

DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

Bathymetry Maps

U.S. Army Corps of Engineers, Philadelphia District

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BATHYMETRY MAPS

The maps are presented in two groups. The first group covers the Delaware River from the Pennsylvania-Delaware state line downstream to the vicinity of the entrance to the Chesapeake and Delaware (C&D) Canal (Figures 1 through 6.) The second group covers the Delaware River and Bay from the C&D Canal entrance to the bay mouth at Cape Henlopen-Cape May (Figures 7 through 15.) Within each group, there is an index map followed by a series of inset maps. Inset maps are identified by "range name," and include information on range length, project stationing, and River Miles (RM) as adopted by Delaware River Basin Commission.

The maps were created from a National Ocean Service (NOS) database of hydrographic soundings for the Delaware River and Bay. These survey data were obtained by NOS in the period between 1983 and 1993. Survey coverage extends from the Delaware shoreline across the river and bay to the New Jersey shoreline, for the entire length of the Delaware Estuary. In this regard, the NOS hydrographic surveys, although not as current as Corps of Engineers channel surveys, provide the most comprehensive spatial coverage, especially for areas outside of the regularly surveyed navigation channel.

The sounding database used to create the Delaware River and Bay bathymetric maps included approximately 400,000 individual data points (i.e., soundings.) In order to create the graphical representations of the hydrographic survey data, the sounding data were first imported into a Corps of Engineers software package, the "Groundwater Modeling System" (GMS.) This software was used because of its ability to import, manipulate, and graphically display large geospatial data sets such as the river and bay bathymetry. Next, the east and west edges of the Delaware River navigation channel were imported into GMS, in order to show the channel in relation to adjacent areas of the estuary. Finally, a zone was defined extending several channel-widths on either side of the channel along its entire length, and an interpolated surface mesh was created within this zone. This step was performed in order to create a continuously color-contoured area in and adjacent to the channel, as opposed to simply displaying the scatter points.

Immediately below are three "sample" plots that illustrate the difference between scatter point data and meshed, contoured depth data. All three plots cover an identical portion of the Delaware River, in the general vicinity of the Christina River. Sample 1 displays scatter point data only, with the depth color-coded over the depth range of 25 to 50 feet below MLLW. Depths shallower than 25 feet MLLW are all red, and depths greater than 50 feet MLLW are all blue. Depths between 25 and 50 feet MLLW are coded by the range of colors between red through yellow, green, and cyan, to blue. Sample

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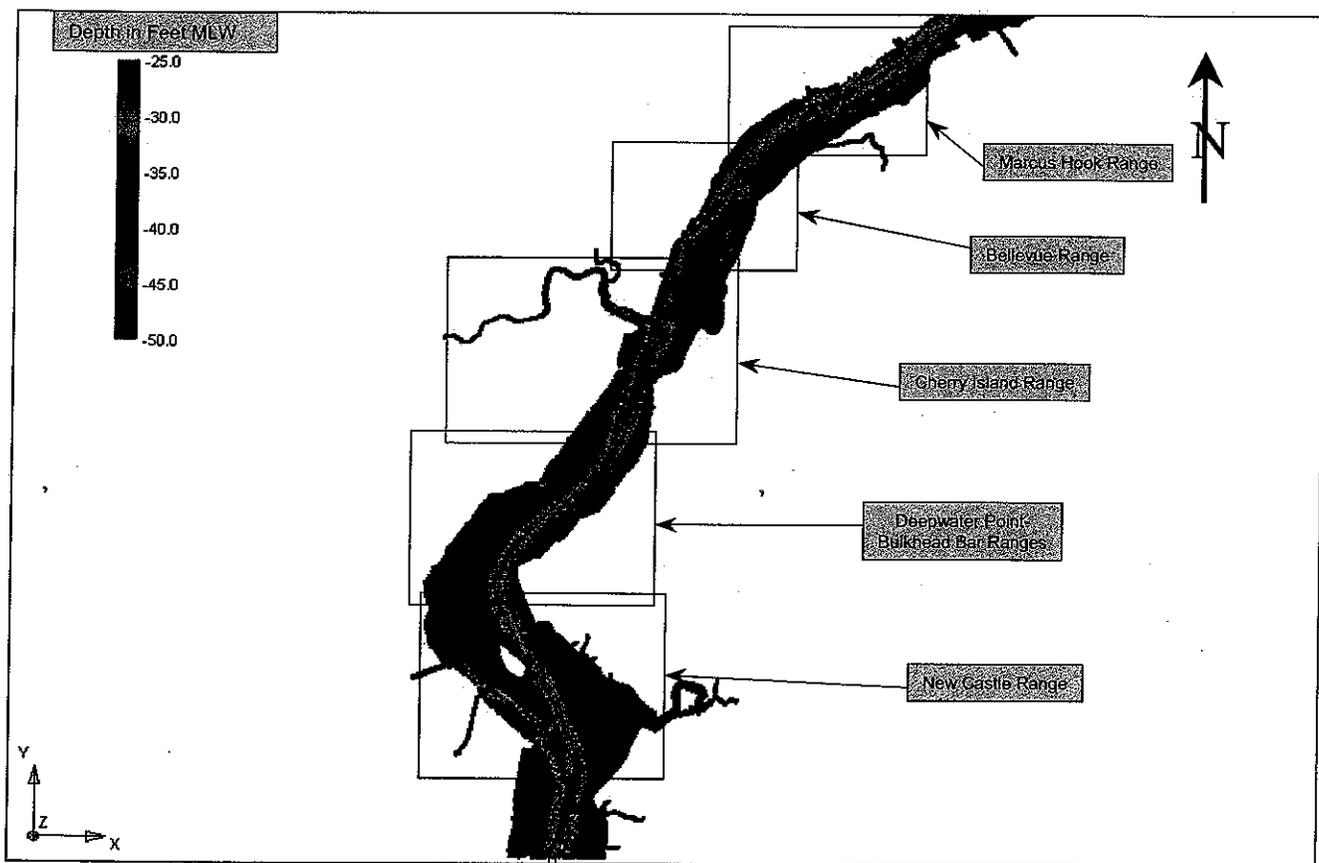
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2 uses the same color scheme, but depicts only the zone on either side of the navigation channel for which the interpolated depth mesh was created. Open (clear) zones in the meshed area are either deeper than 50 feet MLLW (bounded by blue) or shallower than 25 feet MLLW (bounded by red). Sample 2 also shows the typical dimensions of mesh elements in the open areas. Sample 3 combines the scatter point and contoured, mesh data sets, and is the format for the index and inset maps included as Figures 1 through 15.

Each of the inset maps displays one navigation range, or a portion of a range, as in the case of Liston and Brandywine Ranges which are too long to display meaningfully on a single page. As explained above, the figures include both types of depth data – scatter points over the entire estuary, and contoured, meshed data in the zone adjacent to the navigation channel. Careful examination of the series of inset maps reveals that there is a wide range of depths adjacent to the navigation channel.

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Delaware River, Philadelphia to the Sea Project:
Index Map: Existing Depths, PA-DE State Line to C&D Canal

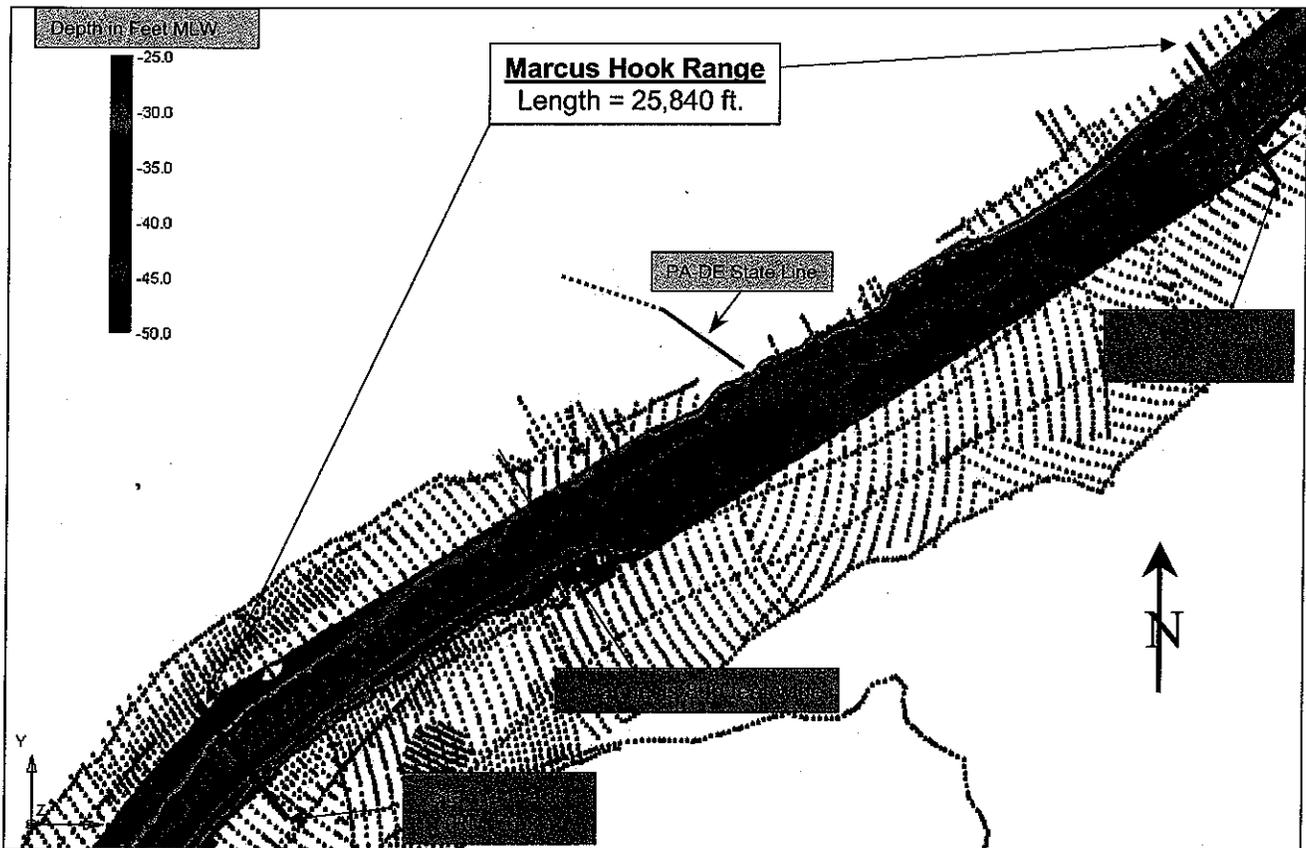


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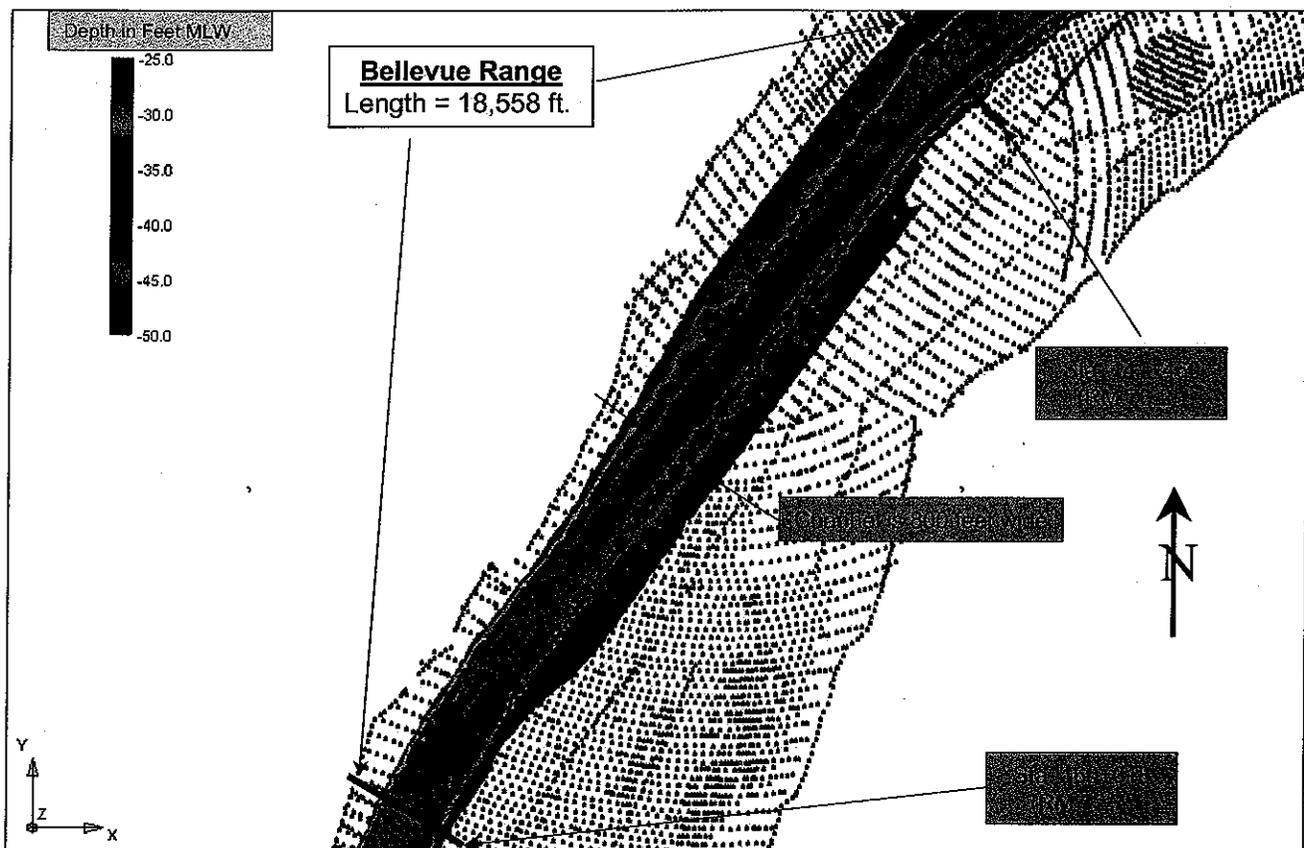
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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Marcus Hook Range



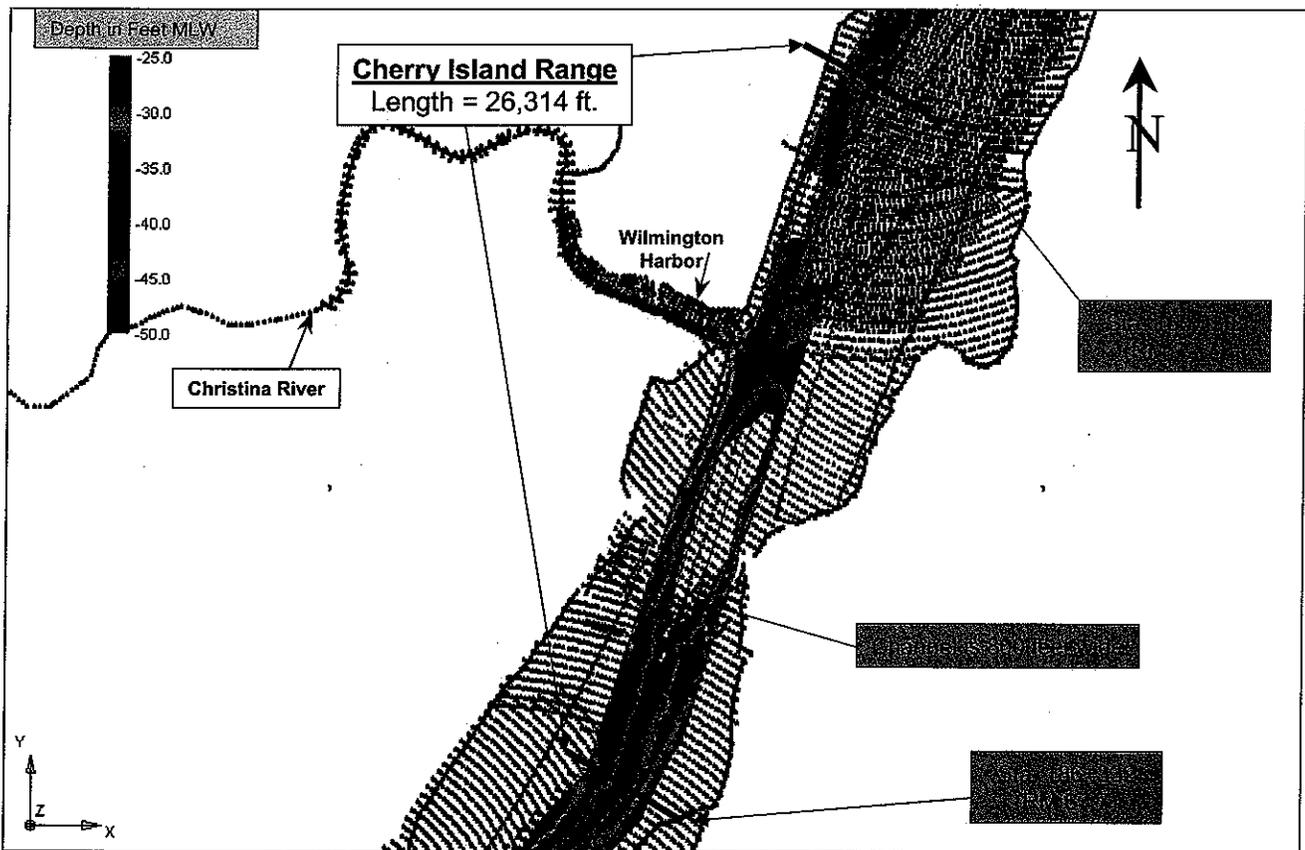
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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Bellevue Range



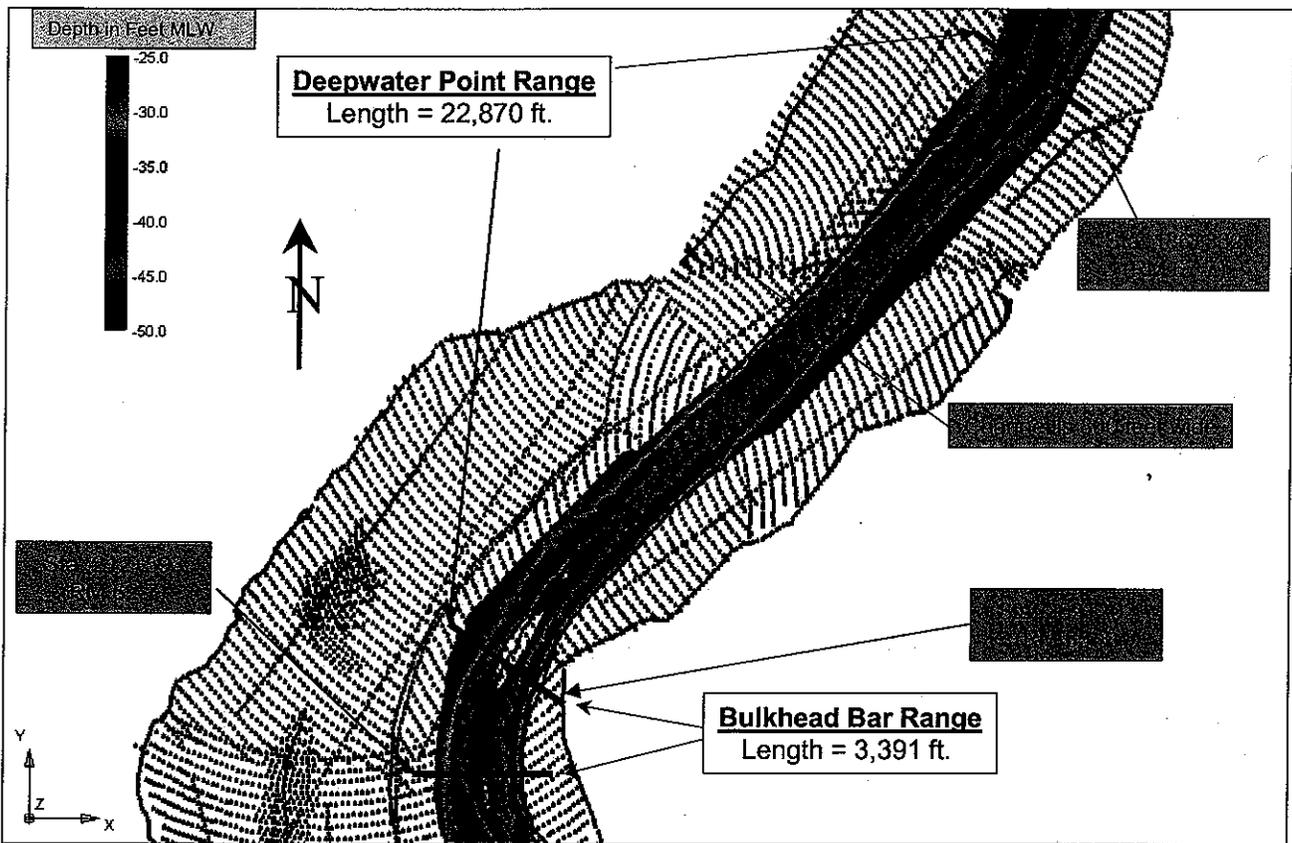
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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Cherry Island Range



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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Deepwater Point & Bulkhead Bar Ranges

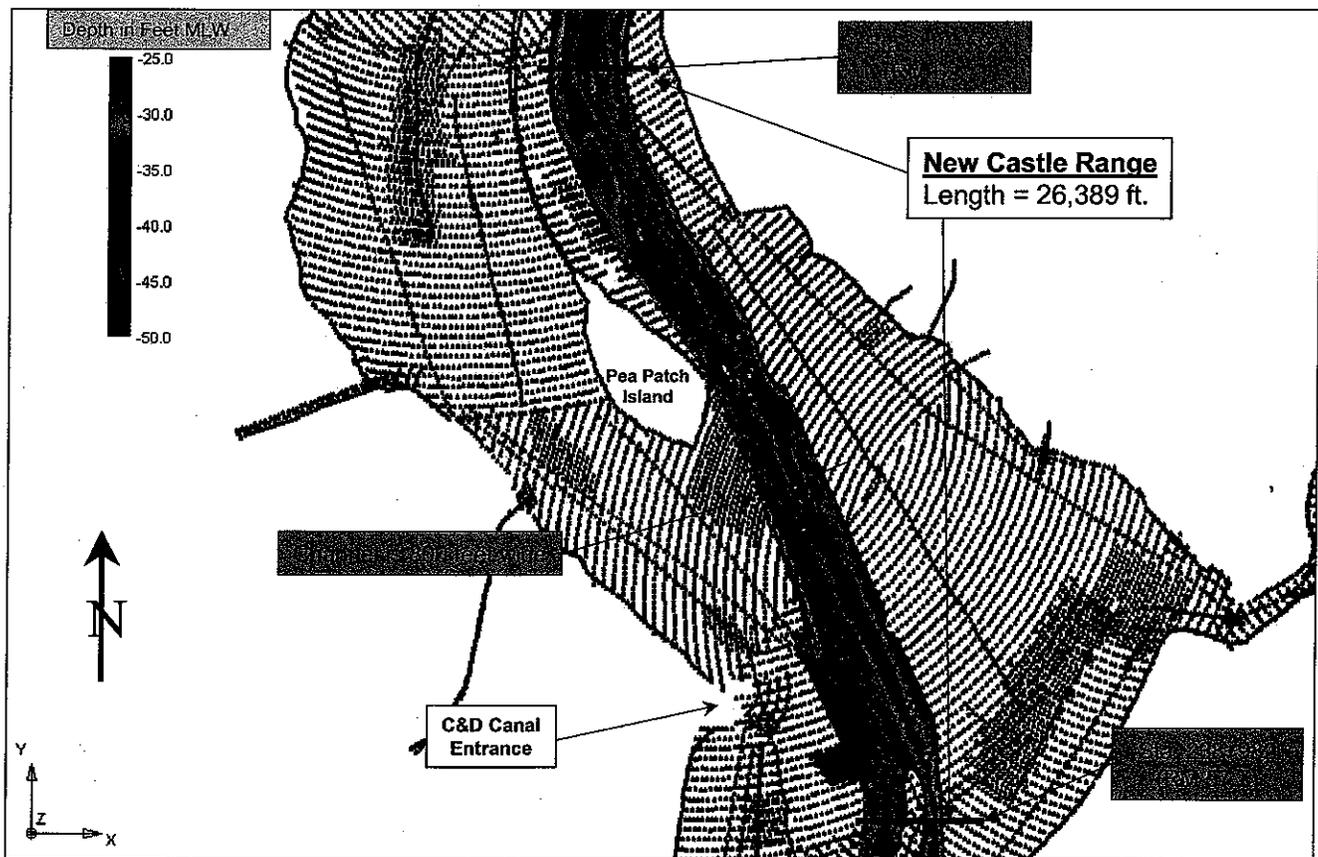


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Delaware River, Philadelphia to the Sea Project:
Existing Depths, New Castle Range

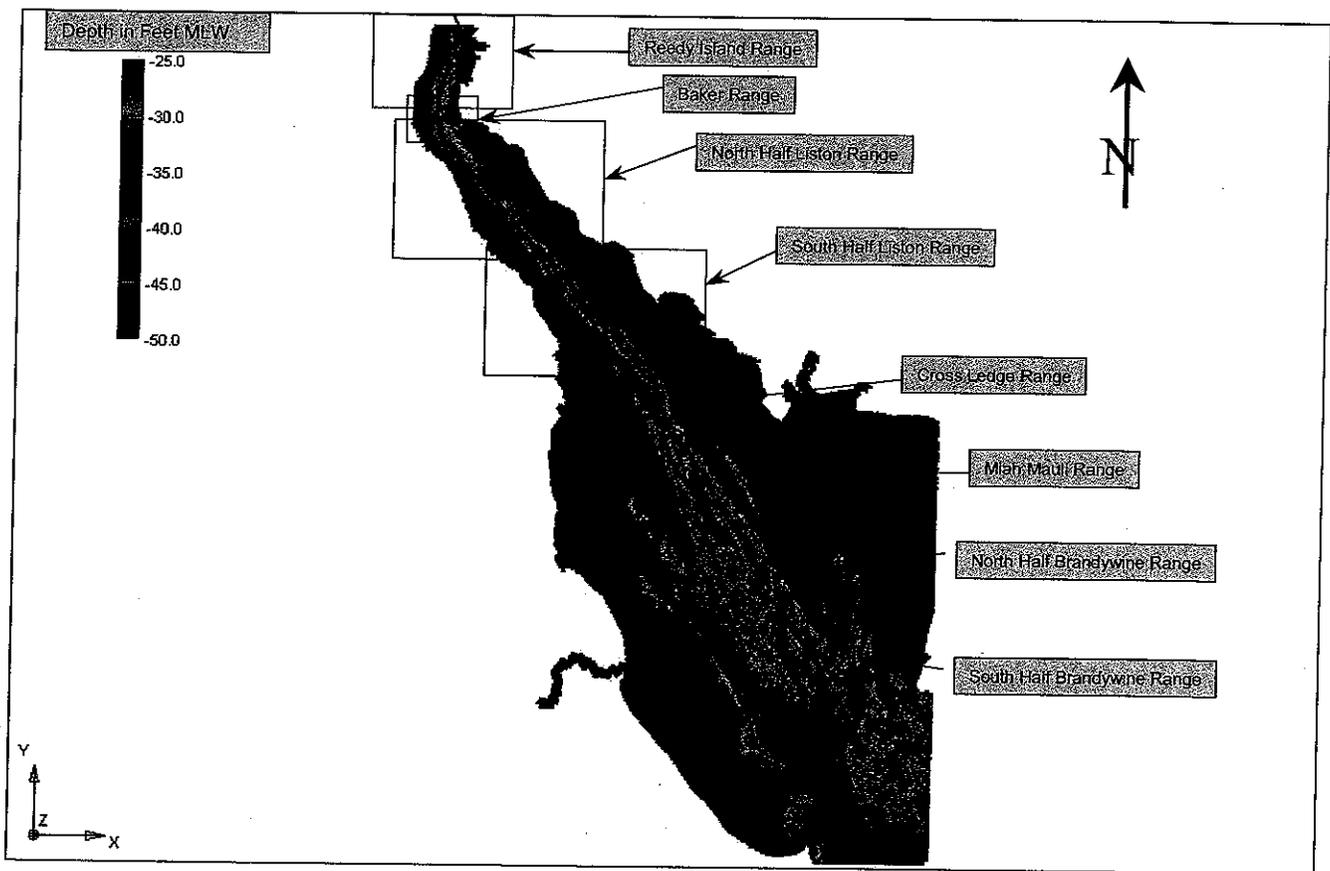


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Delaware River, Philadelphia to the Sea Project:
Index Map: Existing Depths, C&D Canal to Bay Mouth

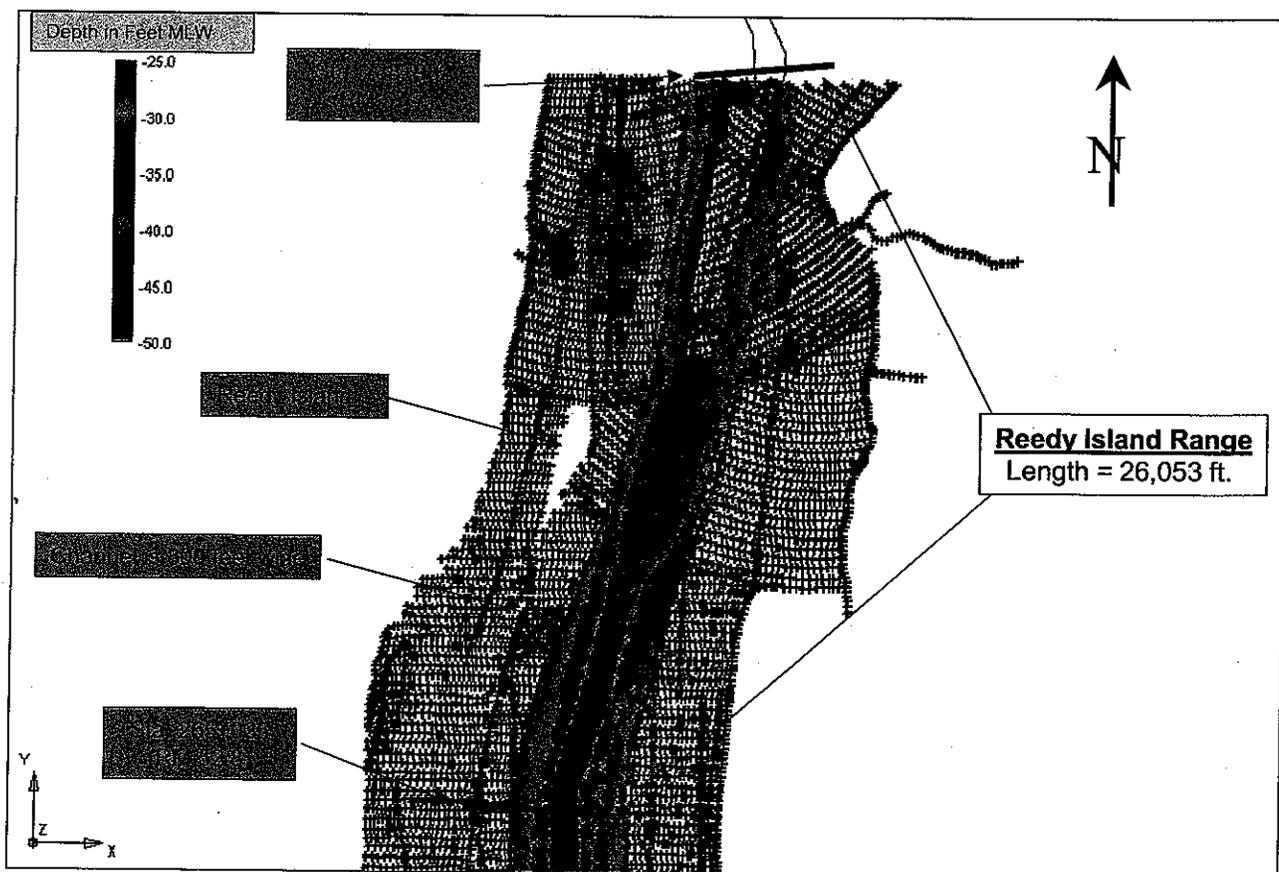


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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Reedy Island Range

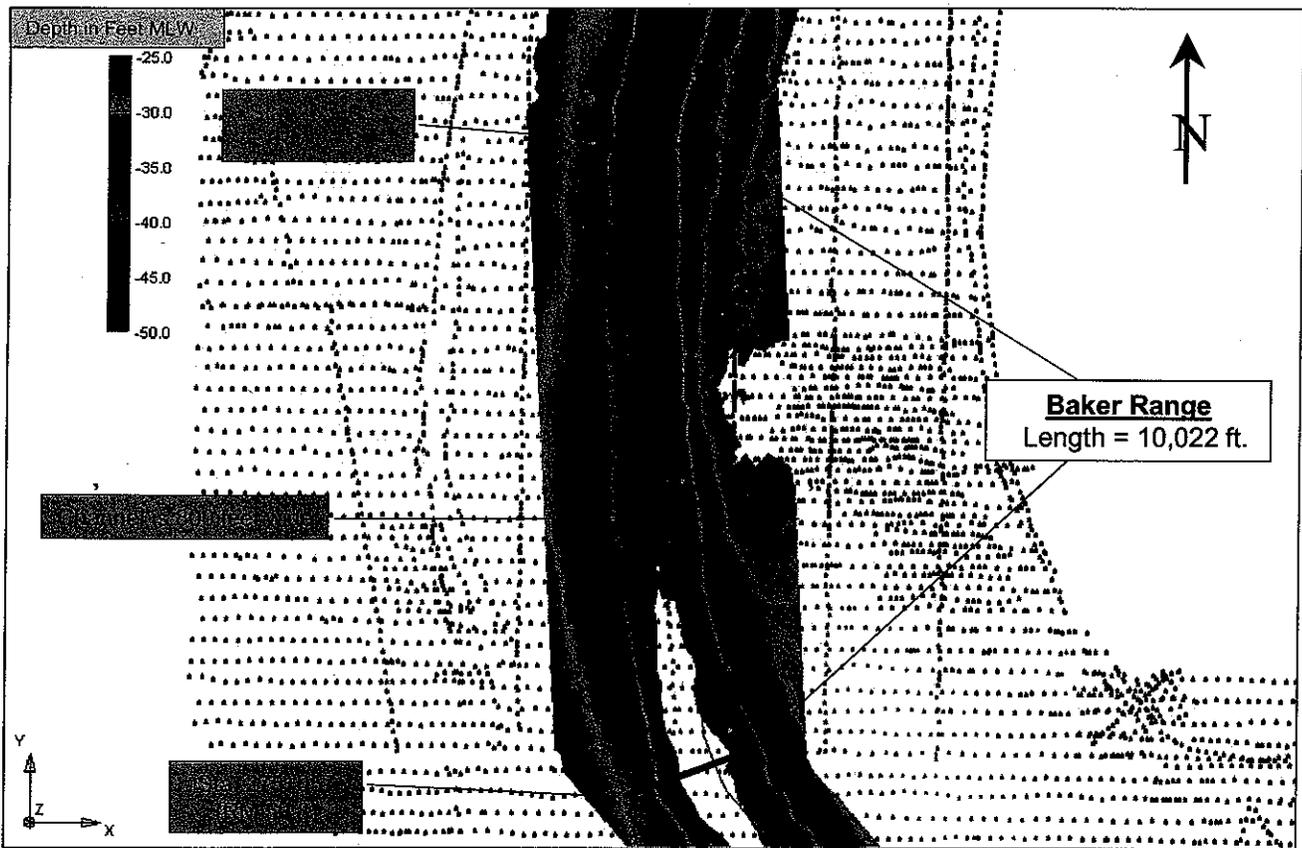


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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Baker Range

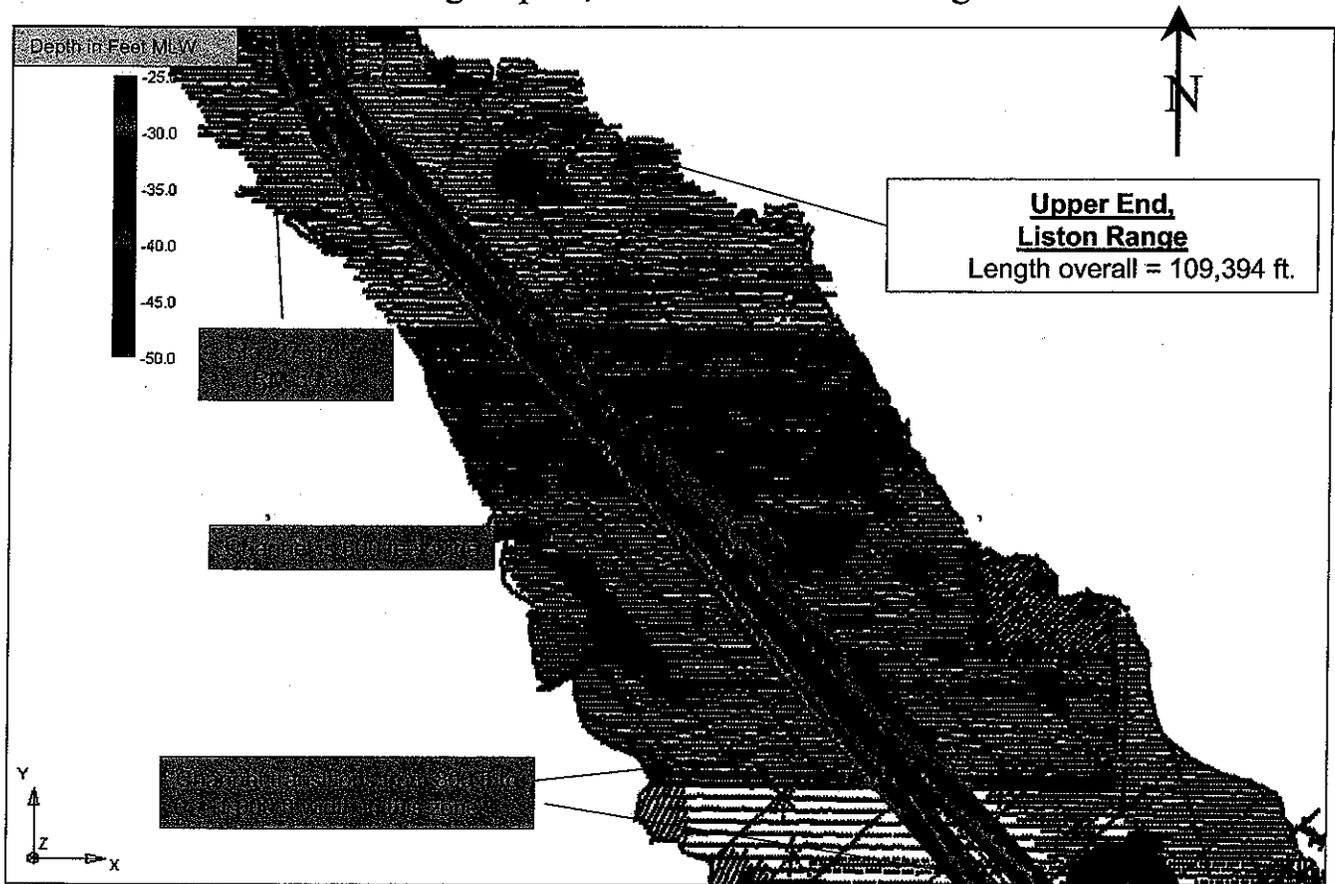


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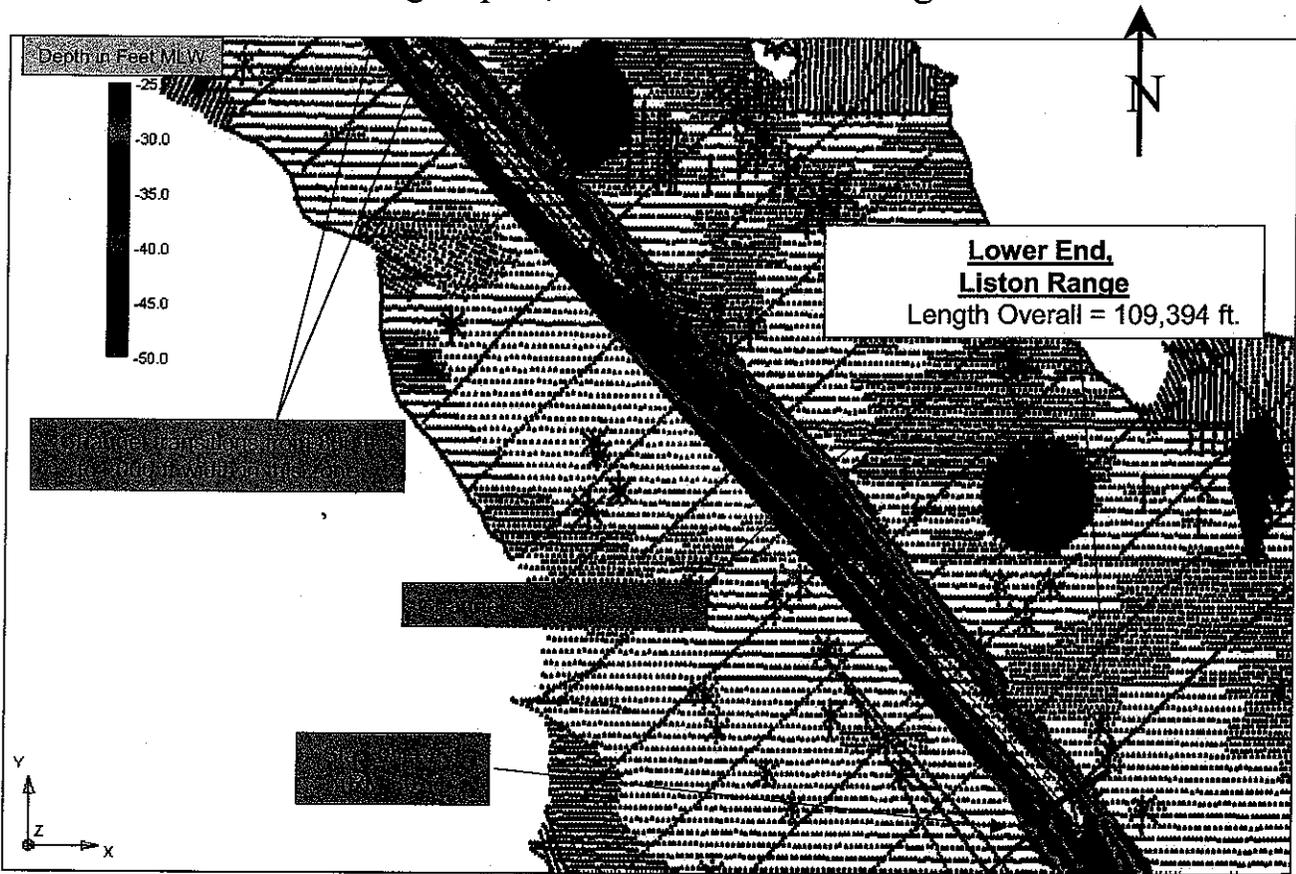
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Delaware River, Philadelphia to the Sea Project:
Existing Depths, North Half Liston Range



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Delaware River, Philadelphia to the Sea Project:
Existing Depths, South Half Liston Range

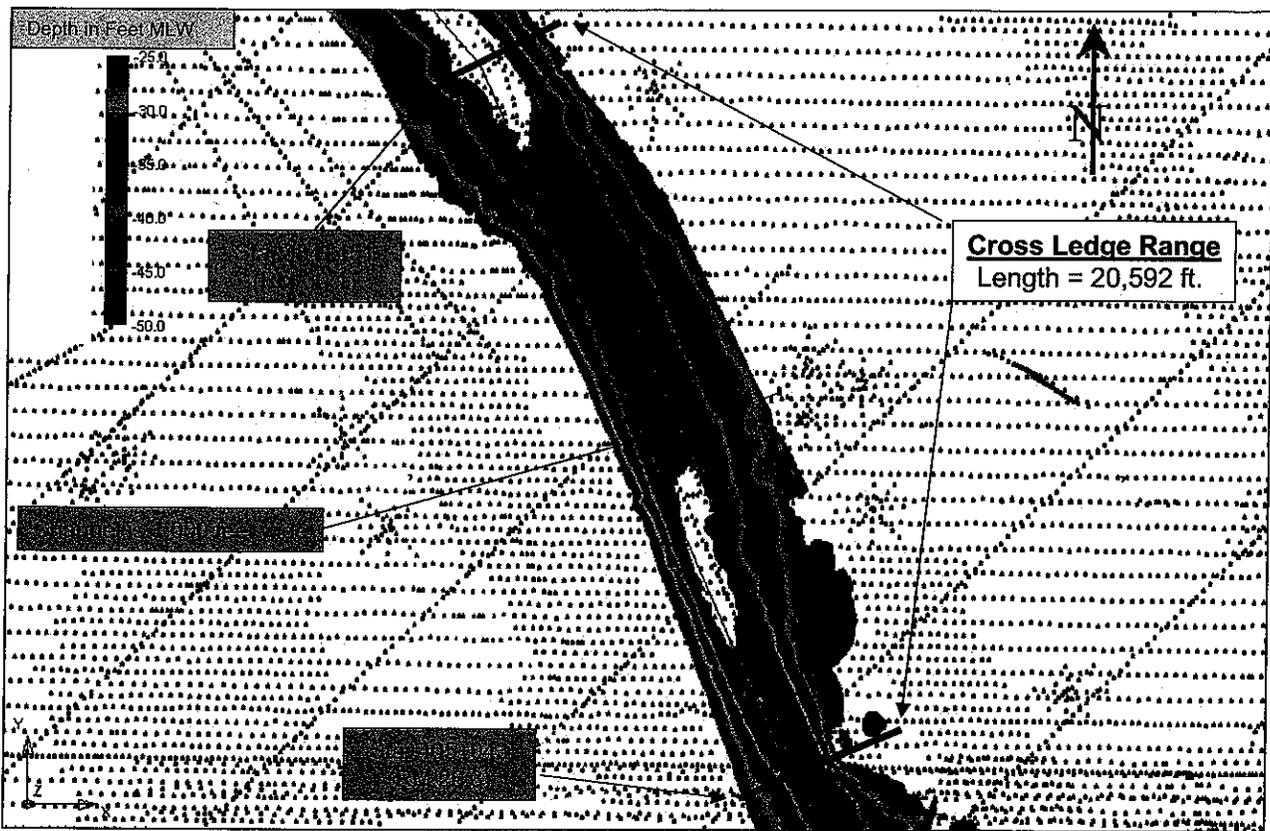


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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Cross Ledge Range

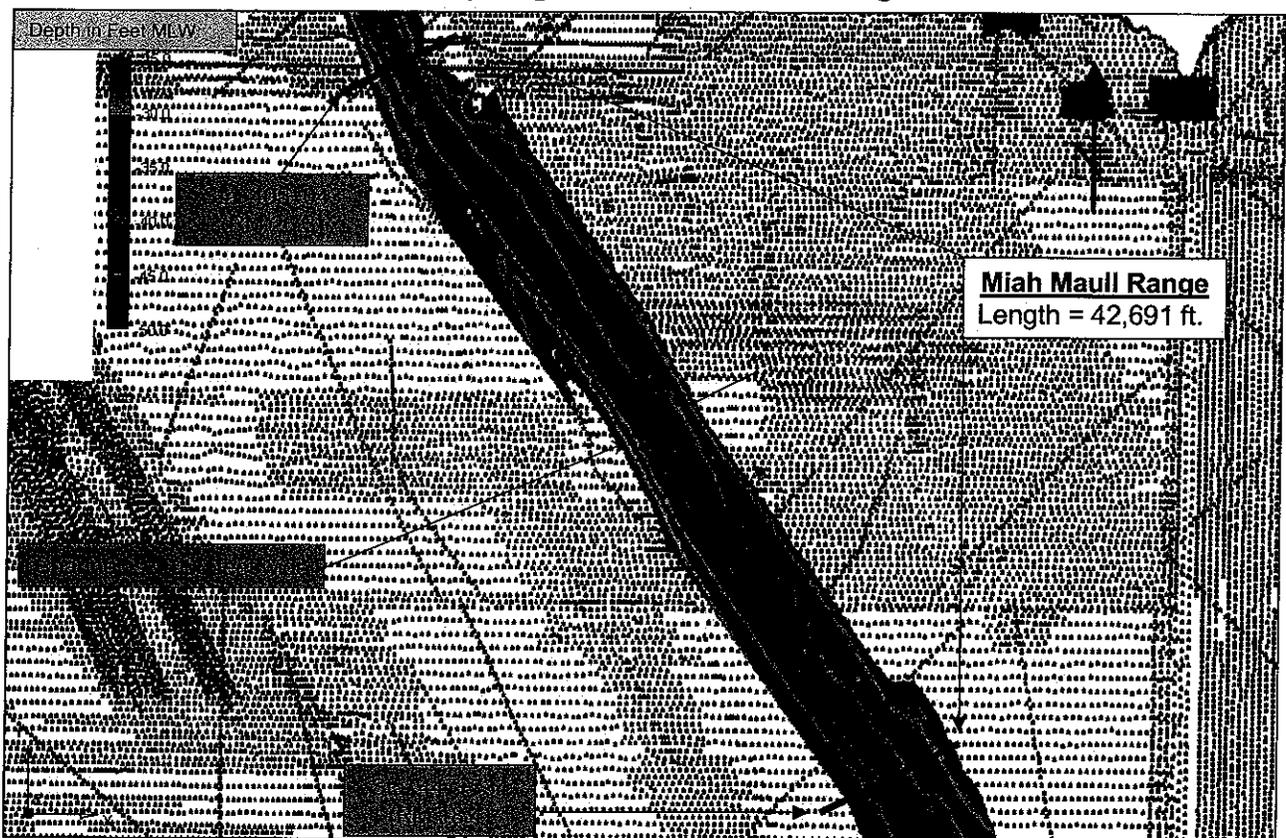


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Delaware River, Philadelphia to the Sea Project:
Existing Depths, Miah Maul Range

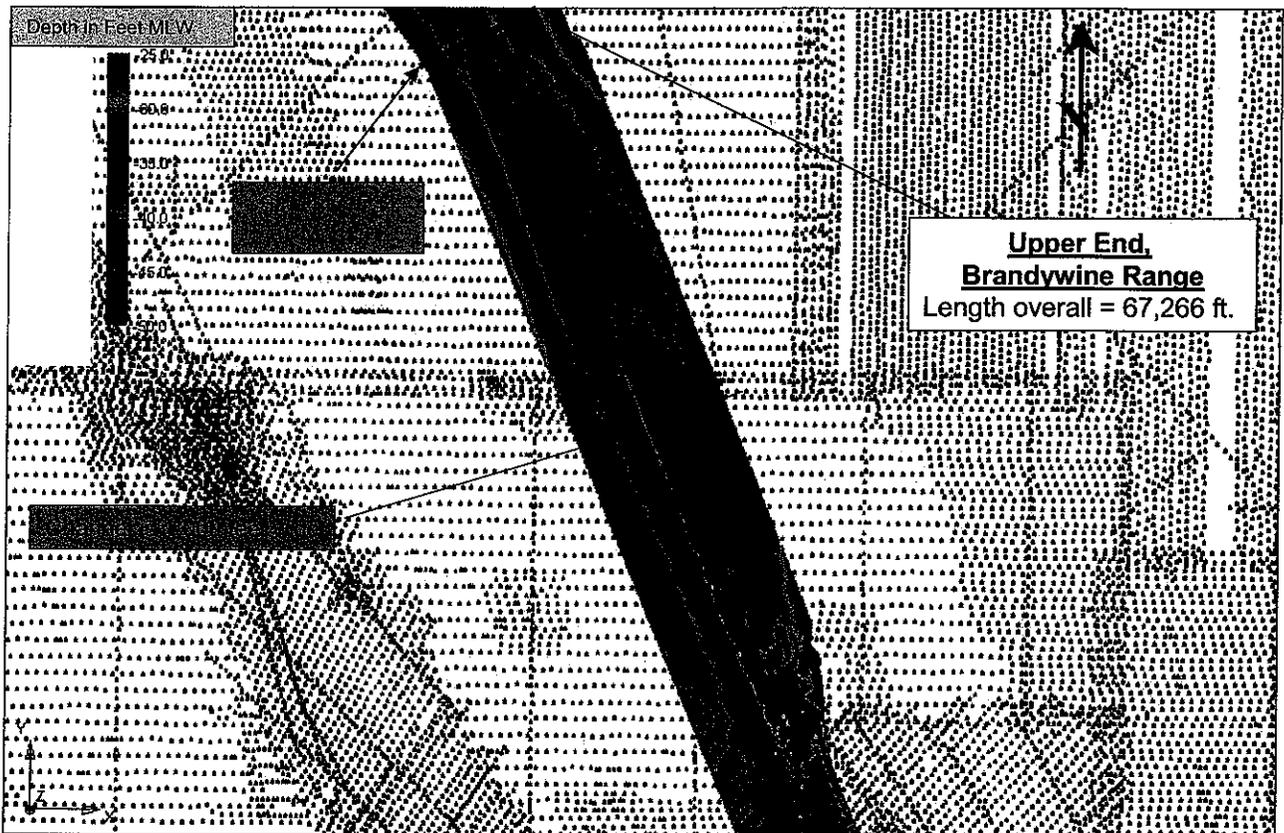


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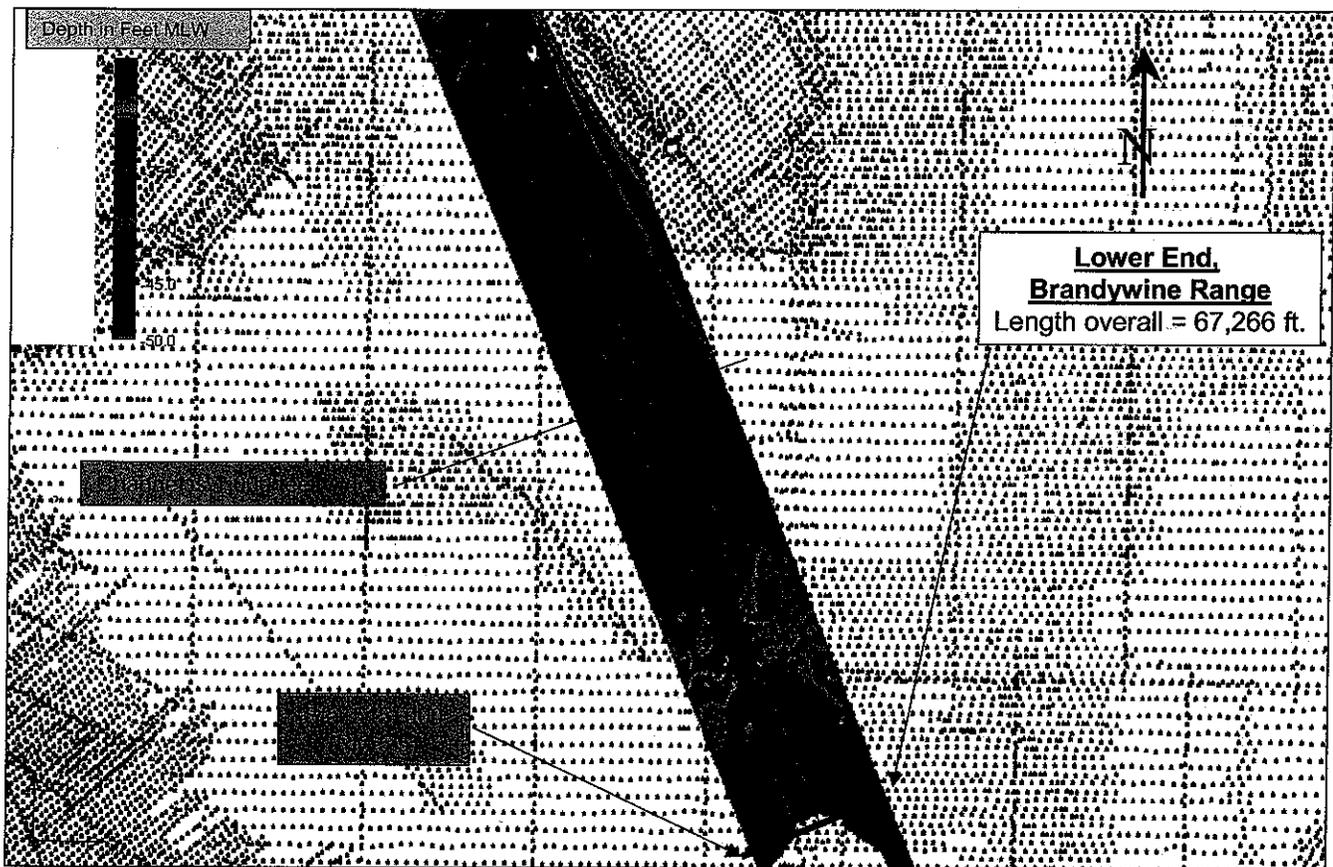
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Delaware River, Philadelphia to the Sea Project:
Existing Depths, North Half Brandywine Range



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Delaware River, Philadelphia to the Sea Project:
Existing Depths, South Half Brandywine Range



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