

Impacts of Beach Scraping and Human Modifications to the Coastal System, Fire Island National Seashore

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Introduction

- Moderate coastal development
- Land loss due to erosion



Protective measures

Property protection and erosion mitigation through beach scraping, beach replenishment

This presentation

Quantitative comparison of scraped vs. non-scraped beaches

- National Park Service Technical Report 2008/131
- *In Press* article in Journal of Coastal Research

Human Modification

Beach replenishment



<http://www.fiyrra.com/fiyrra/FIRenourishment03.html>

Beach scraping



Photo: Meredith Kratzmann

Development



<http://www.fiyrra.com/fiyrra/FIRenourishment03.html>

Sand fencing



Photo: Erika Lentz

Approach

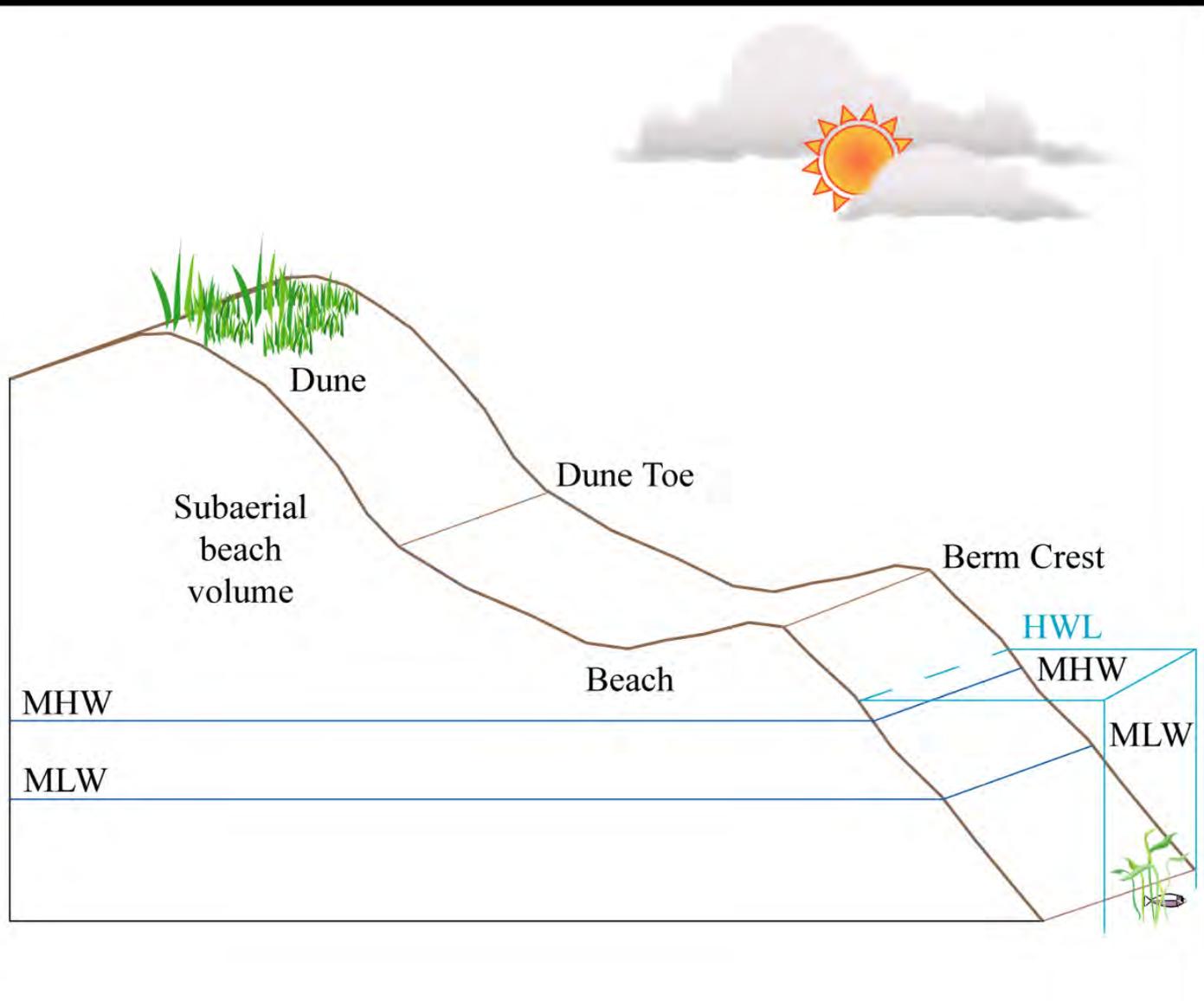
- **Assess morphological change on decadal to sub-decadal timescales**
- **Isolate and assess the effects of beach scraping on dune/beach morphology**
- **Quantify beach volumes, shoreline change, differences in beach profile characteristics**

Beach profile analysis

Objective: isolate impacts of beach scraping

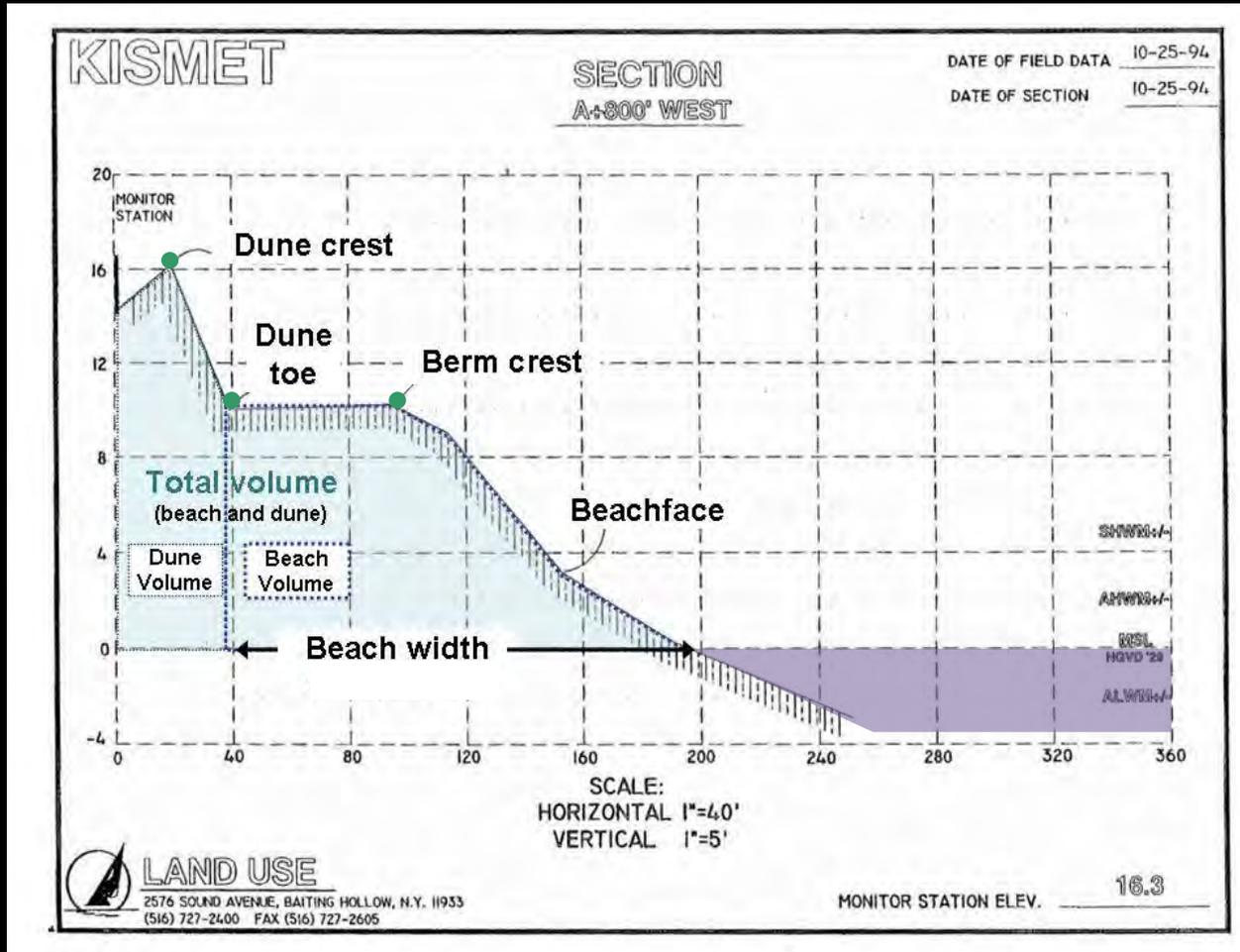
- Profiles collected as part of permit-required monitoring
- Communities: Kismet, Davis Park
- Statistical analysis of beach profile characteristics: scraped vs. non-scraped

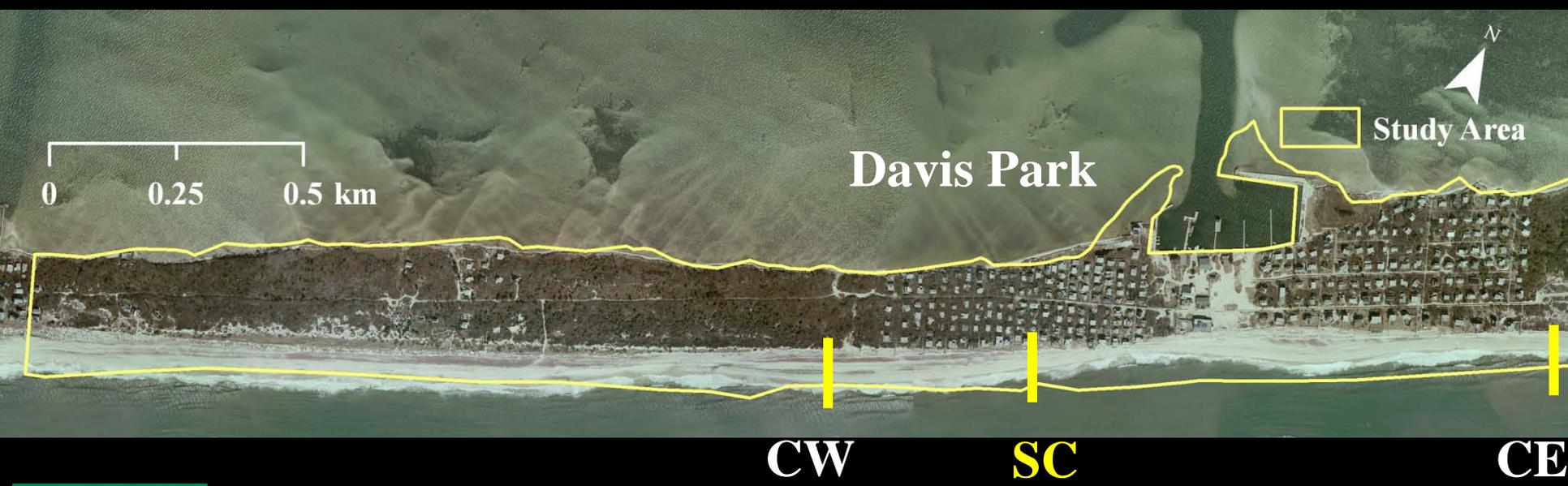




Profiles: Land Use Ecological Services, Inc.

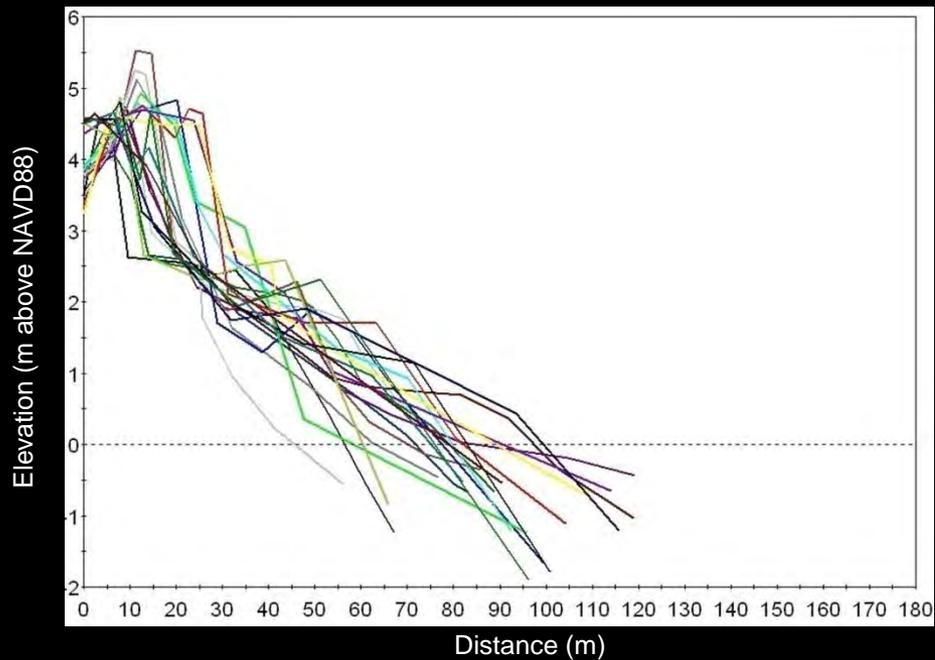
- Digitized hard copy profiles, identified characteristics, conducted statistical analysis





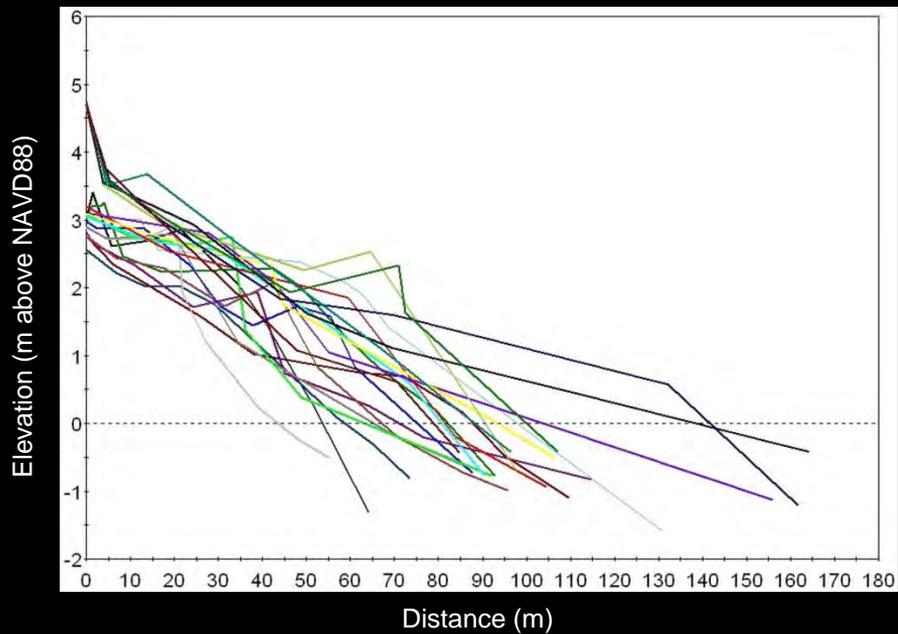
KISMET

Profile envelopes
1998-2007

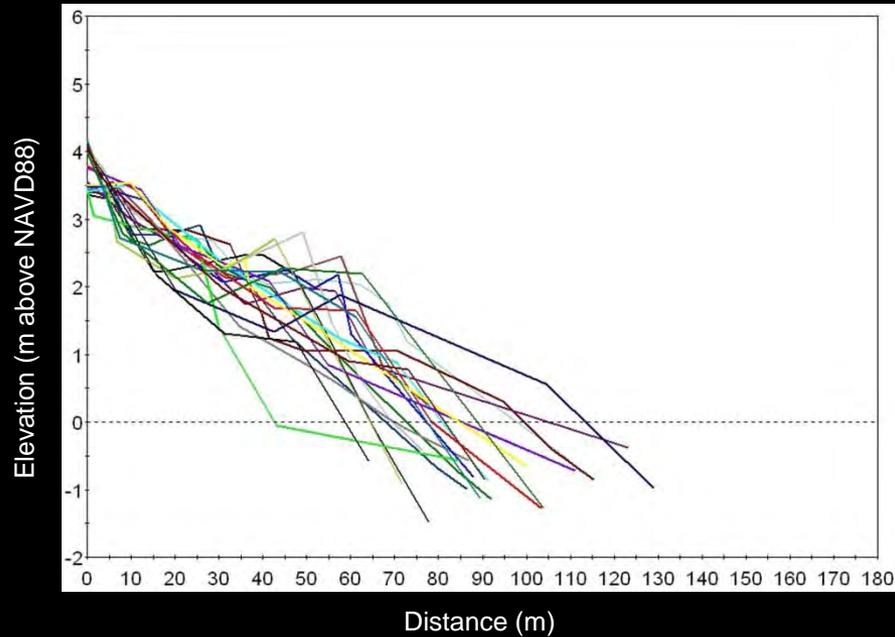


Scraped location

Western control



Eastern control

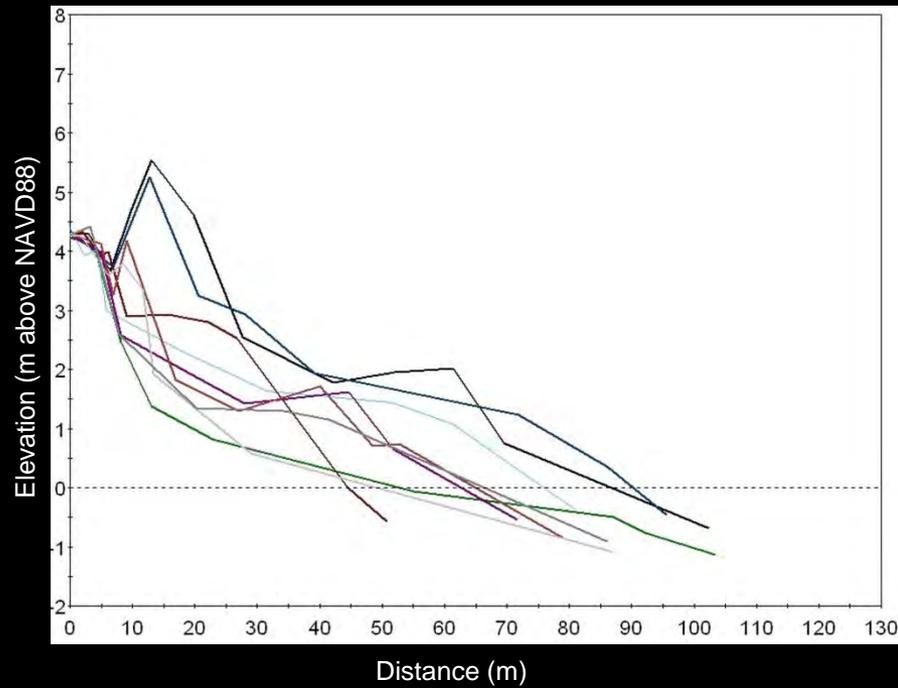


DAVIS PARK

Profile envelopes

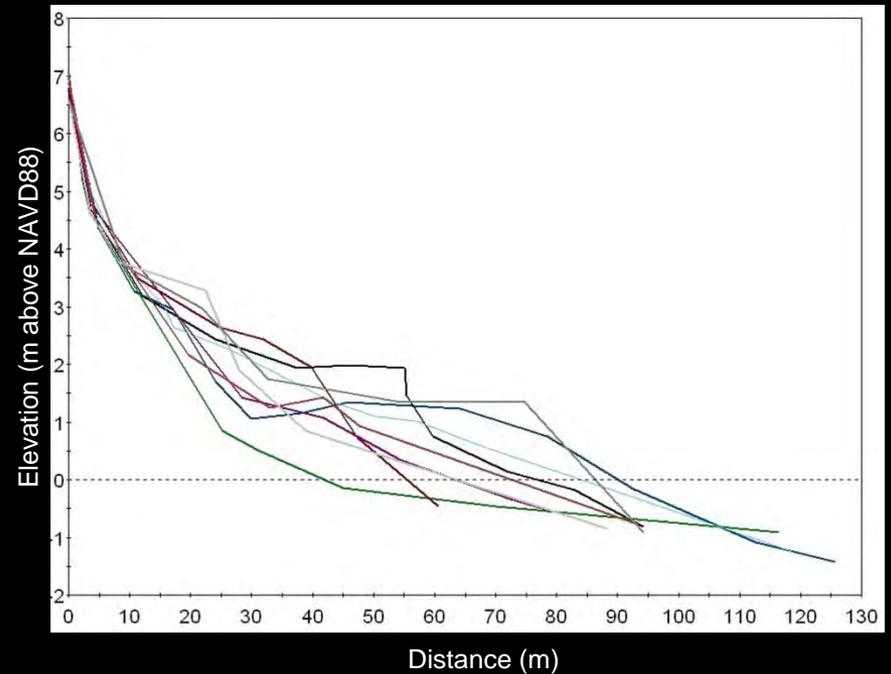
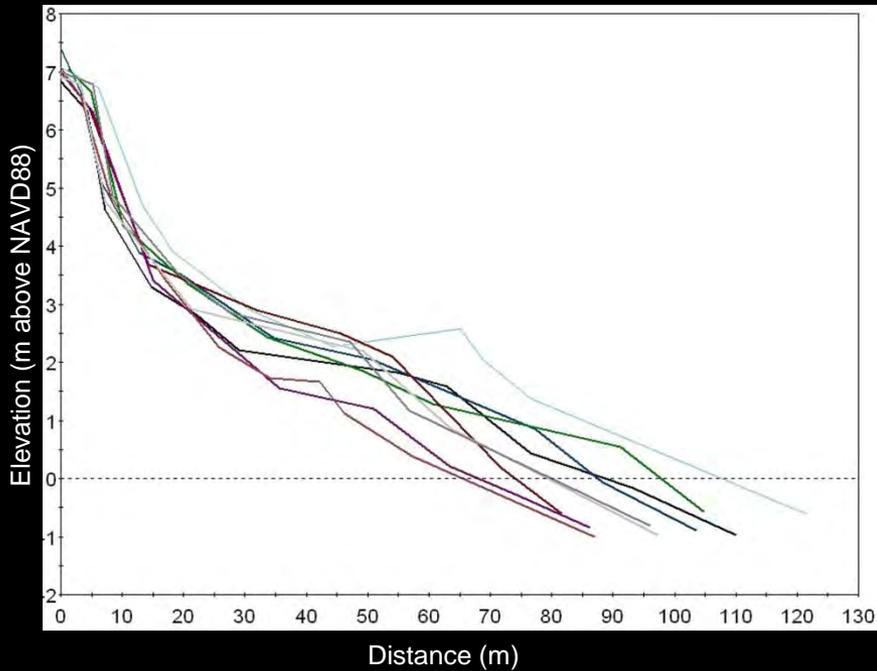
1997-2000

Scraped location



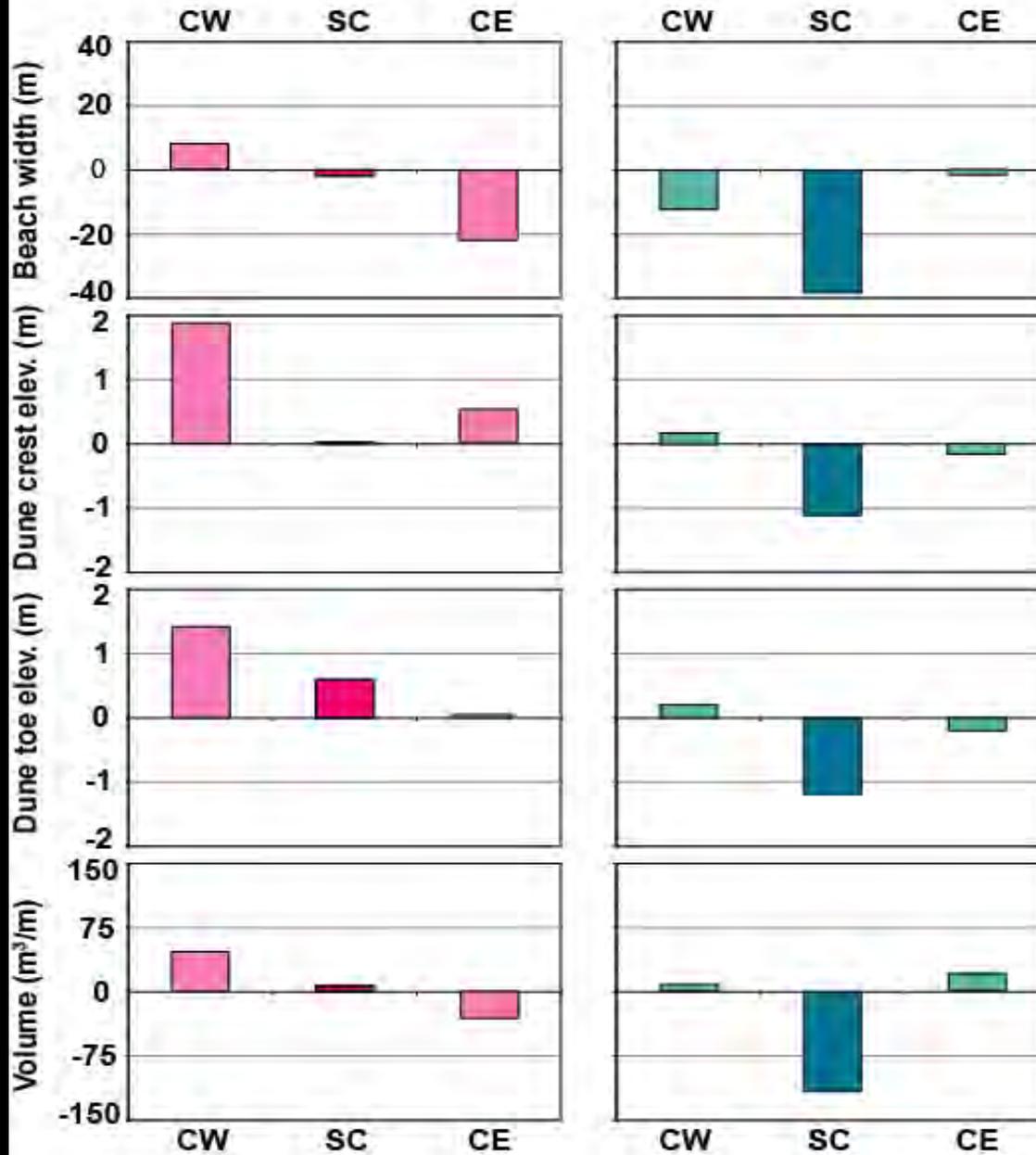
Western control

Eastern control



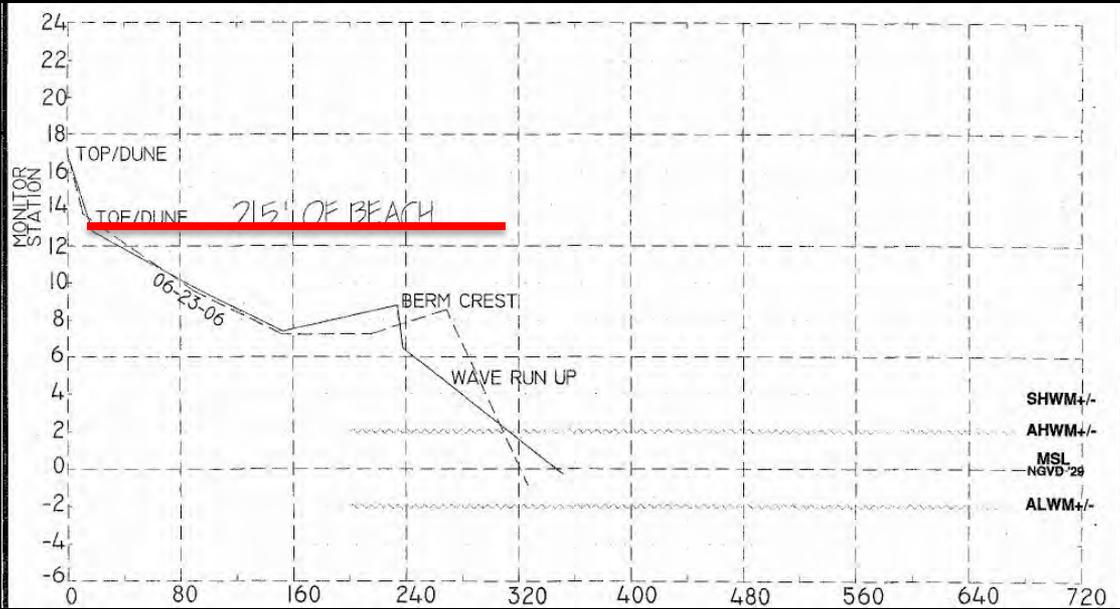
KISMET (1998-2007)

DAVIS PARK (1997-2000)

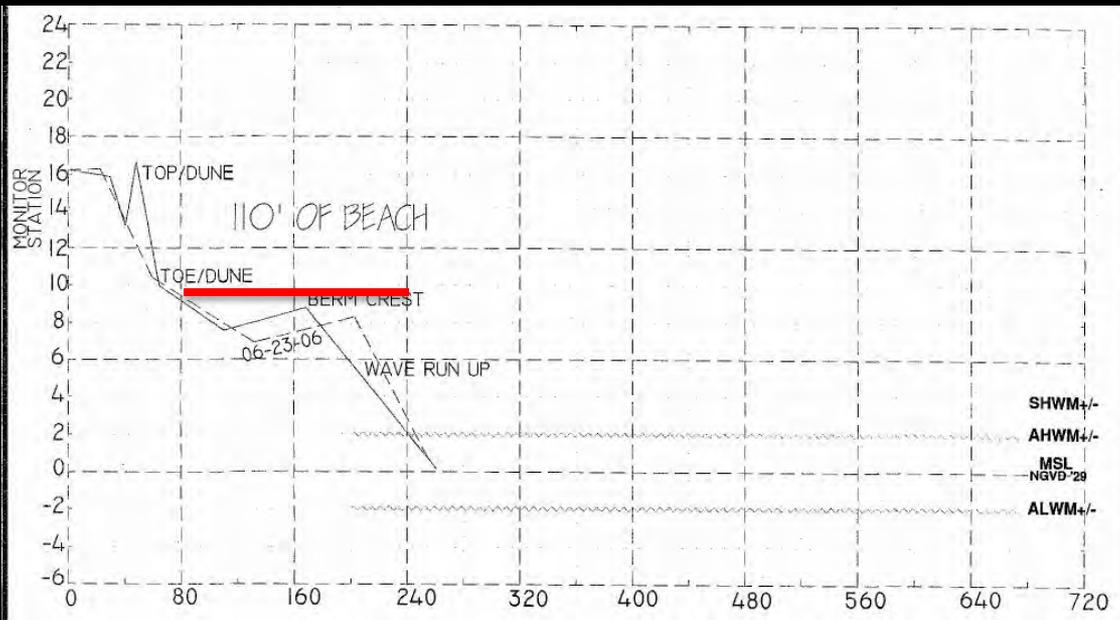


KISMET - August 2006

Western
control



Scraped
profile



Conclusions

- **Beach scraping can accelerate downcoast transport by:**
 - **Scraped beach is lower and narrower (waves reach dune more easily)**
 - **Loose pile of sand more erodible than beach or natural dune**
- **Downcoast beaches benefit: recipients of mobilized material**
- **Ineffective protection in chronically eroding areas (areas with low volumes and dune elevations) – inadvertently accelerates erosion**
 - **An assessment of long- and short-term beach behavior may provide indication of success of proposed scraping**