Carpinteria Living Shoreline

Dune and Shoreline Management Plan

City of Carpinteria Public Workshop No. 4
October 21, 2021

Today's Agenda

- Team Introductions
- Project Progress to Date
- Modeling and Conceptual Design
- Timeline
- Q & A

Introductions

- **Erin Maker**, Environmental Program Manager, City of Carpinteria
- **Chris Webb**, Coastal Engineering Project Manager, Moffatt & Nichol
- **Dave Hubbard,** Dune Designer & Restoration Ecologist, Coastal Restoration Consultants
- **Matt James,** Dune Designer & Restoration Ecologist, Coastal Restoration Consultants
- **Taylor Lane**, Deputy Project Manager, Wood Environmental

Planning for Shoreline Protection

- City Winter Storm Berm Program
- City Sea Level Rise Vulnerability Assessment and Adaptation Plan
- City General Plan/ Local Coastal Plan Update
- **City Dune and Shoreline Management Plan**
- Santa Barbara Climate Collaborative Sea Level Rise Subcommittee
  - Sediment management, short and long term SLR collaboration

Sea Level Rise (SLR) in Carpinteria

- Projections range - reasonable worst case in the City is **5 feet by 2100**
- Increases coastal flooding in low-lying areas and coastal erosion
- Impacts:
  - Property
  - Transportation
  - Coastal Access
  - Recreation
  - Economic

Coastal erosion and damage during historically large El Nino of 1982-83.

Key SLR Vulnerabilities in Carpinteria

- Downtown commercial corridor
- Beach Neighborhood and shorefront properties
- Regional and local infrastructure, including roads, rail, parks, utility lines, and storm drains
- Unprotected low-lying coastline is where the most vulnerable and some of the most valuable assets are
  - 41 affordable housing units
  - 213 campsites within Carpinteria State Park
- Combination of fluvial and coastal flood hazards

Existing Shoreline Protection

Rock revetment upcoast on County property

Vegetated dunes downcoast on State Parks property

City Beach Shoreline

- Low-lying area currently unprotected majority of the year
- Blockage of natural sediment flow and movement of sediment upland is contributor to narrow beach width
- Recent major sediment disposal activities

Source: Coastal View News 2020

Goals and Key Drivers of the Project

- Protect vulnerable areas and resources of the City
- Achieve important co-benefits to public health and recreation, the local economy, and natural ecosystems along Carpinteria coast
- Involve a variety of stakeholders to meet shared interests
- Identify possible funding sources for ongoing maintenance

Dune and Shoreline Management Plan

- Analyze living shoreline alternatives to build resiliency to coastal hazards
- Investigate constraints and feasibility of different living shoreline designs
- Perform cost-benefit analysis of design and maintenance tradeoffs
- Develop a conceptual living shoreline design with a longer-term plan for regional management

Project Area

REACH 1 - Inlet to Ash Ave

REACH 2 - Ash Ave to Linden Ave

REACH 3 - Linden Ave to Carpinteria Creek

REACH 4 - Carpinteria Creek to Tarpits

Constraints and Feasibility Analysis

Purposes:

- Analyze potential opportunities and site constraints for living shoreline design
- Determine factors involved in living shoreline implementation
- Inform preliminary conceptual design alternatives

Example of vegetated dunes downcoast on State Parks property

Opportunities in Carpinteria

2020 – State Park

1929 - Aerial

Opportunities – Potential Components

- Beach Nourishment
  - *Sediment Sources*
  - *Sediment Placement*
- Cobble Nourishment
- Dune Habitat Restoration
- Sand Retention Strategies

Opportunities - Examples

Cardiff Beach Living Shoreline
Encinitas, CA

Surfer's Point Living Shoreline
Ventura, CA

Cape Lookout
Oregon

Site Constraints

- Topography/Bathymetry
- Biological Resources
- Project Footprint Ownership Agreements
- Maintaining Public Access
- Minimizing Viewshed Impacts
- Construction/Maintenance Noise and Disruption

Project Design Strategies

Dune Restoration

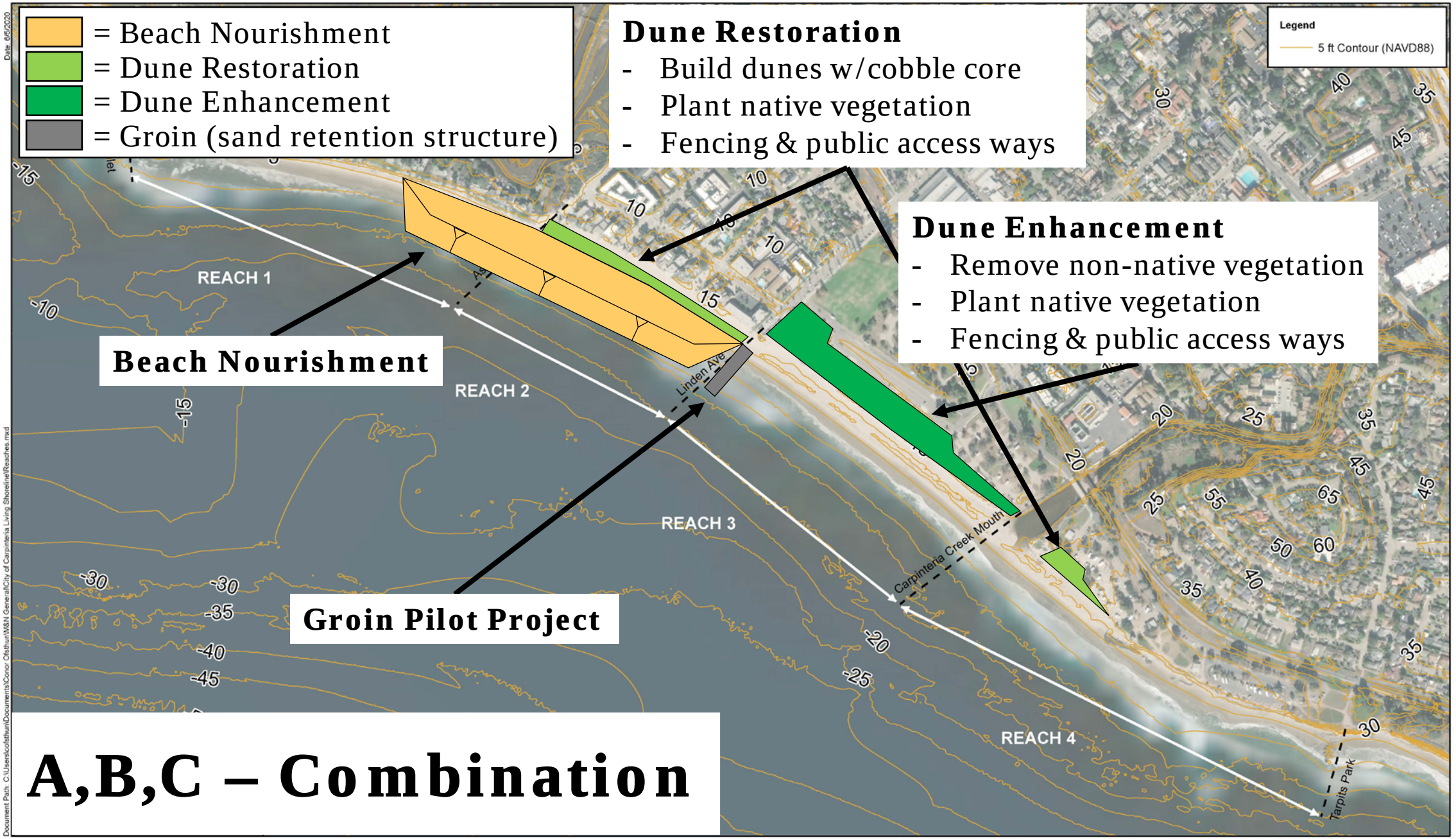
Beach Nourishment

Combination Option

Groin

Cobble

Artificial Reef / Breakwater



A,B,C – Combination

moffatt & nichol

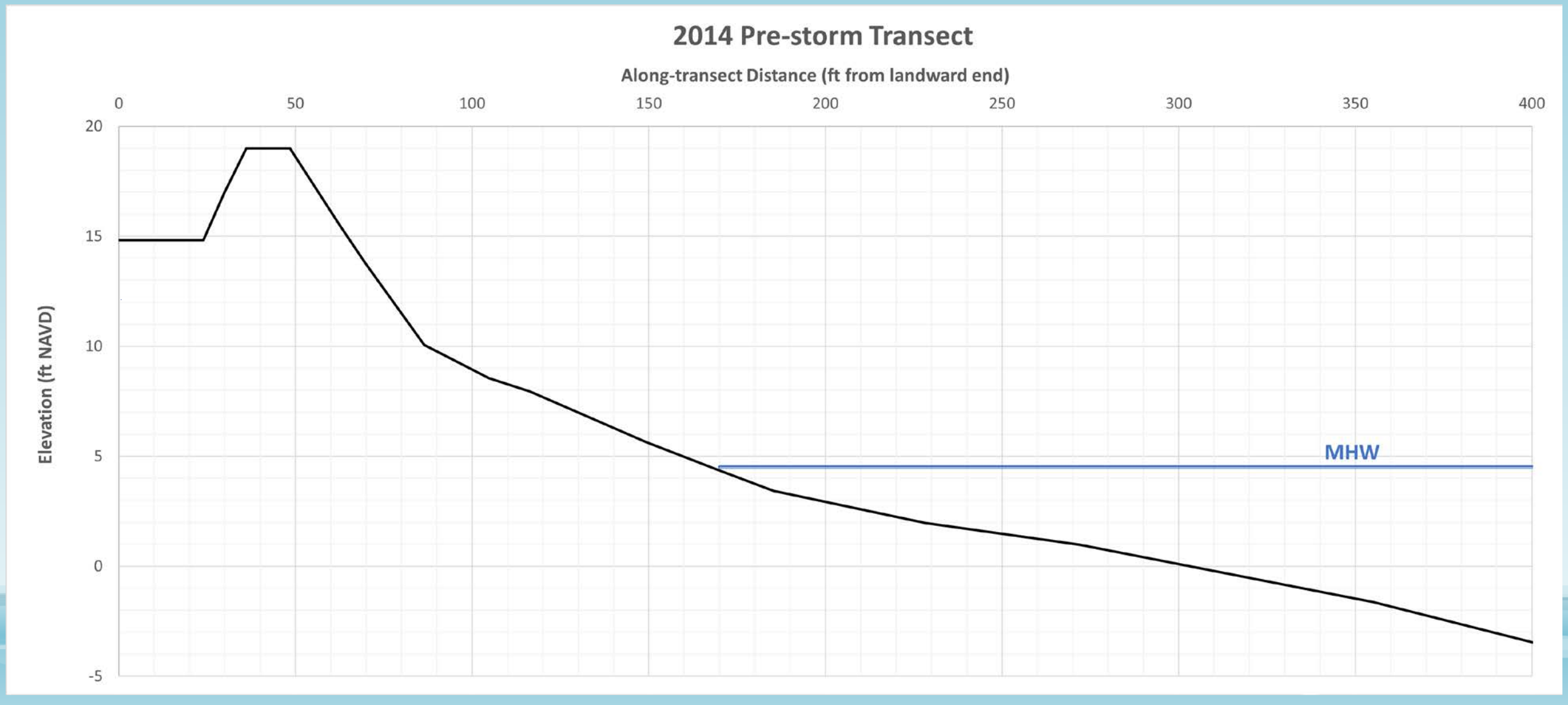
CITY OF CARPINTERIA
Dune and Shoreline Management Plan
Basemap

0 500 1,000 2,000 Feet

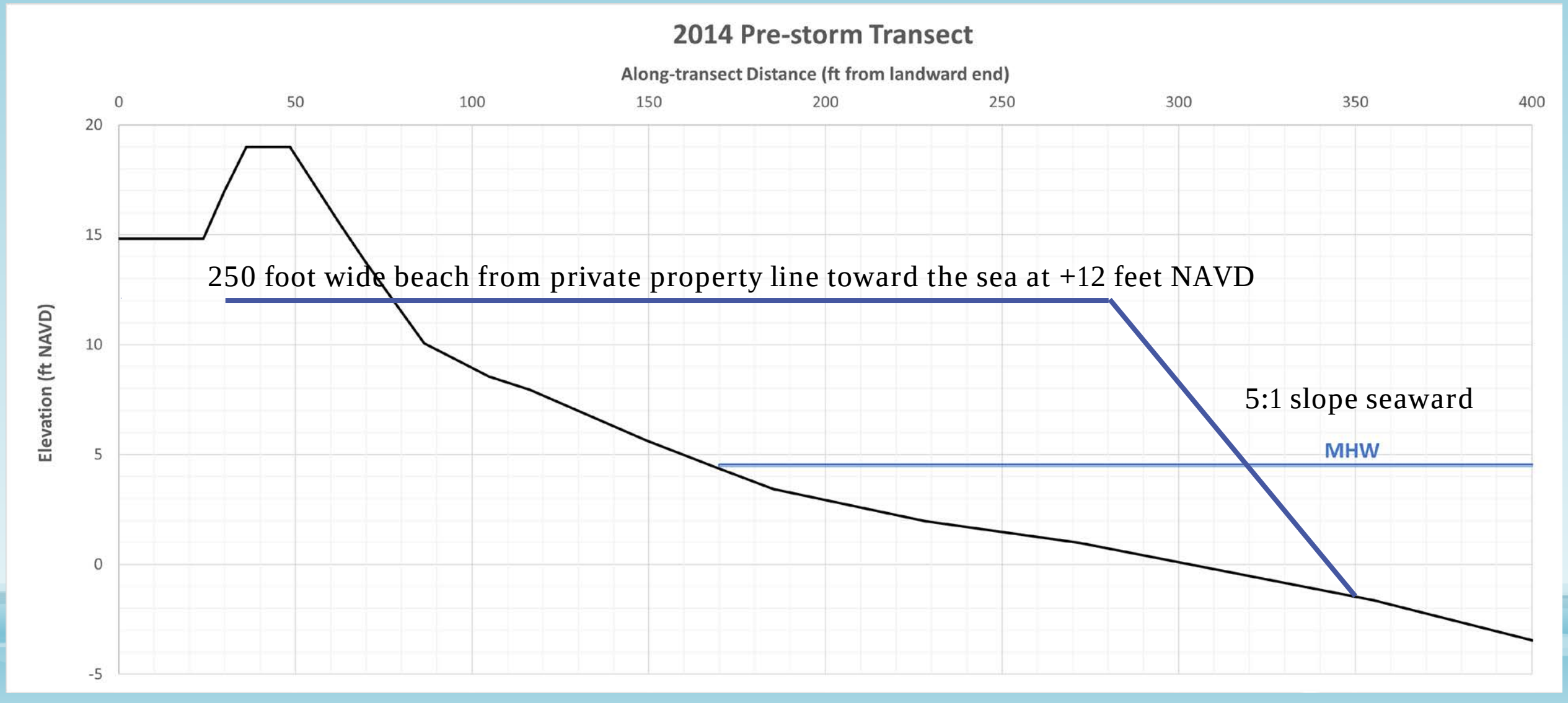
Horizontal Datum: CA State Plane Zone V; Vertical Datum: NAVD88; Unit: Feet
1 inch = 500 feet

N

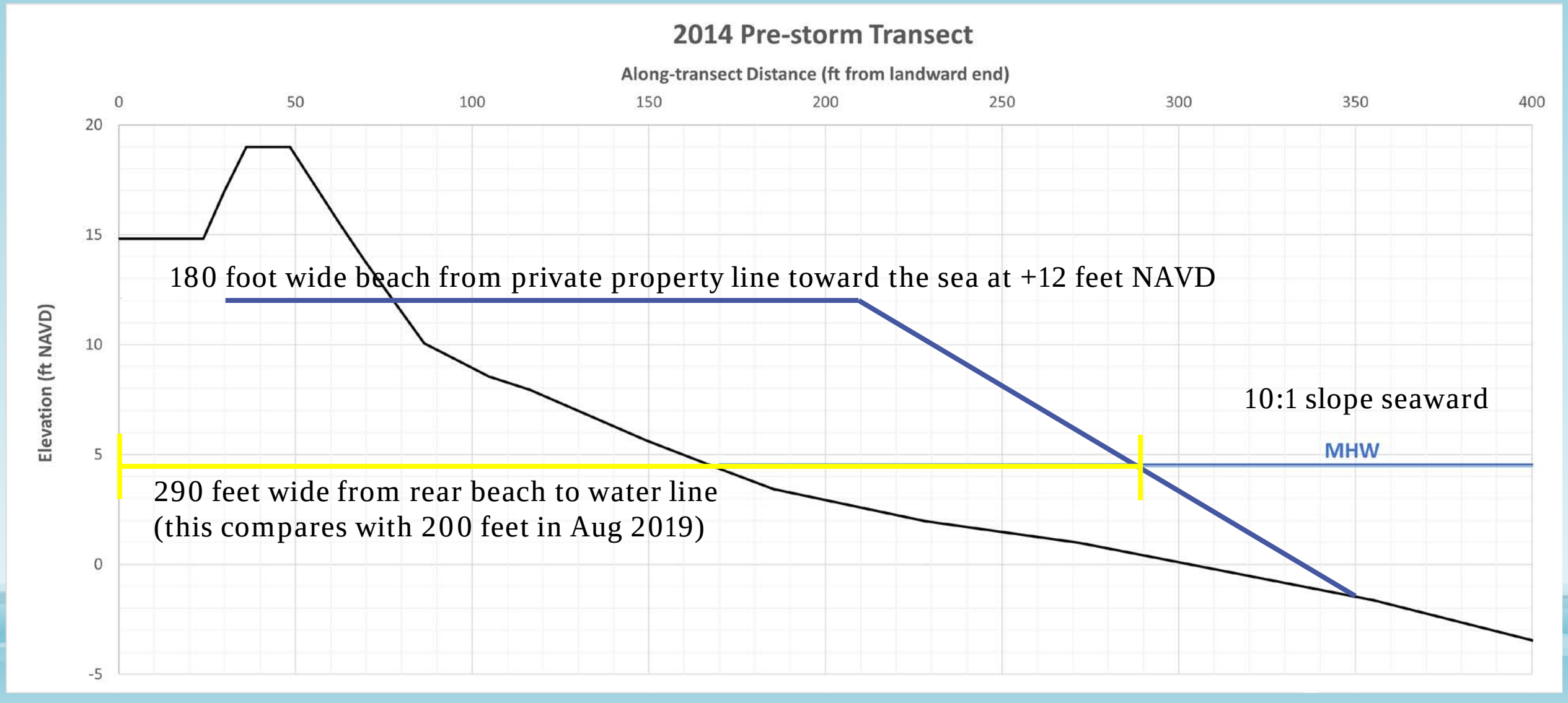
Seasonal Winter Dike Without a Wider Beach



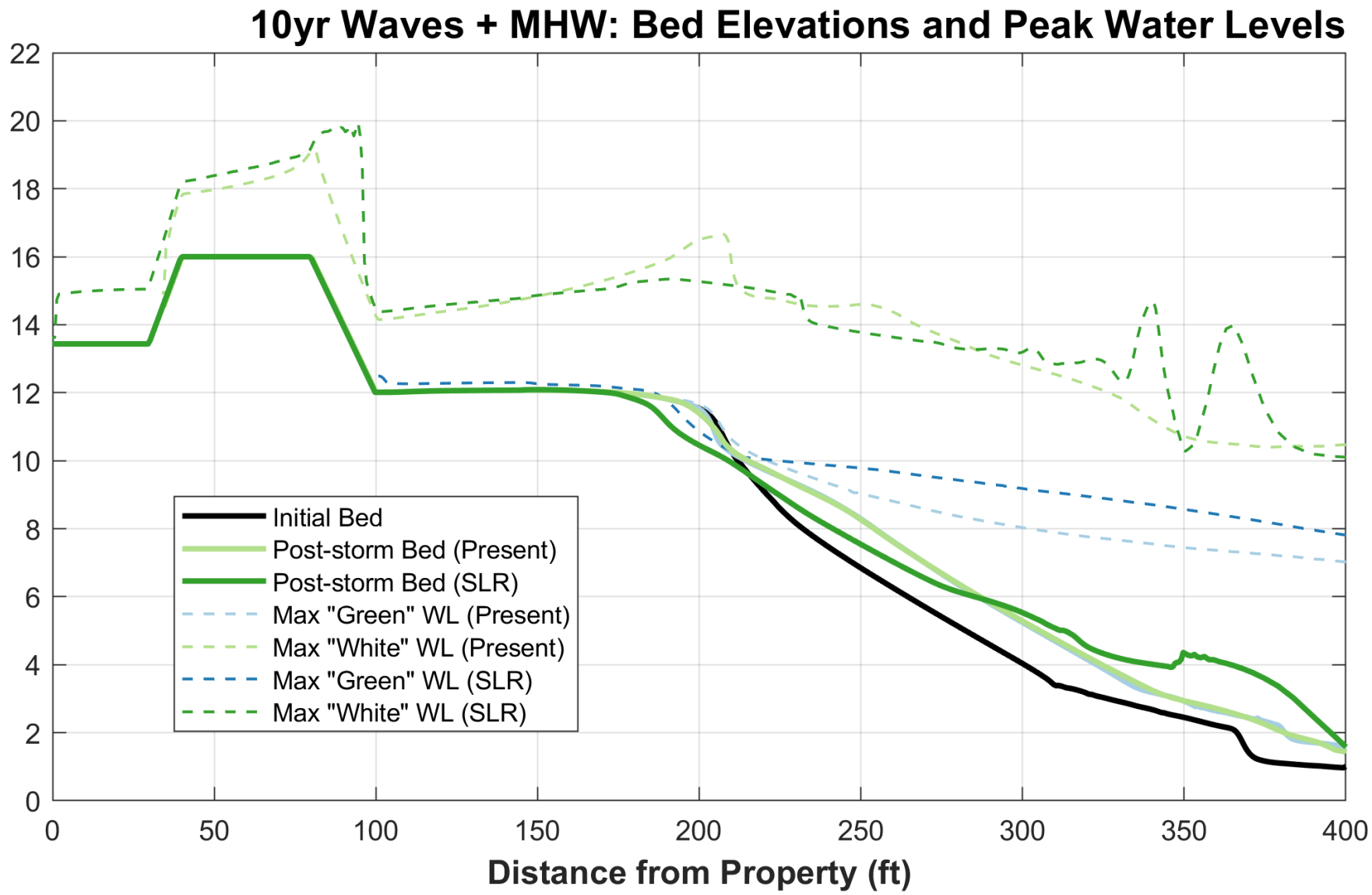
Wider Beach by Nourishment – Immediately Post-Construction



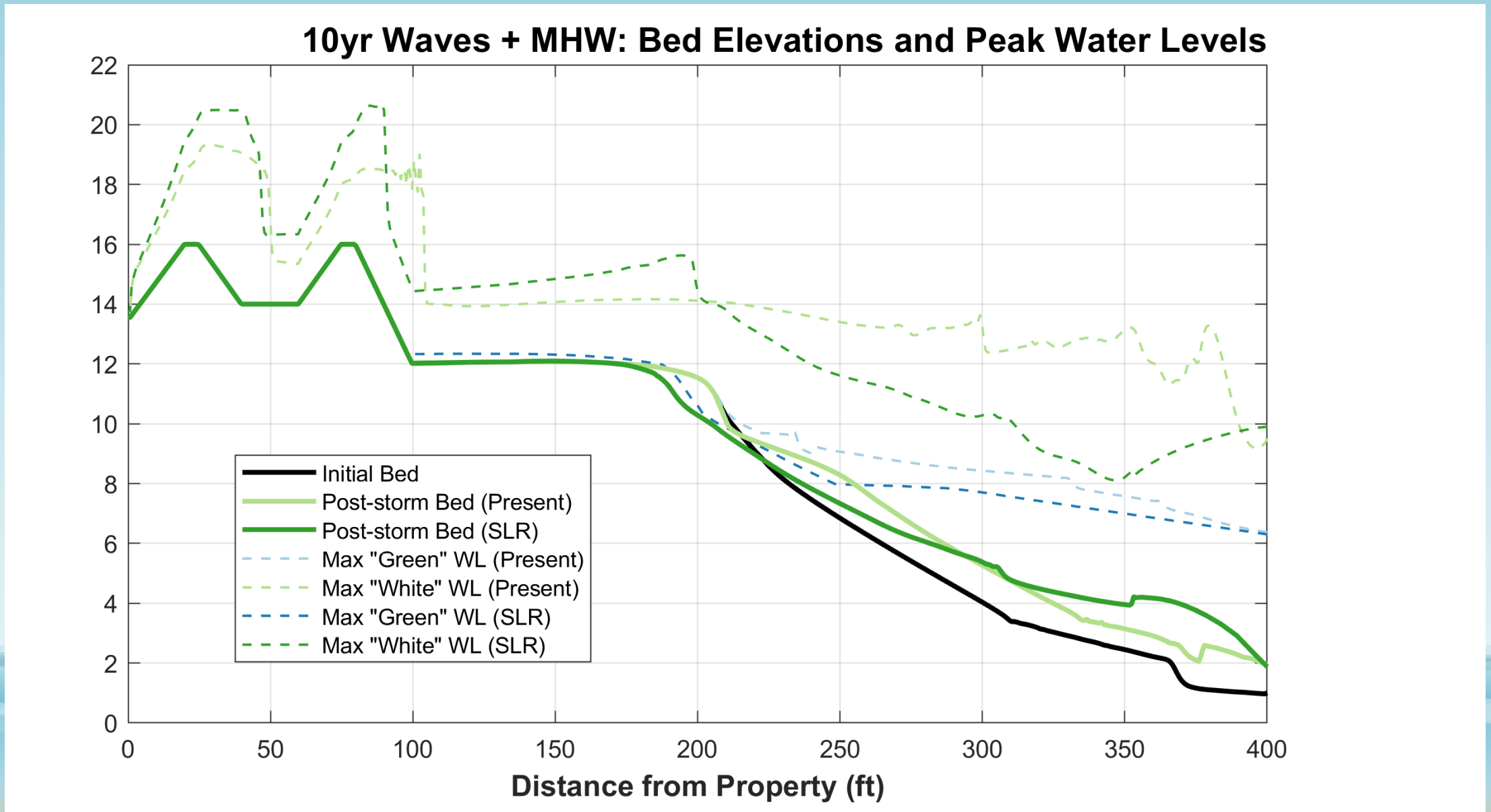
Wider Beach by Nourishment After a Winter Season



Example Living Shoreline – Single Dune Ridge



Example Living Shoreline – Double Dune Ridge



Results Using the Model XBeach

Tested for ability to block waves and water during storms:

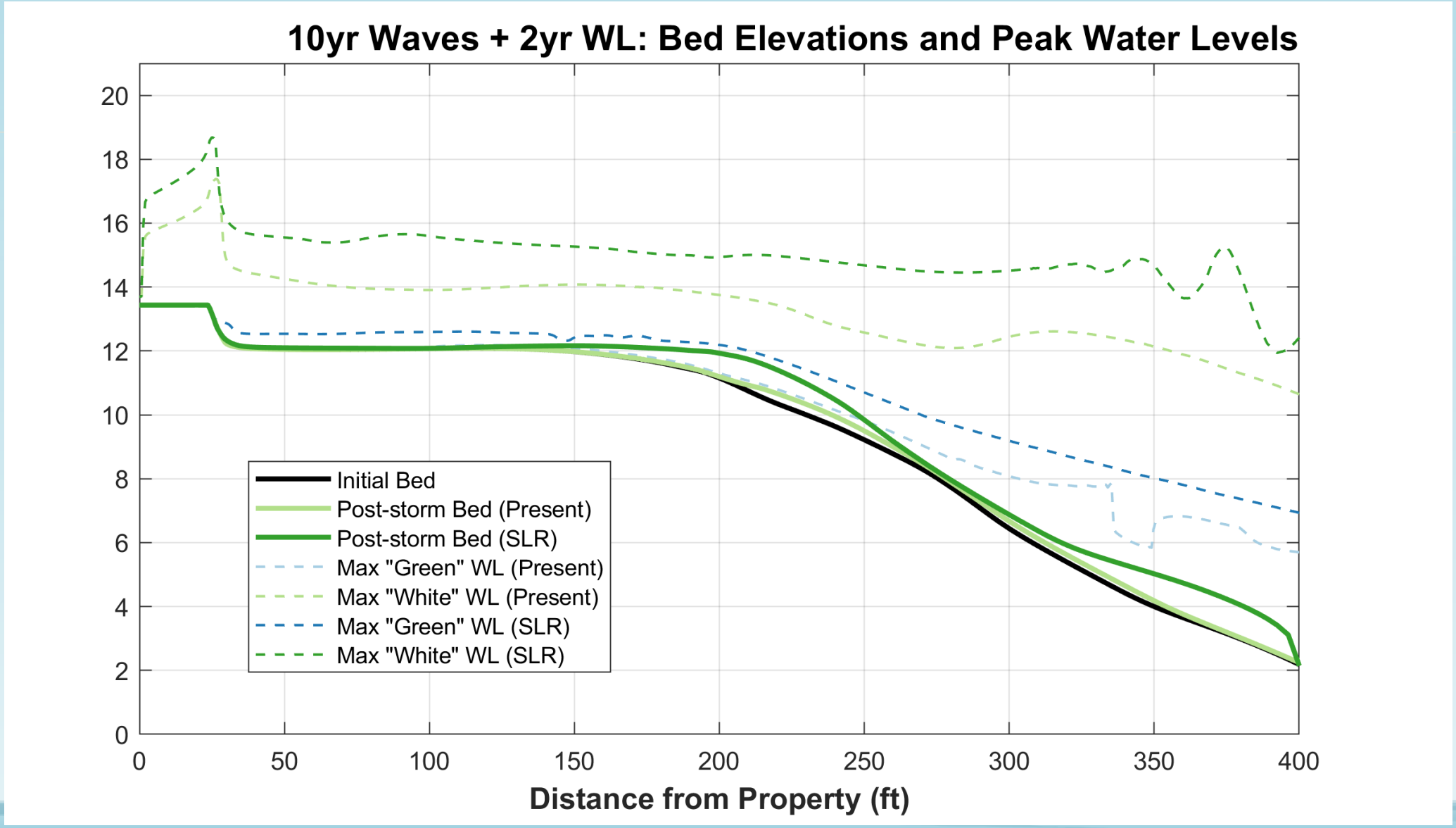
1. 10 Year storm waves and water levels
2. 20 Year storm waves and water levels
3. 50 Year storm waves and water levels
4. 100 Year storm waves and water levels

- This was done for current sea levels and for sea level rise scenario of 2 feet higher

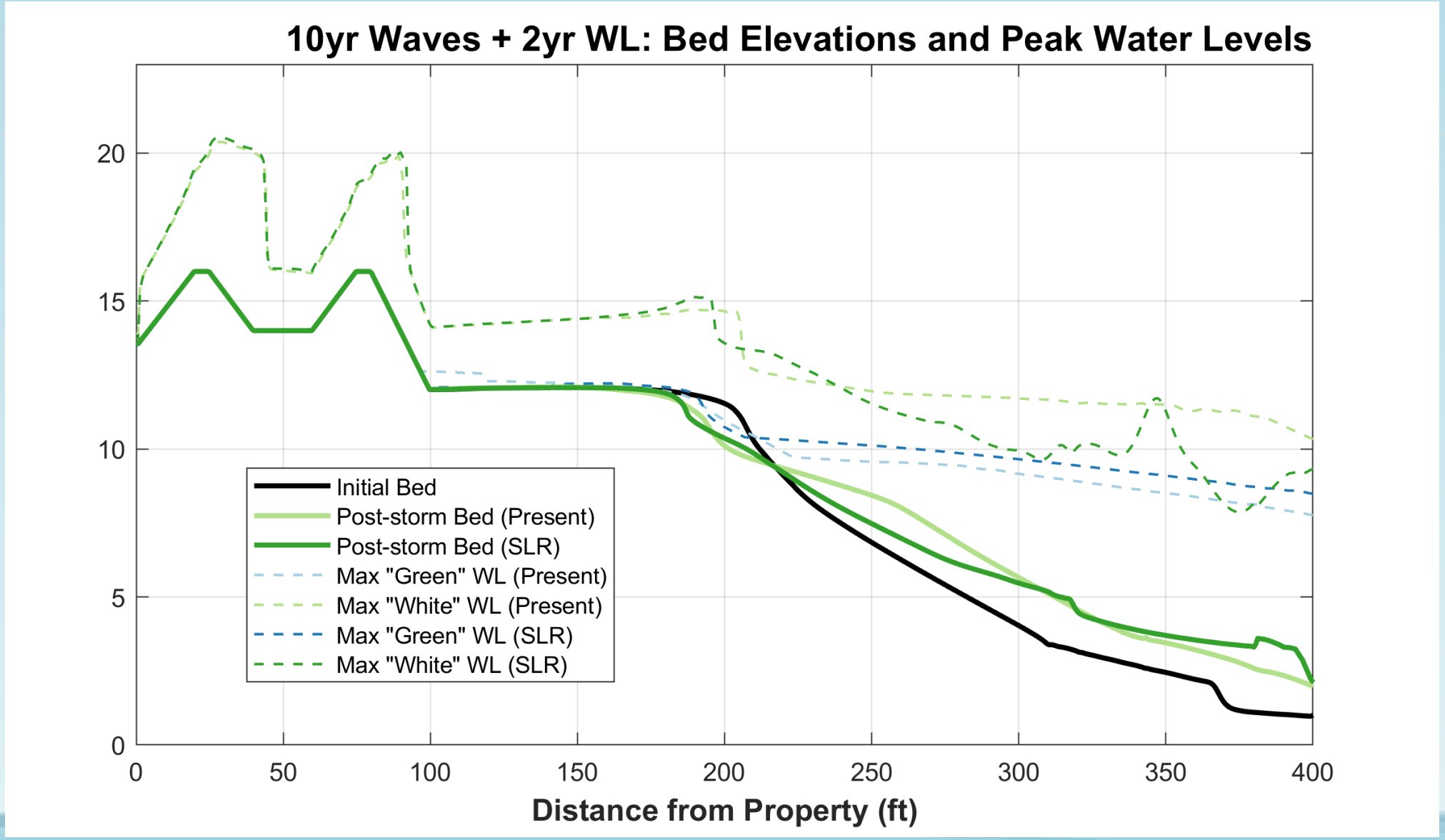
Results of XBeach Modeling Runs (Worst->Best)

1. Wider beach with no dike generally overtops the most
2. Double ridge living shoreline with a wider beach overtops more than the other dune/dike options.
3. Winter dike without a wider beach overtops less than above options, but generally more than the single dune.
4. Single dune ridge living shoreline with a wider beach generally overtops the least (best scenario).

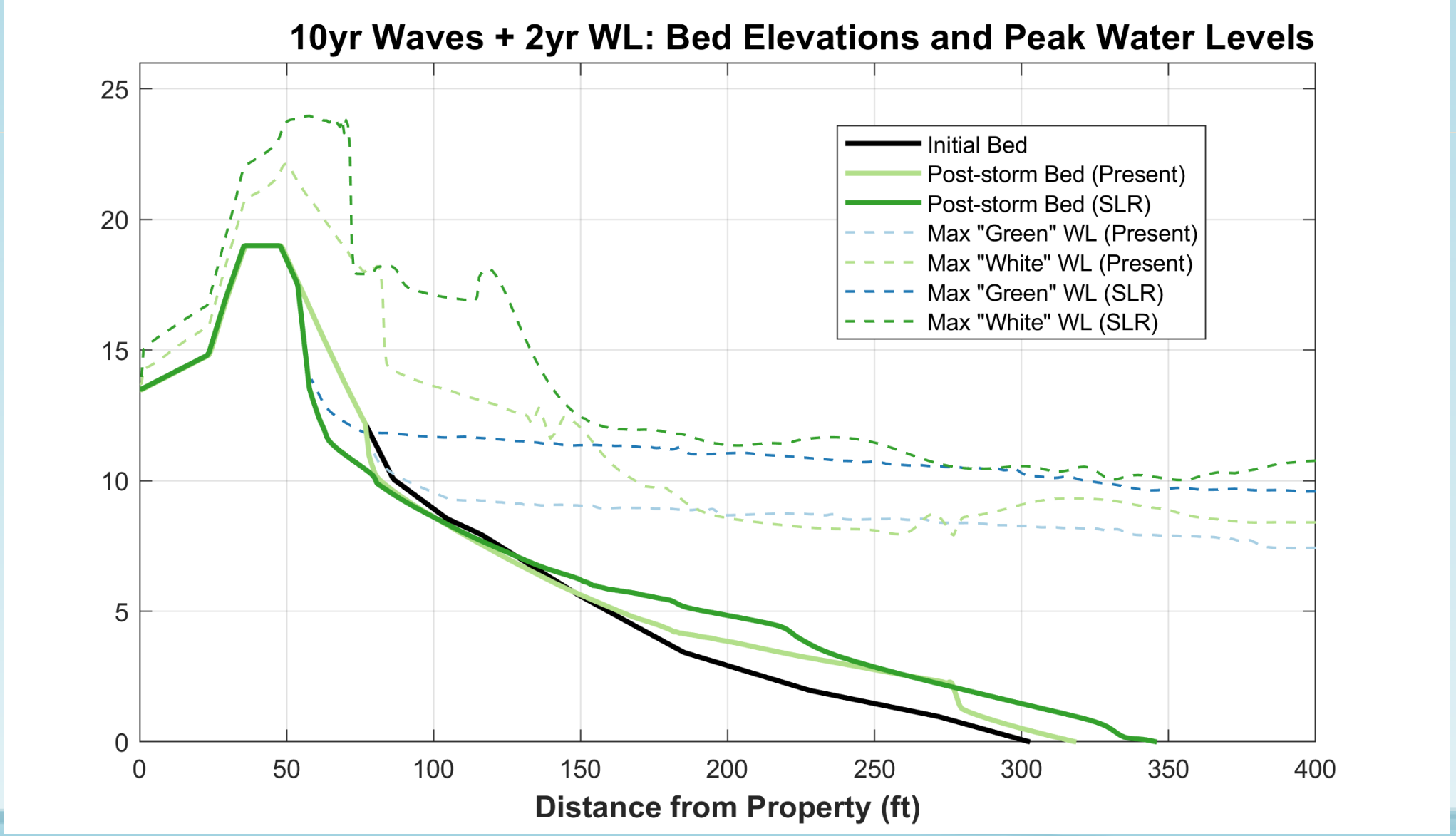
Wider Beach by Nourishment After a Winter Season – 20 Year Storm



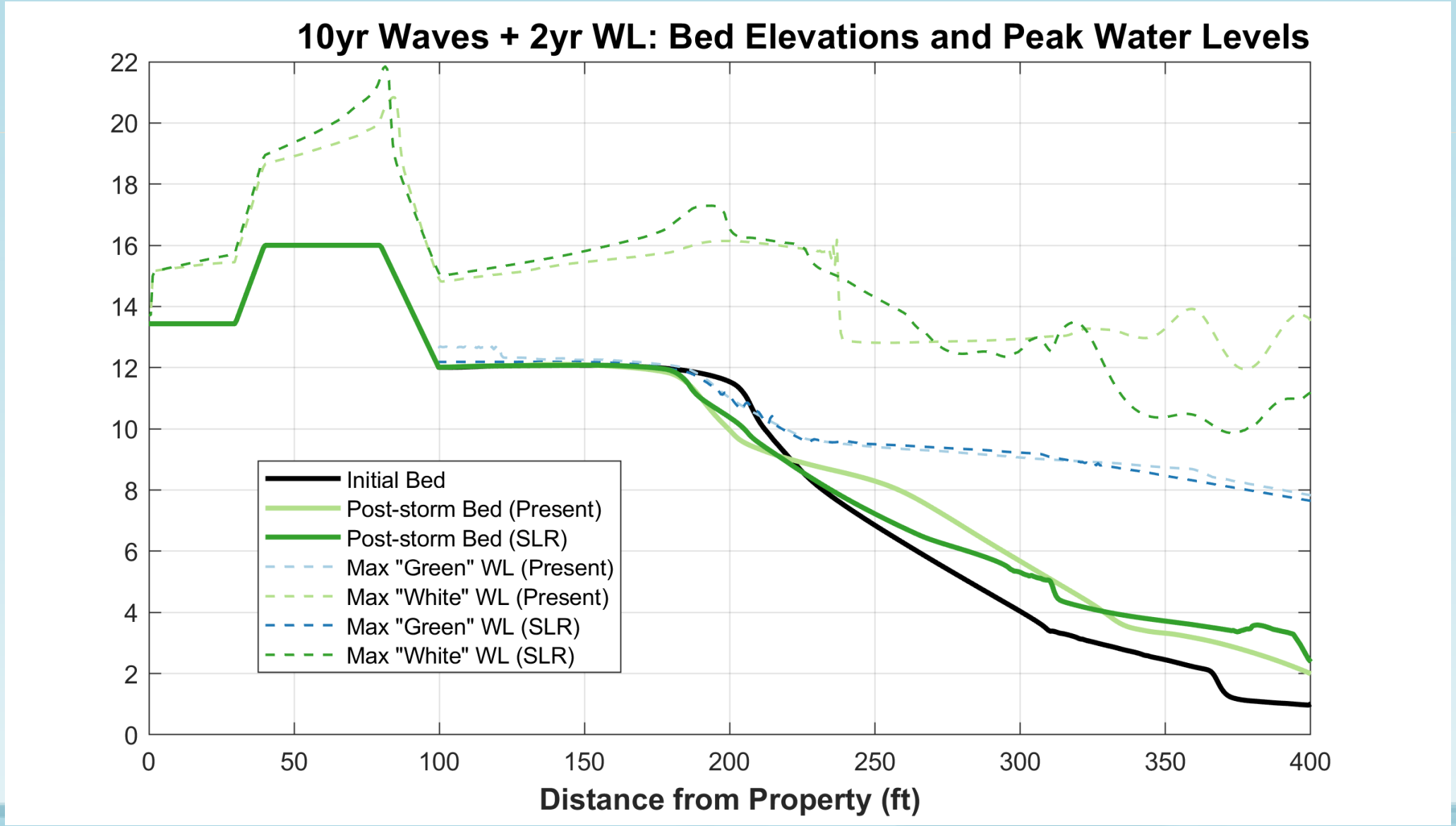
Example Living Shoreline – Double Dune Ridge – 20 Year Storm



Seasonal Winter Dike Without a Wider Beach – 20 Year Storm



Example Living Shoreline – Single Dune Ridge – 20 Year Storm



Conclusions From Xbeach Modeling

1. Single Dune Ridge Living Shoreline With a Wider Beach Is Superior to Other Options From Modeling.
2. Overtopping of the Beach and Living Shoreline Will Still Occur.
3. Consider Retaining the Widest Possible Beach With Sand Retention.
   A. Retention is Possible Using a Structure Such as a Groin.
   B. A Pilot Project Temporary Groin at Linden is Suggested.

Recommendations For the City

1. Explore sources for sediment
2. Design a project with the following components:
   A. Beach Nourishment.
   B. Living Shoreline With a Single Dune Ridge.
   C. Pilot Project Temporary Groin at Linden.

Example Groin at Ventura Pierpont Beach

Project Timeline

Questions?

Thank You!

Questions, comments, concerns:

Erin Maker

Environmental Program Manager

City of Carpinteria

(805) 880-3415

erinm@ci.carpinteria.ca.us