

Coastal Dynamics and Implications for Alongshore Access: Rhode Island South Shore

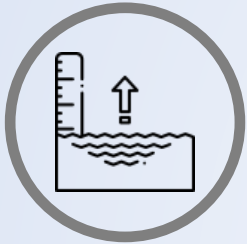


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Presentation Overview



Tidal datums vs. visible tide indicators



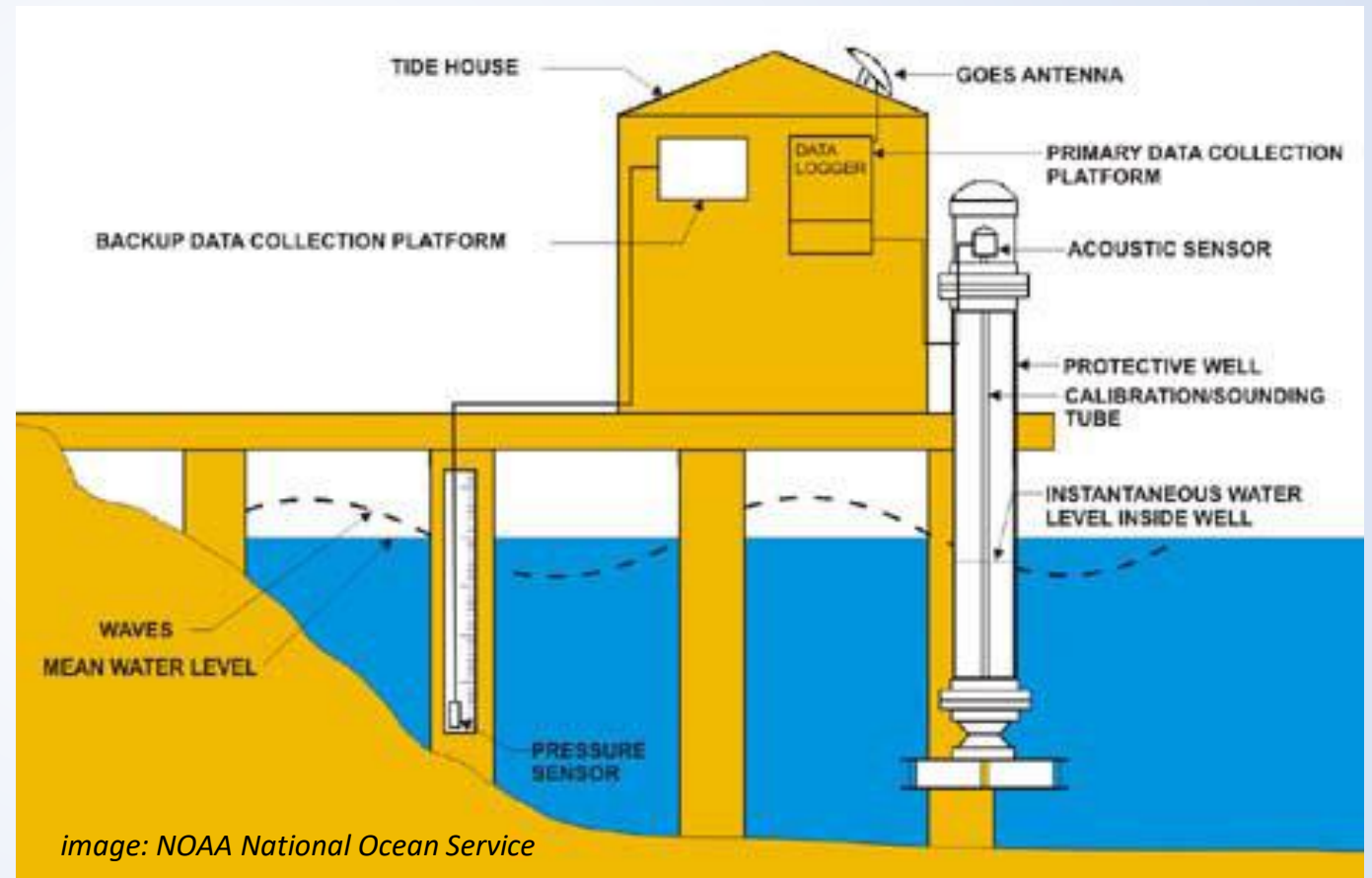
Shoreline change and tidal datums



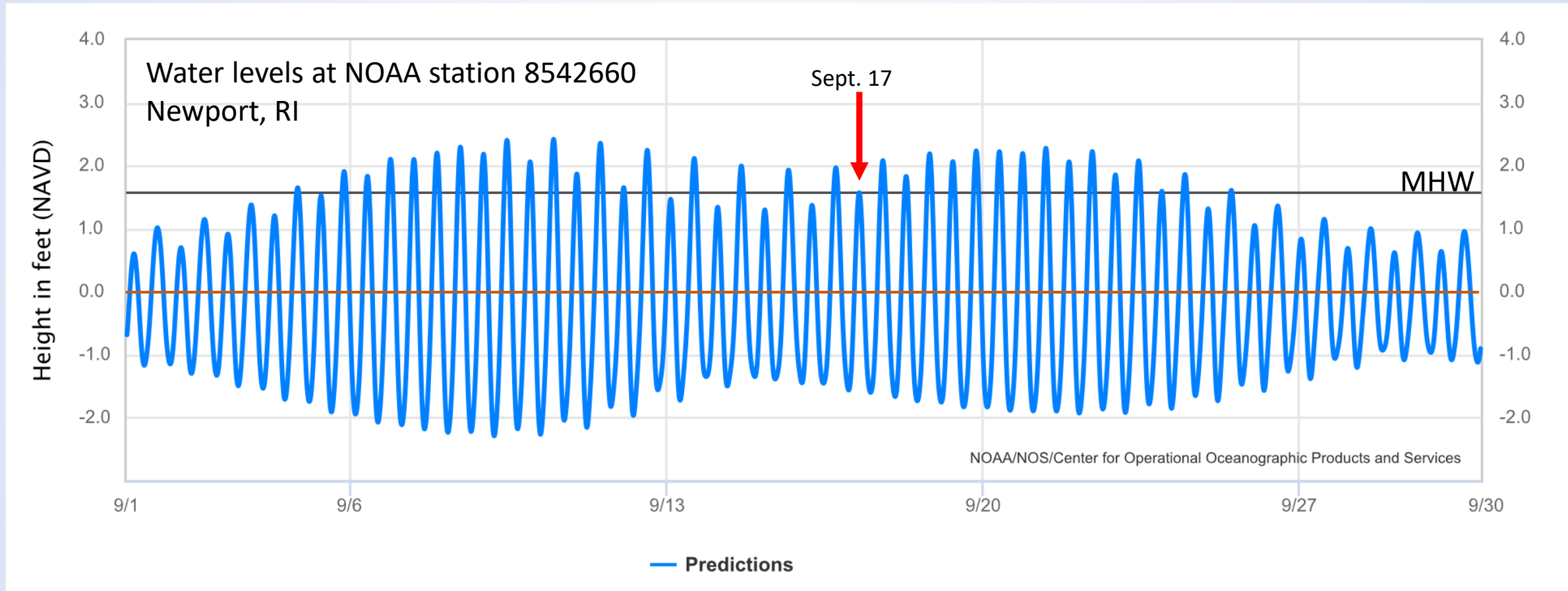
Field surveys

Tides represent a still water level

- Tides are measured at stationary tide gauges on the coast
- Tide gauges remove the effects of waves, creating a “still water level”
- Early continuous tide gauges
 - San Francisco 1854
 - Baltimore 1902
 - Sandy Hook 1910
 - Atlantic City 1911
 - The Battery 1920
 - Boston 1921
 - Newport 1930



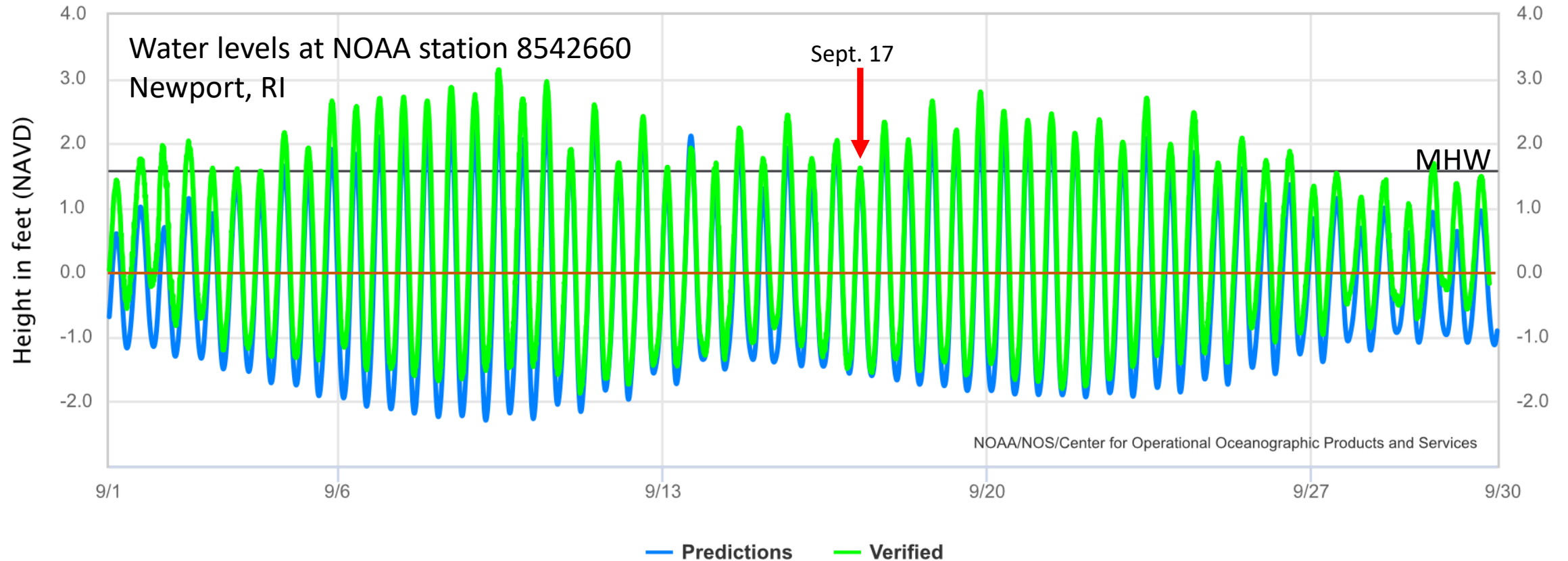
Tidal datums are long-term averages



National Tidal Datum Epoch

1924-1942, 1941-1959, 1960-1978, 1983-2001 (*current*)

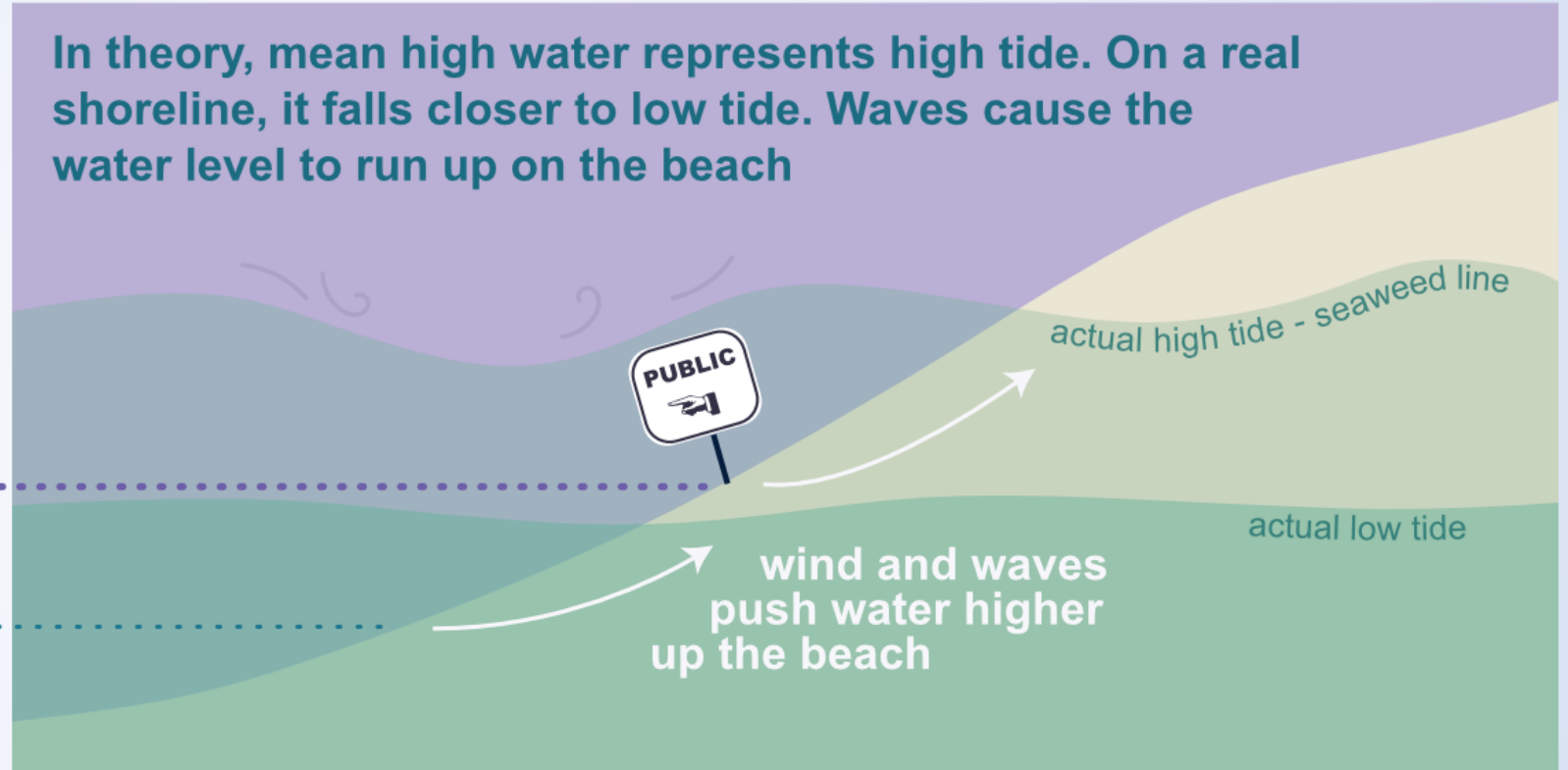
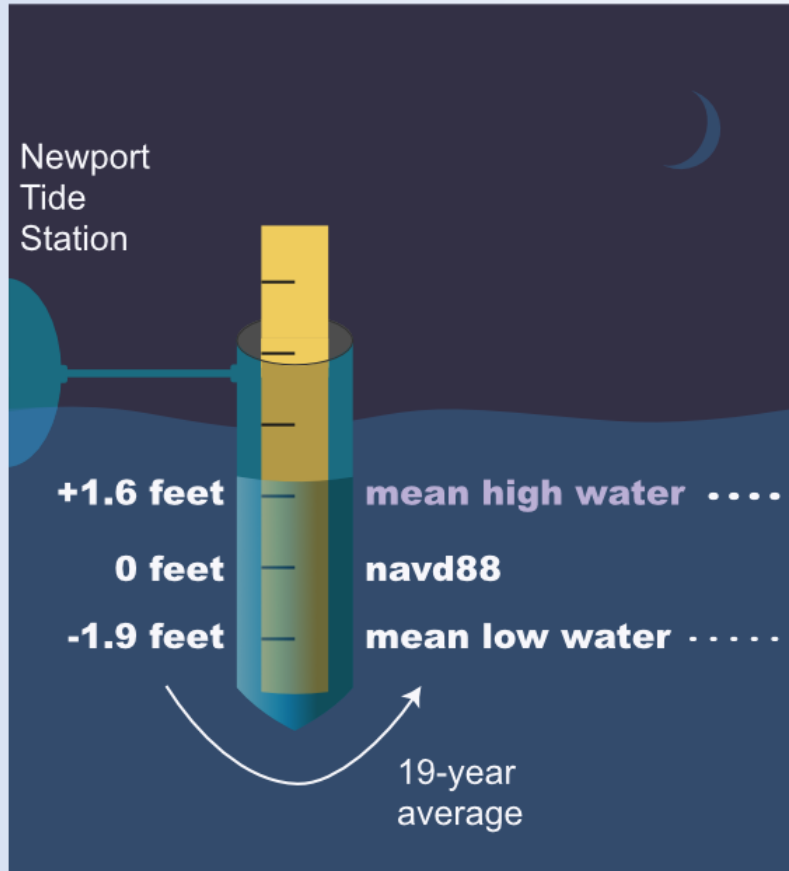
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National Tidal Datum Epoch

1924-1942, 1941-1959, 1960-1978, 1983-2001 (*current*)

Tidal datums can't be seen on the beach

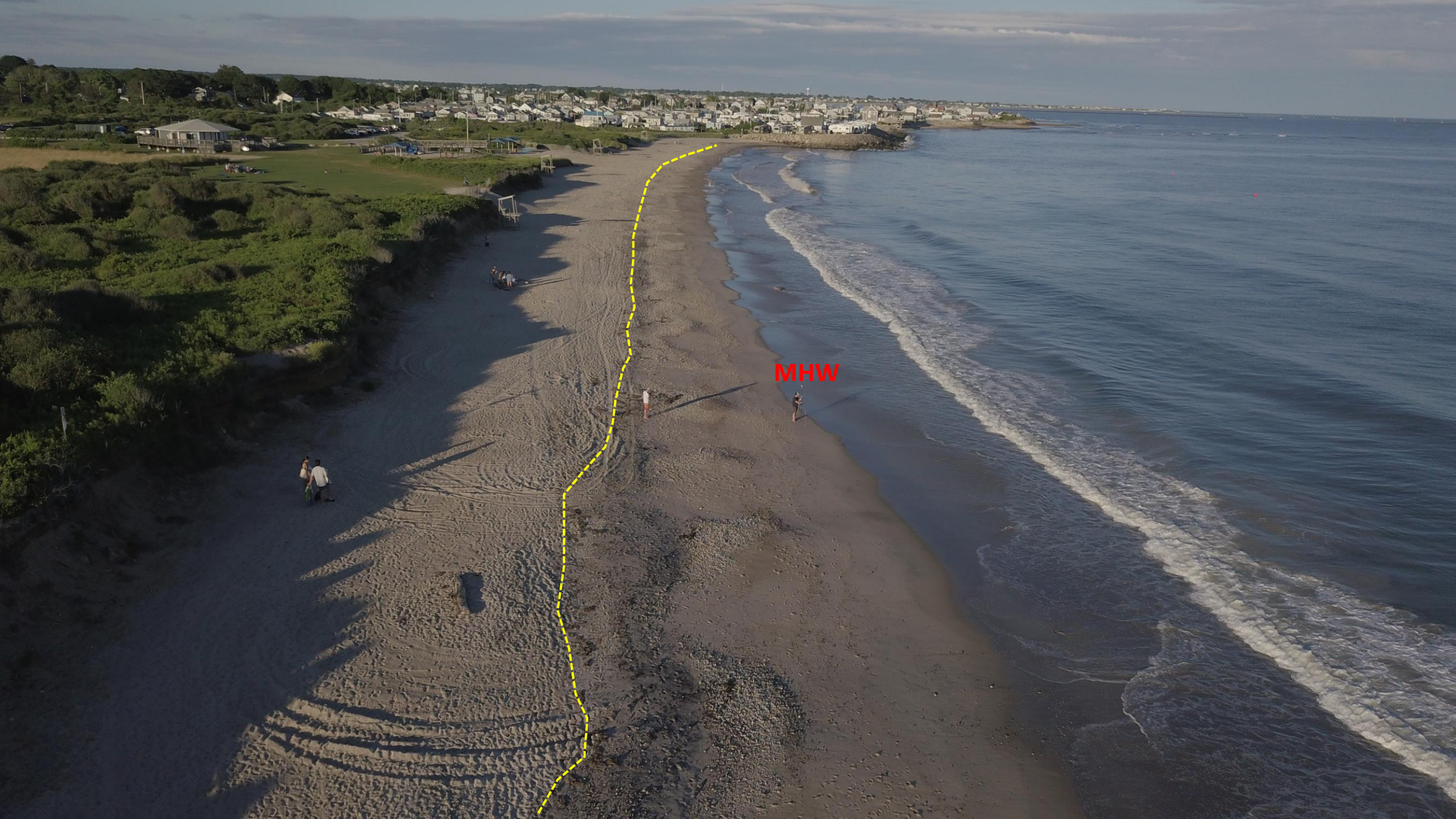


What can be seen is the Last High Tide Swash (LHTS), also called

- seaweed line
- wrack line
- high water line
- high tide mark

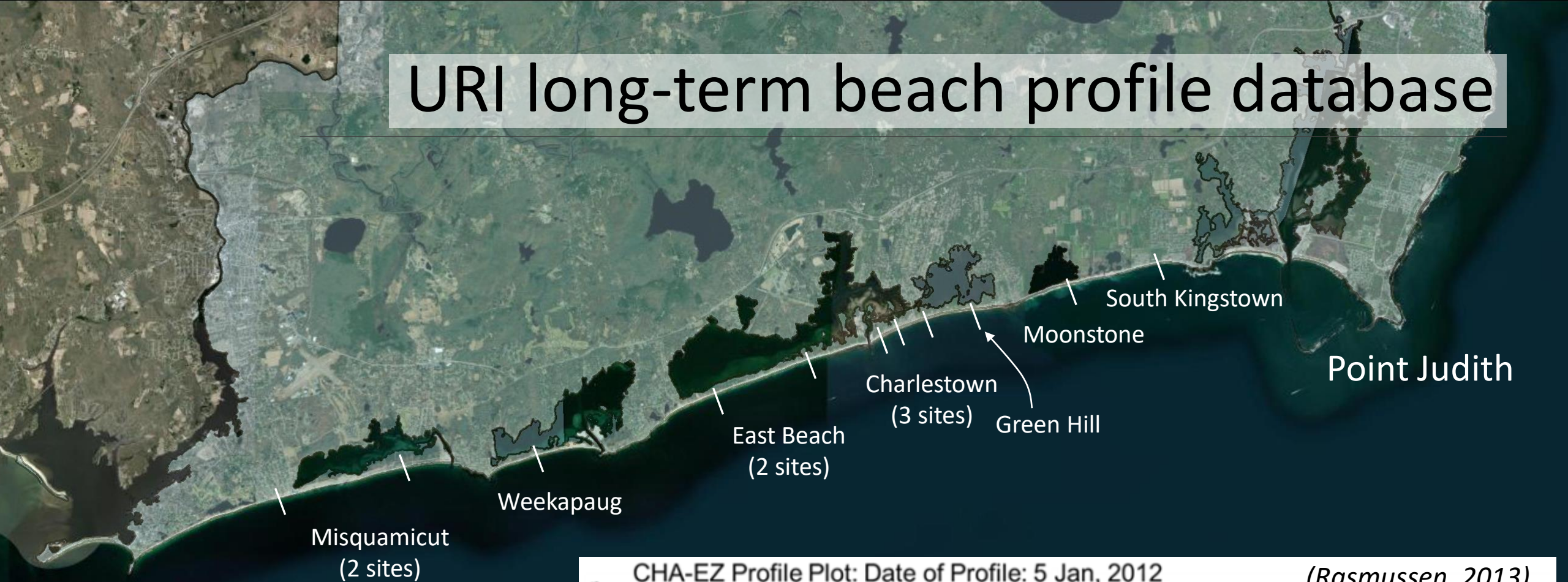






MHW

URI long-term beach profile database



Napatree

Misquamicut
(2 sites)

Weekapaug

East Beach
(2 sites)

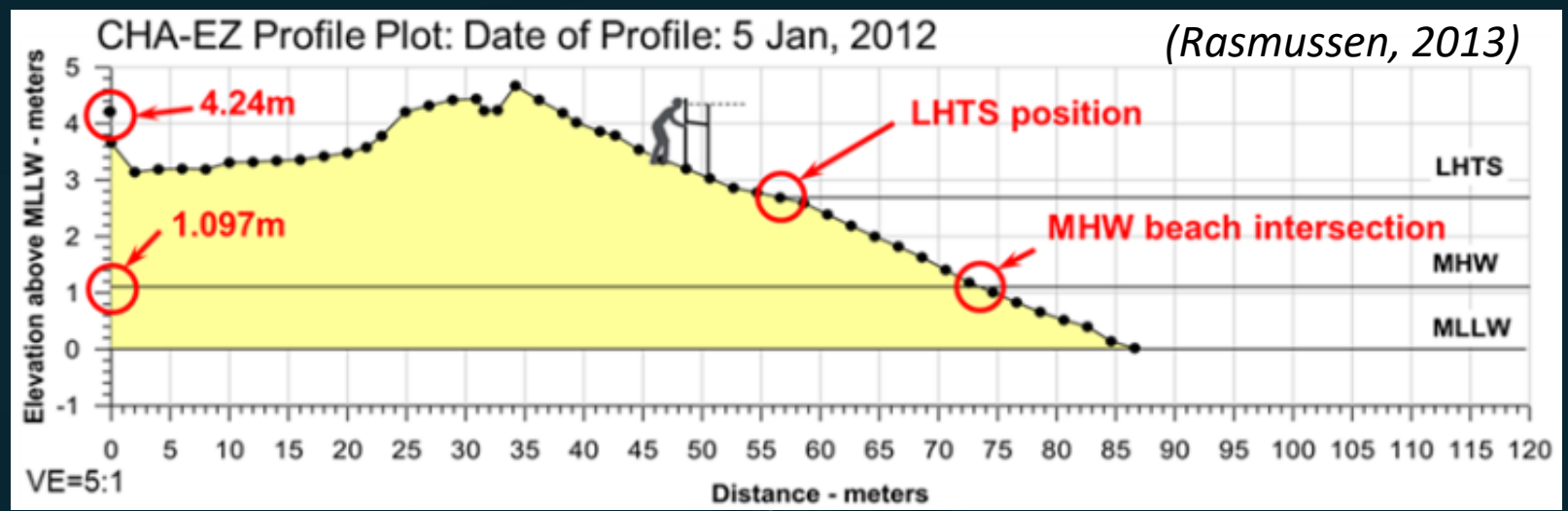
Charlestown
(3 sites)

Green Hill

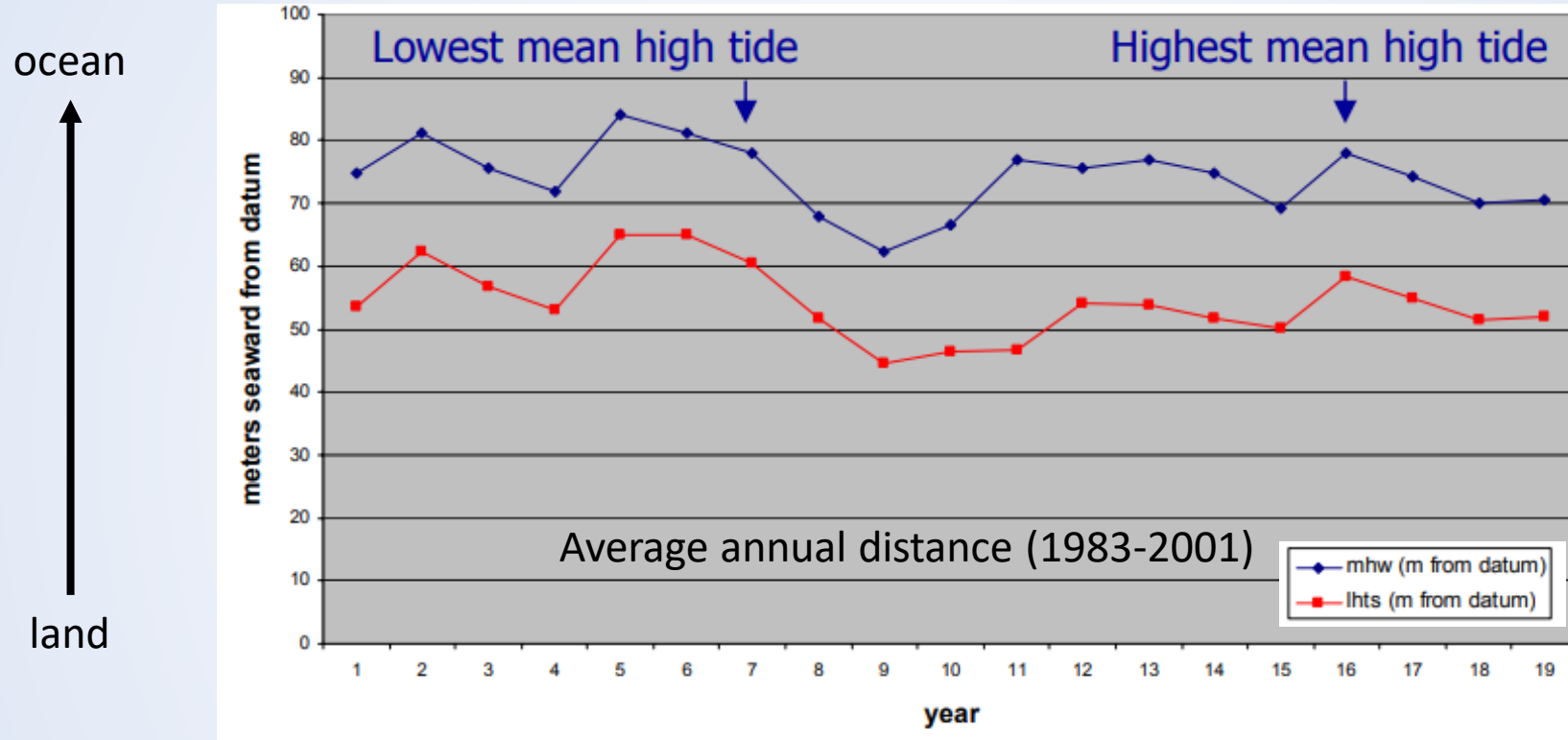
Moonstone

South Kingstown

Point Judith



LHTS is always landward of MHW



Analysis of long-term profile records show that:

- Average horizontal offset is > 60 ft
- Annual offset is consistent over time
- For periods of exceptionally low wave energy, the average difference is still > 40 ft
- Similar offset for all RI south facing beaches

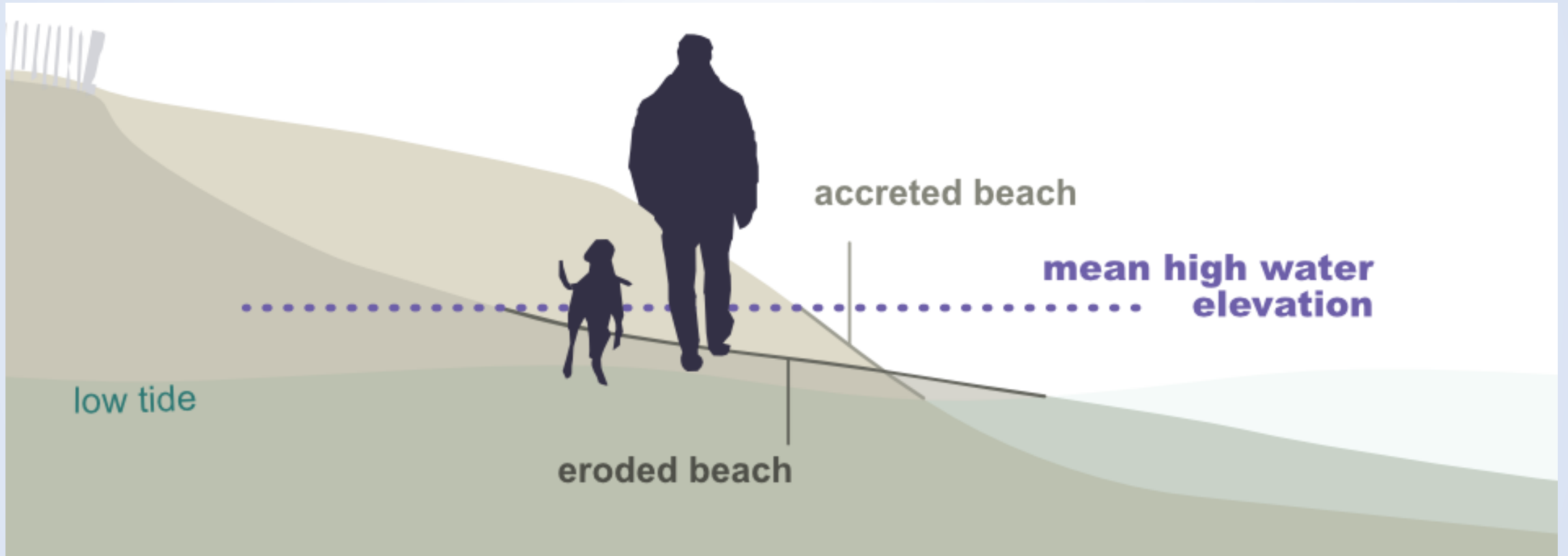
LHTS is always landward of MHW



Napatree

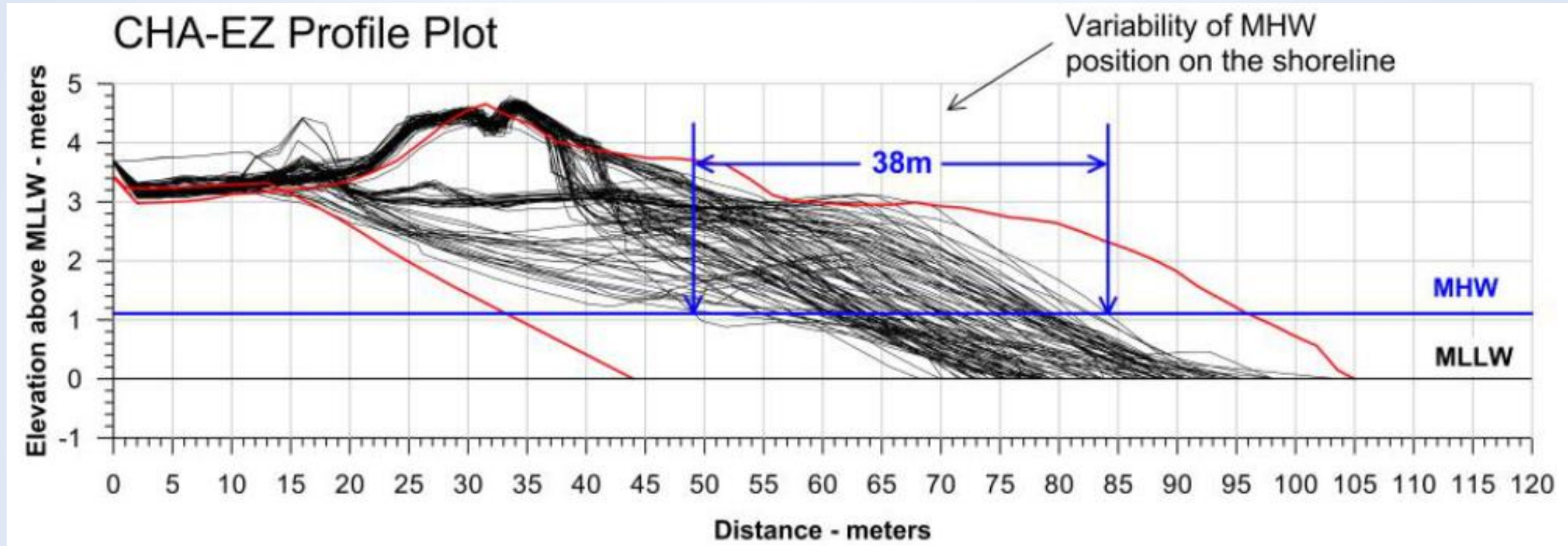
Point Judith

The beach profile can change daily



The location where MHW intersects the beach changes as waves move sand onshore, offshore, and alongshore.

The beach profile can change daily



Two years of near weekly beach transects in Charlestown show that the position of **the Mean High Water line migrated back and forth across 125 ft** swath of the beach profile.

For how long can the public access the shore?



Our perception – for most, if not all of a typical day

Real Time Kinematic GPS

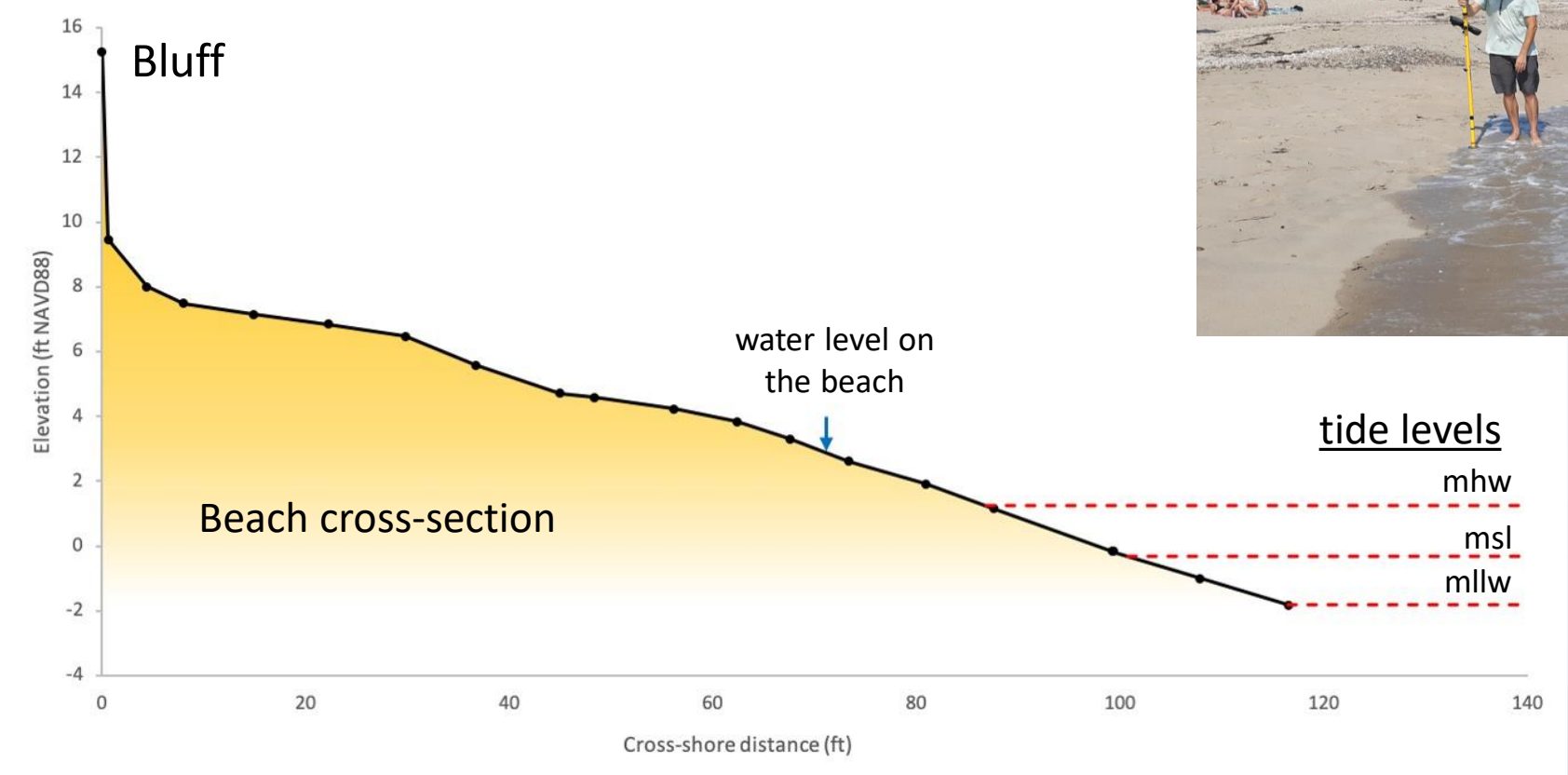


Stakes = surveyed
MHW elevation

MHW

RTK beach survey

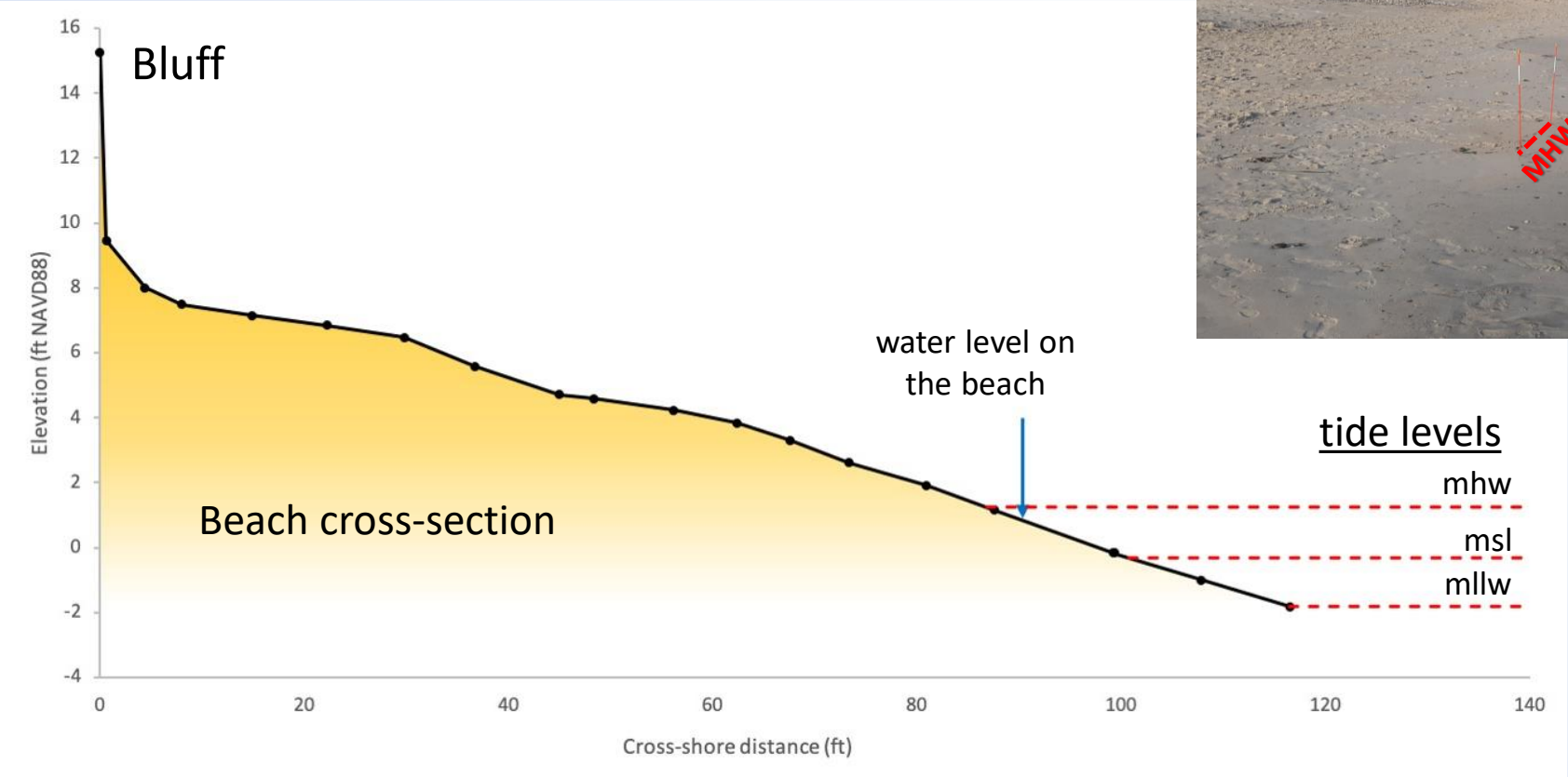
South Kingstown Town Beach
July 15, 2021
2:44 before low tide



Wave runup is 16 ft
landward of MHW

RTK beach survey

South Kingstown Town Beach
July 15, 2021
0:18 after low tide



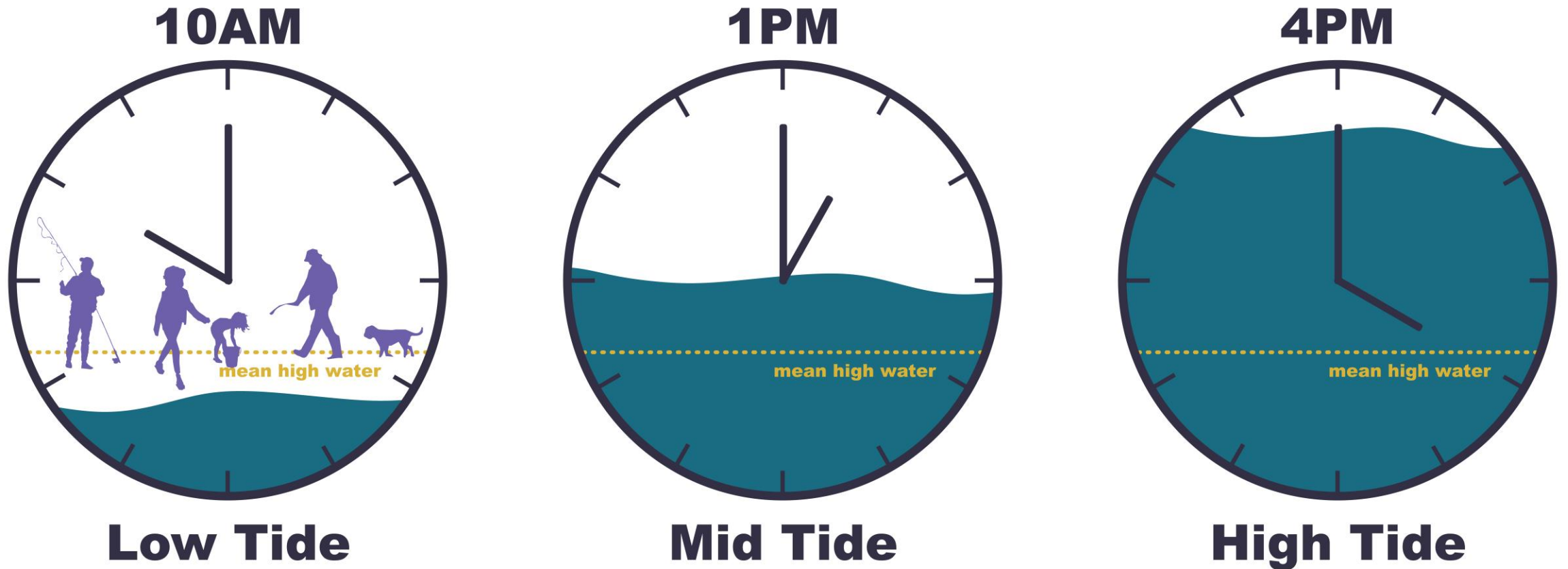
Wave runup is 3 ft seaward of MHW

Survey results

<u>Date</u>	<u>Continuous beach access</u>	<u>Newport tide ht. (ft MLLW)</u>	<u>offshore wave ht. (ft at low tide)</u>
15-Jul-21	1 hr 30 mins	3.85	2.16
18-Aug-21	2 hrs 30 mins	3.65	1.64
19-Sep-21	30 mins	3.66	4.17
21-Oct-21	0 mins	4.75	3.02
15-Nov-21	15 mins	4.03	6.86
17-Dec-21	5hrs 40 min	3.68	8.86
28-Jan-22	4 hrs 10 mins	3.81	5.02

Notes: 1. MHW elevation at Newport - 3.6 ft
2. Average offshore wave height – 4.5 ft

For how long can the public access the shore?



Our reality – at most, a few hours around low tide

Where is the shoreline?

*The people shall continue to enjoy and freely exercise all the rights of fishery, and the privileges of the shore, to which they have been heretofore entitled under the charter and usages of this state, including but not limited to fishing from the shore, the gathering of seaweed, leaving the shore to swim in the sea and **passage along the shore**;*

—Rhode Island State Constitution (Article 1 Section 17)

*We concur in this analysis and **apply the mean-high-tide line as the landward boundary of the shore** for the purposes of the privileges guaranteed to the people of this state by our constitution. This court has held that the common law governs the rights and obligations of the people of the state unless that law has been modified by our General Assembly.*

—Rhode Island Supreme Court, State v. Ibbison (1982)

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*Additionally, we feel that our decision best balances the interests between littoral owners and all the people of the state. Setting the boundary at the point where the spring tides reach would unfairly take from littoral owners land that is dry for most of the month. Similarly, setting the boundary below the mean-high-tide line at the line of the mean low tide would so **restrict the size of the shore as to render it practically nonexistent.***

—Rhode Island Supreme Court, State v. Ibbison (1982)