When a Project Performed Better than Expected

Beach Nourishment at Sagaponack and Bridgehampton, Town of Southampton, Long Island, New York

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Main Questions

- What was the funding structure – Who paid for this project?
- What are the primary reasons why this project performed better than expected?
- How has the weather been since project completion?
- Although the overall project performed well, were there “erosional hot spots?”
- Is a maintenance plan needed when nourishment performs better than expected?
- What are the advantages & challenges of future long-term planning for this area?

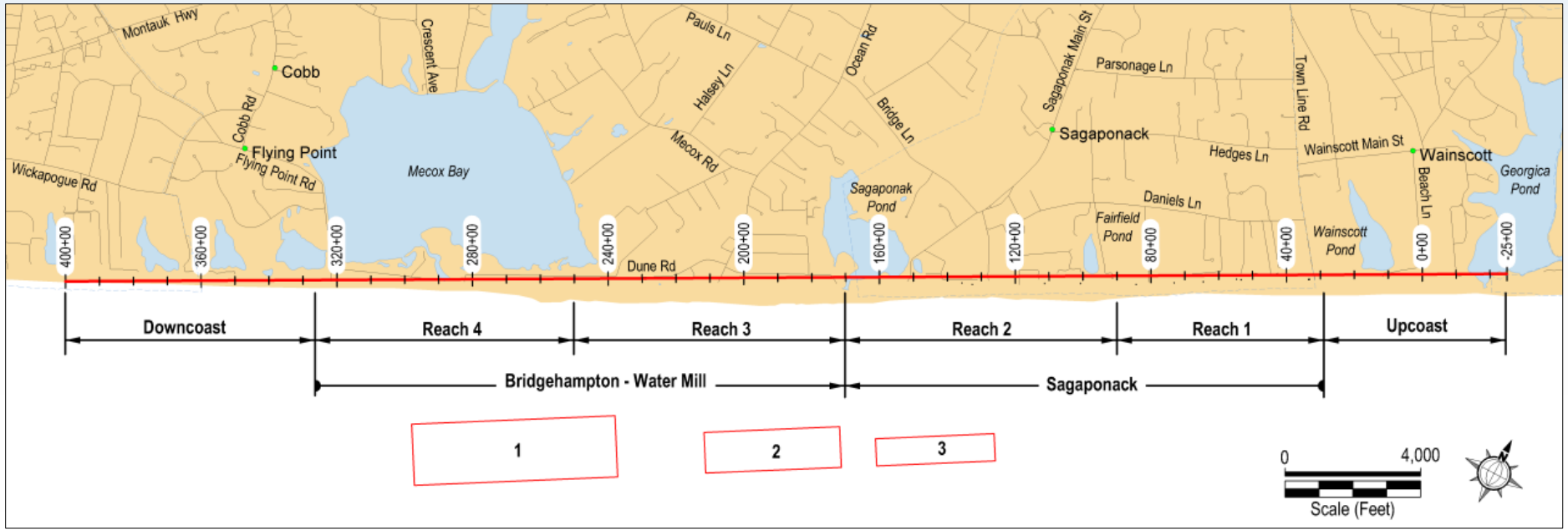
Project Setting – Long Island, New York

Need for Project — Erosion Factors

Project Funding Structure

- Federal – USACE
- Federal – FEMA
- State – New York
- County – Suffolk County
- Town – Town of Southampton
- Private – Beach Erosion Control District (BECD)
  - Beach Erosion Control District (BECD) was formed by the private homeowners fronting the Atlantic Ocean in the region. A BECD is a special improvement district, or a means by which the residents may receive special district services or functions through **self-taxation**.
  - Sagaponack BECD & Bridgehampton BECD

Project Formulation — Overall Plan

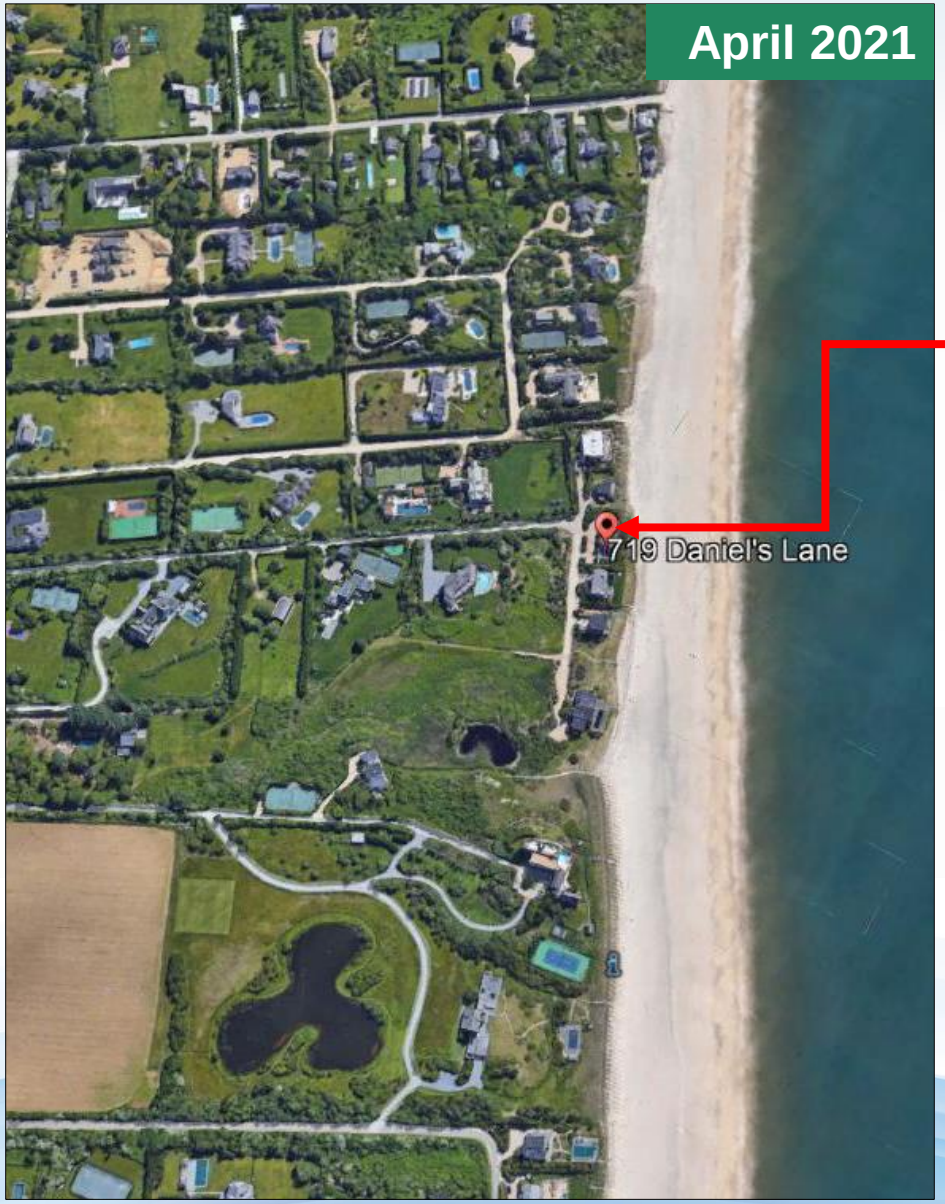


ACTUAL FILLED VS DESIGNED QUANTITIES								
DISTRICT	REACH	LIMITS	LINEAR FEET (FT)	PERMIT ALLOWED (CY)	DESIGNED BASED ON BUDGET (CY)	GLDD REPORTED FILLED VOL (CY)	ACTUALVs. DESIGN (%)	CSE CONFIRMED VOL (CY)
SAGAPONACK	1	28+84 TO 90+00	6,116	600,000	579,982	538,448	93%	593,720
	2	90+00 TO 170+09	8,009	685,000	662,147	706,108	107%	561,165
	SUB TOTAL	28+84 TO 170+09	14,125	1,285,000	1,242,129	1,244,556	100%	1,154,885
BRIDGEHAMPTON	3	170+09 TO 250+00	7,991	707,000	685,044	636,547	93%	672,130
	4	250+00 TO 326+35	7,635	635,500	615,764	662,489	108%	646,196
	SUB TOTAL	170+09 TO 326+35	15,626	1,342,500	1,300,808	1,299,036	100%	1,318,327
TOTAL		**28+84 TO 326+35**	**29,751**	**2,627,500**	**2,542,938**	**2,543,592**	**100%**	**2,473,212**

Project Overview

- Project Length = 2.6 mi (Sag) + 3 mi (Brdg) = 5.6 mi
- Total Volume = 1.2 mcy (Sag) + 1.3 mcy (Brdg) = 2.5 mcy
- Contractor – Great Lakes Dredge & Dock (GLDD)
- Dredge - *Illinois*
- Construction Cost = ~$21.9 M (~$8.63/cy)
- Construction Period: Oct 2013 to Feb 2014

Sagaponack Before & After Photos



Bridgehampton Before & After Photos

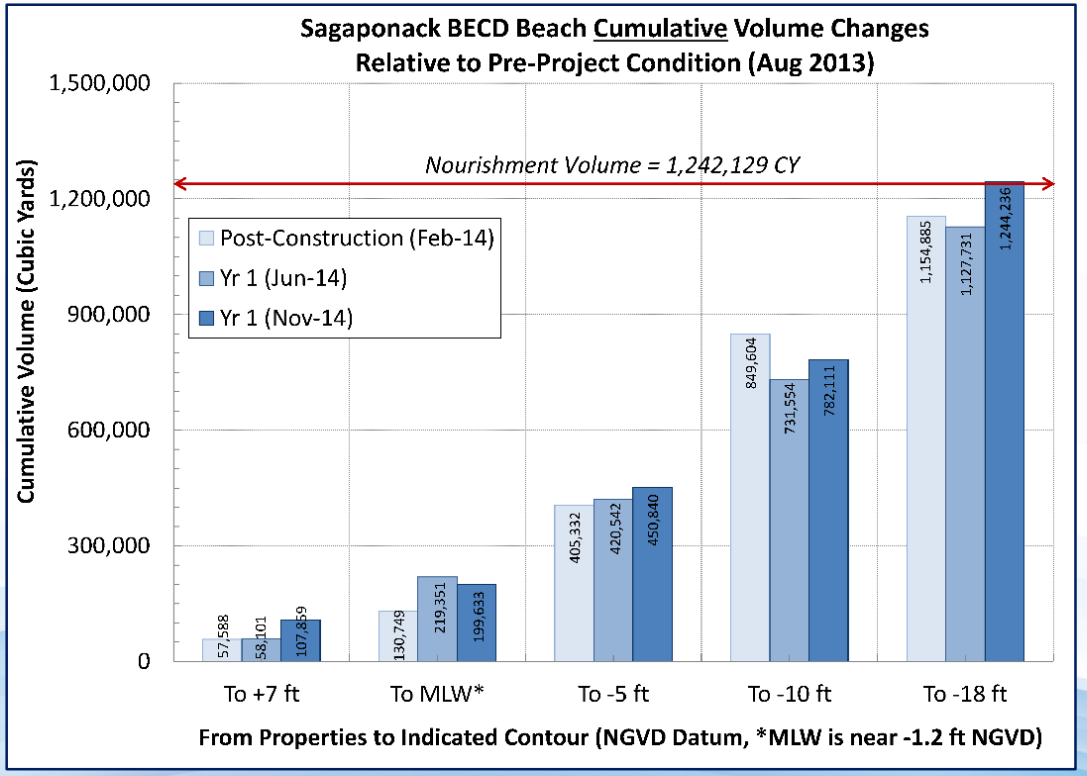
2018 ASBPA
Best Restored Beach

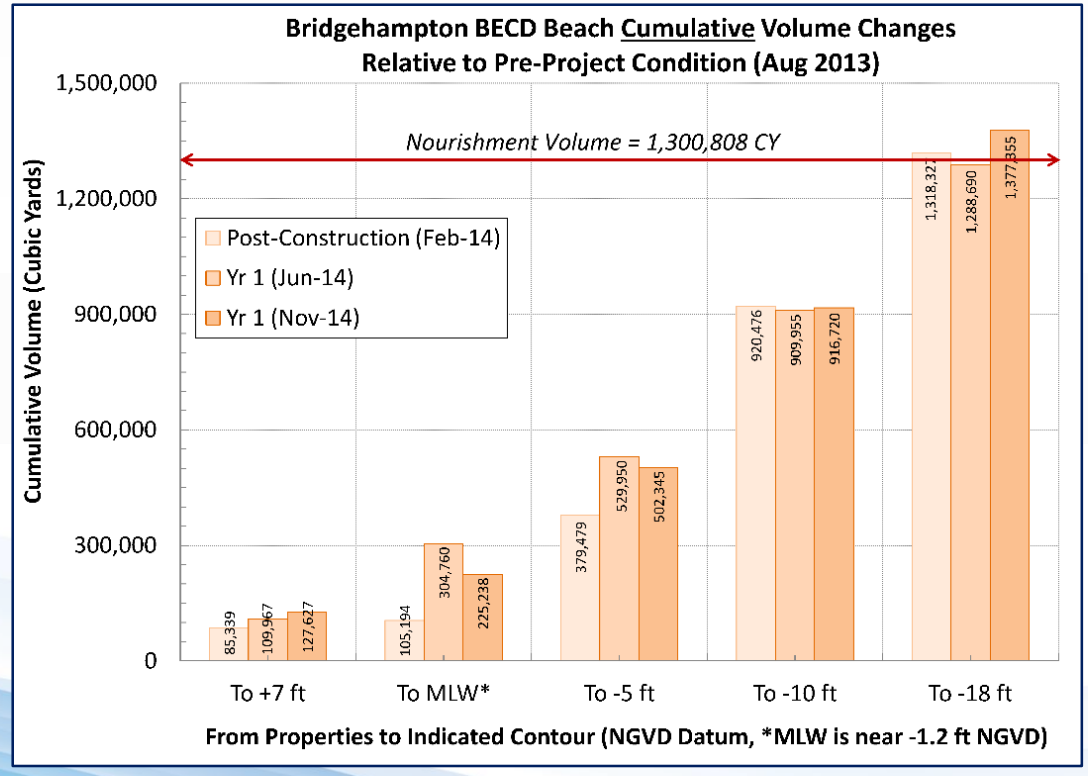
Bridgehampton Dune Recovery After 2018 Nor'easter

Post-Project Monitoring

– Year 1 (2014) Nourishment Sand Remaining

Year	Sagaponack	Bridgehampton
1	100%	106%

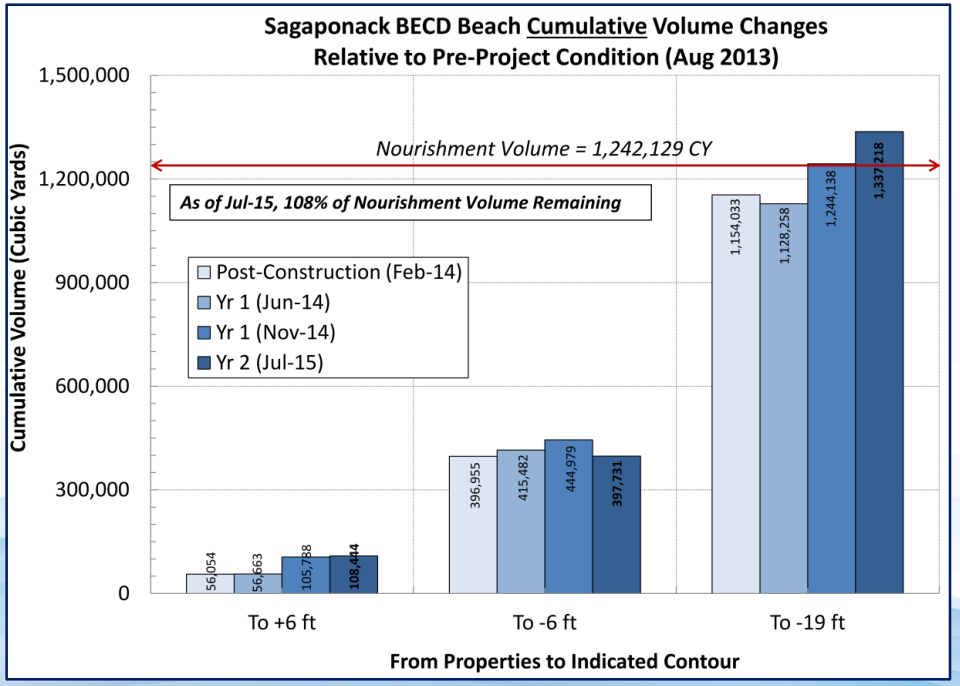


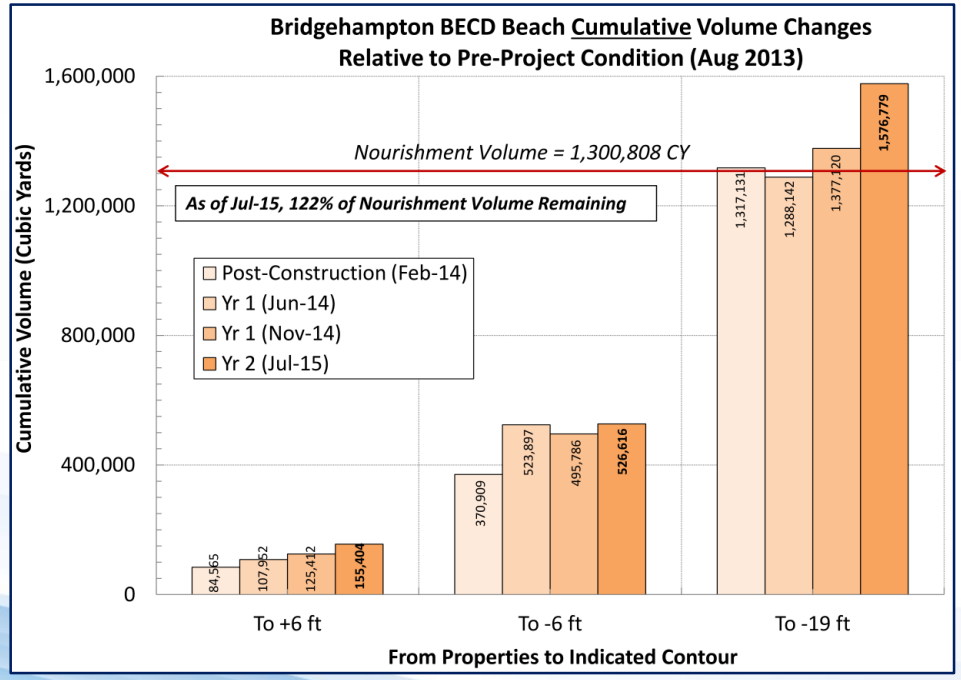


Post-Project Monitoring

– Year 2 (2015) Nourishment Sand Remaining

Year	Sagaponack	Bridgehampton
1	100%	106%
2	108%	122%



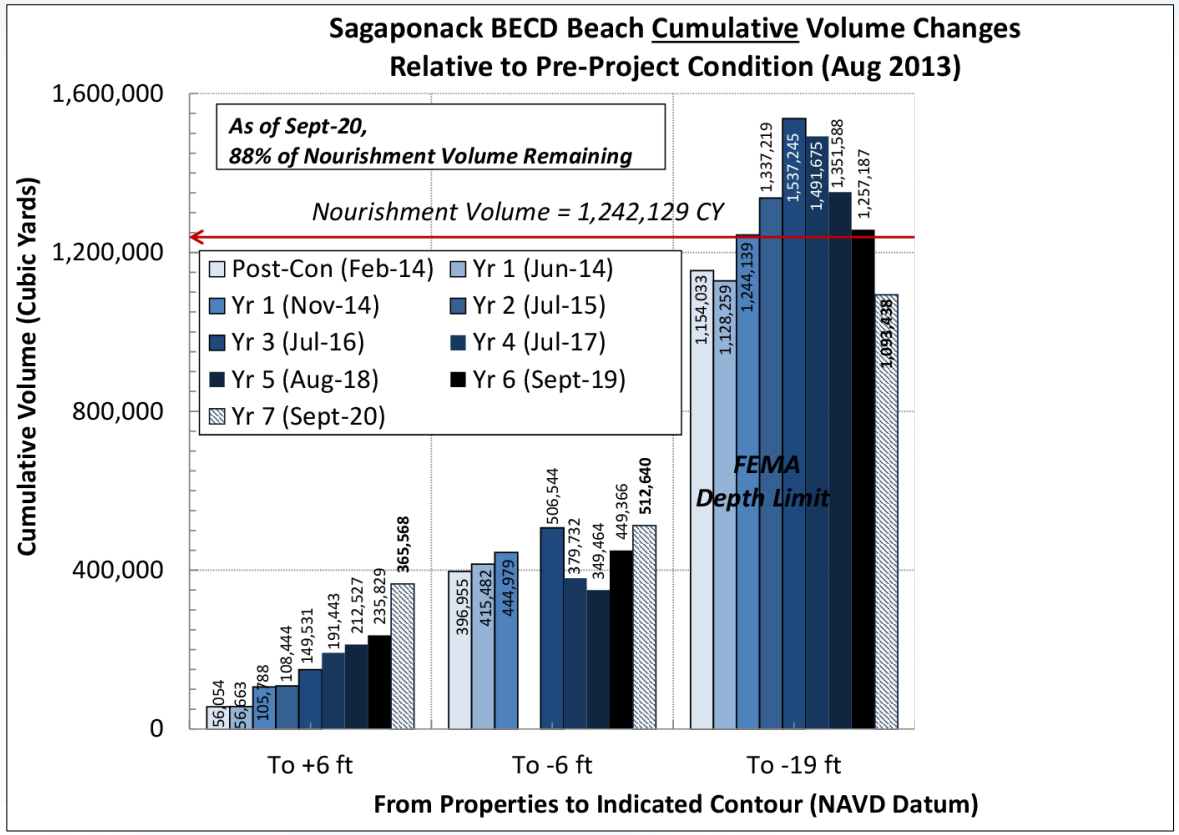


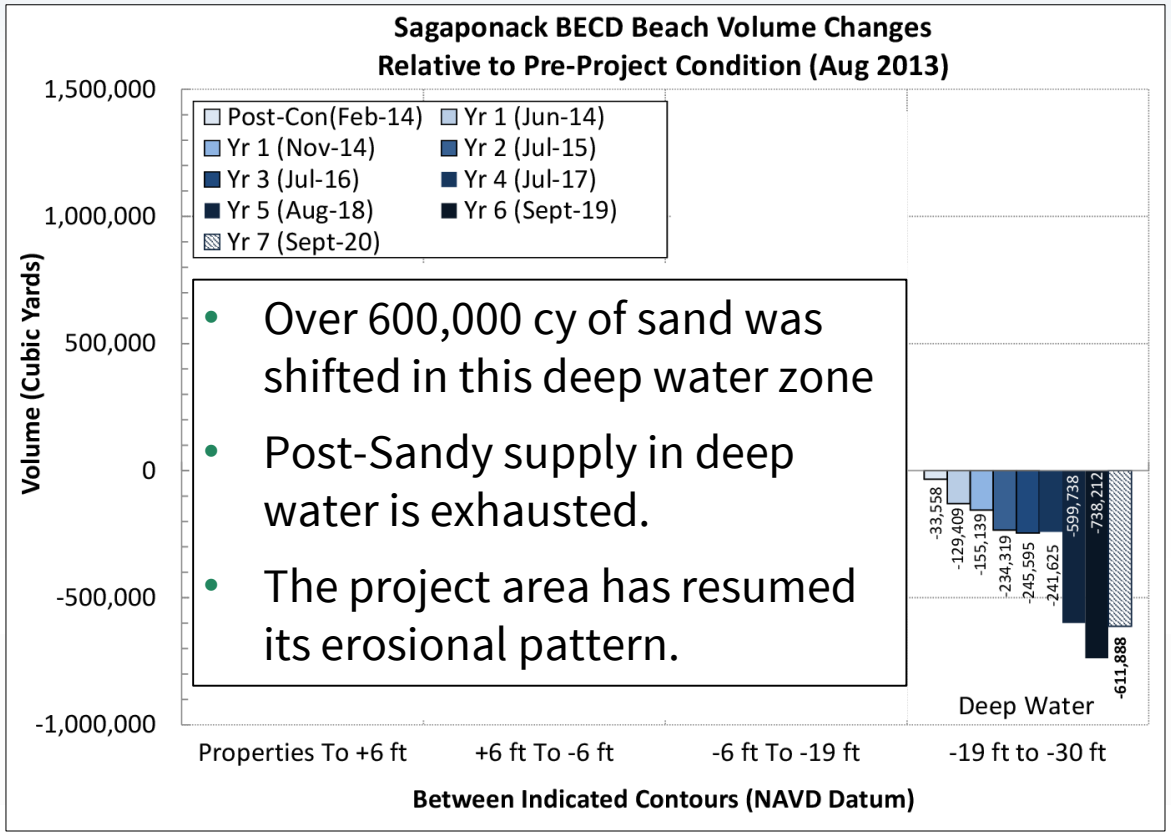
Post-Project Monitoring

– Years 1-7 Nourishment Sand Remaining

Year	Sagaponack	Bridgehampton
1 (2014)	100%	106%
2 (2015)	108%	122%
3 (2016)	124%	122%
4 (2017)	120%	118%
5 (2018)	109%	106%
6 (2019)	101%	113%
7 (2020)	88%	105%

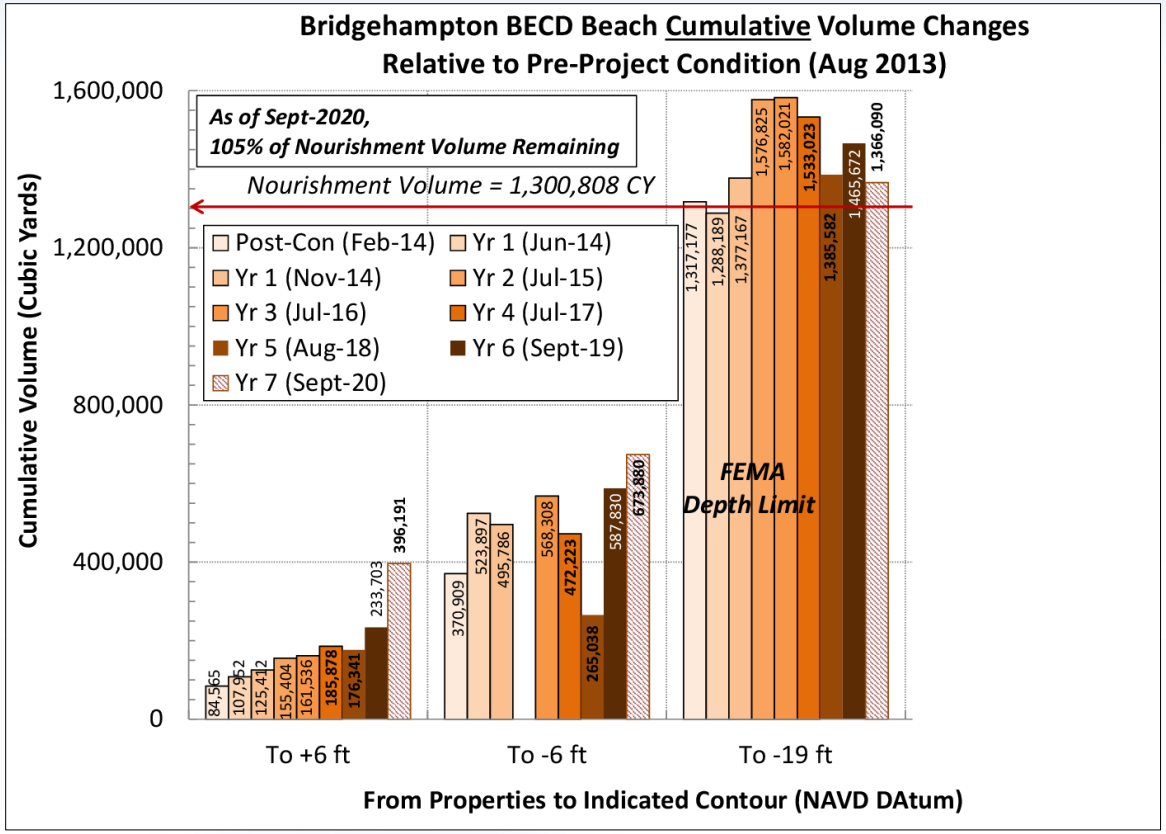
Yr 7 (2020) Sagaponack Project Performance

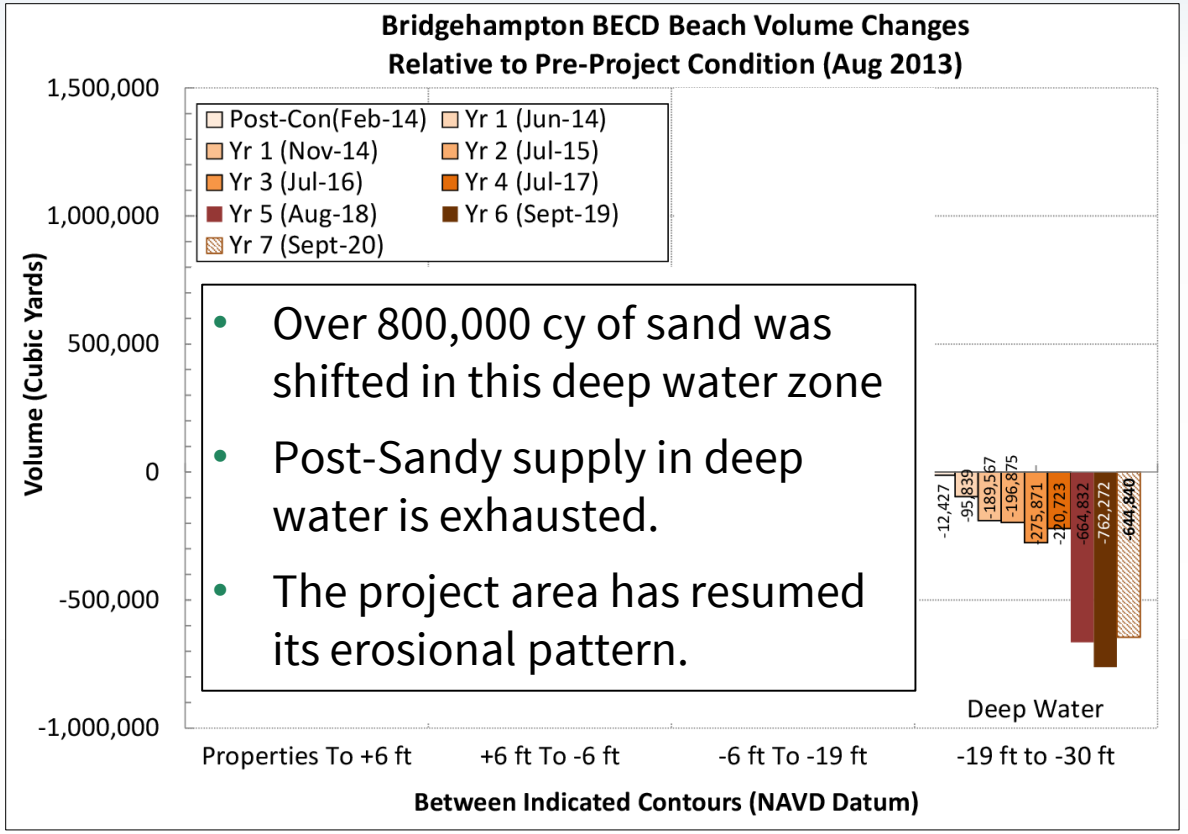




- Over 600,000 cy of sand was shifted in this deep water zone
- Post-Sandy supply in deep water is exhausted.
- The project area has resumed its erosional pattern.

Yr 7 (2020) Bridgehampton Project Performance





- Over 800,000 cy of sand was shifted in this deep water zone
- Post-Sandy supply in deep water is exhausted.
- The project area has resumed its erosional pattern.

Answers to Main Questions

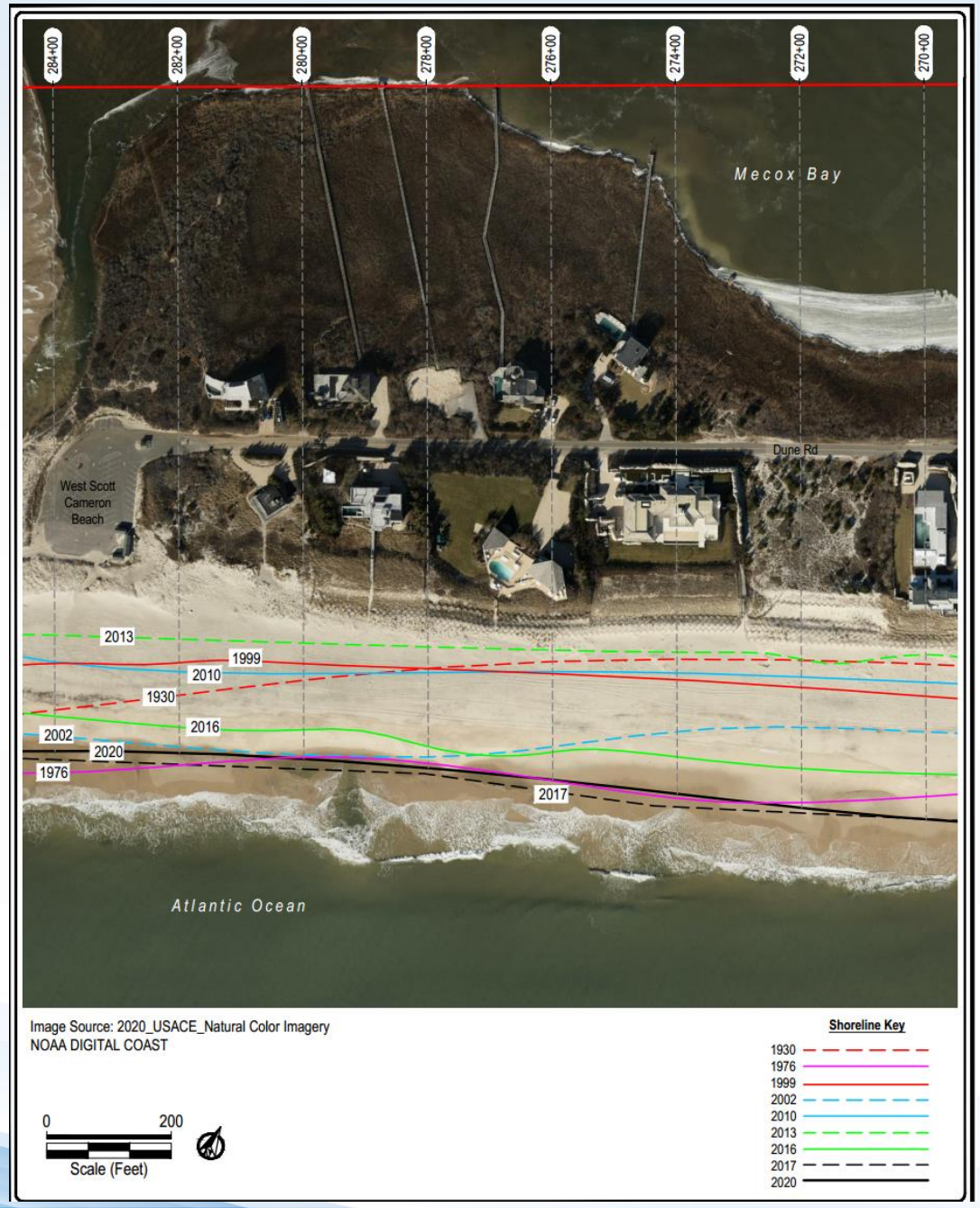
- **What are the primary reasons why this project performed better than expected?**
  Sand supplies from deeper water after *Sandy*; nourishment sand quality
- **Although the overall project performed well, were there "erosional hot spots?"**
  Yes. There were hotspots in both BECDs, and some of them have persisted.
- **Is a maintenance plan needed when nourishment performs better than expected?**
  Yes. To remain eligible for future FEMA restoration funds.
- **What are the advantages and challenges of future long-term planning for this area?**
  Erosion rates estimate, long-term climate change projection; suitable sand supplies
- **How has the weather been since project completion?**
  Record high nor'easters in spring 2018, but no major hurricanes since 2012


Nov 2011 – Before Nourishment


Nov 2020 – 8 Yrs After Nourishment

Historical Shorelines

- Aerial photos since 1930
- Position of mean high water as a measure of beach width
- Between June 2010 and Jan 2020: Sagaponack became 66 ft wider; Bridgehampton became 140 ft wider
- Between 1930 and 2020, Sagaponack MHW is about the same position as 1930 and 1976; Bridgehampton is over 100 ft wider
- Upcoast is 170 ft narrower; downcoast is 135 ft narrower
- **Nourishment has turned back the clock by 40-70 years**



Post-Project Monitoring

– Years 1-8 Nourishment Sand Remaining

Year	Sagaponack	Bridgehampton
1 (2014)	100%	106%
2 (2015)	108%	122%
3 (2016)	124%	122%
4 (2017)	120%	118%
5 (2018)	109%	106%
6 (2019)	101%	113%
7 (2020)	88%	105%
8 (2021)	**53%**	**76%**

Year 7 (2020) to Year 8 (2021) Volume Changes

	Sagaponack	**Bridgehampton**
Dune	Gained 341 cy (0 cy/ft)	Gained 14,713 cy (1 cy/ft)
Beach	Lost 48,503 cy (3.4 cy/ft)	Lost 44,014 cy (2.8 cy/ft)
Underwater	Lost 380,879 cy (27 cy/ft)	Lost 343,758 cy (22 cy/ft)
Net (*to -19ft*)	**Lost 429,041 cy (30 cy/ft)**	**Lost 373,059 cy (24 cy/ft)**

To *Deeper water (further offshore between -19 ft and -30 ft NAVD)*

Lost 389,895 cy (28 cy/ft) *Lost 288,110 cy (18 cy/ft)*

Estimated long-term average erosion rate was 120,000 cy/ft (4 cy/ft/yr) (CSE 2012). The volume changes is **6-7 times higher** than that rate between 2020 and 2021.

Renourishment Needs, Planning, and Design

- 2013-2014 nourishment project has performed better than expected with ~90% of the sand remaining as of Year 7 (2020).
- Sagaponack erosion rate was over 2.5 times higher than the historical average between 2019 and 2020, and 7 times higher between 2020 and 2021.
- Bridgehampton erosion rate was over 1.8 times higher than the historical average between 2019 and 2020, and 6 times higher between 2020 and 2021.
- Erosional hotspots were measured in both BECDs, and some of them have persisted over the past few years.
- Renourishment plan is critical to remain eligible for future FEMA restoration funds.
- It has been nine years since the last declared disaster (Superstorm *Sandy* in October 2012).
- Initiating planning and permitting for renourishment in fall 2023/2024.