COASTAL

FRONTIERS

Dije Court, Transect SC-1695 – October 27, 2022

CITY OF SAN CLEMENTE
BEACH MONITORING PROGRAM
FALL 2022 BEACH PROFILE SURVEY REPORT

Prepared for:

City of San Clemente

Coastal Frontiers Corporation
882A Patriot Drive
Moorpark, CA 93021-3544
(818) 341-8133 www.coastalfrontiers.com

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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1. INTRODUCTION

This report presents the methods and results of the City of San Clemente Fall 2022 Beach Profile Survey. The sections that follow provide an overview of the Monitoring Program, describe the Fall 2022 Survey, and present the results. Beach profile plots accompany the report in Appendix A, while Mean Sea Level (MSL) and Mean High Water (MHW) beach widths are provided in Appendices B and C, respectively.

The vertical datum employed throughout this report is National Ocean Service (NOS) Mean Lower Low Water (MLLW) for the 1983-2001 Epoch. The horizontal datum is California State Plane Zone 6 relative to the North American Datum of 1983 (NAD83(2011)2010.00), with units of U.S. Survey Feet.

2. PROGRAM OVERVIEW

The general objective of the monitoring program is to document changes in the condition of the shorezone between Dana Point Harbor and San Mateo Point, thereby providing a basis for evaluating the impacts of both natural events and beach replenishment operations. The program includes semi-annual beach profile surveys at 12 representative coastal sites.

Shoreline monitoring programs within the study area have been conducted intermittently. Ten surveys were performed by the U.S. Army Corps of Engineers (USACE) between November 1983 and December 1989 under the auspices of the Coast of California Storm and Tidal Waves Study – San Diego Region (CCSTWS-SD; USACE, 1991). Between October 2001 and May 2007, eleven surveys were conducted on behalf of the City's Beach Monitoring Program (Coastal Frontiers, 2007). Four additional wading-depth surveys were later performed between November 2016 and November 2017 exclusively at North Beach to document the placement of opportunistic nourishment. The October 2022 survey represents the first survey of all twelve sites within the study area since May 2007.

The twelve shore-perpendicular beach profile transects within the study area are shown in Figure 1 and listed in Table 1. Five of these were established specifically for the Beach Monitoring Program, and were surveyed for the first time in Fall 2001 (Coastal Frontiers, 2001). Six transects had been established previously by the USACE, and were included in the CCSTWS-SD (USACE, 1991). An additional transect (SC-1702, North Beach) was established in May 2005 to monitor the fate of approximately 5,000 cy of sand nourishment material placed at the site (Coastal Frontiers, 2005).

Figure 1. Transect Location Map

Table 1. San Clemente Area Beach Profile Transects

Transect Designation	Location	Origin
DB-1850	North Doheny State Beach	Historical (CCSTWS)
DB-1805	South Doheny State Beach	Historical (CCSTWS)
SC-1720	Shorecliffs	Historical (CCSTWS)
SC-1705	Capistrano Trailer Court	Established Oct. 2001
SC-1702	North Beach	Established May 2005
SC-1700	North Beach	Established Oct. 2001
SC-1695	Dije Court	Established Oct. 2001
SC-1680	Linda Lane	Historical (CCSTWS)
SC-1660	T-Street	Historical (CCSTWS)
SC-1645	Lost Winds	Established Oct. 2001
SC-1623	San Clemente State Beach	Historical (CCSTWS)
SC-1605	Cottons Point	Established Oct. 2001

3. TRANSECT RECOVERY

Following a nearly 16-year hiatus since the May 2007 survey, some of the survey markers used to conduct the topographic portion of the survey were missing or destroyed. A field campaign was performed on September 22, 2022 to reestablish the survey markers for each transect in preparation for the Fall beach profile survey. Real Time Kinematic (RTK) Global Navigation Satellite Systems (GNSS) techniques were used to measure the precise location and elevation of each survey marker. Intact historical markers were reoccupied, while missing or destroyed markers were reinstalled and measured.

The RTK measurements were based on precise positioning derived from the National Geodetic Survey (NGS) Online Positioning User Service (OPUS), which is tied to the National Oceanic and Atmospheric Administration's (NOAA) Continuously Operating Reference Station (CORS) network and the National Spatial Reference System (NSRS). OPUS provides elevations relative to the North American Vertical Datum of 1988 (NAVD88). The NAVD88 elevation was subsequently adjusted to NOS MLLW datum for the 1983-2001 National Tidal Datum Epoch using the height difference published for La Jolla, CA (Station ID 9410230; NOAA, 2023).

The horizontal discrepancies relative to the historical values were typically small, averaging 0.7 ft. A portion of this is attributable to adjusting the positions to the current horizontal epoch, which accounts for about 1.0 ft. The root-mean-square error (RMSE) of the vertical discrepancies measured 0.3 ft, and is likely attributable to physical changes during the intervening years, or differences in survey techniques. The revised survey marker positions were used to process all beach profile data obtained in Fall 2022. Given the modest differences and the inability to confirm the nature of any physical changes, no modifications were made to the historical data.

4. FALL 2022 BEACH PROFILE SURVEY

4.1 Field Activities

The Fall 2022 beach profile survey was conducted on October 27 and 28 in good conditions with light winds, and wave heights generally less than 3 ft. The wading and bathymetric portions of the survey were performed concurrently by two separate crews. Data were acquired along each transect from the back beach to either the 45 ft isobath relative to MLLW, or a distance of 6,000 ft seaward of the transect origin (whichever was first reached when proceeding offshore).

The above-water beach and surf zone were surveyed using an electronic total station and a survey rodman. The total station was used to determine the position and elevation of the beach at each location occupied by the rodman. Each transect was surveyed from the backbeach seaward through the surf zone until the survey rod no longer protruded above the water surface when held vertically. This location, typically in a water depth of 10 to 12 ft below MLLW, provided substantial overlap with the landward portion of the bathymetric survey.

Bathymetric data were collected with a digital acoustic echo sounder operated from a shallow-draft survey vessel. A motion reference unit (MRU), which provides real-time corrections to the echo sounder for wave-induced vessel heave, also was utilized. A dual antenna Global Positioning System (GPS) receiver was used to determine the vessel heading and the position of each sounding. To improve the accuracy of each position, differential corrections transmitted in real-time from Wide Area Augmentation System (WAAS) were utilized (DGPS). All systems were interfaced to a laptop computer using the Hypack Survey software package.

The boat traveled from the offshore terminus to the surf zone guided by DGPS navigation. The sounding and MRU data were acquired on a continuous basis. Positions

were recorded at 2 Hz, with interpolated values assigned to the soundings acquired between position fixes.

The calibration of the echo sounder was checked at the beginning and end of the survey using a standard "bar check" procedure. Additionally, the speed of sound in sea water was obtained at the offshore end of each transect using a device that measures conductivity, temperature, and depth (CTD) along a vertical profile within the water column.

4.2 Data Reduction

Data from the wading portion of the survey were collected and processed in real time using the SurvCE software package developed by Carlson. The raw total station data were read by the software, and the coordinates and elevation of each data point were calculated. Following survey activities, the total station coordinate and elevation data were verified and inserted into a surface modelling utility (Trimble Terramodel).

The raw data from the bathymetric portion of the survey consisted of Hypack files containing the position data and heave-compensated soundings. The raw soundings were corrected based on the speed-of-sound profiles obtained at the end of each transect. The soundings then were adjusted to the MLLW datum using tide measurements made by NOAA at La Jolla (Station ID 9410230). To provide a more accurate representation of local tide conditions, the water levels recorded at La Jolla were adjusted using the time and height differences for San Clemente published by NOAA.

The adjusted soundings were edited for outliers using the Hypack single-beam processing module. The MRU utilized during the survey removed the majority of the wave contamination from the record in real time. However, to further minimize the influence of wave-induced vessel motion, selected portions of the echo sounder record were filtered using Hypack.

The processed soundings were thinned to a nominal interval of 10 ft to produce a file suitable for developing beach profile plots. The resulting x, y, z data (easting, northing, and elevation) were inserted into the surface modelling utility containing the wading data. As indicated above, the field work was conducted in such a manner as to provide substantial overlap between the wading and bathymetric portions of the survey. The data were examined in this region to ensure that the two data sets were compatible. Once this confirmatory inspection had been completed, only the more detailed data in the region of overlap were retained (typically the bathymetric data). The less detailed data were purged, after which the wading and bathymetric data were merged to create a single digital beach profile data file (*.bpd) containing range and elevation pairs along the transect alignment.

Based on past experience, the vertical accuracy of the processed soundings is approximately ±0.5 ft. According to the Hemisphere GNSS equipment specifications, the root mean square (RMS) accuracy of the horizontal positions obtained in the manner described above is approximately 2.0 ft (95% confidence). The electronic total station used to conduct the survey is capable of measuring ranges to within ±0.5 ft and elevation differences to within ±0.1 ft. However, because the rodman was subjected to waves and currents in the surf zone, the horizontal distance perpendicular to each transect (parallel to the shoreline) may vary from minimal at short ranges to approximately ±15 ft at the offshore end.

5. RESULTS

5.1 Data Products

Beach profile plots developed from the October 2022 survey data accompany the report in Appendix A. To place the survey results into historical context, each profile is plotted in concert with the envelope of profiles measured during the roughly 5.5-year period that comprises the most recent phase of the Monitoring Program (Fall 2001 to Spring 2007). In addition, the profiles from the October 1986, October 2001, and October 2006 surveys are shown, where such data are available. The range on each profile plot represents the distance in feet seaward of the transect origin measured along the transect alignment. The elevation is given in feet relative to MLLW for the 1983-2001 National Tidal Datum Epoch.

In 2003, NOAA implemented the current National Tidal Datum Epoch (1983-2001) to account for changes in sea level along the coast (NOAA, 2003). While historical surveys conducted prior to 2003 by the City and the USACE referenced the previous epoch (1960-1978), all data presented in this report have been updated to the current epoch to facilitate direct comparison.

Mean Sea Level (MSL) and Mean High Water (MHW) beach widths derived from the profile data are presented in Appendices B and C, respectively. The beach width was computed as the horizontal distance, in feet, between the landward limit of the beach and the point at which the beach profile intersected the plane of the respective tidal datum. MSL lies 2.73 ft above MLLW, while MHW is located 4.60 ft above MLLW, based on the published tidal datum elevations at La Jolla, CA (Station ID 9410230; NOAA, 2023).

Notwithstanding the use of MLLW as the elevation reference for the profile data, MSL was adopted as the shoreline reference in the belief that it provides a more accurate

indicator of changes in beach configuration. Alternatively, MHW beach widths may be used to generally characterize "towel space."

As part of the 2022 survey, the landward terminus of the beach was documented at each of the twelve sites (Appendix B). In several cases, this location differed from that used historically due to physical changes at the back beach. For all historical survey data, the MSL and MHW beach widths were recomputed to reflect the updated landward termini. ***These revised beach widths supersede those provided prior to 2022.***

The Fall 2022 Beach Profile Survey data are included in a compressed (*.zip) folder attached to the electronic submittal of this report. The *.zip folder contains ASCII files of: (1) range and elevation pairs for each profile (*.bpd), and (2) northing, easting, and elevation triplets (*.nez) for the entire survey. In the case of the georeferenced data, the horizontal positions are in U.S. Survey Feet relative to California State Plane Zone 6, NAD83(2011)2010.00. A header within each file provides relevant details for the data, including date, location, and datums.

5.2 Observations

A detailed analysis of the state of the City's beaches exceeds the present Scope of Work. General observations are offered, however, based on the profile plots and MSL beach widths provided in Appendices A and B, respectively. In the interest of completeness, MHW beach widths are provided in Appendix C. For clarity, the term "beach width" discussed herein refers to MSL beach width.

Beach Widths and Shoreline Changes

1. **MSL Beach Widths (Appendix B, Figure 2):** Figure 2 illustrates the MSL beach widths at the time of the Fall 2022 survey. The envelope of historical Fall beach widths is provided for context (comprised of all surveys conducted between 1983 and 2006 during the months of October through December). Fall 2022 beach widths ranged from 0 ft at Capistrano Trailer Court and Dije Court (Transects SC-1705 and SC-1695, respectively) to 238 ft at Lost Winds (SC-1645). The Fall 2022 beach widths fell below or near the lower bound of the historical range from Doheny State Beach (DB-1850) to Dije Court (SC-1695), and at Cotton's Point (SC-1605). In the region from Linda Lane (SC-1680) to San Clemente State Beach (SC-1623), the Fall 2022 beach widths tended to fall near the upper bound of the envelope.

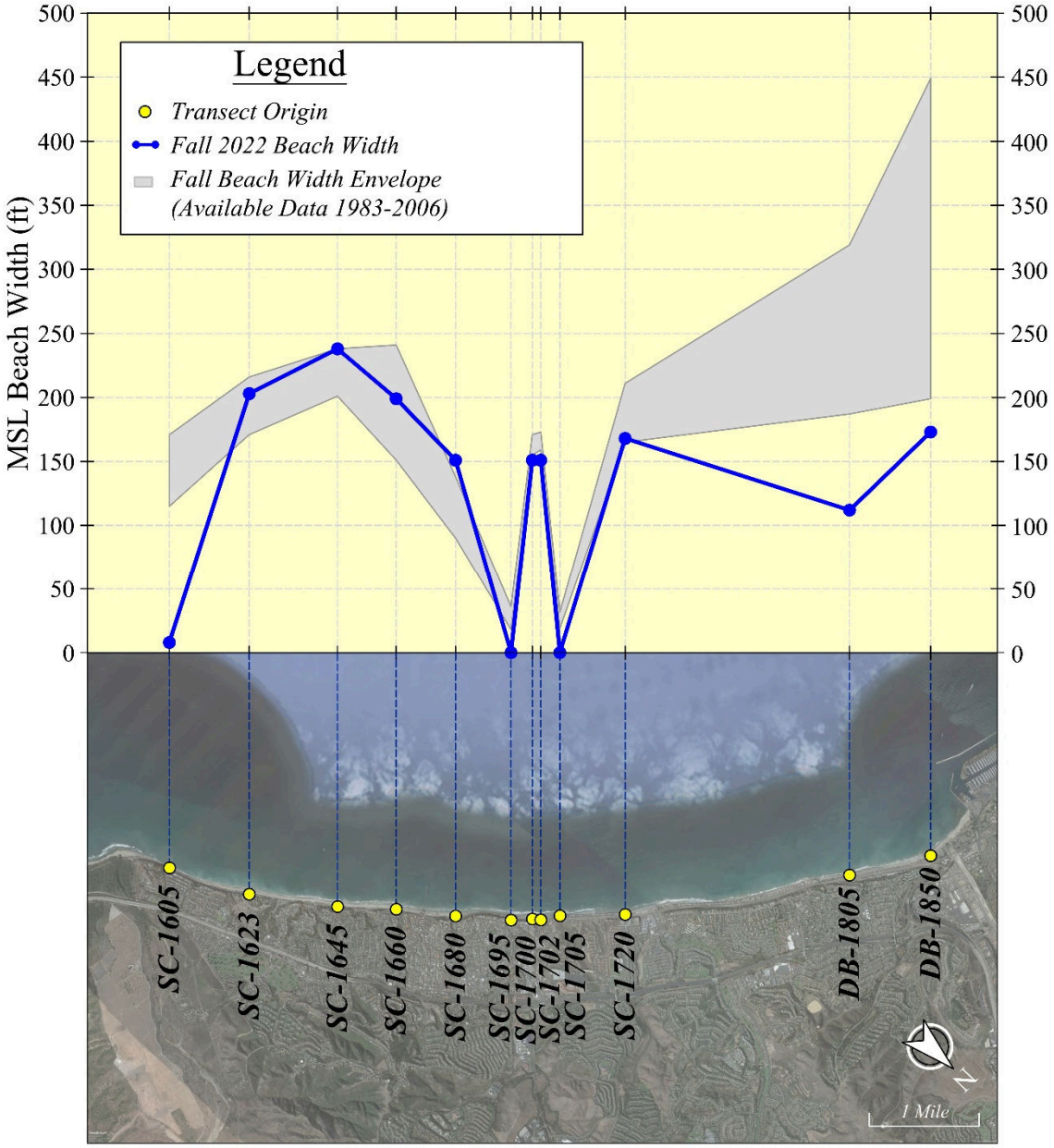

Figure 2. Fall 2022 MSL Beach Widths
Relative to 1983-2006 Historical Fall Beach Width Envelope

2. **Shoreline Change Trends (Appendix B):** As illustrated in the time series plots provided in Appendix B, a trend of decreasing beach widths at Doheny State Beach (DB-1850 and DB-1805) resulted in historical minimums at both sites by the time of the October 2022 survey (173 and 112 ft, respectively). At Shorecliffs (SC-1720), the October 2022 beach width (168 ft) was the third most eroded condition on record since monitoring began in November 1983. A trend of shoreline stability has persisted at

the two North Beach sites (SC-1702 and SC-1700) since monitoring was initiated. However, beach widths at both Capistrano Trailer Court (SC-1705) to the north, and Dije Court (SC-1695) to the south, decreased to the narrowest conditions on record (0 ft). At the four sites from Linda Lane (SC-1680) to San Clemente State Beach (SC-1623), the October 2022 beach widths increased, or remained essentially unchanged, relative to the those captured during the most recent phase of the Monitoring Program (October 2001 to May 2007). The sharpest change occurred at Cottons Point (SC-1605), in which the beach width decreased from 126 ft in October 2006, to 8 ft in October 2022. Due to the lack of sand at this site in October 2022, the beach was not accessible along a majority of the revetment.

3. **MSL Beach Width Changes – Oct 2001 to Oct 2022 (Table 2, Figure 3):** Relative to the October 2001 beach condition when the City's Beach Monitoring Program was first initiated, the October 2022 beach widths were 24 ft narrower, on average. Among the eleven sites common to the two surveys (excludes Transect SC-1702, North Beach), beach widths decreased at seven sites and increased at the remaining four. Losses occurred at the northern half of the study area between North Doheny State Beach (DB-1850) and Dije Court (SC-1695), and at the southern end of the region (Cottons Point, SC-1605). Beach width gains predominated between Linda Lane (SC-1680) and San Clemente State Beach (SC-1623). The largest loss in the study area (140 ft) occurred at Cottons Point (SC-1605), while the greatest gain (61 ft) was measured at Linda Lane (SC-1680).

4. **MSL Beach Width Changes – Oct 1986 to Oct 2022 (Table 2, Figure 4):** During the 37-year period between the October 1986 and October 2022 surveys, beach width changes were mixed across the study area. As illustrated in Figure 4, beach width losses were concentrated at Doheny State Beach, with losses of 137 and 205 ft occurring at DB-1850 and DB-1805, respectively. Elsewhere in the study area, changes were more modest. Shorecliffs (SC-1720) and T-Street (SC-1660) remained essentially unchanged (change of 10 ft, or less), while modest gains occurred at Linda Lane (13 ft; SC-1680) and San Clemente State Beach (23 ft; SC-1623). On average, beach widths decreased by 51 ft among the six sites for which data are available.

Table 2. Mean Sea Level Beach Width Changes at San Clemente Area Transects

Transect	Location	MSL Beach Width Change (ft)	
		Oct 2001 - Oct 2022 (22 Years)	Oct 1986 - Oct 2022 (37 Years)
DB-1850	N. Doheny SB	-94	-137
DB-1805	S. Doheny SB	-112	-205
SC-1720	Shorecliffs	-20	3
SC-1705	Capistrano Trailer Court	-27	--
SC-1702	North Beach	--	--
SC-1700	North Beach	-11	--
SC-1695	Dije Court	-26	--
SC-1680	Linda Lane	61	13
SC-1660	T-Street	48	-5
SC-1645	Lost Winds	37	--
SC-1623	San Clemente SB	25	23
SC-1605	Cottons Point	-140	--

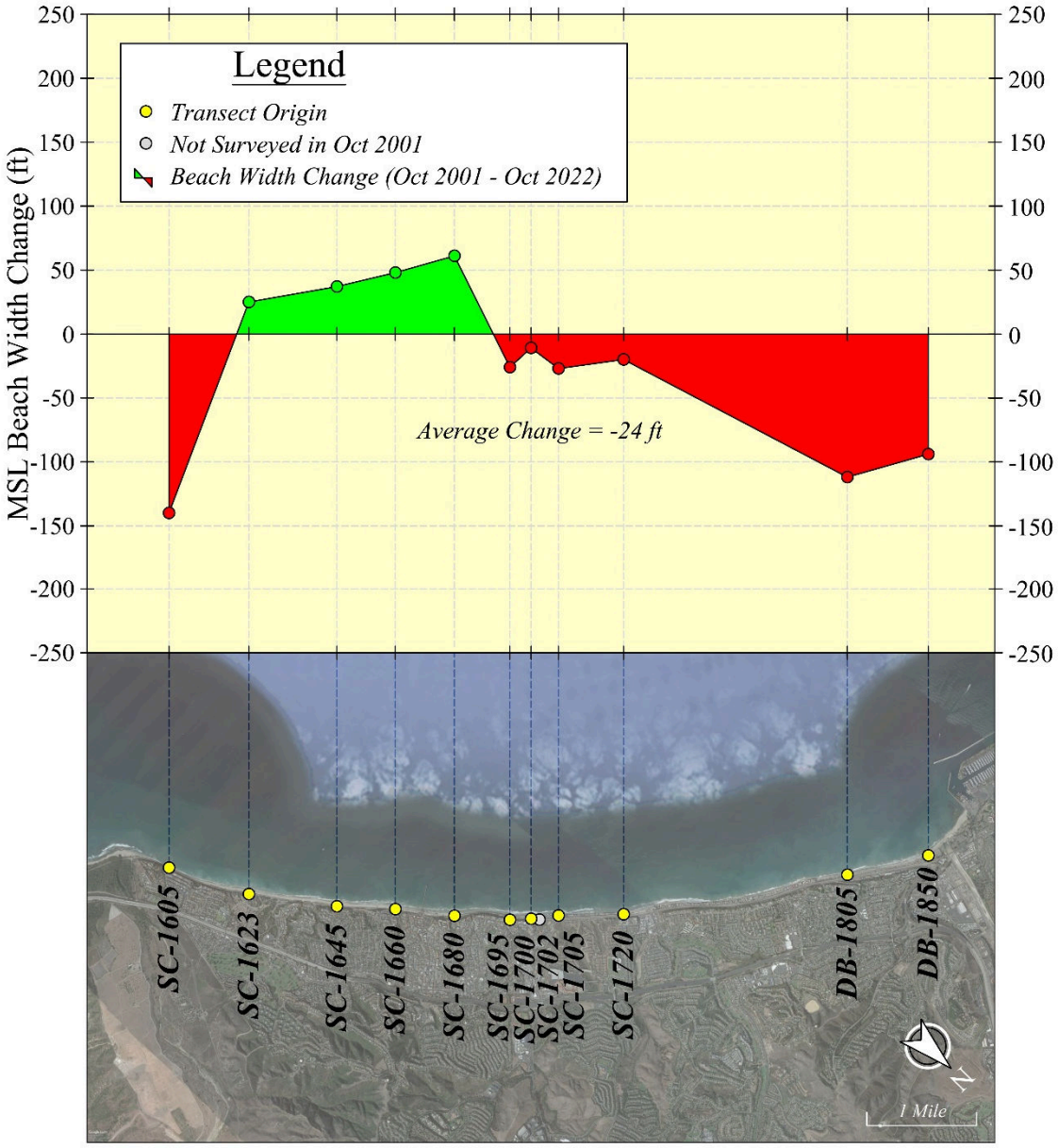

Figure 3. Beach Width Changes, October 2001 to October 2022

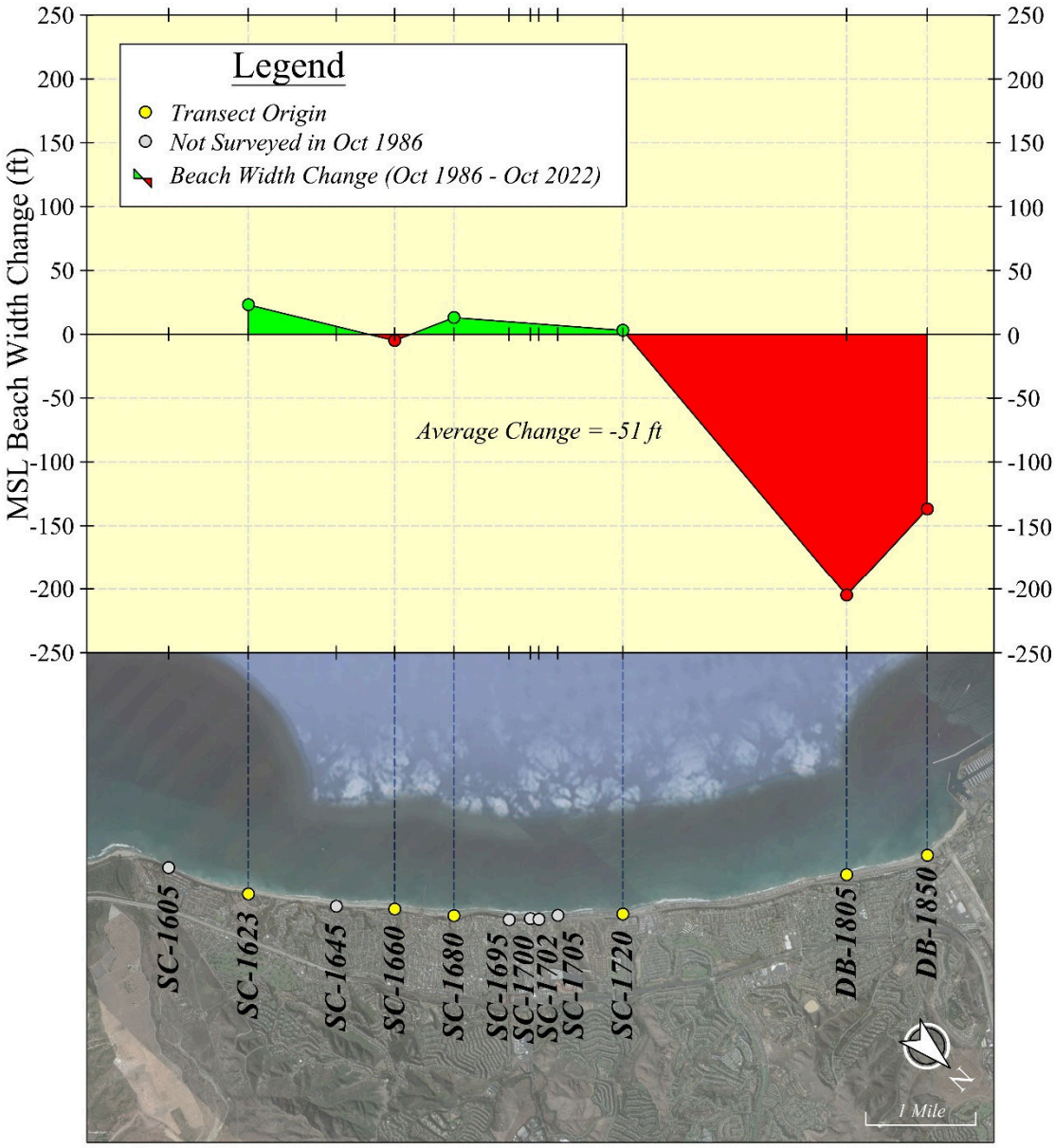

Figure 4. Beach Width Changes, October 1986 to October 2022

Profile Changes

Southern California Edison constructed the 376-acre artificial Wheeler North Reef (WNR) offshore of the San Clemente shoreline during three phases between 1999 and 2020. While the Phase 1 Experimental Reef (22.4 acres) was installed in 1999 prior to the 2001-2007 Beach Monitoring Program, the majority of the reef was constructed after the May 2007 Survey as Phase 2 (152 acres, June to September 2008; Coastal Environments, 2018) and Phase 3 (202 acres, July 2019 to July 2020; SCE, 2020). Changes evident in the October 2022 profiles relative to the historical data in depths greater than about 40 ft at Transects SC-1720 through SC-1605 are believed to be artifacts of the WNR.

1.) **Doheny State Beach:** Substantial above-water erosion occurred at both Doheny State Beach locations (DB-1850 and DB-1805) during the 16-year period between the October 2006 and October 2022 surveys. The above-water profile at both sites retreated about 100 ft during this period, with the October 2022 profile falling below the historical envelope at both locations.

2.) **Shorecliffs:** The October 2022 profile at Shorecliffs (SC-1720) shows significant erosion above the waterline when compared to the historical profile envelope. Increased jaggedness in the October 2022 profile between roughly -38 and -48 ft MLLW is presumed to be the WNR.

3.) **Capistrano Trailer Court:** At Capistrano Trailer Court (SC-1705), the historical surveys documented a narrow beach in front of the revetment. By time of the October 2022 survey, the beach was severely eroded, with the highest sand elevations approximating MLLW. Below water, minimal change occurred between the October 2006 and October 2022 conditions. The WNR also appears in the October 2022 profile at this site between approximately -40 and -44 ft MLLW.

4.) **North Beach:** The above water portion of the October 2022 profiles for the two transects located at North Beach (SC-1702 and SC-1700) were slightly eroded in comparison to the October 2006 condition. Below water, profile changes were negligible during this period with the exception of increased jaggedness offshore in the vicinity of -40 ft MLLW, presumed to be the WNR.

5.) **Dije Court:** The October 2022 profile at Dije Court (SC-1695) was more eroded than the historical envelope in the above-water region, with essentially no beach sand observed above MSL. Below water, the profile changes were modest relative to the historical condition.

6.) **Linda Lane to San Clemente State Beach:** The October 2022 profiles at Linda Lane (SC-1680), T-Street (SC-1660), Lost Winds (SC-1645), and San Clemente State Beach (SC-1623) show modest above-water accretion relative to the October 2006 survey. The October 2022 profiles at each location exceed the historical envelope in this region. At Linda Lane, the accretion also extends below water to a depth of roughly 14 ft. At T-Street, Lost Winds, and San Clemente State Beach, modest below-water losses prevailed. In areas further offshore where the October 2022 profiles differ from the historical range, it is believed that the changes are artifacts of the WNR.

7.) **Cottons Point:** At Cottons Point (SC-1605), the profiles show considerable erosion between the October 2006 and October 2022 surveys from the back beach to a depth of about 30 ft. The maximum sand elevation declined from about +15 ft during the Fall 2001 to Spring 2007 period, to +3.5 ft at the time of the October 2022 survey. In addition, the profile retreated over 100 ft landward during this period. The increased jaggedness in the October 2022 nearshore profile (ranges of ~200 to 1500 ft) also suggests exposure of natural hard-bottom reef as a result of the sand loss. At approximately range 4500 ft, the October 2022 profile falls below the lower limit of the envelope, which coincides with the general location of the WNR.

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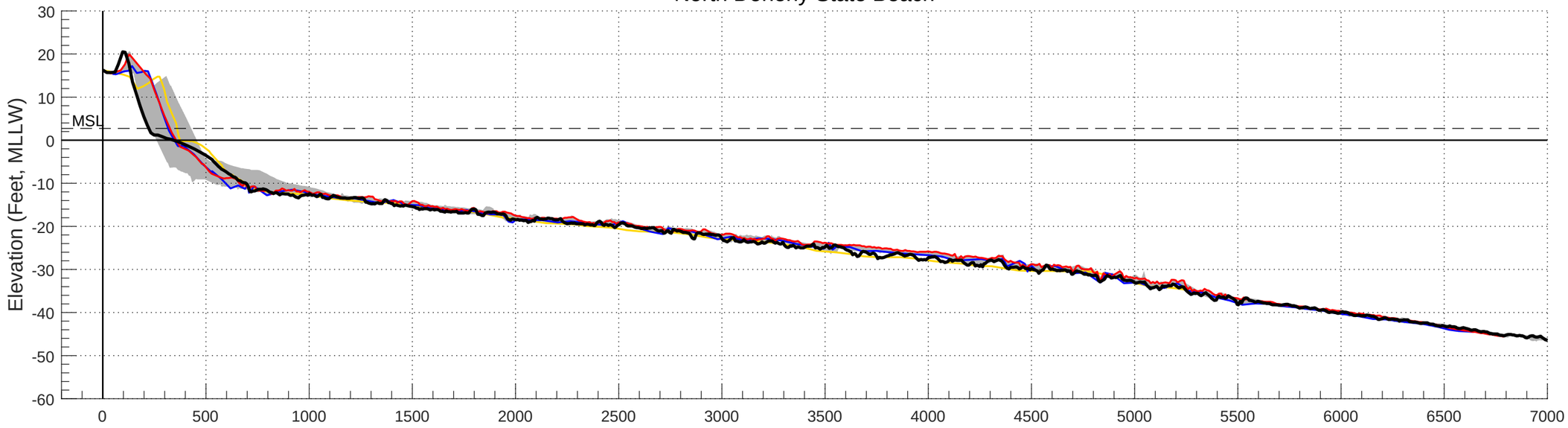
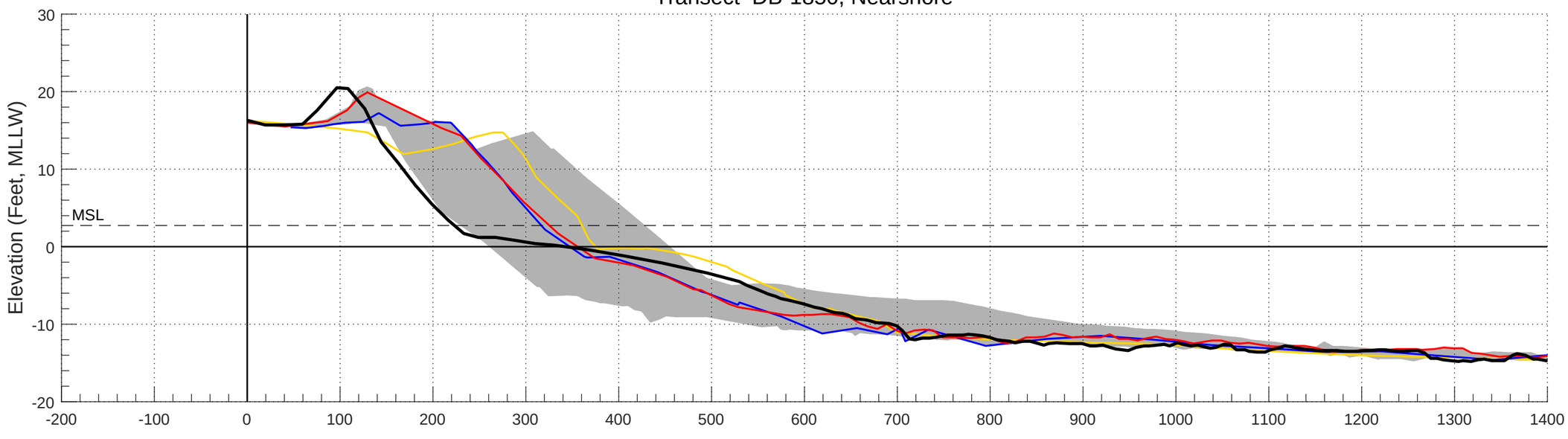
APPENDIX A

BEACH PROFILE PLOTS

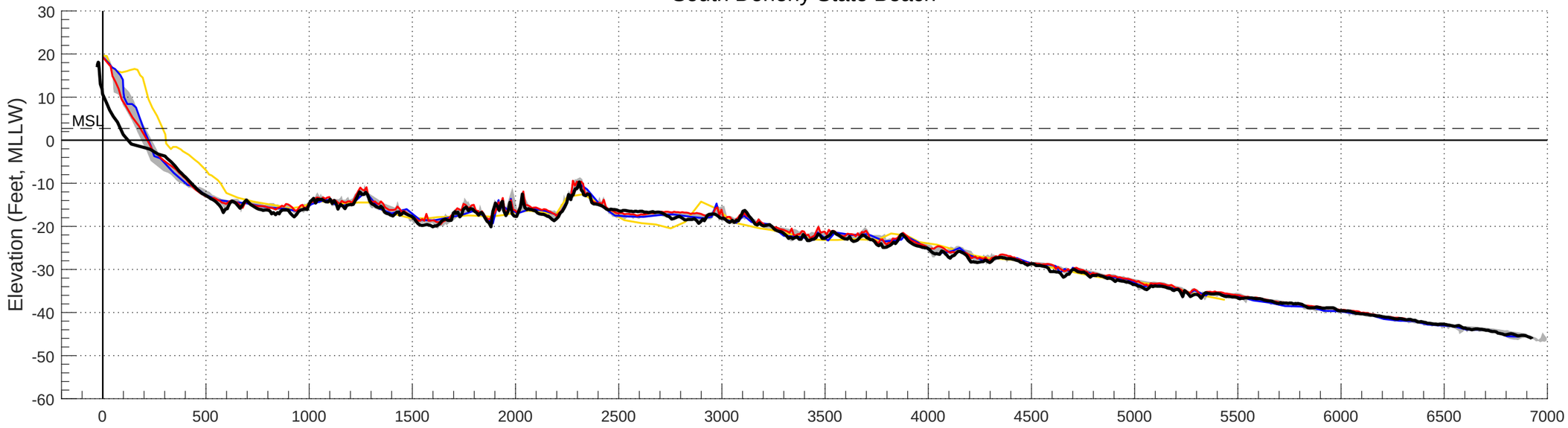
Transect DB-1850
North Doheny State Beach



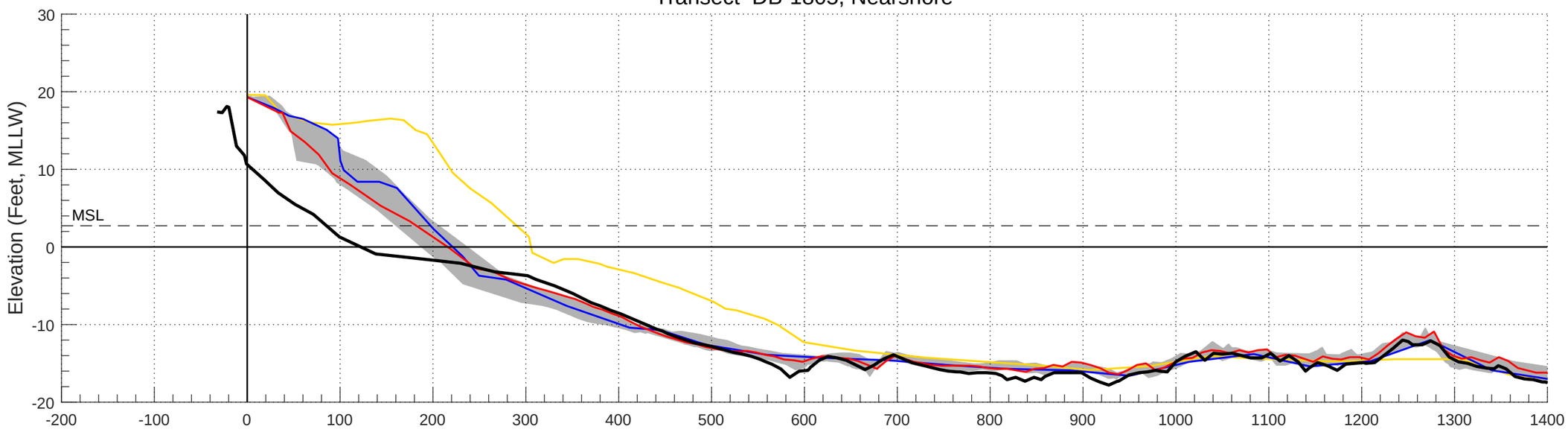
Transect DB-1850, Nearshore



Transect DB-1805
South Doheny State Beach



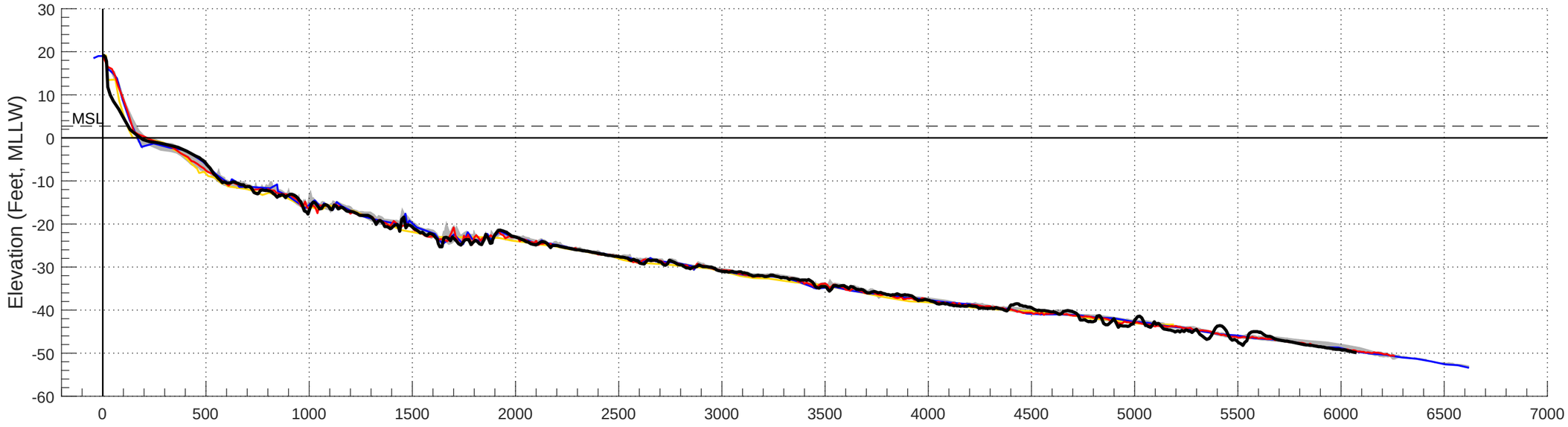
Transect DB-1805, Nearshore



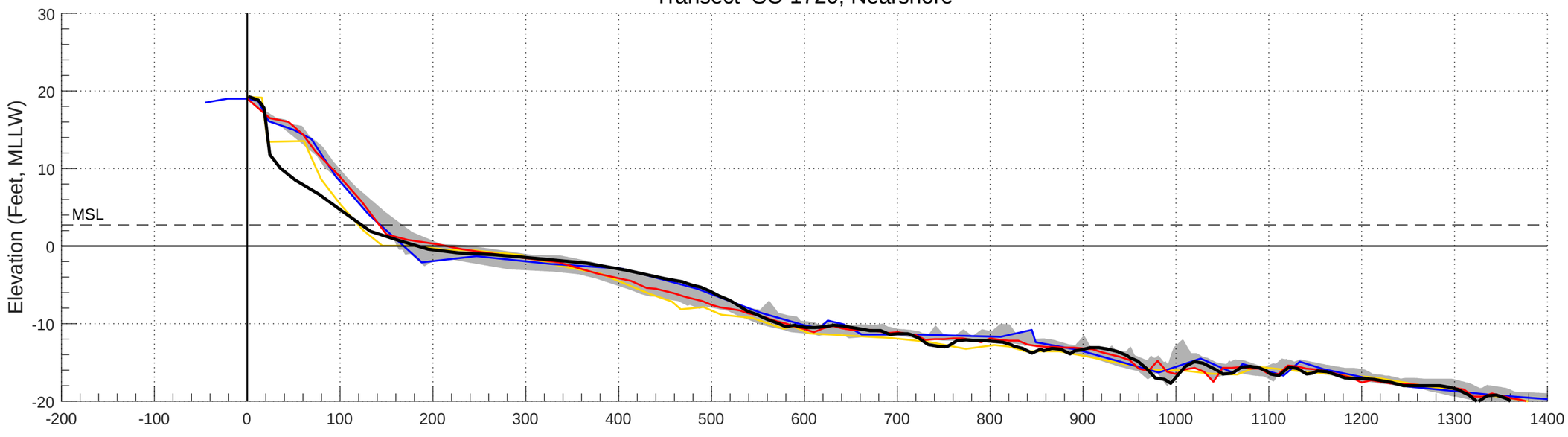
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 1986
Oct 2001
Oct 2006
Oct 2022

Transect SC-1720
Shorecliffs



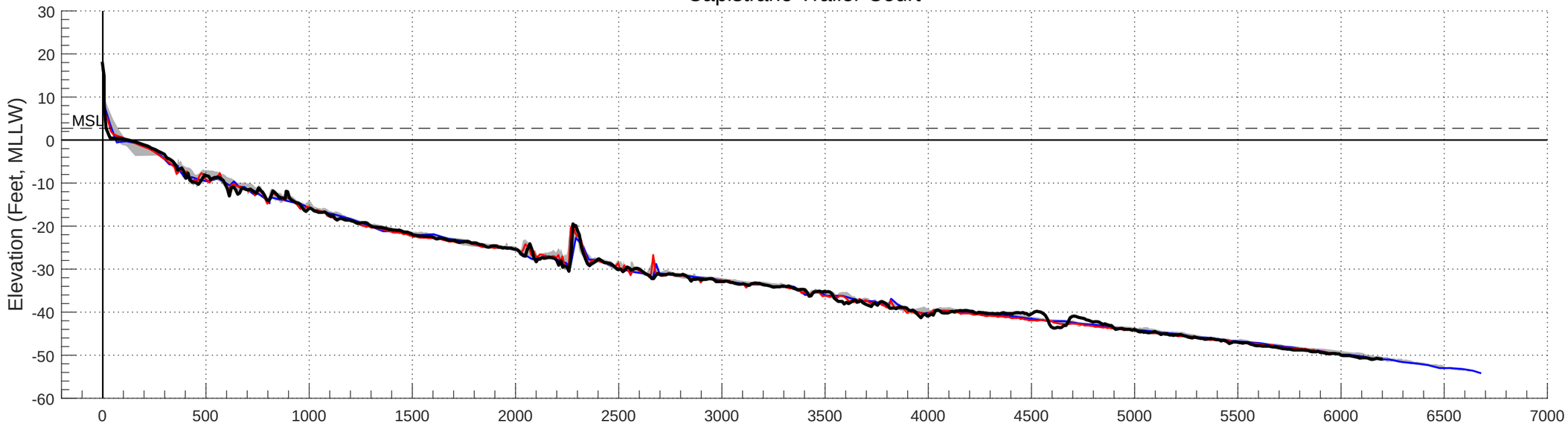
Transect SC-1720, Nearshore



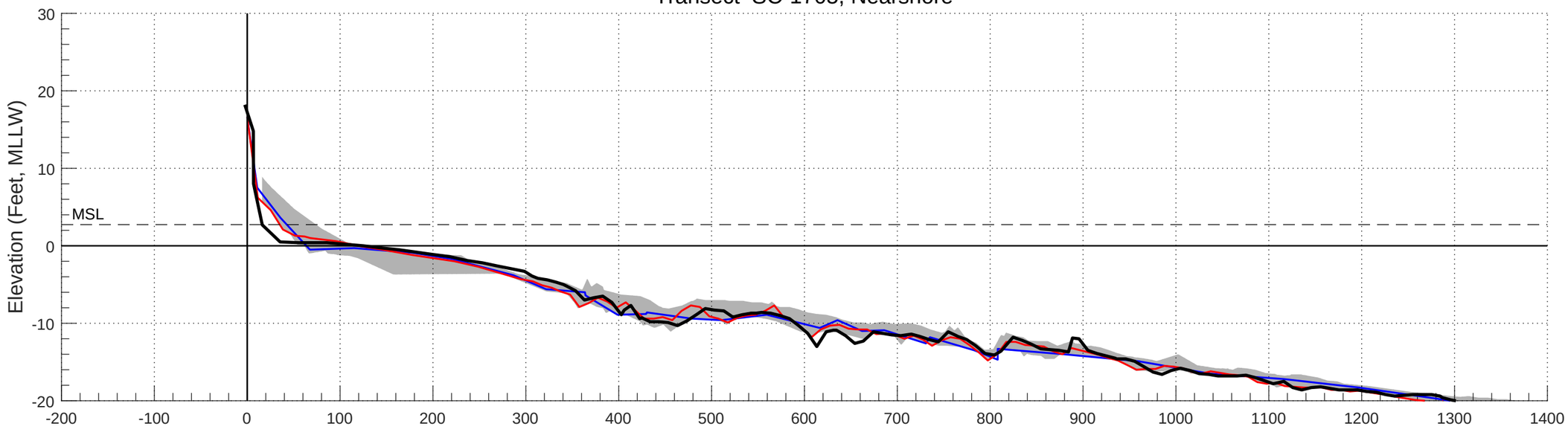
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 1986
Oct 2001
Oct 2006
Oct 2022

Transect SC-1705
Capistrano Trailer Court



Transect SC-1705, Nearshore



Cross-Shore Distance (Feet Seaward of Transect Origin)

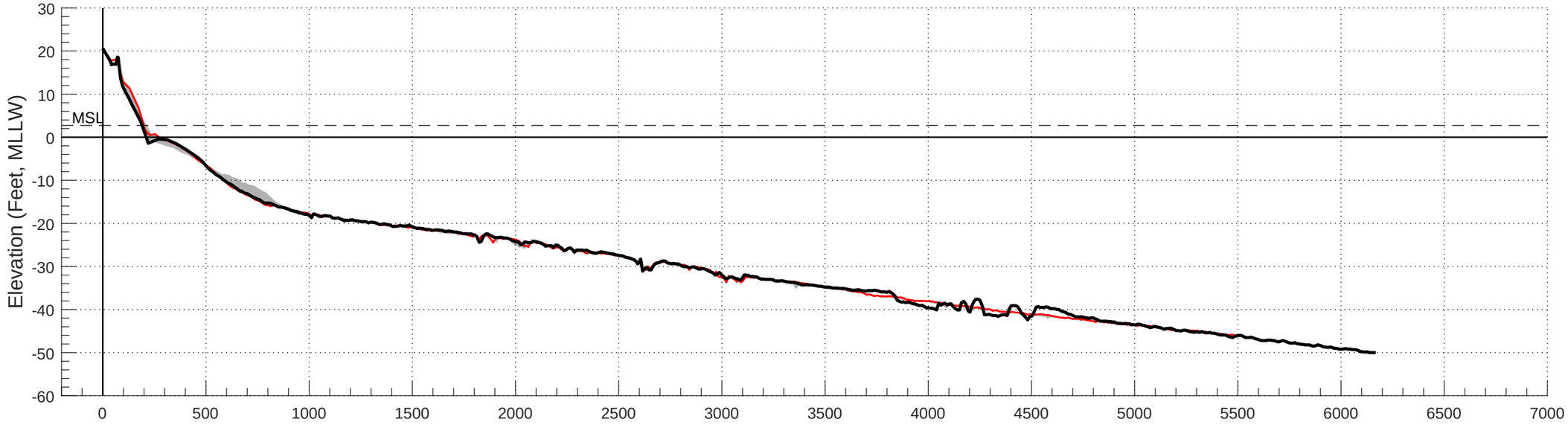
Profile Envelope (Fall 2001 - Spring 2007)

Oct 2001

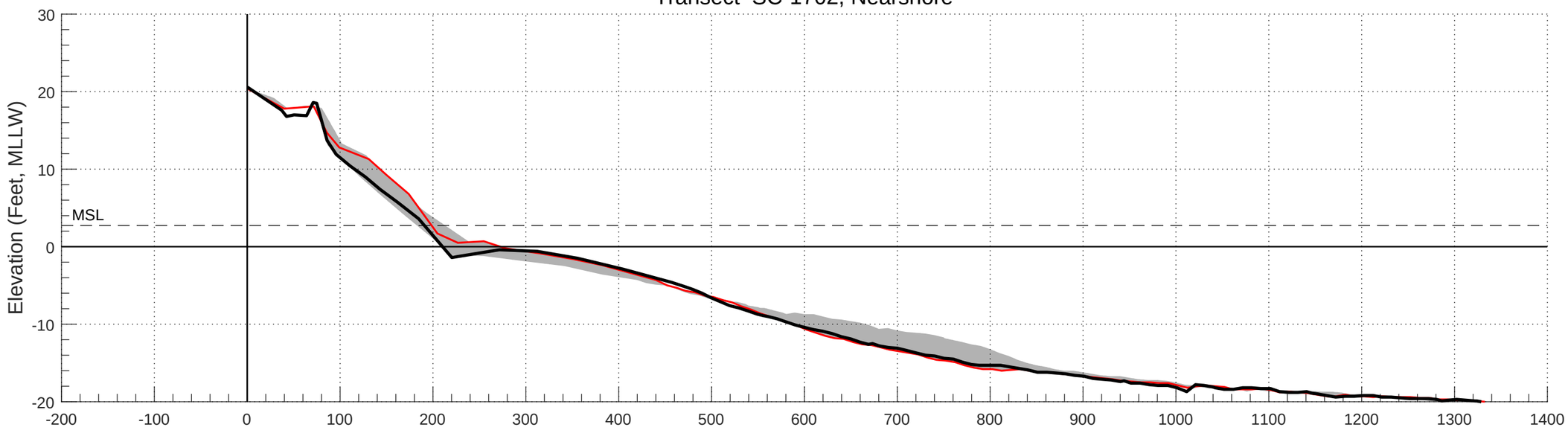
Oct 2006

Oct 2022

Transect SC-1702
North Beach



Transect SC-1702, Nearshore



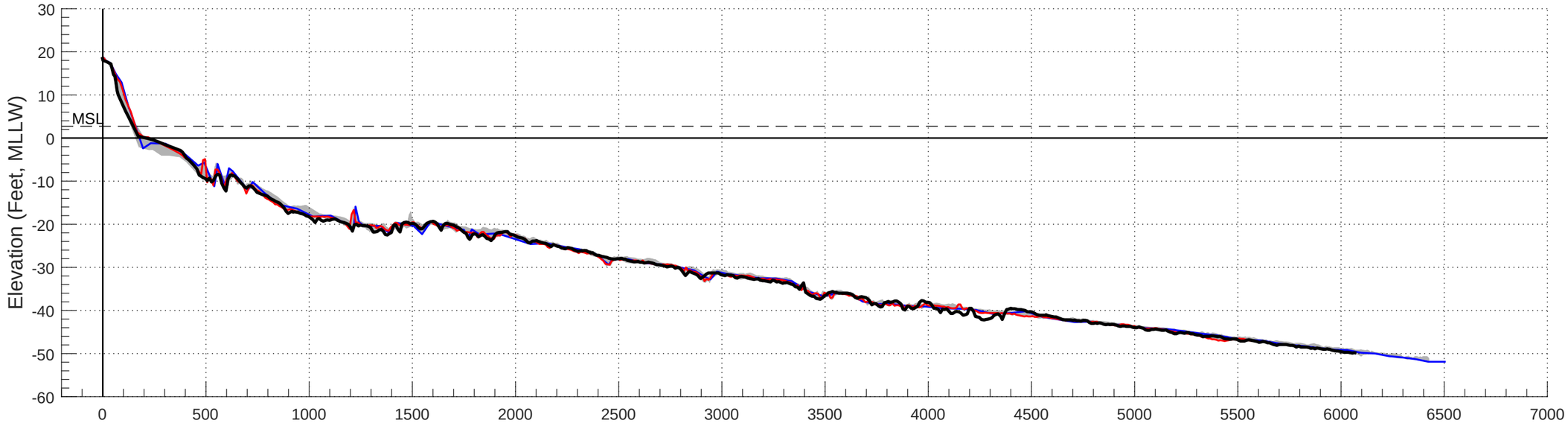
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope
(Fall 2001 - Spring 2007)

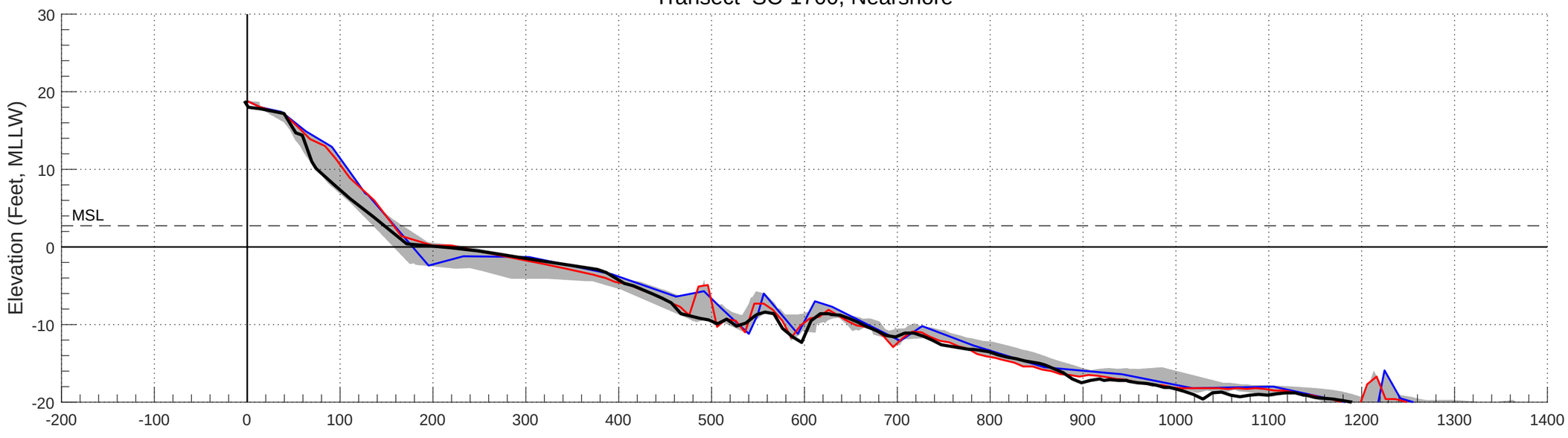
Oct
2006

Oct
2022

Transect SC-1700
North Beach



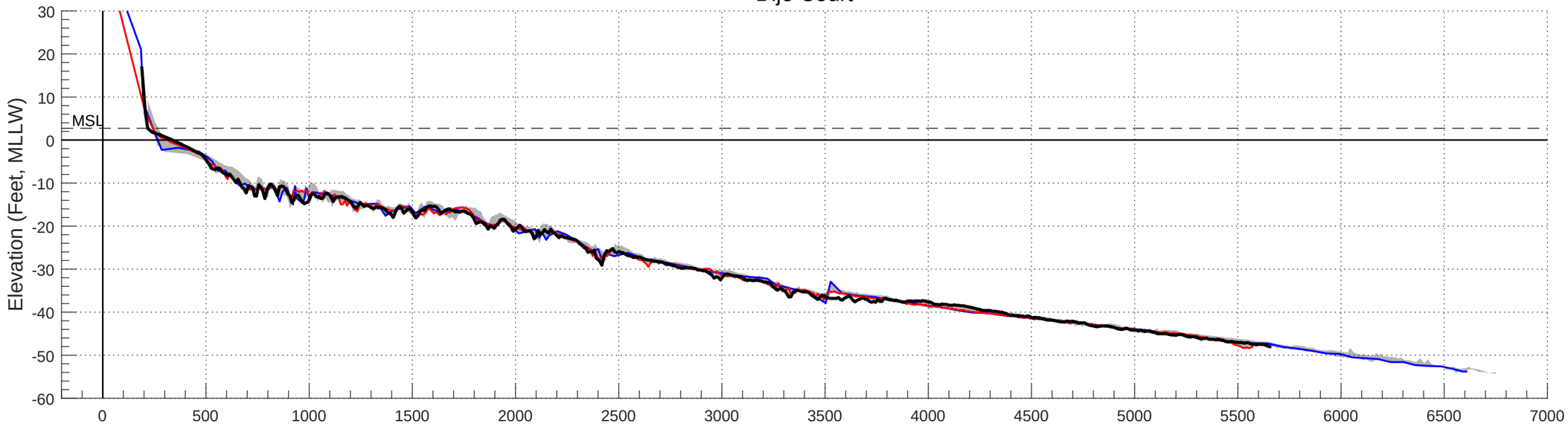
Transect SC-1700, Nearshore



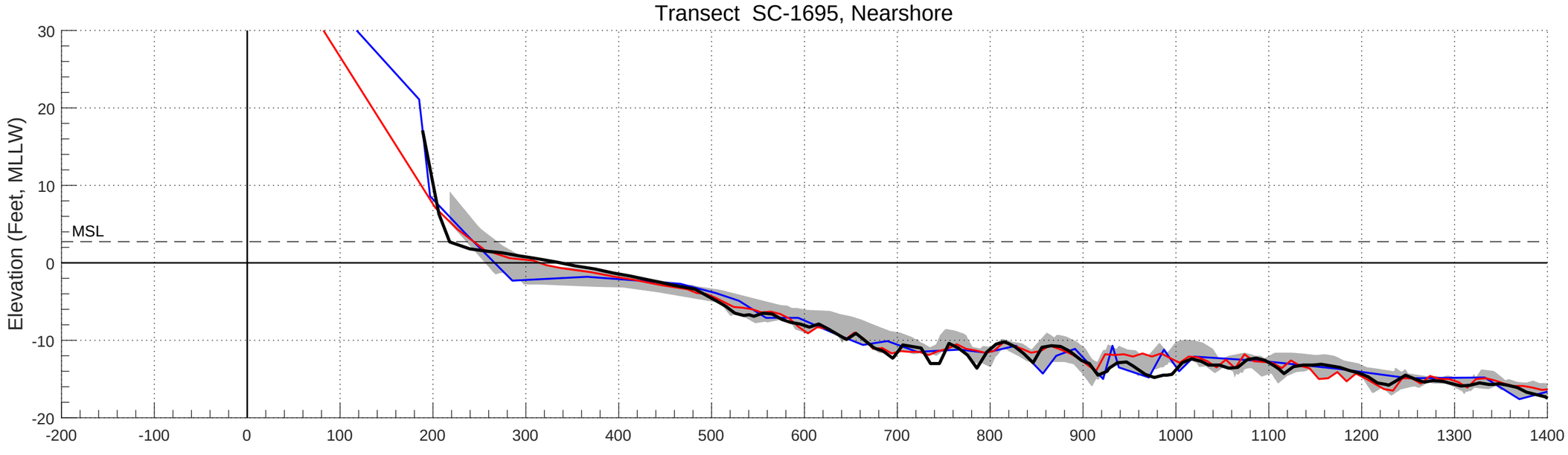
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 2001
Oct 2006
Oct 2022

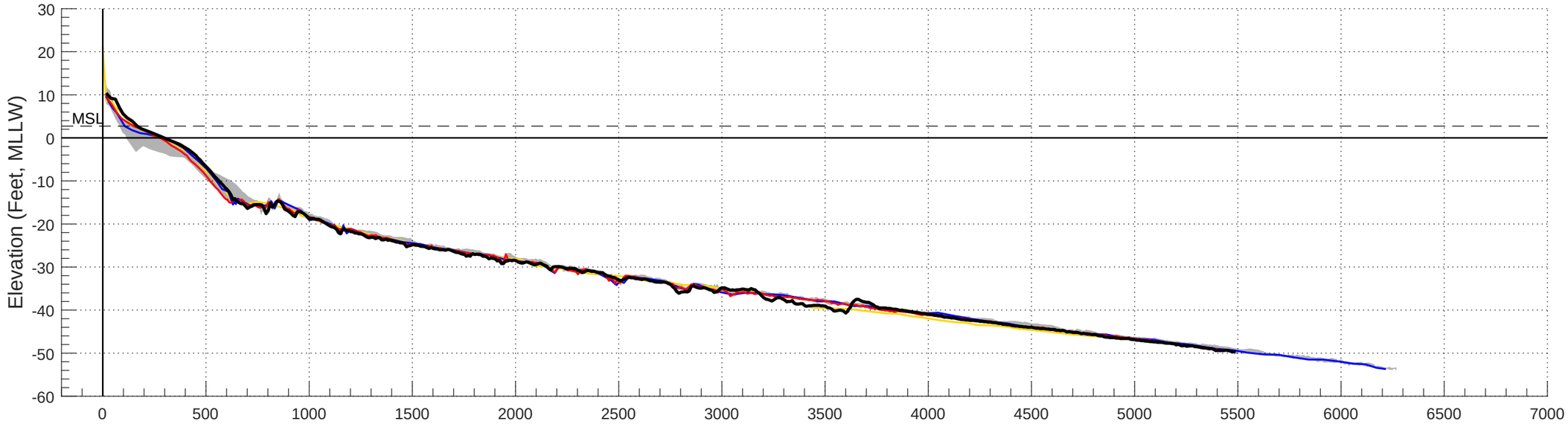
Transect SC-1695
Dije Court



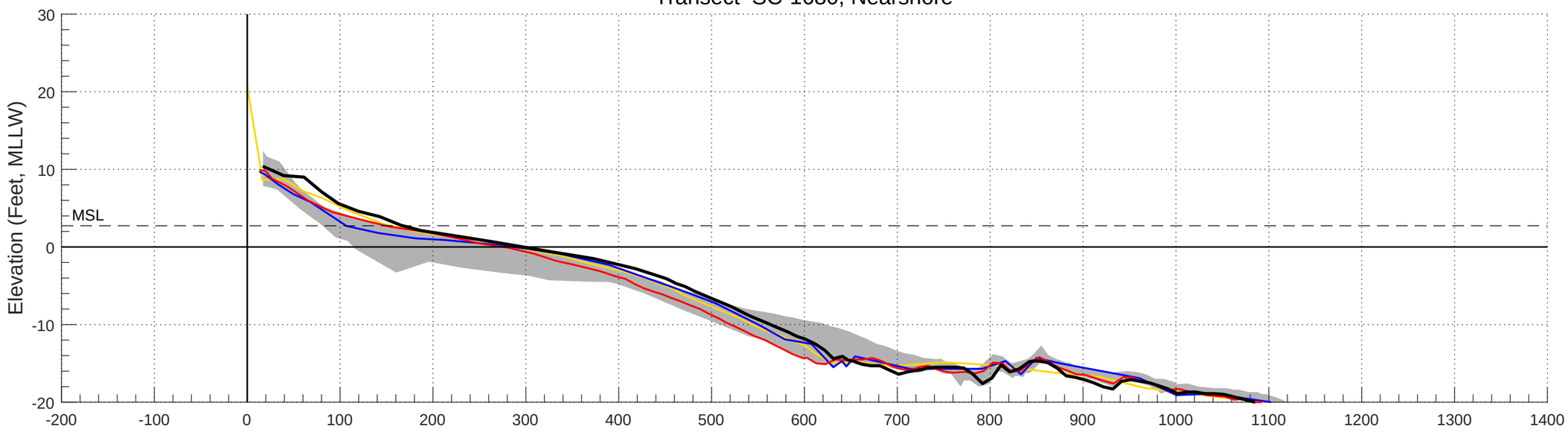
Transect SC-1695, Nearshore



Transect SC-1680
Linda Lane



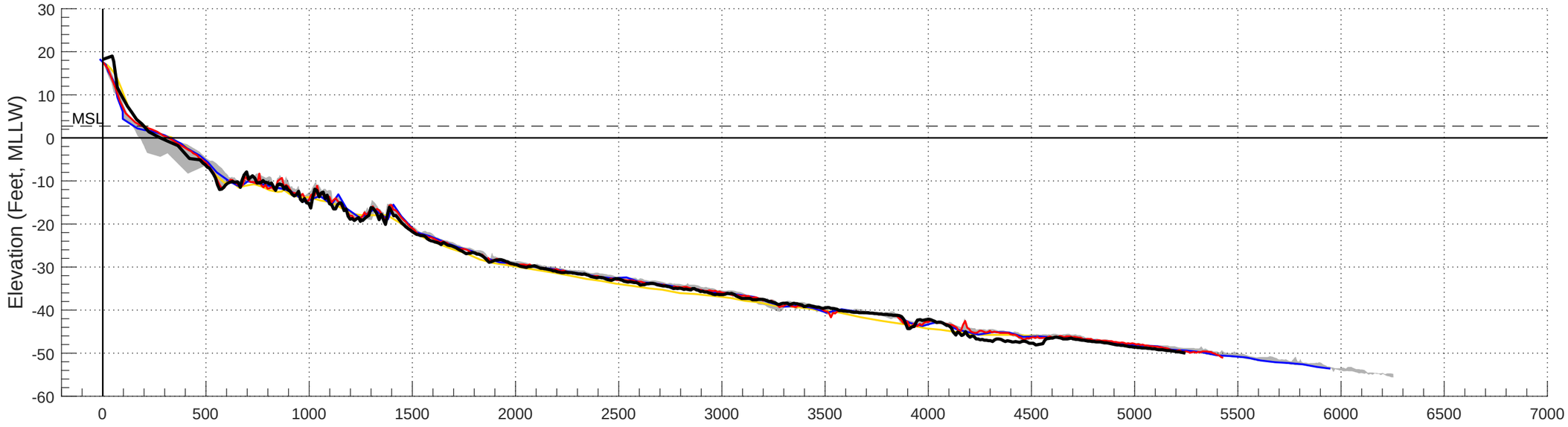
Transect SC-1680, Nearshore



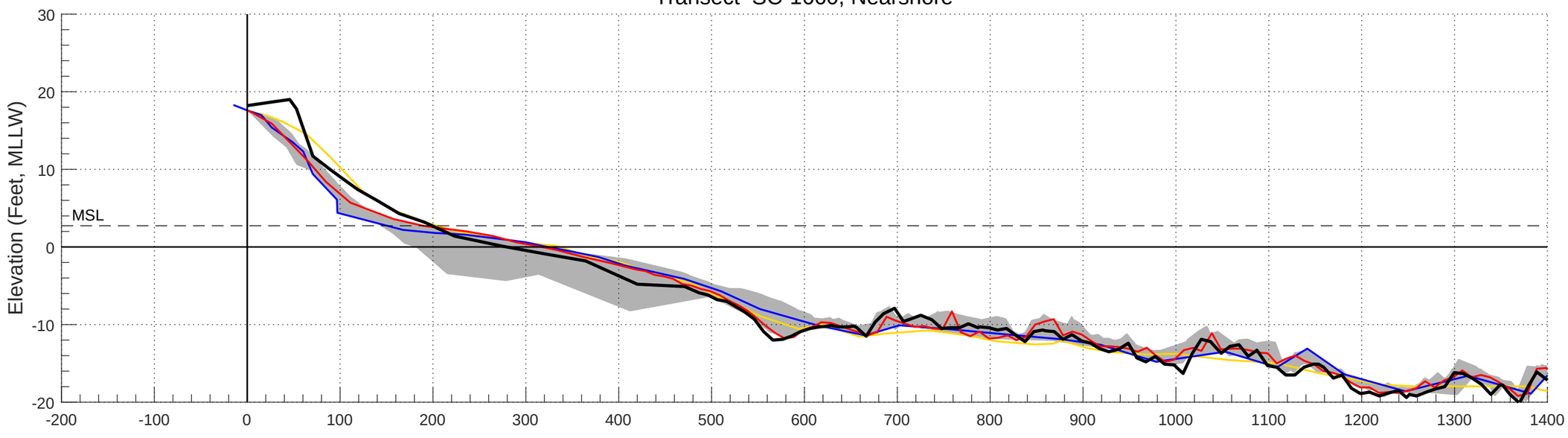
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 1986
Oct 2001
Oct 2006
Oct 2022

Transect SC-1660
T-Street



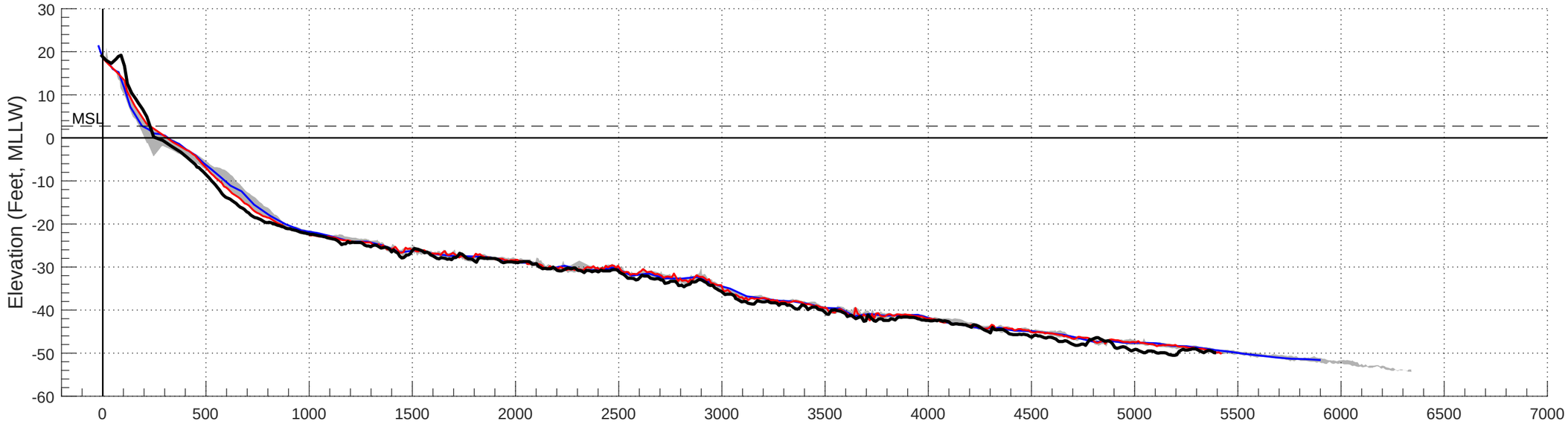
Transect SC-1660, Nearshore



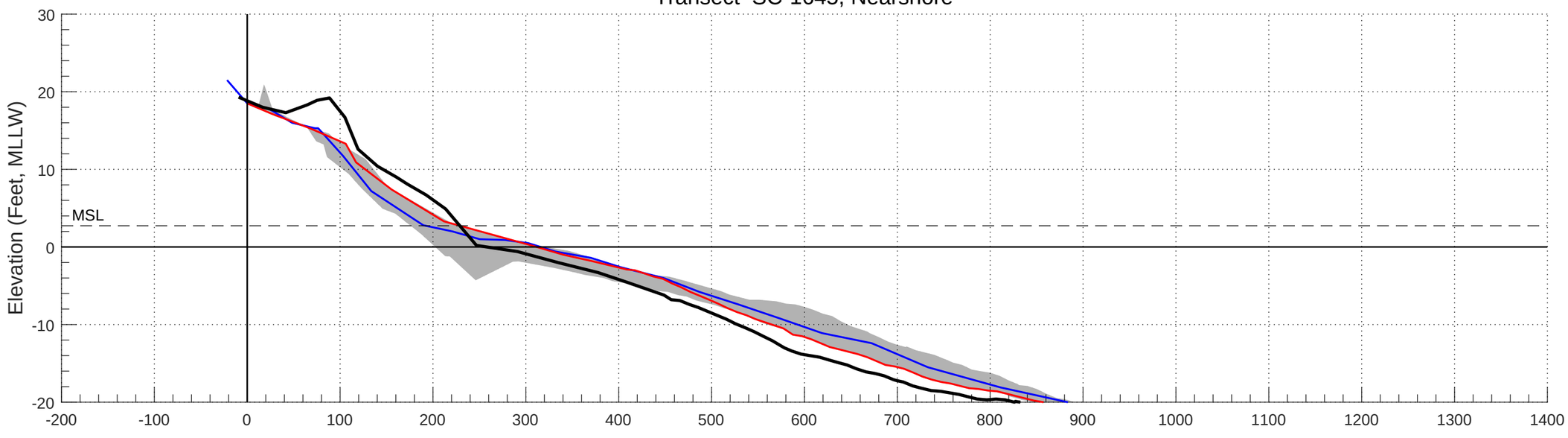
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 1986
Oct 2001
Oct 2006
Oct 2022

Transect SC-1645
Lost Winds



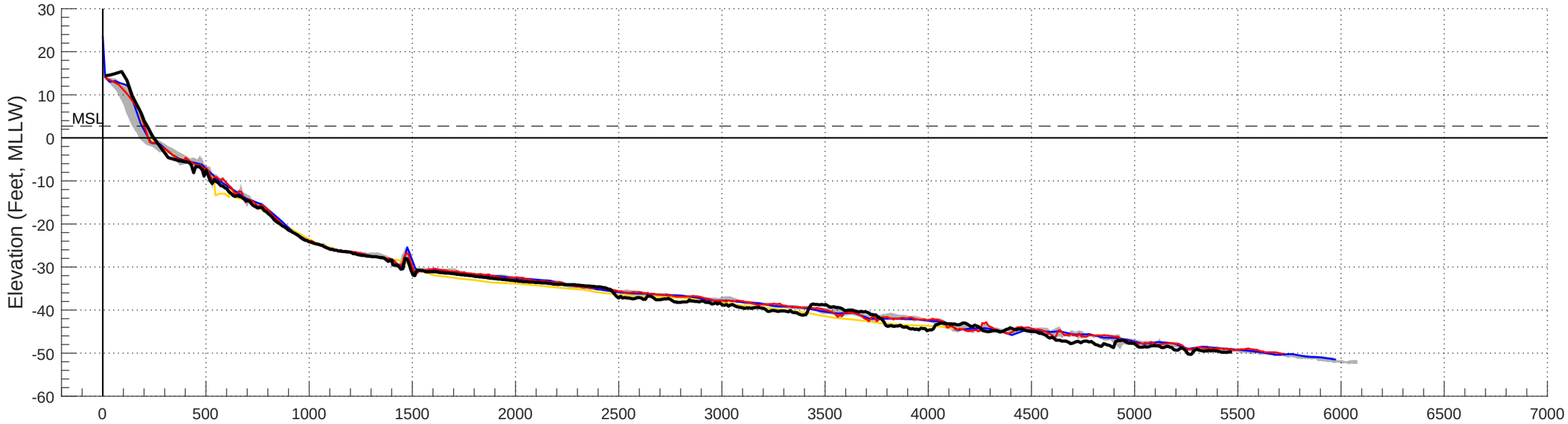
Transect SC-1645, Nearshore



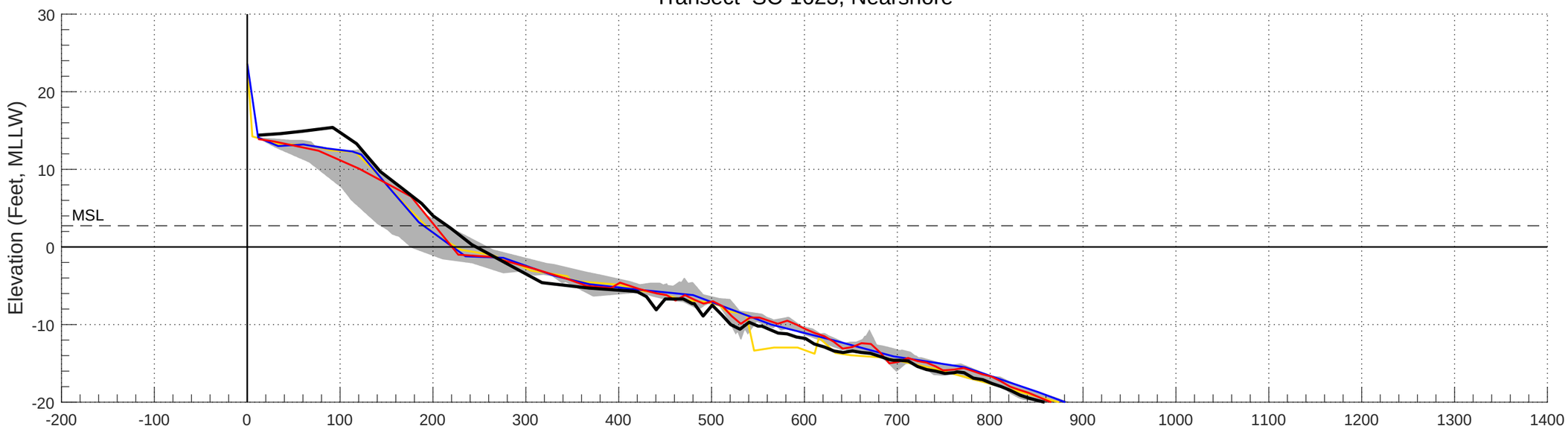
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 2001
Oct 2006
Oct 2022

Transect SC-1623
San Clemente State Beach



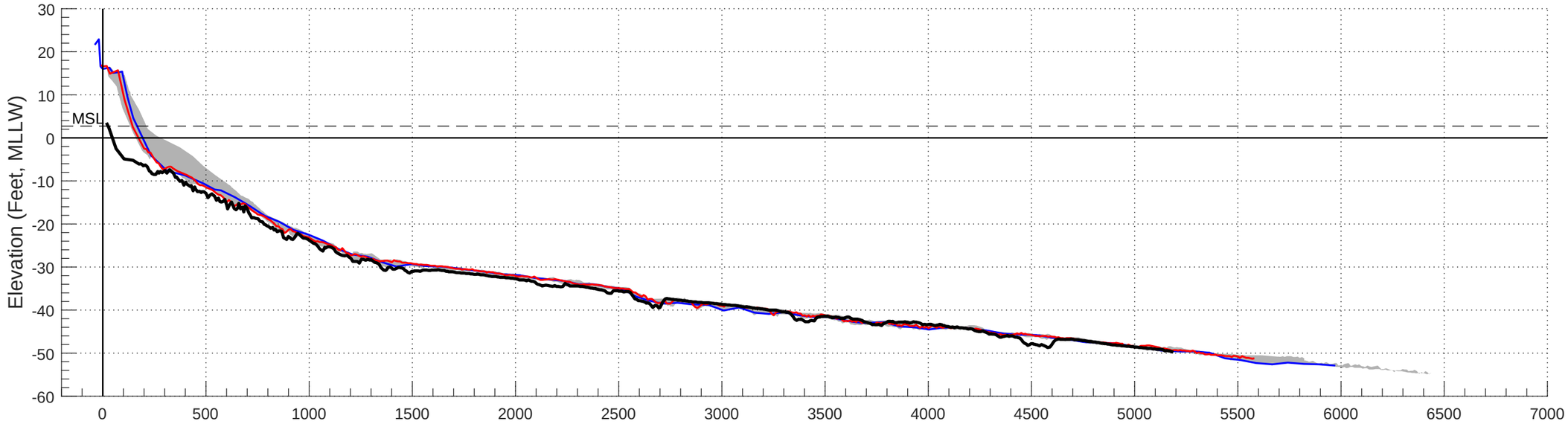
Transect SC-1623, Nearshore



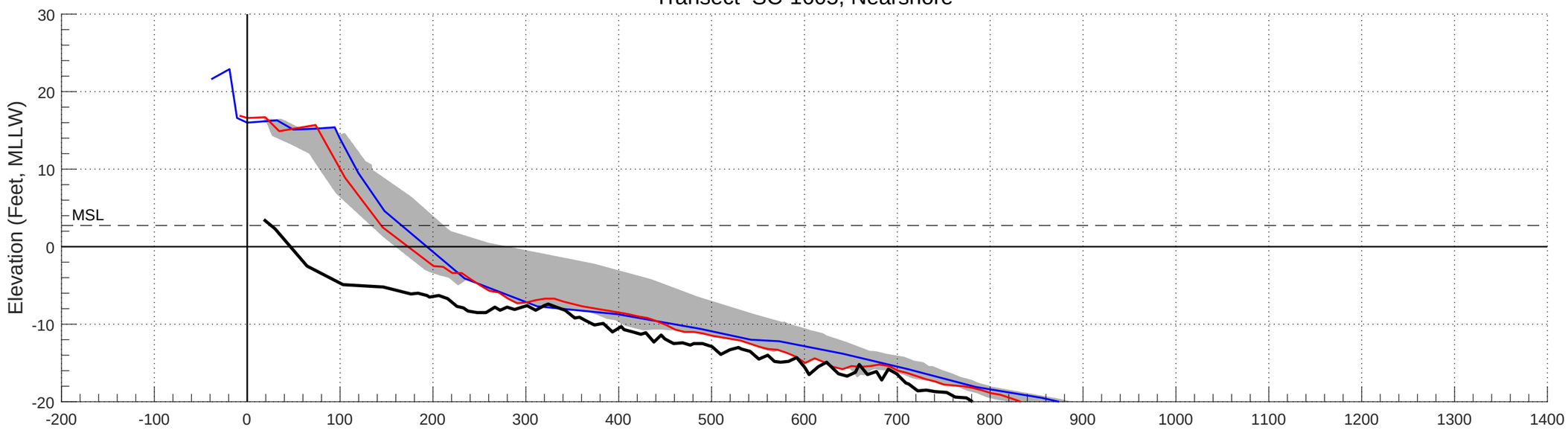
Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)
Oct 1986
Oct 2001
Oct 2006
Oct 2022

Transect SC-1605
Cottons Point



Transect SC-1605, Nearshore



Cross-Shore Distance (Feet Seaward of Transect Origin)

Profile Envelope (Fall 2001 - Spring 2007)

Oct 2001

Oct 2006

Oct 2022

APPENDIX B

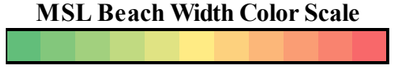
MEAN SEA LEVEL BEACH WIDTHS DERIVED FROM BEACH PROFILE DATA

Mean Sea Level Beach Widths Derived from Beach Profile Surveys

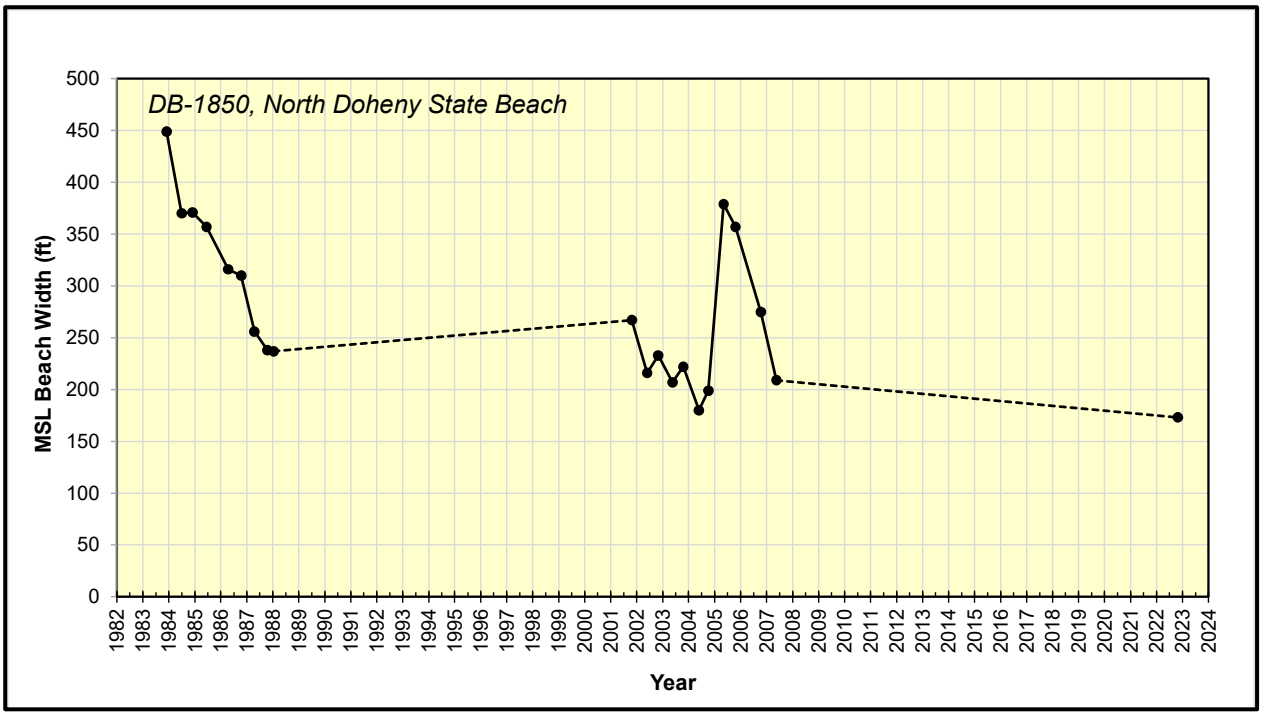
Transect	Mean Sea Level Beach Width (feet) [1]																										Landward Limit of Sand
	Nov/Dec 1983	Jun/Jul 1984	Nov/Dec 1984	Jun 1985	Apr 1986	Oct 1986	Apr 1987	Oct 1987	Jan 1988	Dec 1989	Oct 2001	May 2002	Oct 2002	May 2003	Oct 2003	May 2004	Oct 2004	May 2005	Oct 2005	Oct 2006	May 2007	Nov 2016	Dec 2016	May 2017	Nov 2017	Oct 2022	
DB-1850 North Doheny State Beach	449	370	371	357	316	310	256	238	237	--	267	216	233	207	222	180	199	379	357	275	209	--	--	--	--	173	Campground
DB-1805 South Doheny State Beach	319	320	318	329	300	317	267	299	--	259	224	234	218	215	200	195	191	200	187	209	218	--	--	--	--	112	Bike Path
SC-1720 Shorecliffs	172	170	191	171	189	165	194	167	198	211	188	207	196	205	193	198	197	200	195	187	212	--	--	--	--	168	Railroad Pad
SC-1705 Capistrano Trailer Court	--	--	--	--	--	--	--	--	--	--	27	43	32	48	24	39	31	47	25	19	58	23	47	40	16	0	Revetment
SC-1702 North Beach	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	173	159	143	152	134	141	155	151	Revetment
SC-1700 North Beach	--	--	--	--	--	--	--	--	--	--	162	147	156	138	155	150	163	138	171	161	146	159	145	144	151	151	Railroad Fence
SC-1695 Dije Court	--	--	--	--	--	--	--	--	--	--	26	52	36	50	26	34	18	36	27	26	50	32	41	42	23	0	Revetment
SC-1680 Linda Lane	--	92	106	97	73	138	64	127	--	132	90	76	111	64	100	75	110	65	126	133	77	--	--	--	--	151	Tunnel Headwall
SC-1660 T-Street	241	186	172	176	159	204	139	175	146	203	151	155	158	143	165	147	168	149	159	189	155	--	--	--	--	199	Light Post
SC-1645 Lost Winds	--	--	--	--	--	--	--	--	--	--	201	185	203	200	208	195	234	198	219	238	187	--	--	--	--	238	Railroad Fence
SC-1623 San Clemente State Beach	188	156	171	153	168	180	159	185	--	216	178	131	204	134	175	138	185	155	186	190	145	--	--	--	--	203	Tunnel Headwall
SC-1605 Cottons	--	--	--	--	--	--	--	--	--	--	148	182	128	180	171	194	146	156	115	126	141	--	--	--	--	8	Revetment

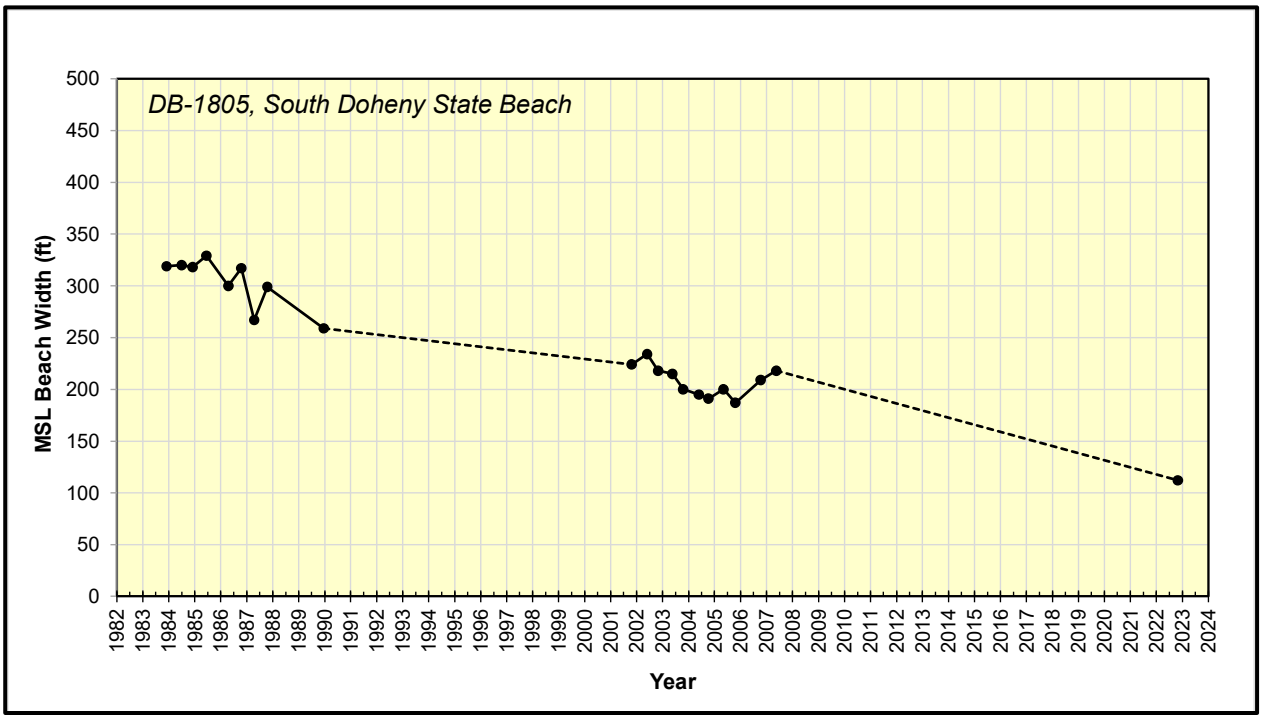
Notes: [1] Color-coded cells illustrate the rank of each beach width relative to all values within the database shown (twelve sites; Nov/Dec 1983 to Oct 2022). See color scale below.

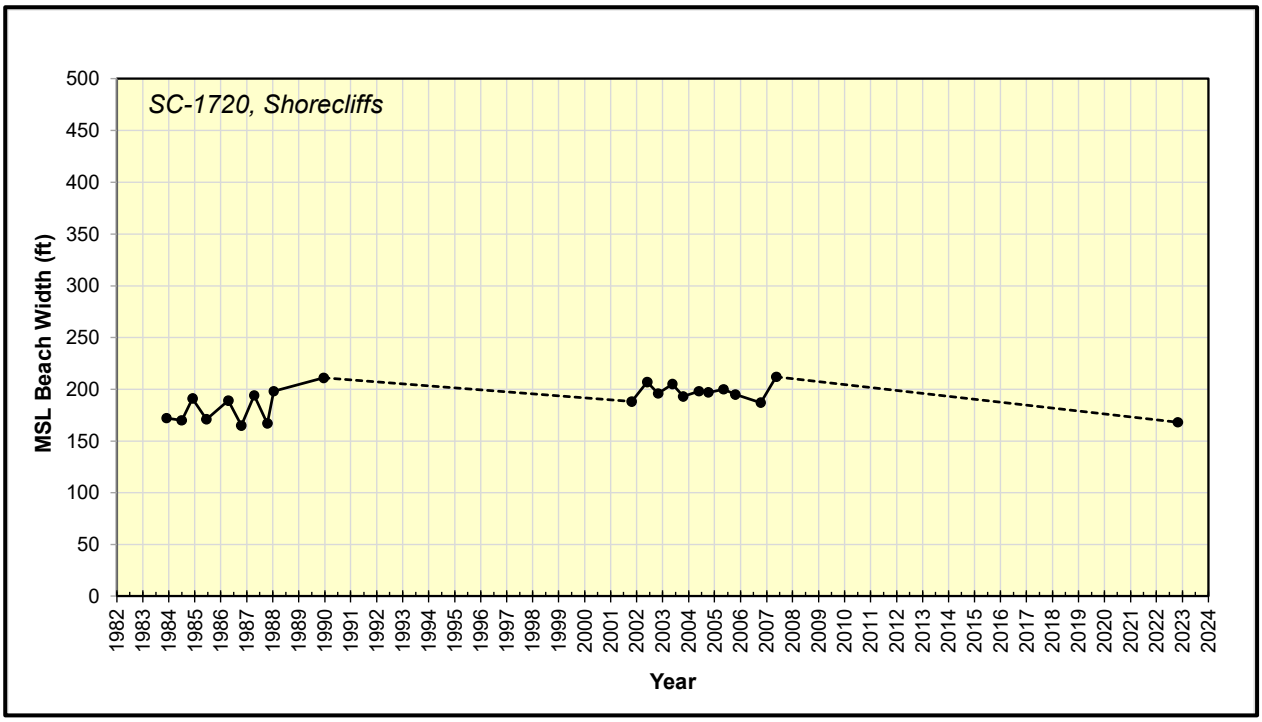
MSL Beach Width Color Scale

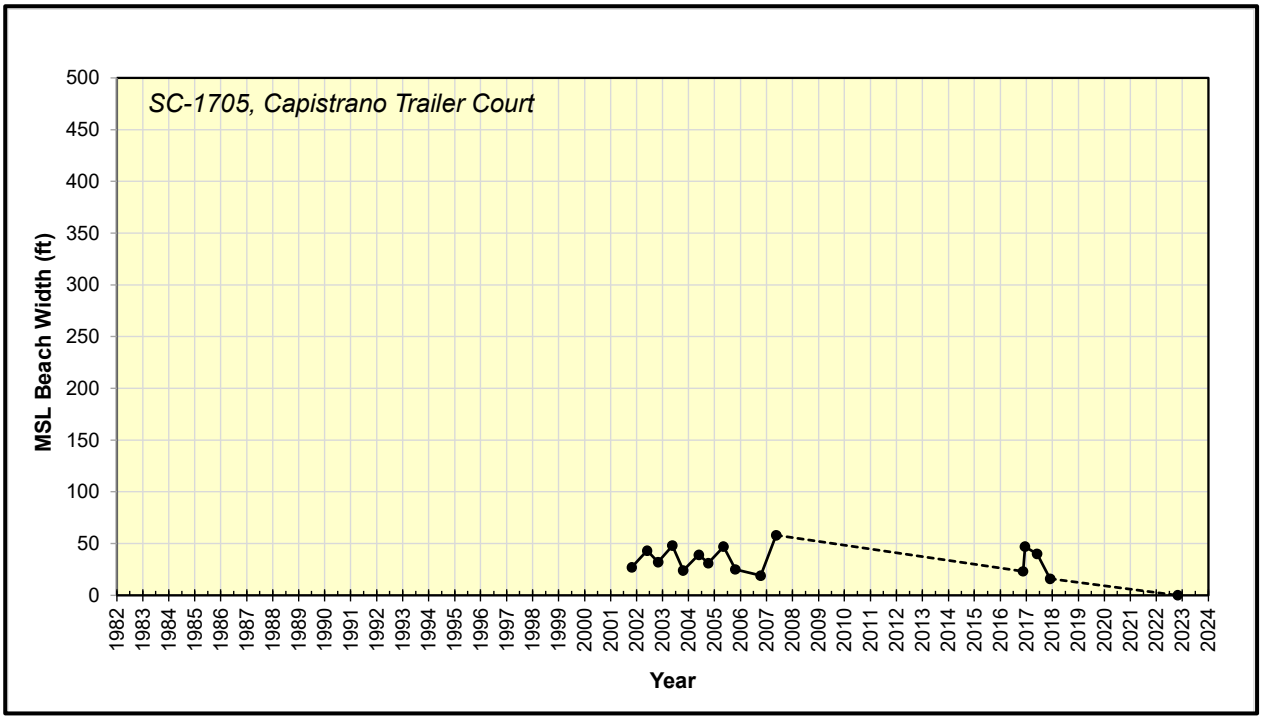


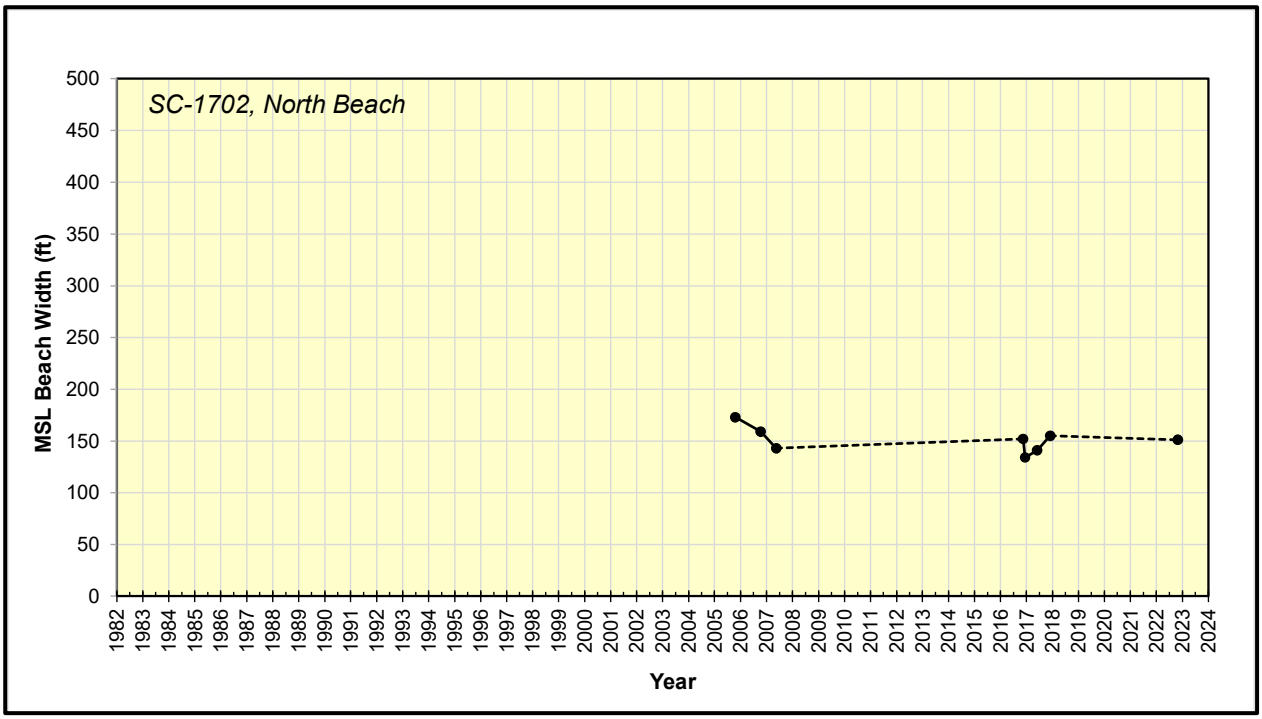
Widest **Narrowest**

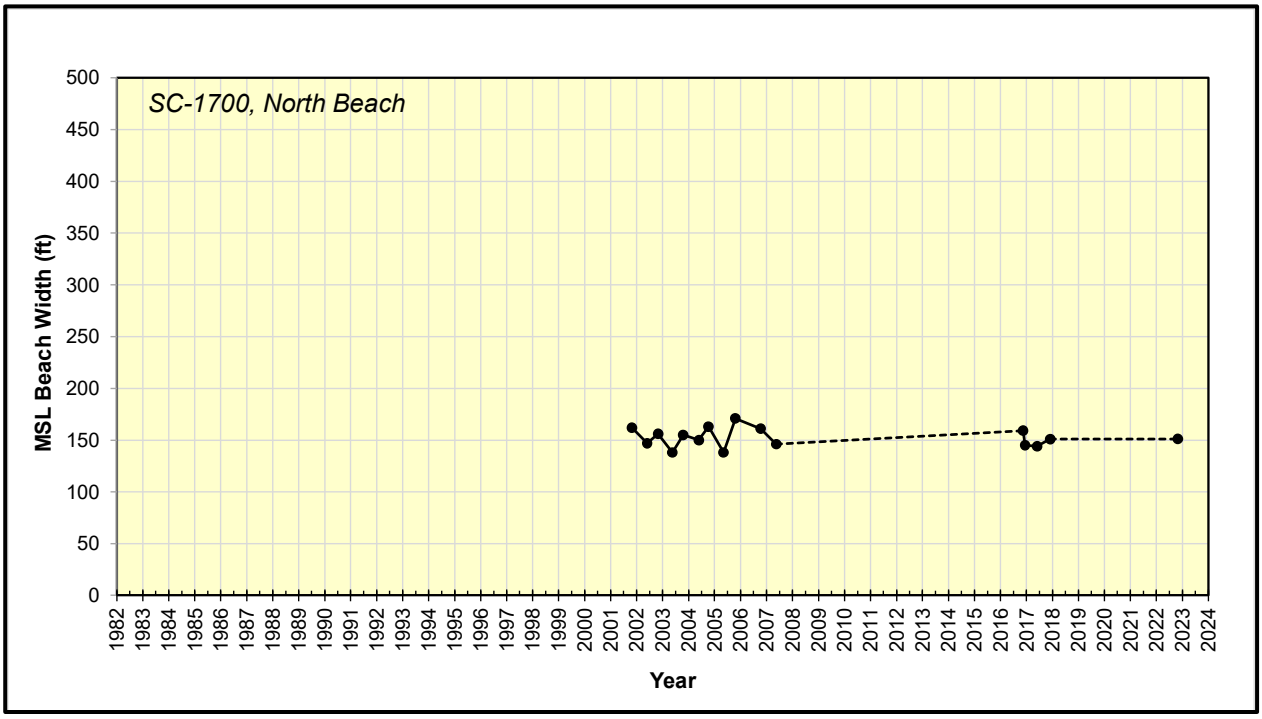

DB-1850, North Doheny State Beach
MSL Beach Width (ft)
Year

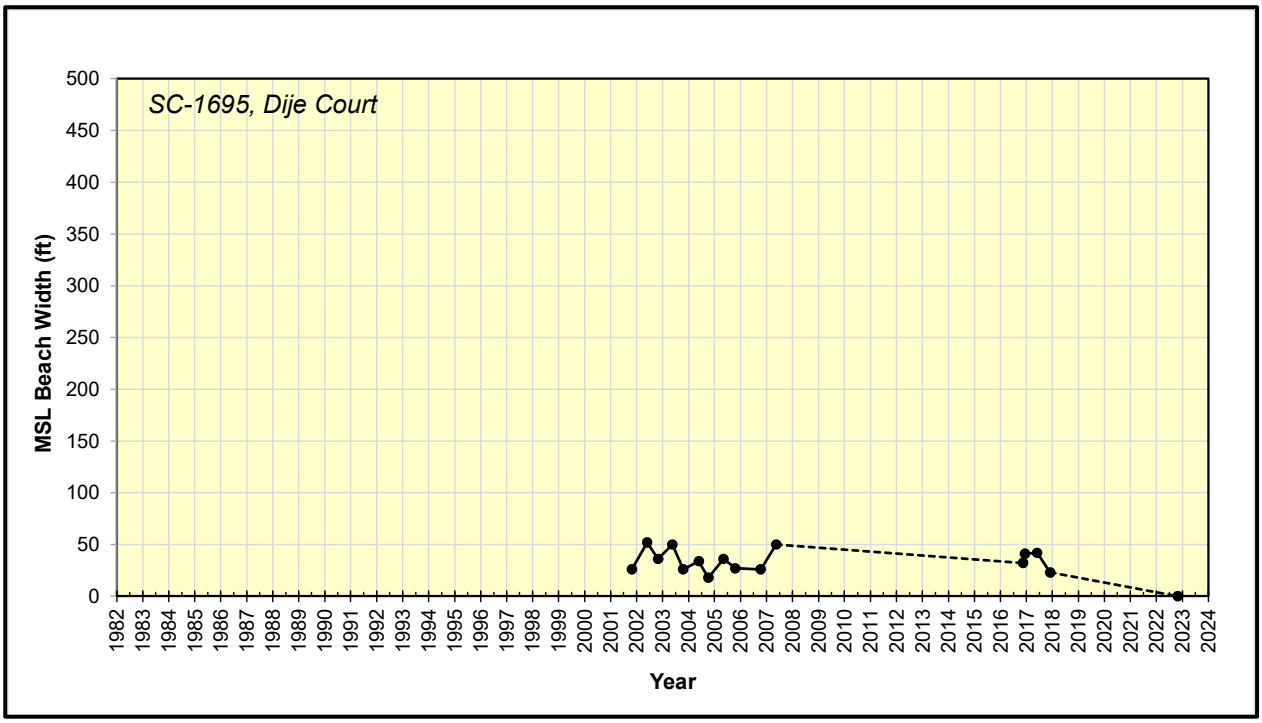

DB-1805, South Doheny State Beach
MSL Beach Width (ft)
Year

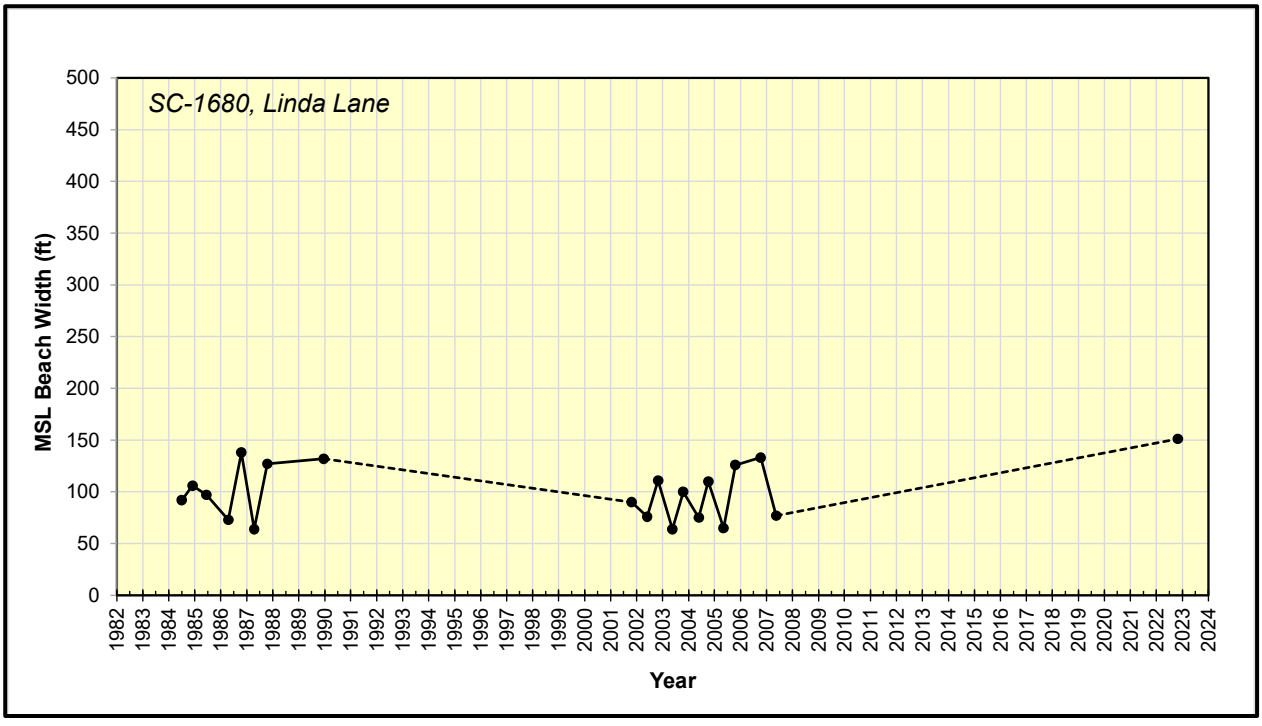

SC-1720, Shorecliffs
MSL Beach Width (ft)
Year

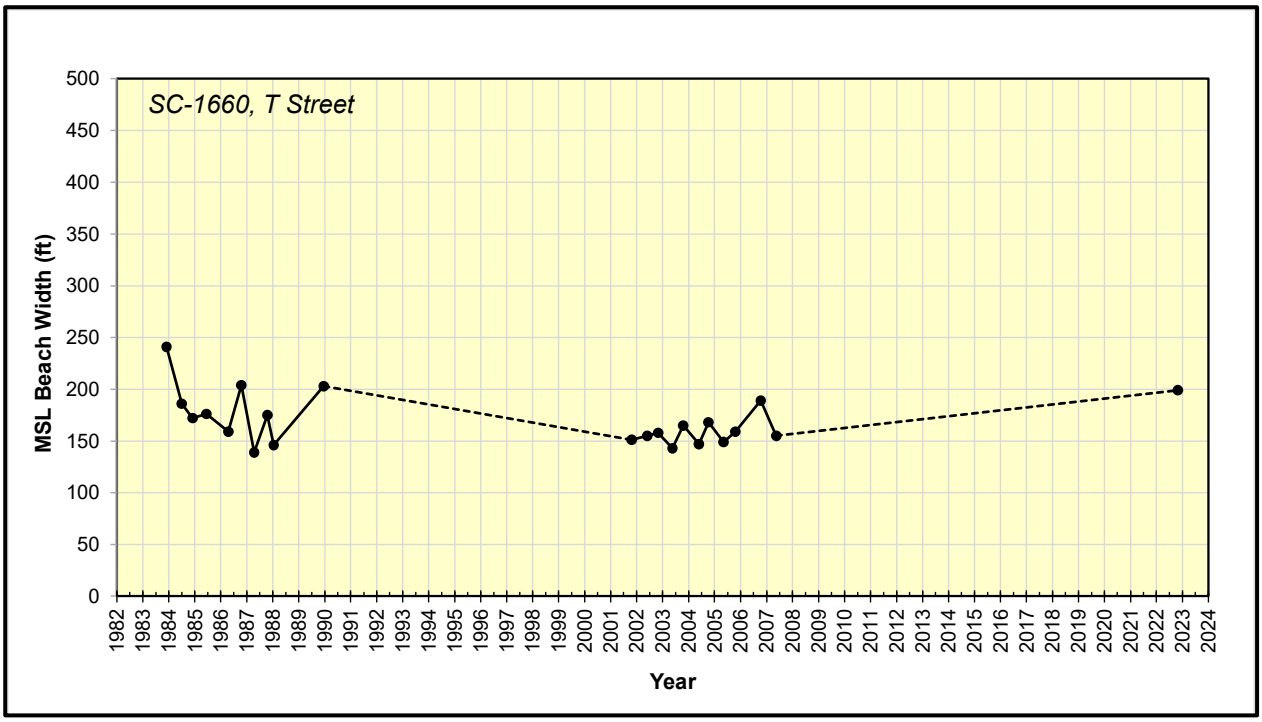

SC-1705, Capistrano Trailer Court
MSL Beach Width (ft)
Year

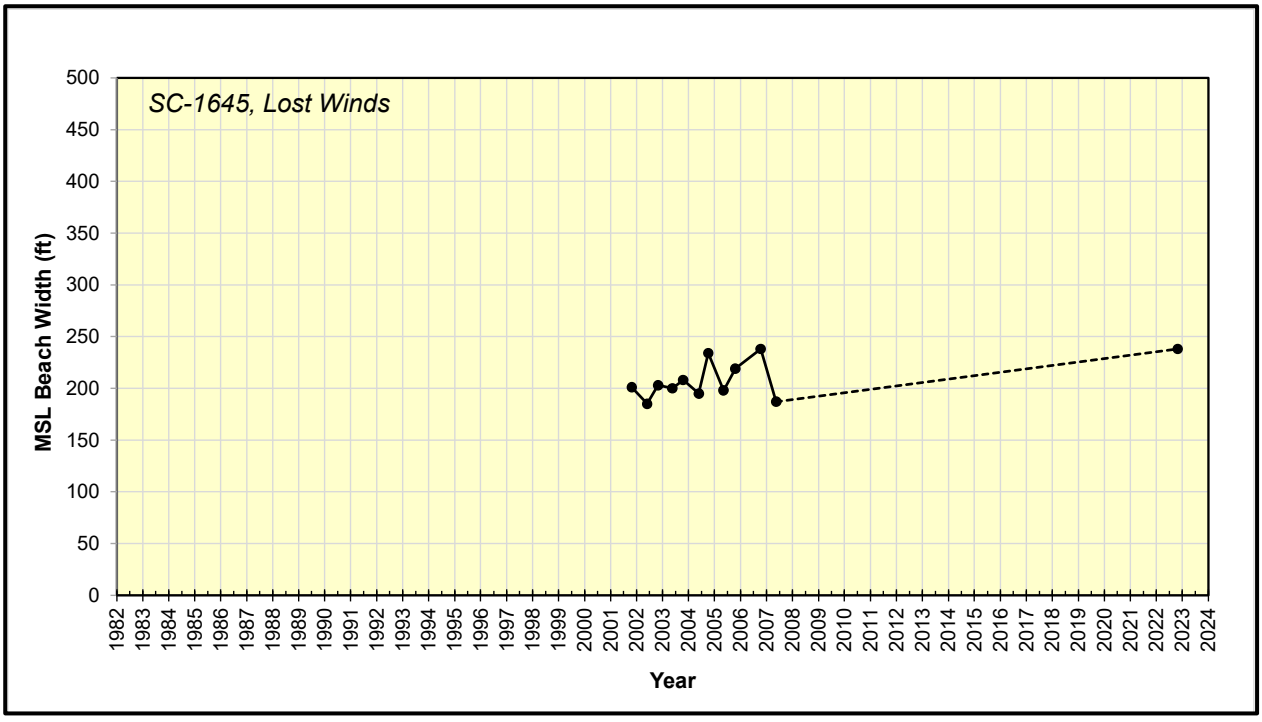

SC-1702, North Beach
MSL Beach Width (ft)
Year

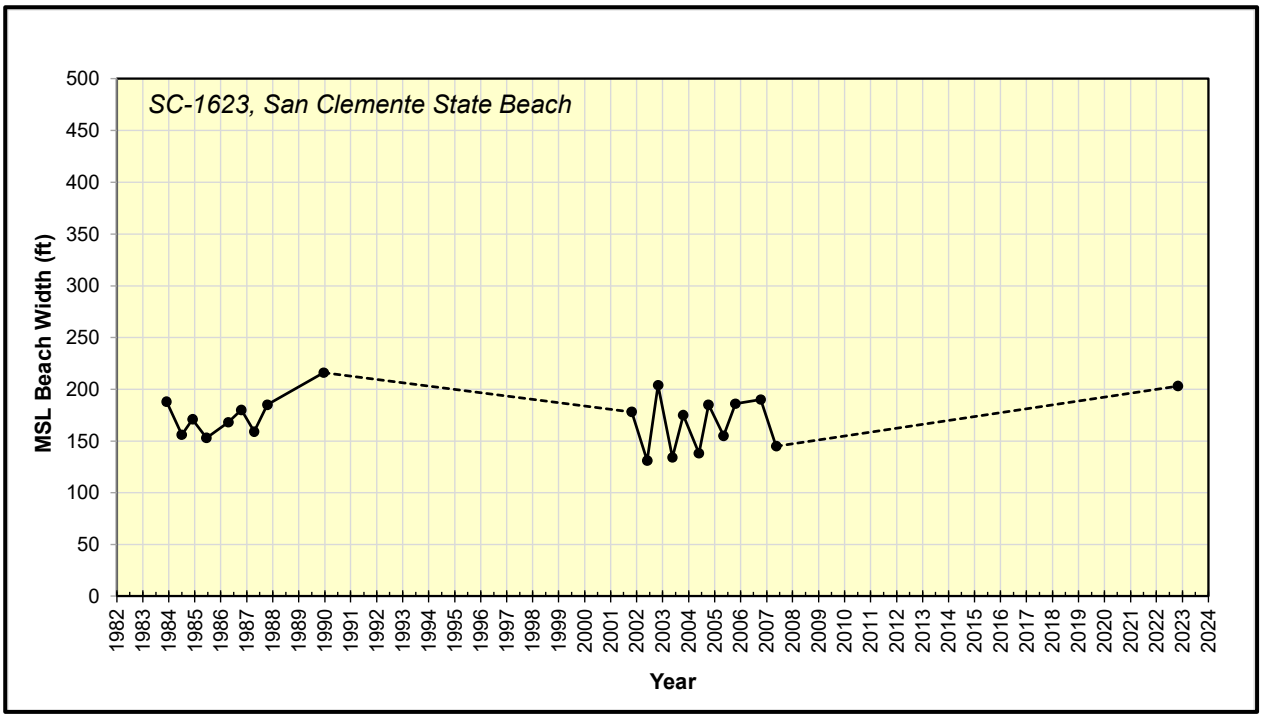

SC-1700, North Beach
MSL Beach Width (ft)
Year

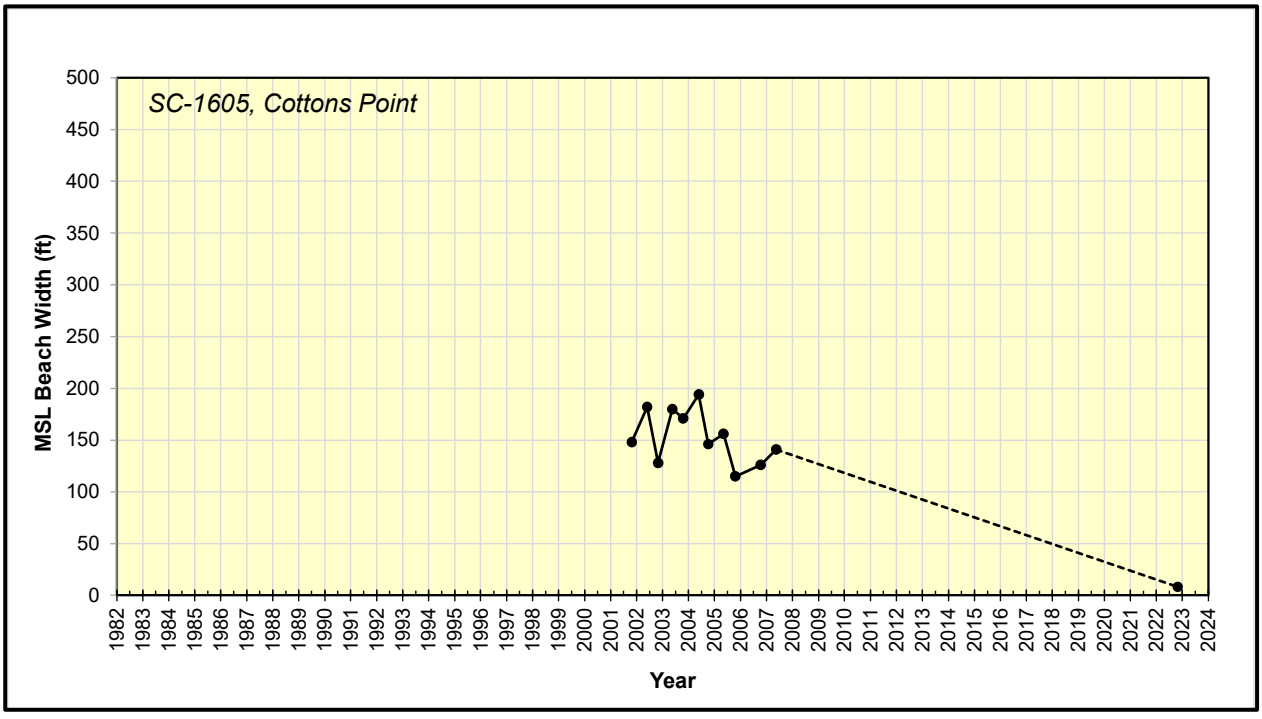

SC-1695, Dije Court
MSL Beach Width (ft)
Year


SC-1680, Linda Lane
MSL Beach Width (ft)
Year


SC-1660, T Street
MSL Beach Width (ft)
Year


SC-1645, Lost Winds
MSL Beach Width (ft)
Year


SC-1623, San Clemente State Beach
MSL Beach Width (ft)
Year


SC-1605, Cottons Point
MSL Beach Width (ft)
Year

APPENDIX C

MEAN HIGH WATER BEACH WIDTHS DERIVED FROM BEACH PROFILE DATA

Mean High Water Beach Widths Derived from Beach Profile Surveys

Transect	Mean High Water Beach Width (feet) [1]																									Landward Limit of Sand
	Nov/Dec 1983	Jun/Jul 1984	Nov/Dec 1984	Jun 1985	Apr 1986	Oct 1986	Apr 1987	Oct 1987	Jan 1988	Dec 1989	Oct 2001	May 2002	Oct 2002	May 2003	Oct 2003	May 2004	Oct 2004	May 2005	Oct 2005	Oct 2006	May 2007	Nov 2016	Dec 2016	May 2017	Nov 2017	Oct 2022	
DB-1850 North Doheny State Beach	429	355	358	341	301	299	243	223	218	--	253	205	218	189	210	158	184	360	339	258	195	--	--	--	--	156	Campground
DB-1805 South Doheny State Beach	301	315	301	303	284	300	253	280	--	237	211	216	196	196	181	176	170	175	168	182	195	--	--	--	--	92	Bike Path
SC-1720 Shorecliffs	148	151	150	149	174	151	180	153	184	179	172	189	179	188	182	180	183	184	185	175	192	--	--	--	--	146	Railroad Pad
SC-1705 Capistrano Trailer Court	--	--	--	--	--	--	--	--	--	--	13	28	12	32	14	23	16	32	12	9	37	7	25	20	4	0	Revetment
SC-1702 North Beach	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	151	147	124	135	119	125	141	134	Revetment
SC-1700 North Beach	--	--	--	--	--	--	--	--	--	--	148	131	143	123	144	134	149	123	149	149	126	142	130	126	139	131	Railroad Fence
SC-1695 Dije Court	--	--	--	--	--	--	--	--	--	--	11	32	15	30	15	18	4	20	6	6	32	17	26	24	7	0	Revetment
SC-1680 Linda Lane	--	73	75	70	56	94	34	79	--	90	66	47	71	46	67	59	73	43	79	73	55	--	--	--	--	103	Tunnel Headwall
SC-1660 T-Street	196	157	138	142	141	161	124	132	124	154	97	128	122	127	131	127	132	132	128	135	130	--	--	--	--	159	Light Post
SC-1645 Lost Winds	--	--	--	--	--	--	--	--	--	--	176	165	162	184	181	182	207	183	190	203	170	--	--	--	--	225	Railroad Fence
SC-1623 San Clemente State Beach	169	141	151	128	153	165	144	166	--	202	163	113	176	117	158	122	170	140	172	177	127	--	--	--	--	184	Tunnel Headwall
SC-1605 Cottons	--	--	--	--	--	--	--	--	--	--	130	166	107	151	154	176	132	139	98	115	125	--	--	--	--	0	Revetment

Notes: [1] Color-coded cells illustrate the rank of each beach width relative to all values within the database shown (twelve sites; Nov/Dec 1983 to Oct 2022). See color scale below.

MHW Beach Width Color Scale