72.40	1942
H06828	1781	11.35	1943
H06859	12658	36.42	1943
H06970	12162	32.95	1944
H07640	20014	28.94	1948
H07790	4310	44.56	1949
H07939	2058	25.42	1951
H08111	4390	36.21	1953
H08170	22228	13.49	1954
H08207	3368	29.73	1955
H08172	29858	81.64	1956
H08313	20107	32.99	1956
H08314	18667	32.39	1956
H08316	12838	14.07	1956
H08348	11323	30.60	1956
H08349	12515	45.87	1956
H08350	4413	213.49	1956
H08367	23139	33.26	1957
H08394	10754	18.80	1957
H08395	11384	37.88	1957
H08396	11336	34.48	1957
H08409	37804	93.33	1957
H08315	7763	61.71	1958
H08449	18971	32.83	1958
H08450	26956	77.76	1958
H08484	11380	63.57	1959
H08497	19518	37.04	1959
H08503	4293	129.18	1959
H08171	39591	73.12	1960

H08599	13468	170.46	1961
H08600	11035	201.10	1961
H08601	14305	175.80	1961
H08602	23399	70.70	1961
H08603	12180	77.77	1961
H08615	18025	40.22	1961
H08631	32454	35.92	1961
H08397	10373	33.82	1962
H08616	13039	46.73	1962
H08708	12461	36.68	1962
H08709	11631	82.61	1962
H08366	16648	35.56	1963
H08760	13003	48.02	1963
H08824	29355	50.57	1963
H08761	28962	47.81	1964
H08820	21735	37.80	1964
H08821	16850	47.73	1964
H08845	13010	43.36	1965
H08846	21591	56.91	1965
H08847	6276	87.34	1965
H08902	11557	42.98	1966
H08903	12336	43.44	1966
H08904	3057	48.95	1966
H08905	8511	99.54	1966
H08908	18197	37.33	1966
H08926	16014	33.26	1968
H09170	8261	51.17	1970
H09233	6603	117.67	1971
H09554	7164	221.76	1975
H09555	9684	404.87	1975
H09557	9822	481.08	1975
H09615	12843	81.61	1976
H09644	13999	36.42	1976
H09645	13004	39.97	1976
H09628	22898	30.61	1977
H09646	10082	32.79	1977
H09647	16615	34.38	1977
H09668	11161	28.51	1977
H09669	3795	15.65	1977
H09712	19322	30.11	1977
H09724	14896	33.61	1977
H09661	14810	31.37	1978
H09750	11942	42.85	1978
H10186	15208	147.34	1985
H10191	14643	171.41	1985
H10192	13564	163.65	1985
H10198	3633	23.10	1985
D00103	640	209.95	1990
F00345	2170	36.02	1990
F00348	5806	40.13	1990

H10339	3062	37.11	1990
H10350	14705	39.59	1990
D00111	1523	64.41	1991
F00360	10183	15.52	1991
F00363	1512	37.85	1991
F00364	5050	31.60	1991
F00365	4945	28.92	1991
F00367	2204	52.14	1991
H10378	13165	31.39	1991
F00368	1692	19.88	1992
F00372	314	20.63	1992
F00373	35	79.88	1992
F00374	472	27.59	1992
F00375	464	14.24	1992
F00376	644	13.56	1992
F00378	7387	19.65	1992
H10404	5627	30.36	1992
H10424	7757	33.75	1992
F00379	3557	5.44	1993
H10422	3298	69.92	1993
H10434	28139	14.83	1993
H10458	31886	20.90	1993
H10461	21824	25.46	1993
H10496	14194	22.37	1993
H10511	5917	18.80	1993
F00406	1805	11.33	1994
H10498	41331	28.18	1994
H10504	33119	26.21	1994
H10520	30288	20.43	1994
H10530	24765	15.94	1994
H10547	35534	27.18	1994
H10548	11102	26.41	1994
H10556	23910	26.66	1994
H10563	11015	26.34	1994
F00411	4706	12.47	1995
H10575	21861	22.21	1995
H10605	18993	31.03	1995
H10616	5319	21.35	1995
H10628	9082	16.53	1995
H10633	2381	13.62	1995
H10641	13097	15.30	1995
H10648	25084	35.10	1995
H10654	13151	35.44	1995
H10659	22127	29.76	1996
H10711	22260	20.84	1996
H10720	2743	31.44	1996
H10772	6859	7.48	1997
H10788	116228	0.87	1997
H10817	95228	2.83	1998
H10795	361731	0.85	1999

H10900	13976	2.70	1999
H10914	71098	22.05	2000
H10984	79031	22.87	2000
H11077	5684	8.79	2001
H11078	10136	28.17	2001
F00491	887	20.46	2002
F00498	498	19.72	2004
H11318	6639	22.82	2004
H11319	14840	24.57	2004
H11320	26692	26.48	2004
H11321	16166	43.38	2004
H11322	10995	41.66	2004

APPENDIX 2: Sample displays of the interpolated surface

Diagram 1: Lower left corner of data set showing 1) collection area in black, 2) interpolated surface in blue, and 3) intended area of use in red. There is approximately 1,000m of additional data beyond the area of intended use.

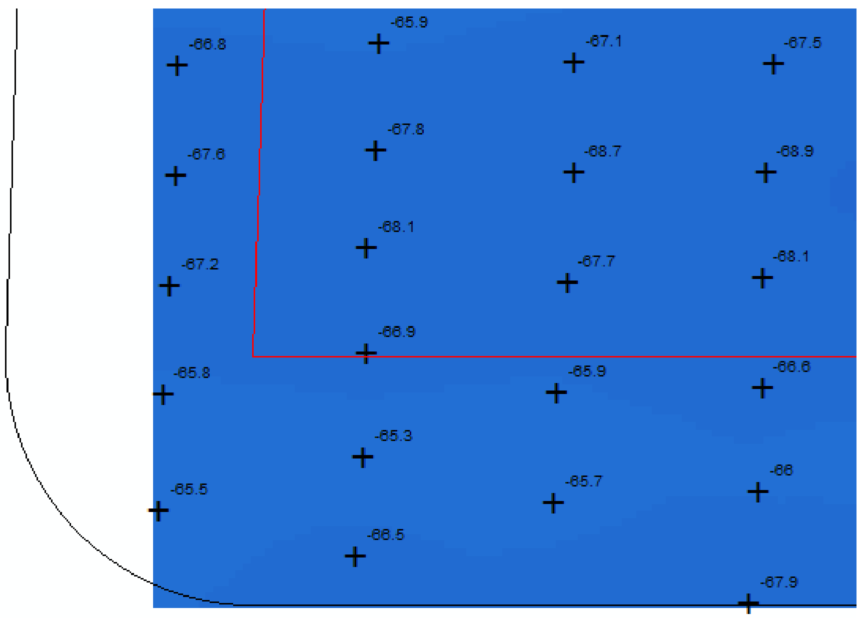

Diagram 2: Geographic area of coverage

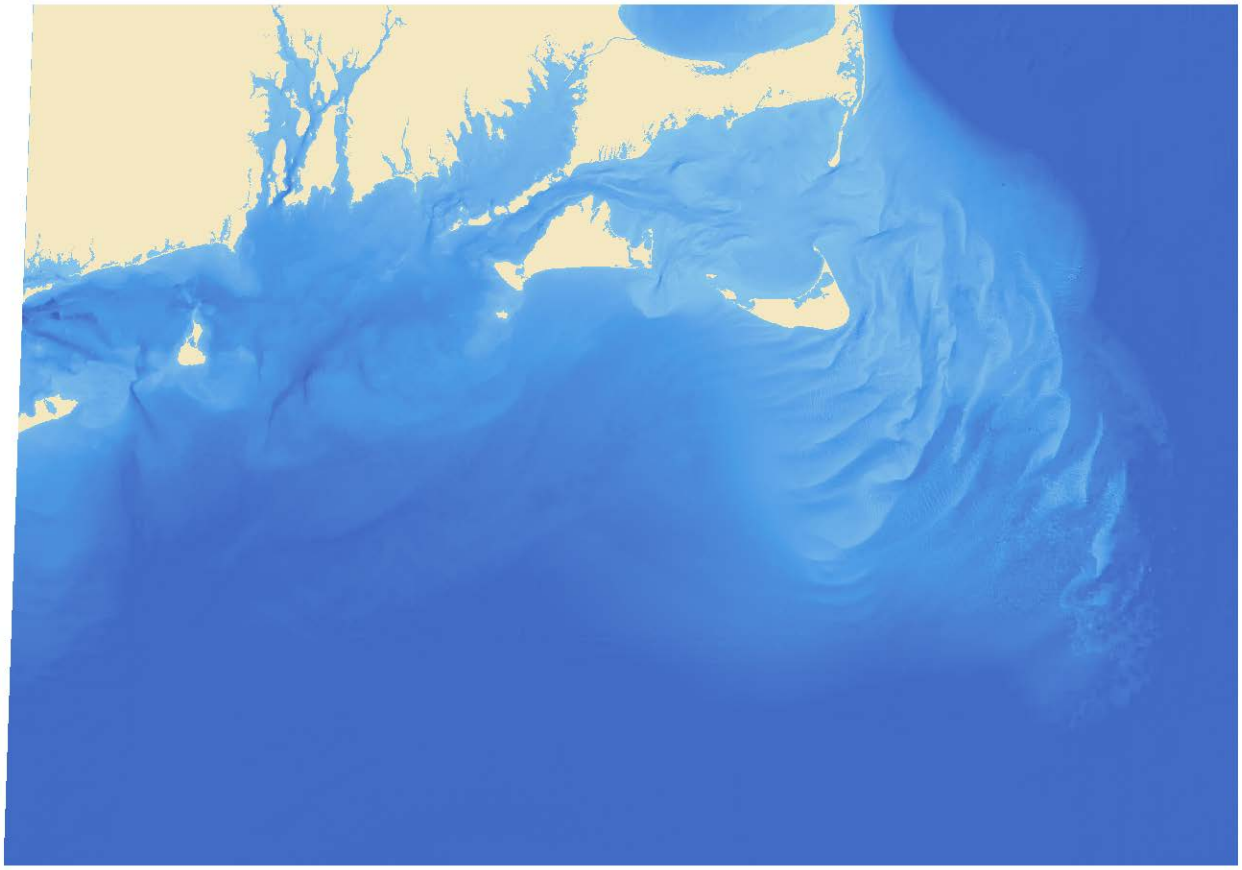

Diagram 3: A sample area showing the effect of varied sounding density. Note the detail in the sand waves in the lower left and center where sounding density is high, and the mild banding in the surface interpolation in the upper left where there is low sounding density.