



Kiawah Island 2020 Beach Monitoring



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Coastal Science & Engineering

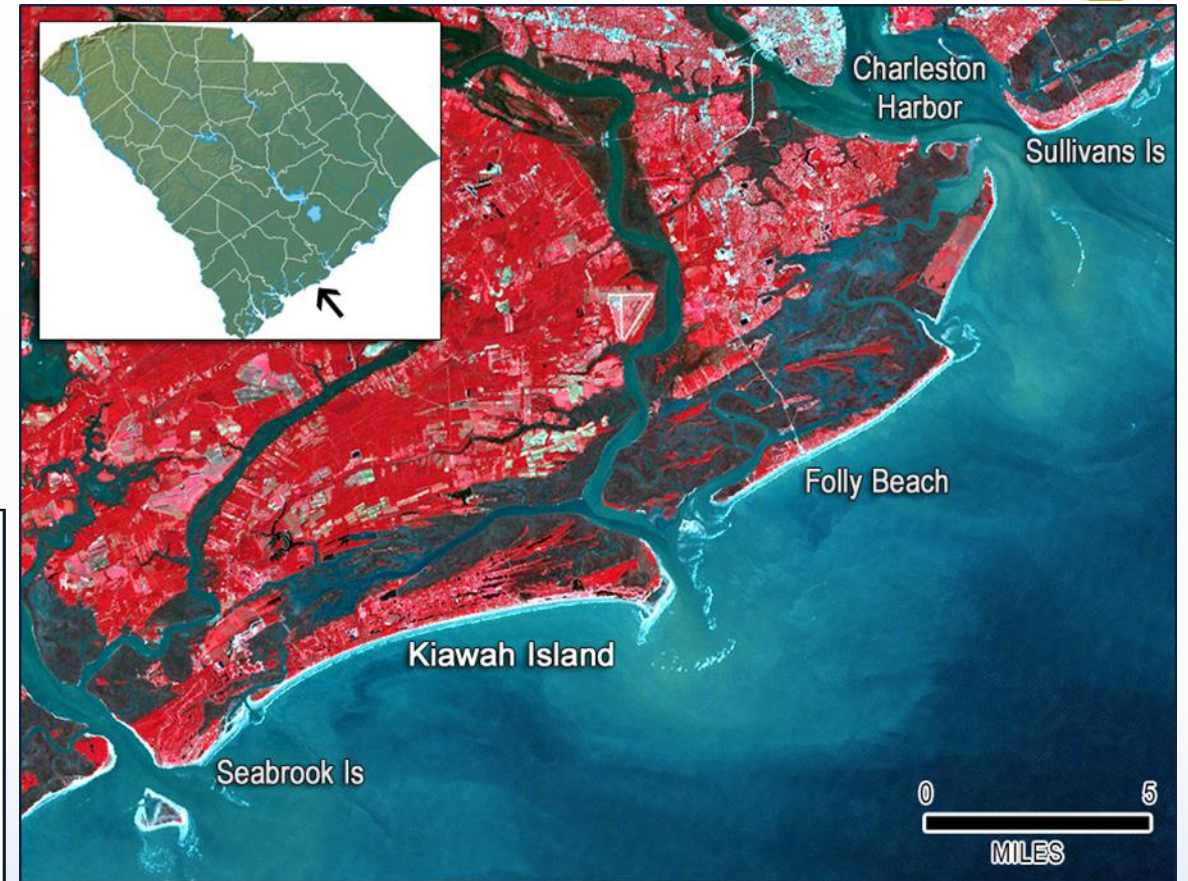
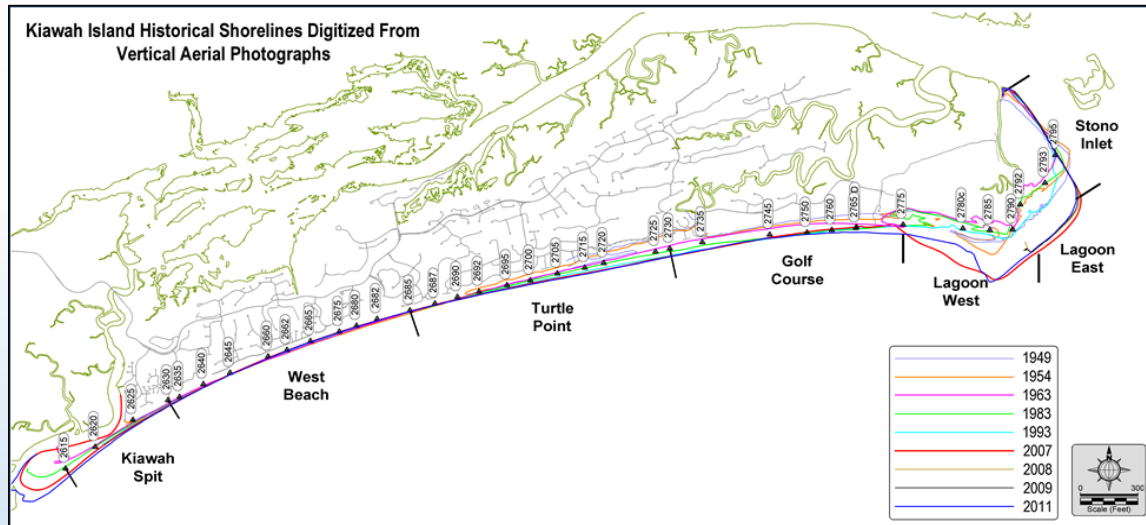
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COASTAL SCIENCE & ENGINEERING

Kiawah Island

- ~10 miles of beach along a mostly east-west configuration
- Stono Inlet to east, Captain Sams Inlet to west
- Most of the island has accreted over past several decades (1-10 ft/yr)
- Developed after studies of the beach processes completed



Shoal Bypassing at Stono Inlet



1977



1979



1983



1986

2006 Restoration Project

- ~550,000 cy
- Inlet realignment + beach restoration
- Land-based equipment



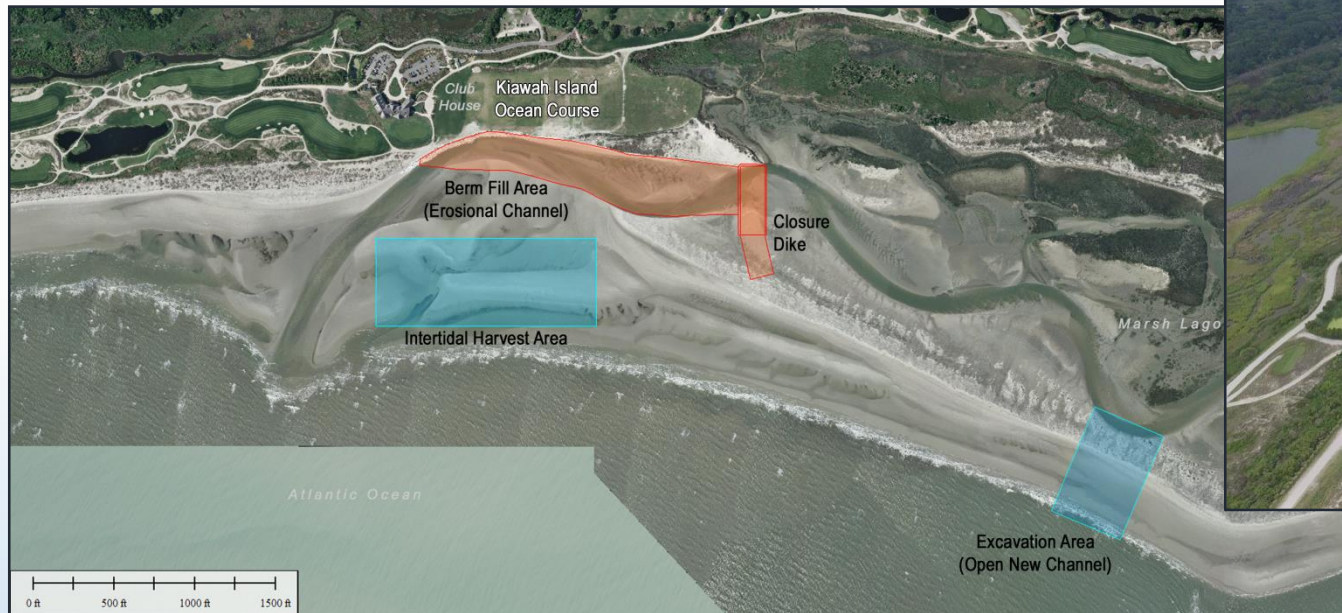
February 2006



July 2006

2015 Restoration Project

- ~100,000 cy
- Limit beach restoration
- Focus on habitat conservation



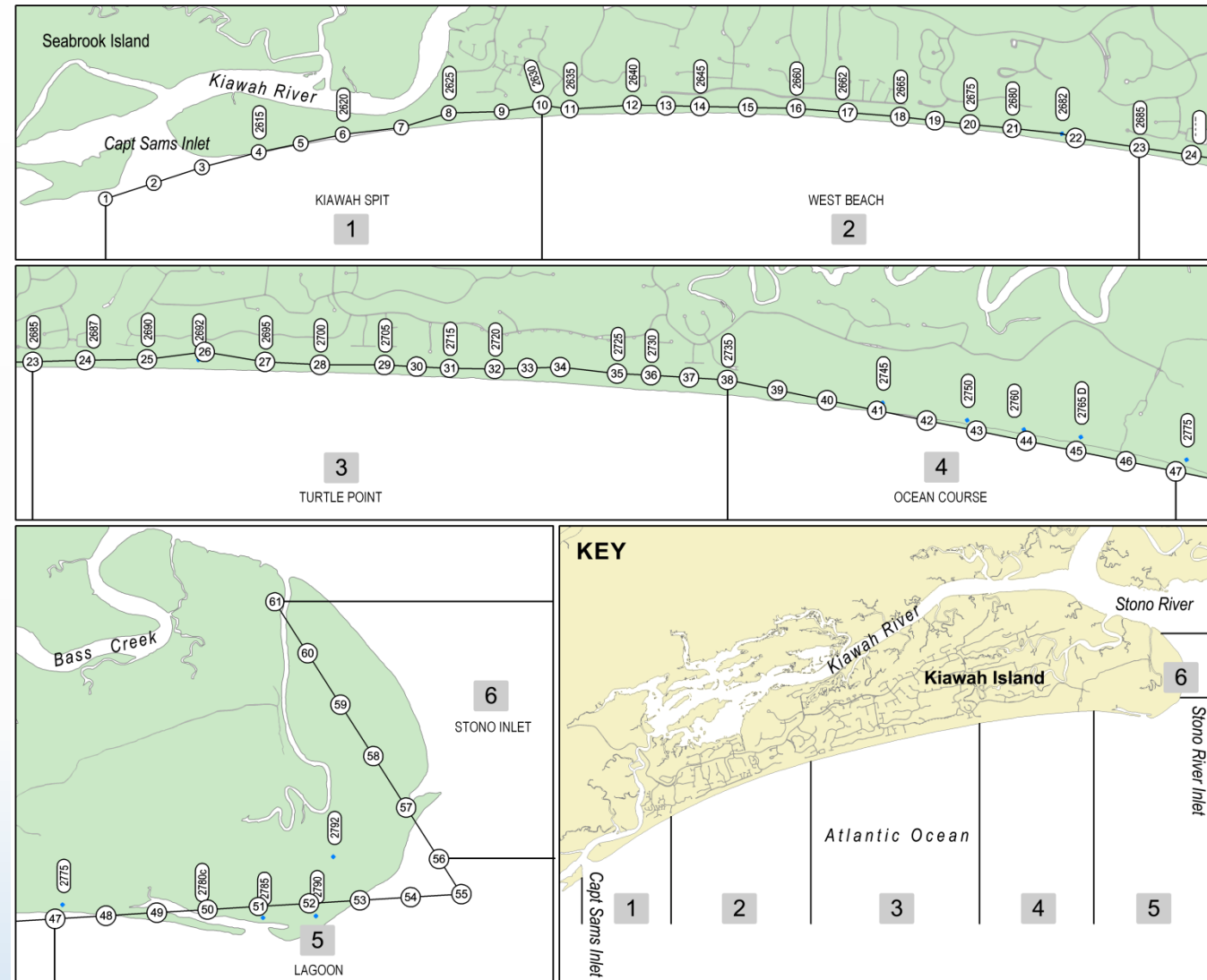
7 July 2015



Kiawah Island Beach Monitoring



- 61 profiles established
 - Some duplicate older OCRM series
- YR 14 (2020 survey) of East End monitoring:
 - Nov-19 to Nov-20
- 6 reaches established
 - Kiawah Spit
 - West Beach
 - Turtle Point
 - Ocean Course
 - Lagoon
 - Stono Inlet



Kiawah Island

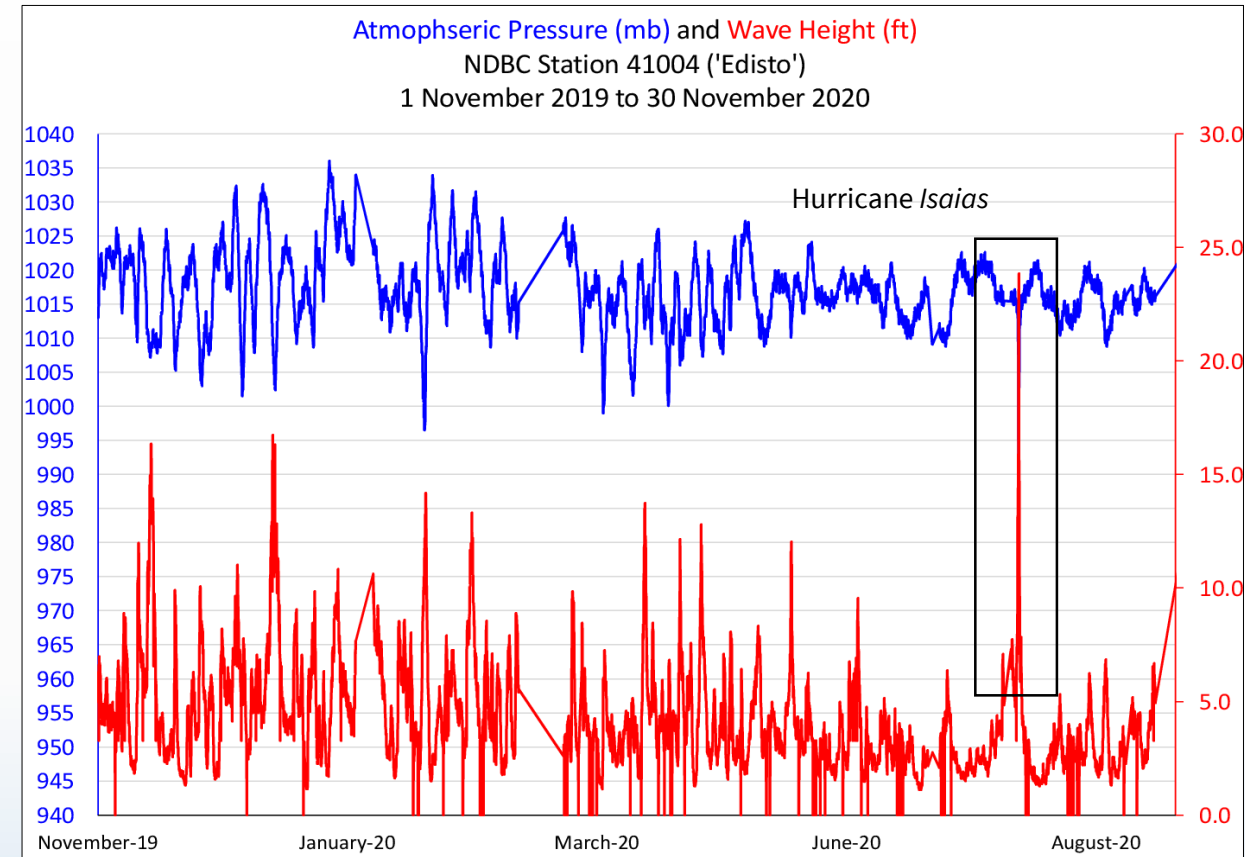


- Results by Reach, Nov-19 to Nov-20:

			Reach Unit Volume Change Since Previous (cy/ft)					
Reach	Name	Length	Nov-15	Jan-17	Nov-17	Jan-19	Nov-19	Nov-20
1	Kiawah Spit	8,820	-105.4	-0.5	18.9	-8.1	3.3	3.4
2	West Beach	11,798	-0.1	-11.6	1.2	5.3	-2.8	4.3
3	Turtle Point	13,614	6.3	-14.4	-3.7	0.3	-3.4	-1.7
4	Ocean Course	9,000	7.1	-4.1	1.6	12.6	1.9	-8.0
5	Lagoon	8,000	-25.8	-57.8	-23.2	-25.0	-0.4	32.8
6	Stono Inlet	6,000	-13.4	-32.7	-14.3	-20.1	-22.9	1.3
1-6	All	57,232	-18.7	-18.0	-2.2	-3.7	-3.0	4.5

Kiawah Island

- Key Events, Nov-19 to Nov-20
 - 3 August 2020 (Hurricane *Isaias*)
 - Atmospheric Pressure < 1000 mb?
 - Only three times Nov-19 to Nov-20
 - Relatively calm, compared to 2015-2018



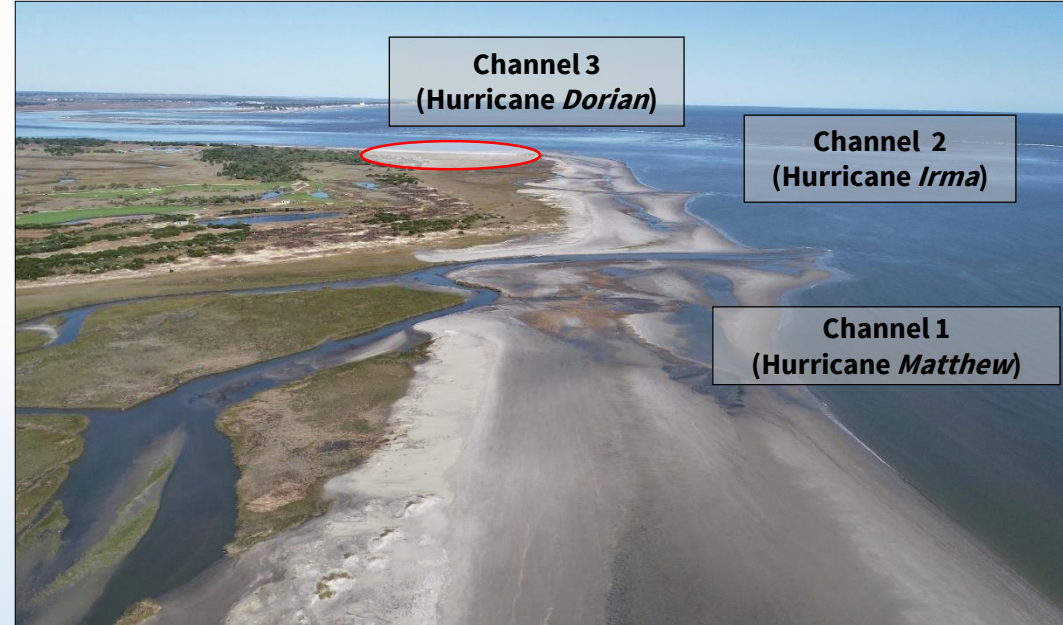
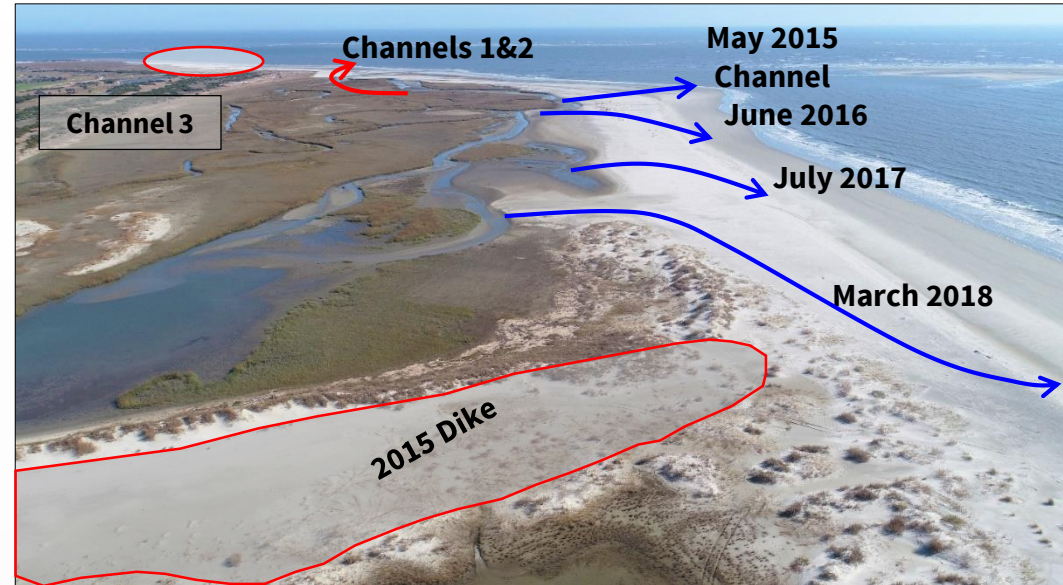
Kiawah Island

- Key Events, Jul-15 to Nov-20
 - Overwash at East End
 - New outlets cut east of 'inlet corner' starting in ~2016
 - Yellow arrow
 - 2015 project channel completely shoaled in
 - Blue box



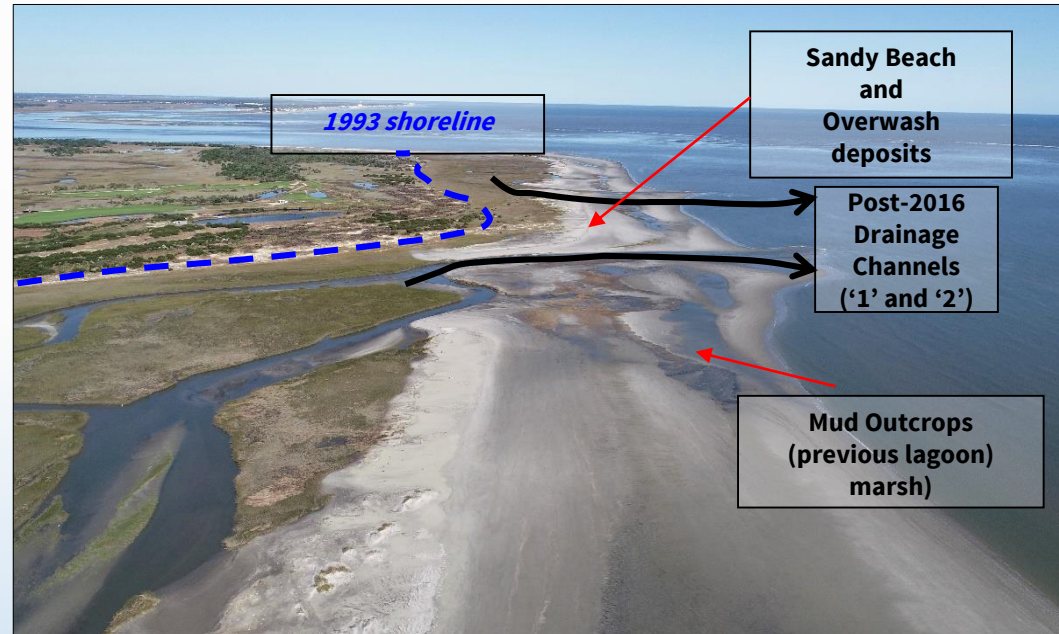
Kiawah Island

- Key Events, Nov-19 to Nov-20
 - 2015 project channel completely shoaled in
 - Blue arrows indicate post-project migration
 - Three new drainage channels opened since ~2016
 - Channel 1 (Hurricane *Matthew*)
 - Channel 2 (Hurricane *Irma*)
 - Channel 3 (Hurricane *Dorian*)



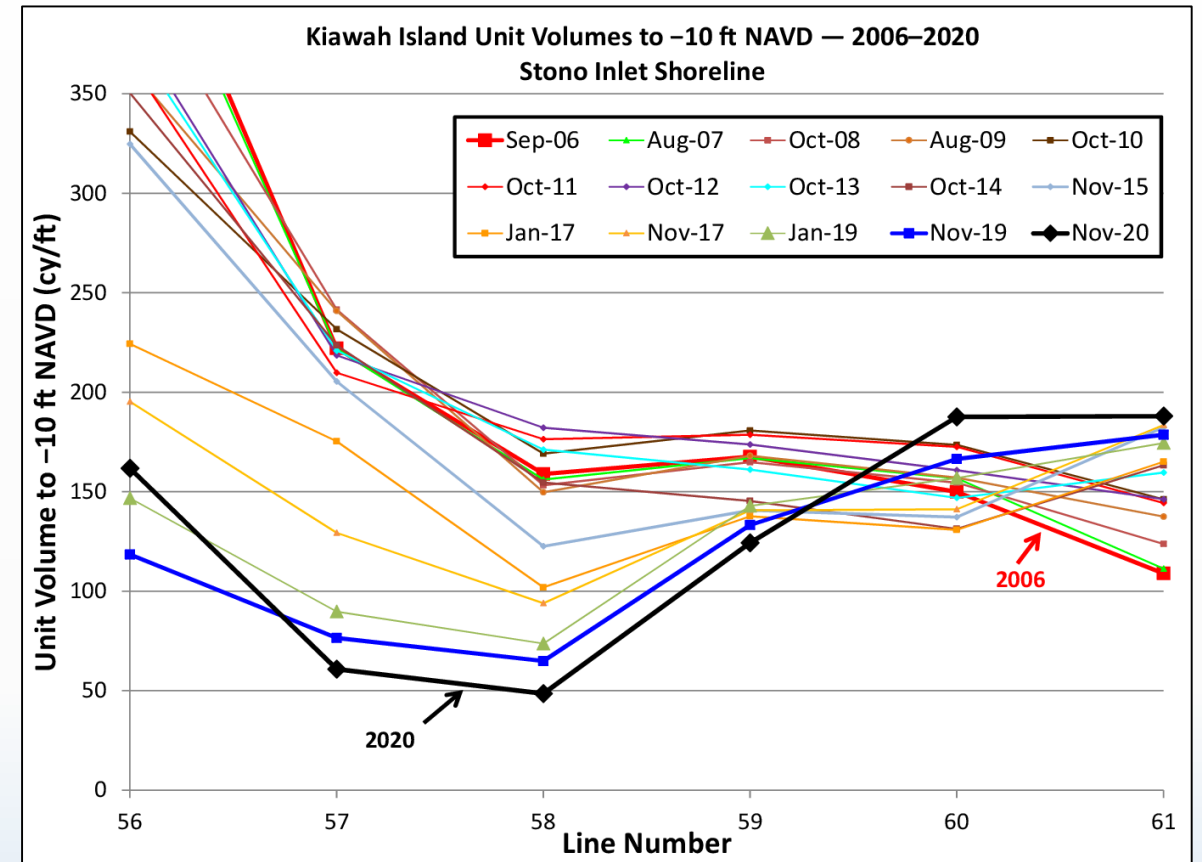
Kiawah Island

- Key Events, Nov-19 to Nov-20
 - New Stono Inlet shoal attaching
 - Attachment zone (seaward bulge) noticeable at low tide as of Nov-20 (both images at right)



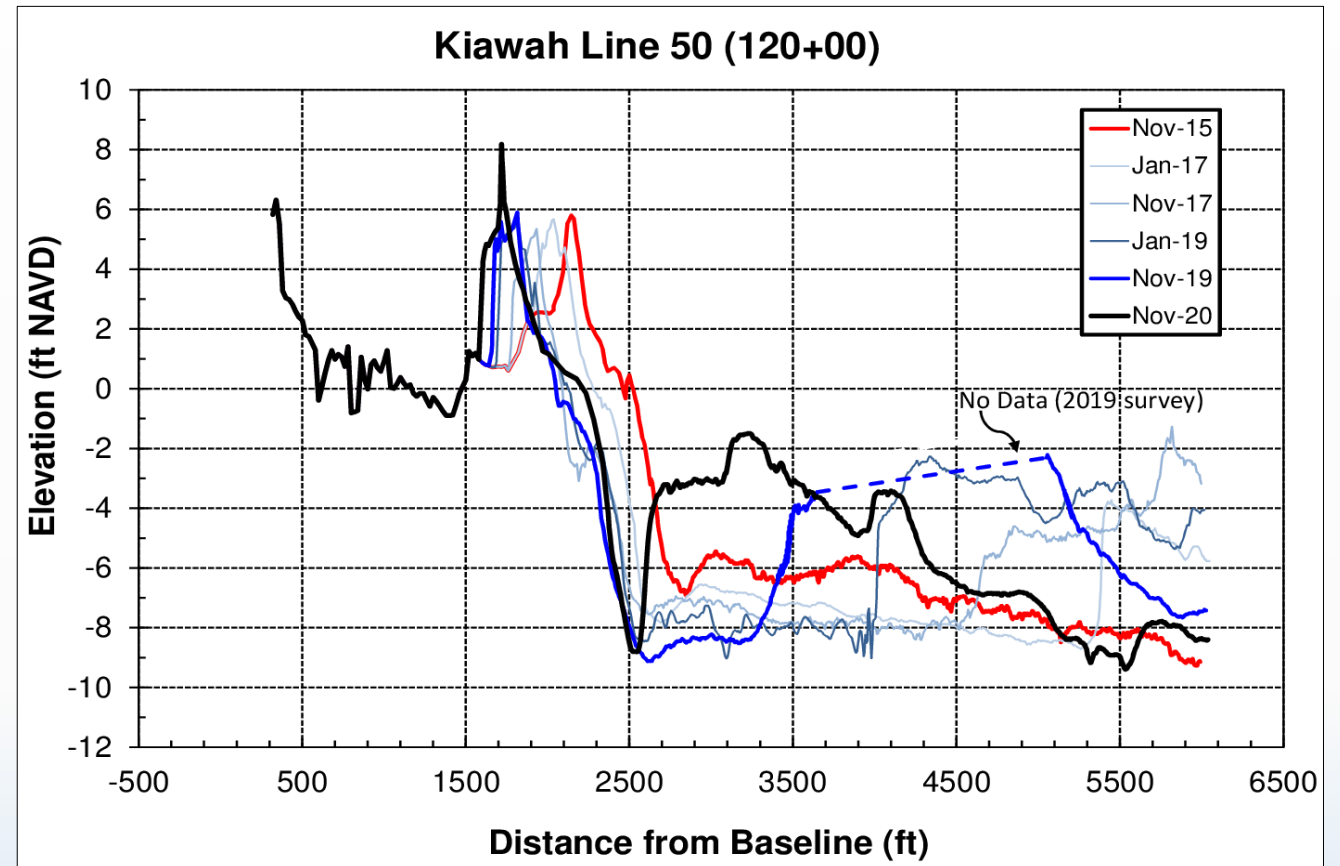
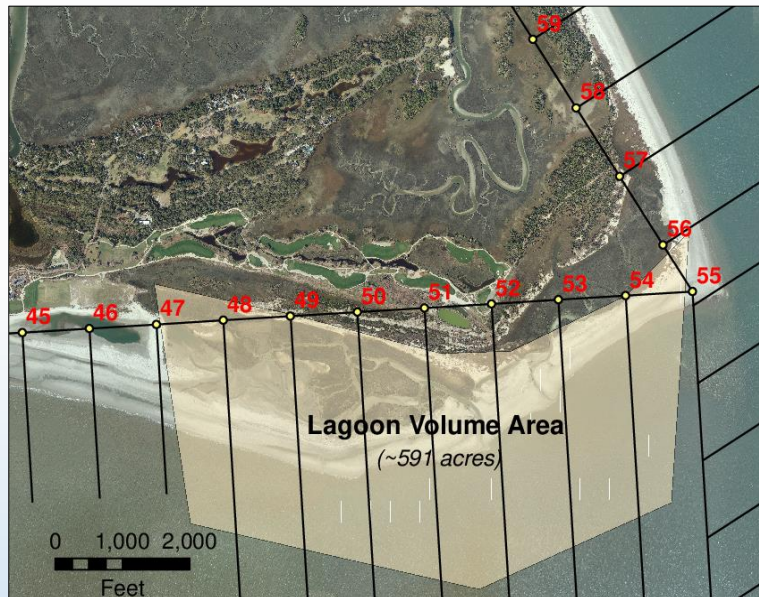
Stono Inlet Reach

- Nov-19 to Nov-20:
 - +1.3 cy/ft (~7,600 cy)
 - Erosion between Lines 56 and 59 likely influenced by wave refraction around incoming tidal shoal
 - Eroded sand is deposited between lines 56 and 59



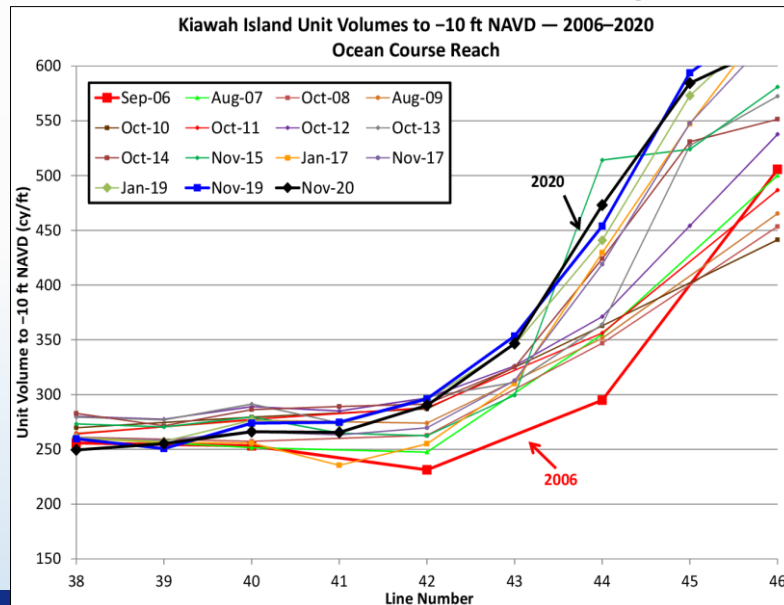
Lagoon Reach

- Nov-19 to Nov-20:
 - +32.8 cy/ft (~262,410 cy)
 - Accretion around Lines 50-53 related to incoming tidal shoal
 - First increase in volume surveyed along Lagoon Reach since October 2014



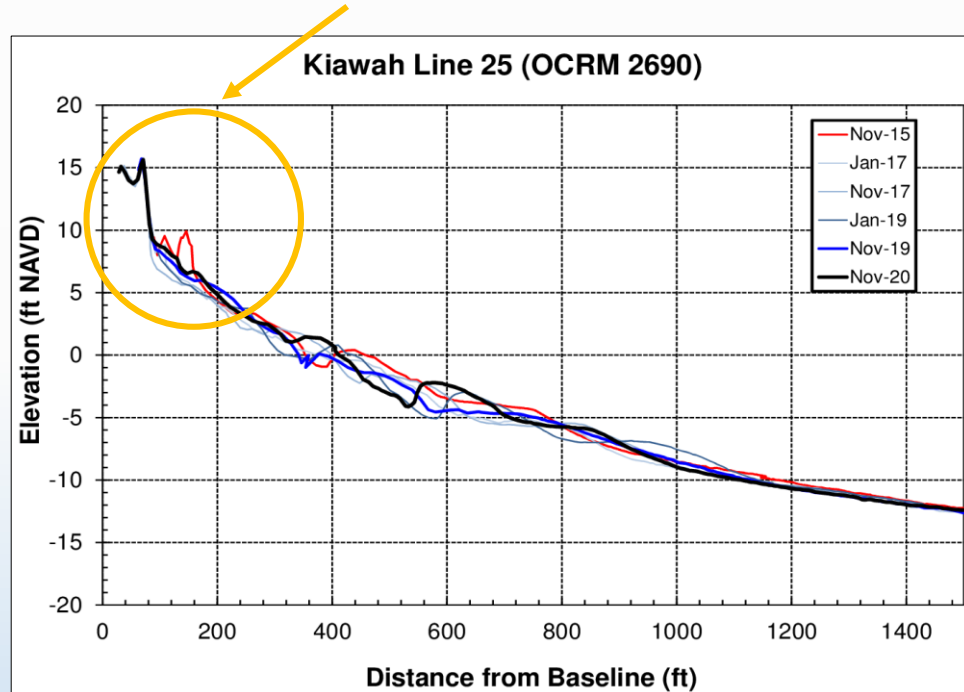
Ocean Course

- Nov-19 to Nov-20:
 - -8.0 cy/ft (~71,960 cy)
 - Accretion between Lines 42 and 46 related to incoming shoal
 - Yellow arrow
 - Some erosion may occur between Lines 38 and 42 while shoal in attaching



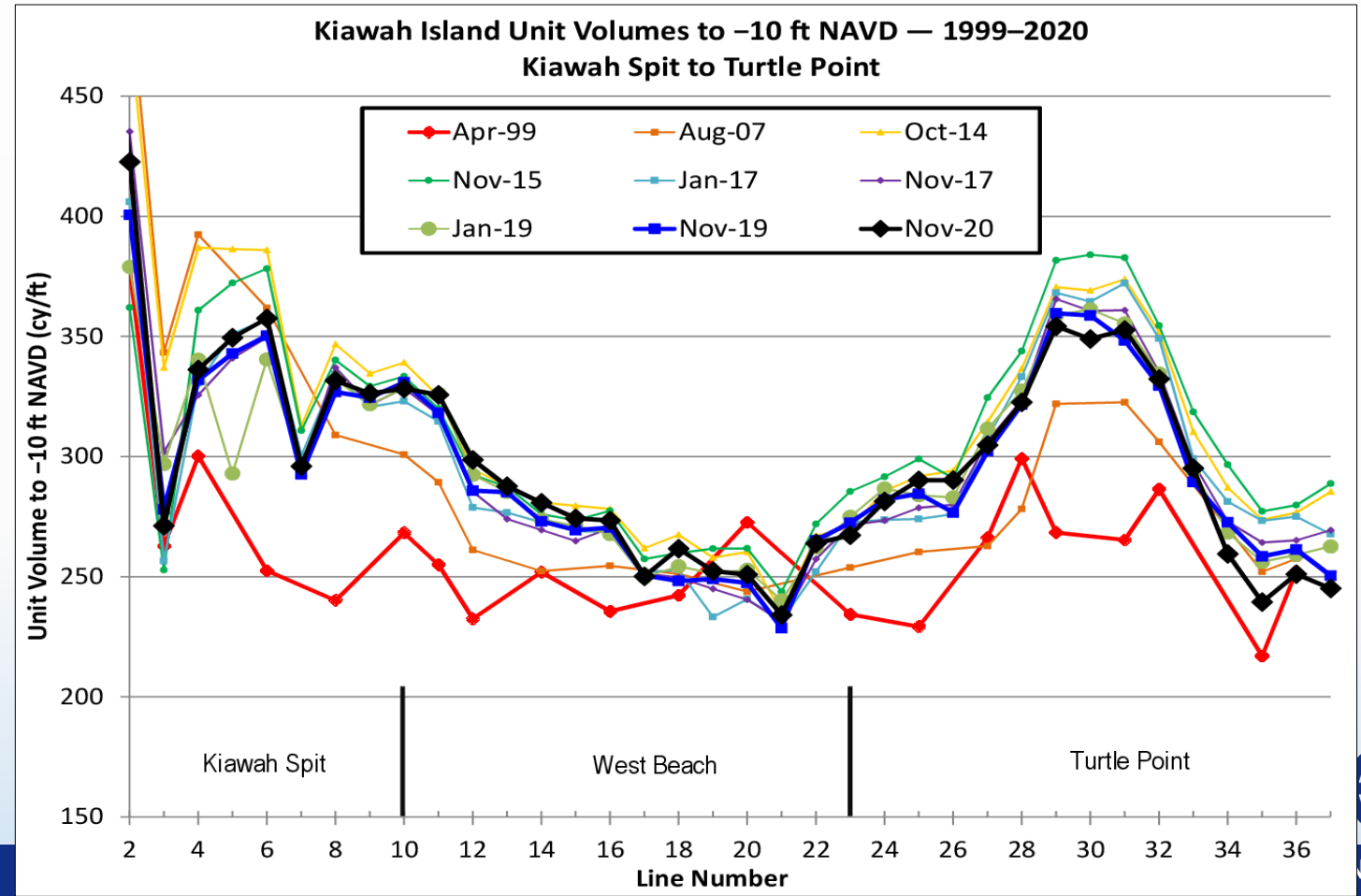
Turtle Point

- Nov-19 to Nov-20:
 - -1.7 cy/ft (~22,640 cy)
 - Generally eroding since ~Nov-17
 - Dune grasses have re-established, but beach appears narrower:



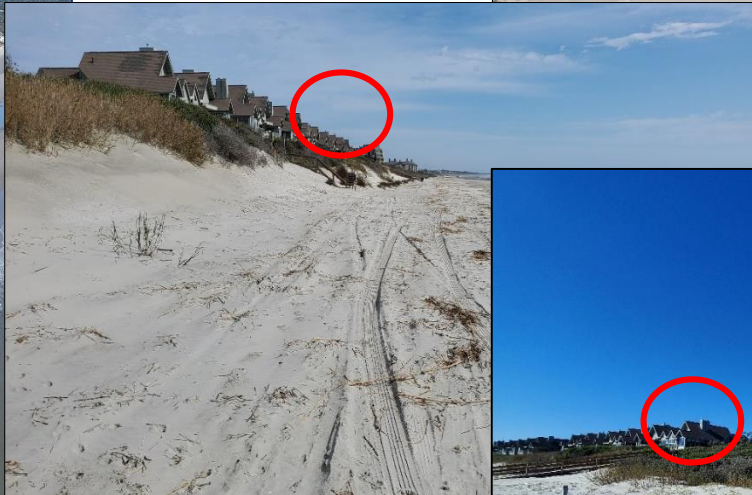
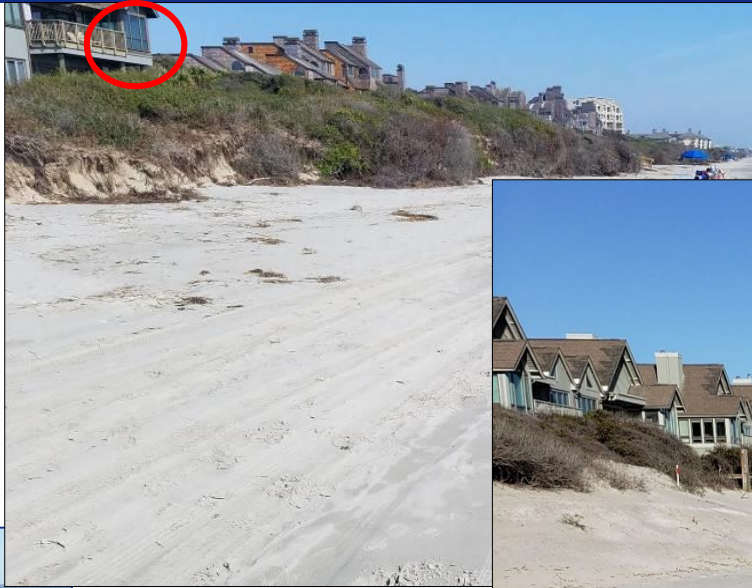
Turtle Point

- Since Apr-99
 - Erosion since Jan-17 reverses long-term accretion
 - Nov-20 unit volume is lowest since Oct-12:



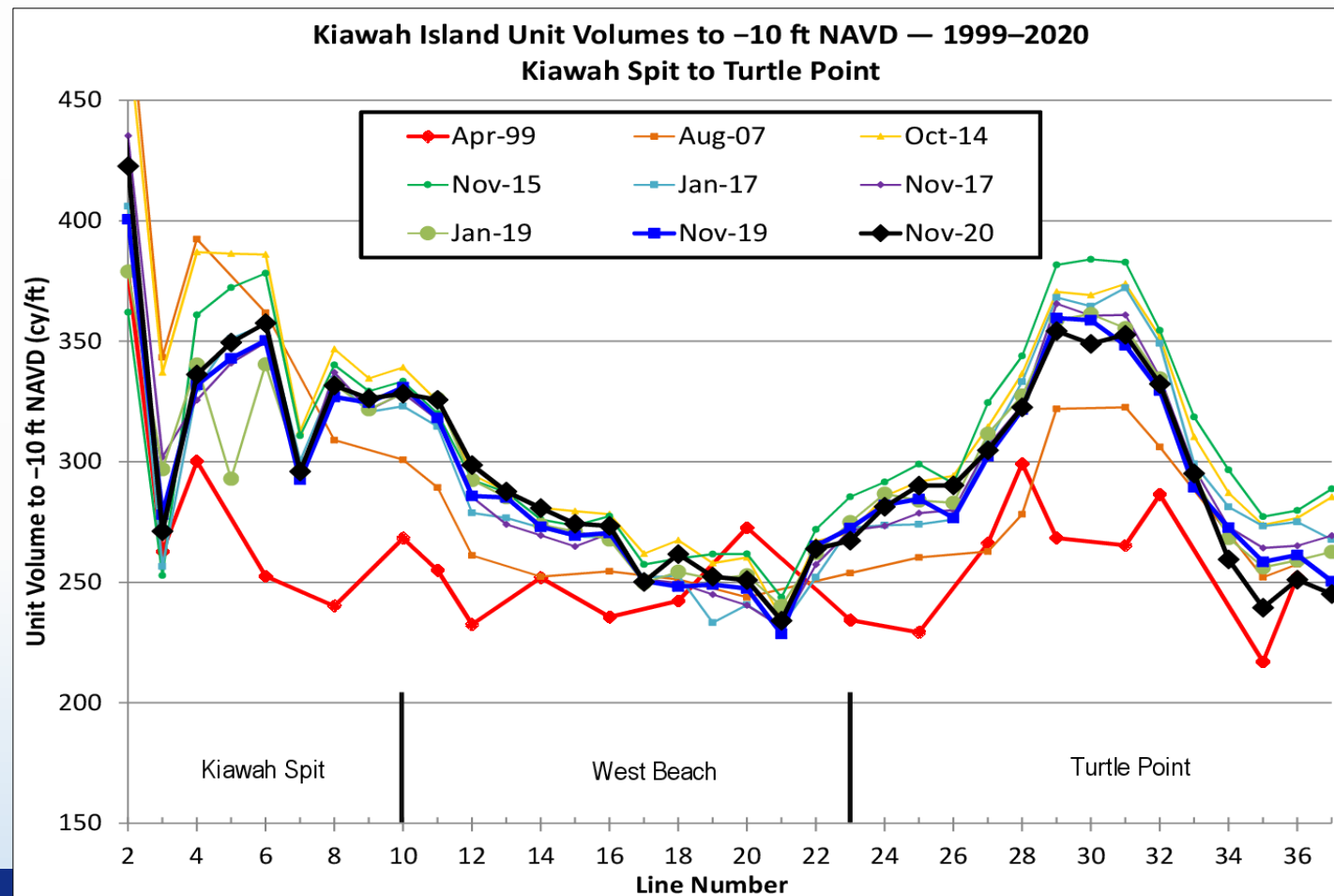
West Beach

- Nov-19 to Nov-20:
 - +4.3 cy/ft (~50,600 cy)
 - Lots of accretion along dune in vicinity of Eugenia Ave



West Beach

- Since Apr-99
 - Mostly accretion, with exception of Lines 16 to 22 (Eugenia Ave.)



Kiawah Spit

- Nov-19 to Nov-20:
 - +3.4 cy/ft (~29,650 cy)
 - Accretion likely related to shifting shoals around Capt Sams Inlet
 - Only erosion at Line 3 (isolated)
 - Continued extension of Kiawah Spit may lead to some dune recession along this reach
 - Rotation of inlet channel since 2015 project may trigger relocation (as opposed to lateral migration of the channel)



Kiawah Spit

- Since Apr-99:
 - Losses greatest in ~2-year period following relocation (2015-2017, etc.)
 - Volumes remain generally higher than Apr-99

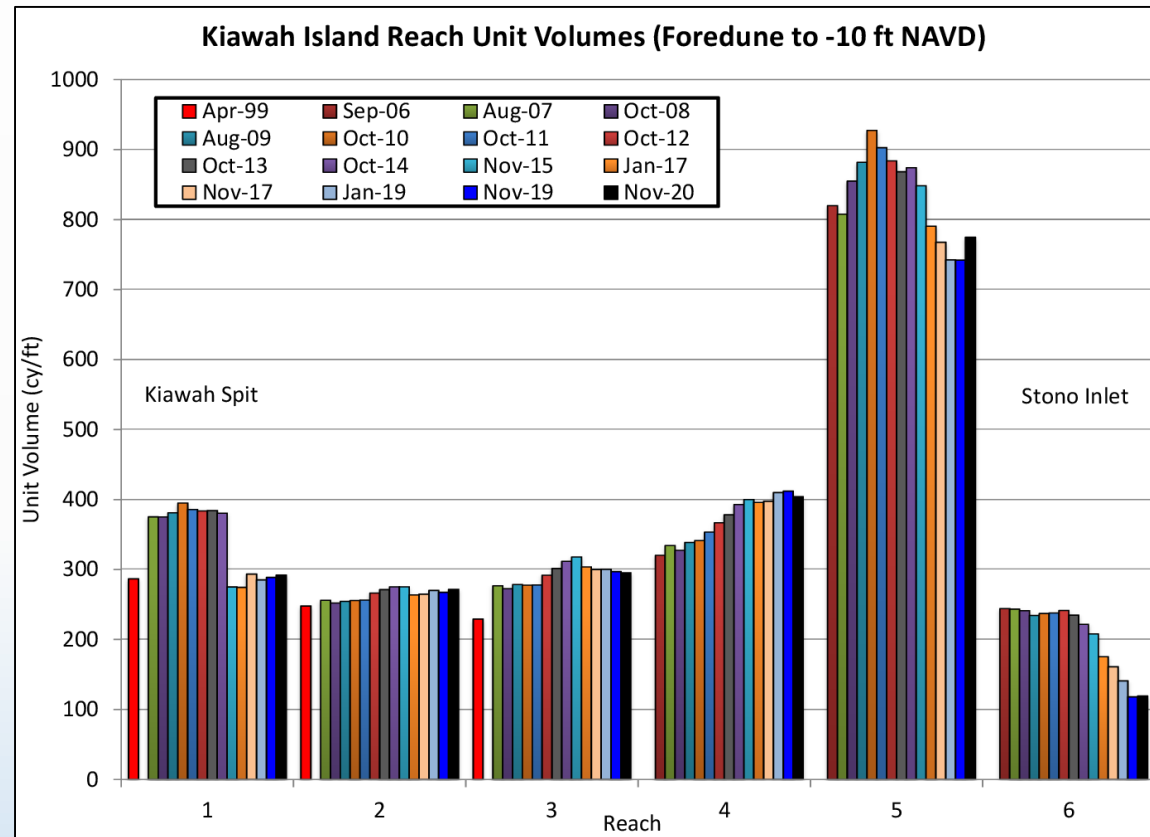


Kiawah Island



- Conclusions

- Island-wide changes Nov-19 to Nov-20 = +4.4 cy/ft (~255,660 cy)
- East End changes ('Ocean Course' to 'Stono Inlet') = +8.4 cy/ft (~198,050 cy)
- Downcoast changes ('Kiawah Spit' to 'Turtle Point') = **+1.7 cy/ft (~57,600 cy)**



Kiawah Island



- Conclusions

- 3 August 2020 (Hurricane *Isaias*) continues storm impacts at East End
- Overwash of East End beach, 3 new drainage channels within Lagoon / Stono Inlet reaches
 - *Matthew* (2016), *Irma* (2017), *Dorian* (2019)
- Stono Inlet shoal attachment:



Kiawah Island



- Key Recent Events

- Stono Inlet shoal attachment:

- Short-term (~1-2 yrs): accretion along Lagoon Reach, eastern portions of Ocean Course reach and western portions of Stono Inlet reach
 - Longer-term (~@+ yrs): accretion along rest of Ocean Course and Stono Inlet reaches, gradual landward migration of high water line along Lagoon Reach

