

Maine Coastal Erosion and Hazards

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Long-Term Beach Erosion

Erosion is a consequence of shoreline recession - the inland migration of the shoreline. Not all Maine beaches are eroding.

Long-term erosion results from gradual changes in the local beach sand budget and sea level.

Many beaches are eroding
1 foot per year.

Some beaches have
eroded up to 3 feet per
year.



S. M. Dickson, 1986



Short-Term Beach Erosion

Short-term erosion results from storms that produce coastal flooding and surf.

Sand dunes can erode 10s of feet horizontally in a single storm.

Flooding can erode dunes several feet down and move sand more than 100 feet inland.



S. M. Dickson, 1992



1978 Winter Storms



Coastal erosion, wave action, and flooding in January and February blizzards cause \$47M in Maine property damage.



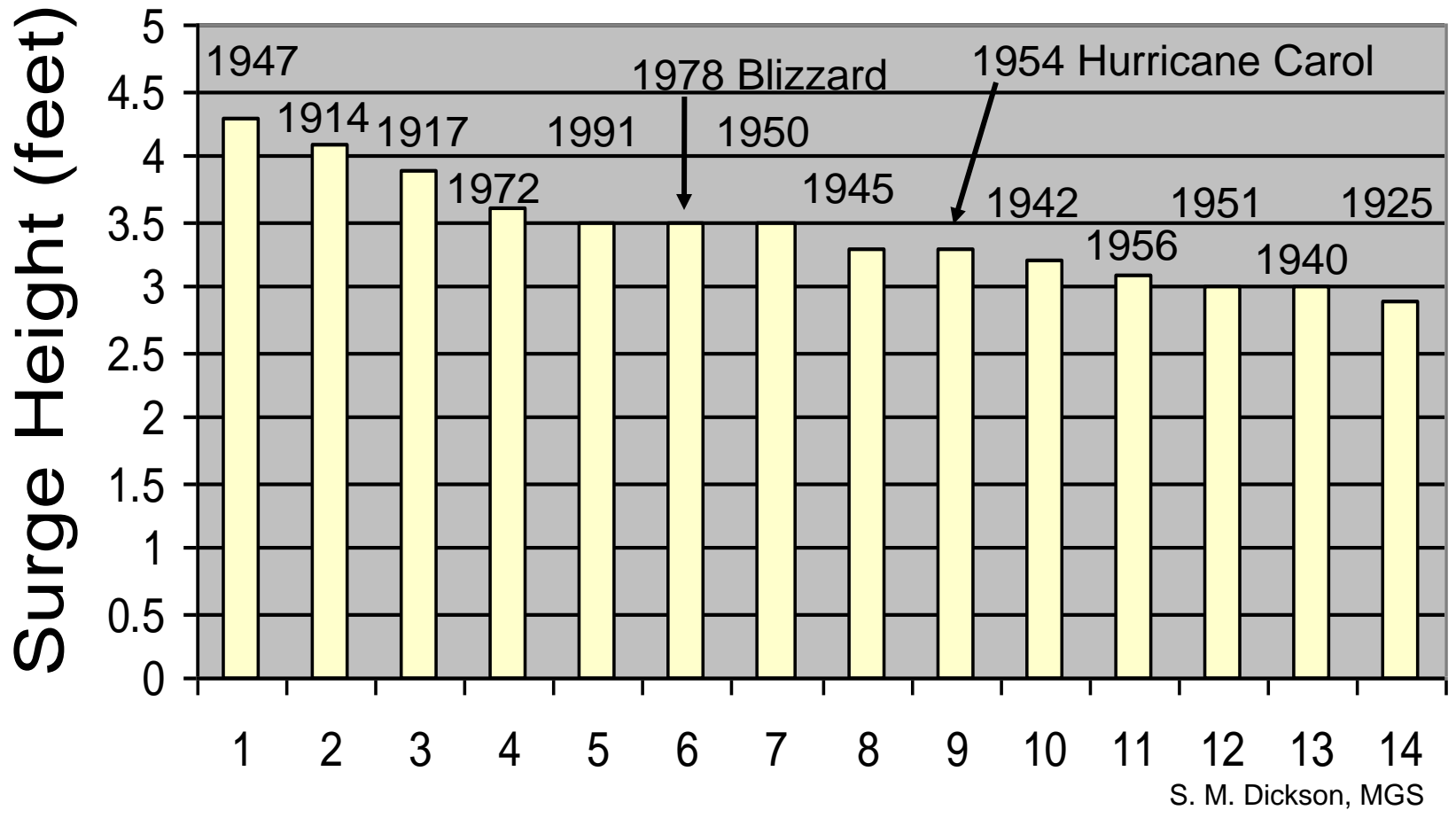
Storm Surge at Portland

1. 4.3 feet March 3, 1947
2. 4.1 feet March 1, 1914
3. 3.9 feet Dec. 14, 1917
4. 3.6 feet Dec. 19, 1972
5. 3.5 feet Oct. 30, 1991 (Perfect Storm)
6. 3.5 feet Feb. 7, 1978 (Blizzard; 10-yr surge)
7. 3.5 feet Nov. 26, 1950
8. 3.3 feet Aug. 31, 1954 (Hurricane Carol)
9. 3.2 feet Dec. 2, 1942
10. 3.1 feet Mar. 16, 1956

Data courtesy of the National Weather Service.



Top 14 Coastal Storm Surges

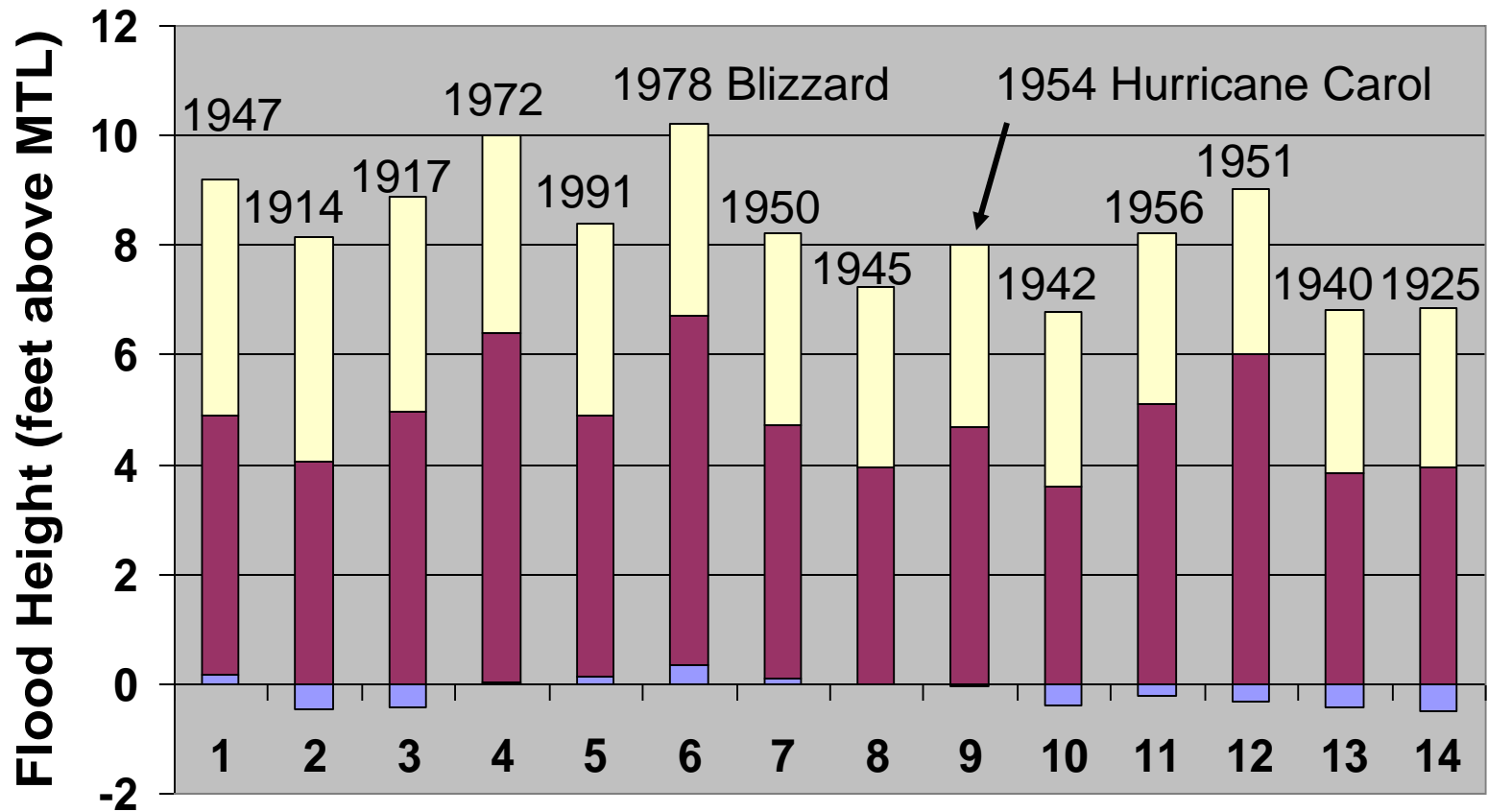


Storm Rank by Surge Amount

S. M. Dickson, MGS



Coastal Flooding & Erosion Events



S. M. Dickson, MGS

Storm Rank by Surge Amount

Surge
- MHW -
Tide
Mean
Sea
Level



Coastal Erosion Damage - 1976



J. T. Kelley, 1976

1976 beach erosion at
Hunnewell Beach,
Phippsburg



L. K. Fink, 1976

Erosion undermines homes at Hunnewell Beach, Phippsburg



Erosion Damage - Saco



- 1
- 2
- 3

Since the 1983 Sand Dune Rules went into effect, 3 homes in Saco were the only ones in Maine damaged by >50%. They were not rebuilt nor were the rules challenged in court. Three other houses, one in Saco and two at Popham Beach, were damaged <50% by waves and each was rebuilt farther inland.



Maine Geological Survey

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Beach and Dune Geology

by Stephen M. Dickson

Camp Ellis Beach, Saco River
 Saco, Maine

Photo 10-13, Open-File Report (in prep.)

S. M. Dickson, MGS



See explanation for description of map units. Geologic boundaries based on MGS Coastal Sand Dune Map and field notes.

Erosion Damage – 1986 & 1990



S. M. Dickson, 1986



S. M. Dickson, 1990

Erosion undermines homes at Camp Ellis Beach in Saco



Erosion Damage – Camp Ellis



S. M. Dickson

Erosion destroyed a seawall and house at Camp Ellis Beach in Saco (in the 1990s).



Erosion Damage & Redevelopment



S. M. Dickson, 1986



S. M. Dickson, 1990

Erosion undermines a home at Camp Ellis Beach prior to its expansion and subsequent total collapse in 1991.



Erosion Damage - 1991



S. M. Dickson, 1991

This building was relocated landward in a frontal dune after seawall failure and storm damage.



Erosion Damage – Popham 1983



J. T. Kelley, 1983



S. M. Dickson, 1989

Undermined and threatened by erosion, 2 homes retreat and elevate.



Conclusions

In the last century 30 – 40 buildings have been destroyed by beach erosion in Maine:

A minimum of 20 houses have been lost at Camp Ellis in Saco. 33 lots are now in the ocean.

At least 10 buildings, including a hotel, were lost at Popham Beach in Phippsburg.

A hotel at Higgins Beach in Scarborough was destroyed by erosion.

In the last 20 years, 3 houses in Saco were completely destroyed by erosion. Many others were damaged.

Sea-level rise will continue – probably 2x faster than in the last century – so more property damage from erosion is expected.

