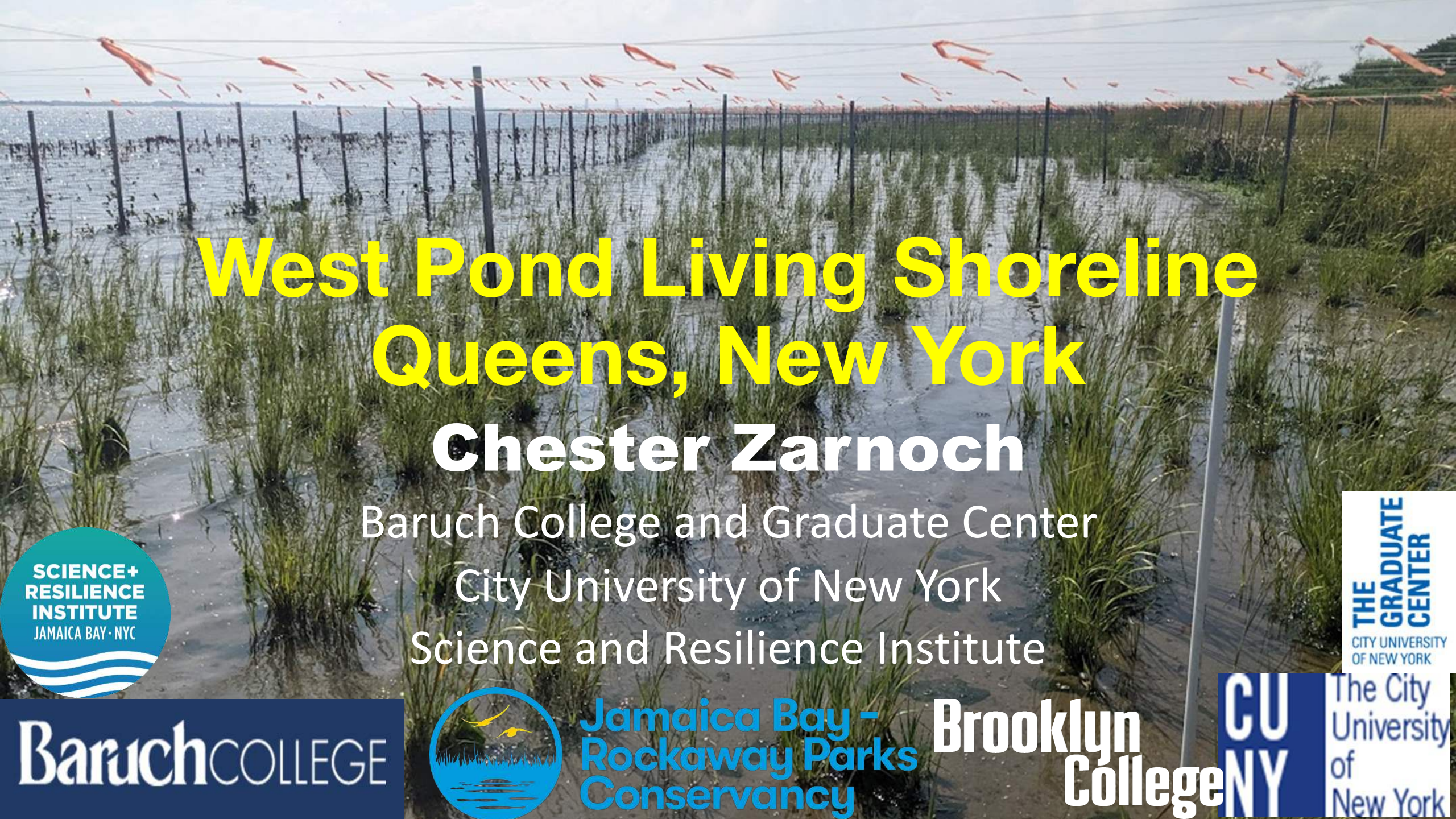

West Pond Living Shoreline Queens, New York

Chester Zarnoch

Baruch College and Graduate Center

City University of New York

Science and Resilience Institute

SCIENCE+ RESILIENCE INSTITUTE JAMAICA BAY · NYC

THE GRADUATE CENTER CITY UNIVERSITY OF NEW YORK

Baruch COLLEGE

Jamaica Bay – Rockaway Parks Conservancy

Brooklyn College

CUNY The City University of New York


City College ASRC
West Pond Living Shoreline
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2024 Airbus
N
10 km


West Pond June 2012
Bird Watch Be
Cross Bay Blvd
Cross Bay Blvd
Cross Bay Blvd
Jamaica Bay Wildlife Refuge
Gateway National Recreation Area...
NATIONAL PARK SERVICE
Look Out Bench
Jamaica Bay Wildlife Refuge
Gateway National Recreation Area
Google Earth
N
400 m


West Pond Nov 2012
Jamaica Bay Wildlife Refuge
Gateway National Recreation Area ...
Look Out Bench
Hurricane Sandy
Google Earth
N
200 m


West Pond June 2017
Gateway National Recreation Area...
Jamaica Bay W
Look Out Bench
N
200 m
Google Earth


West Pond May 2021
Look Out Bench
Gateway National Recreation Area...
Jamaica Bay W
N
200 m
Google Earth


NATIONAL PARK SERVICE
Jamaica Bay - Rockaway Parks Conservancy
JFK INTERNATIONAL AIRPORT
BIG JOHN'S POND
JAMAICA BAY WILDLIFE REFUGE
HISTORIC OUTFALL
WEST POND
LOW MARSH
HIGH MARSH
BLACK BANK
South Marsh
MONARCH BUTTERFLY
Danaus plexippus
SPARTINA ALTERNIFLORA
Smooth cordgrass
JAMAICA BAY
ATLANTIC HORSESHOE CRAB
Limulus polyphemus
RED KNOT
Calidris canutus
DIAMONDBACK TERRAPIN
Malaclemys terrapin

Project Team

Project Lead (design and construction): Jamaica Bay-Rockaway Parks Conservancy, a project of the Fund for the City of New York

Design Team (design, permit and construction management): Dirtworks Landscape Architecture, Rippled Waters Engineers, Great Ecology

Contractor: Galvin Bros. Inc./Madhue Contracting Inc., a Joint Venture

Non-profit Partner: Billion Oyster Project (provided oyster shell)

Key Community Partners: Jamaica Bay Ecowatchers and American Littoral Society

Funding Partners: NYS Dept. of Environmental Conservation, NYC Department of Environmental Protection and NYS Attorney General's Office (on behalf of the Nitrogen Settlement Fund), National Fish and Wildlife Foundation

Monitoring Partner: Science and Resilience Institute at Jamaica Bay

West Pond Living Shoreline

May-October 2021

- 2,400 linear feet of shoreline
- 51,000 cubic yards of sand/soil
- 14 acres total area

- 200,000 native plants

- Breakwater features
  - -4,900 bags of shell
- Erosion Control
  - -20”w and 12”w coir logs
  - - Tree fascines

Natural materials

- $3.7 million project

Jamaica Bay – Rockaway Parks Conservancy

- Breakwater features
  4,900 bags of shell

Jamaica Bay – Rockaway Parks Conservancy

- Erosion Control
  -20”w and 12”w coir logs

Jamaica Bay – Rockaway Parks Conservancy

2021

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Monitoring began September 2022

Monitoring began September 2022

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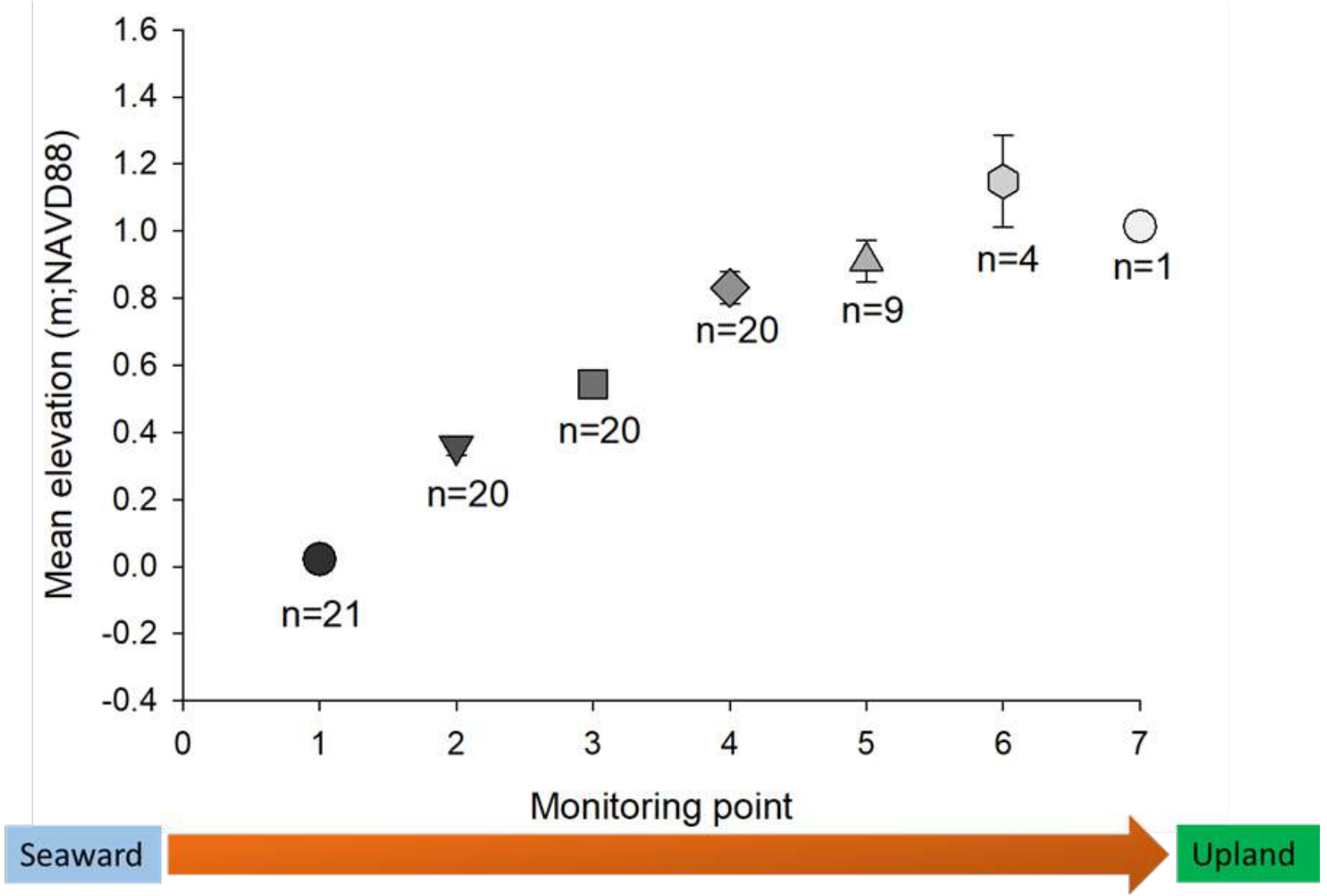
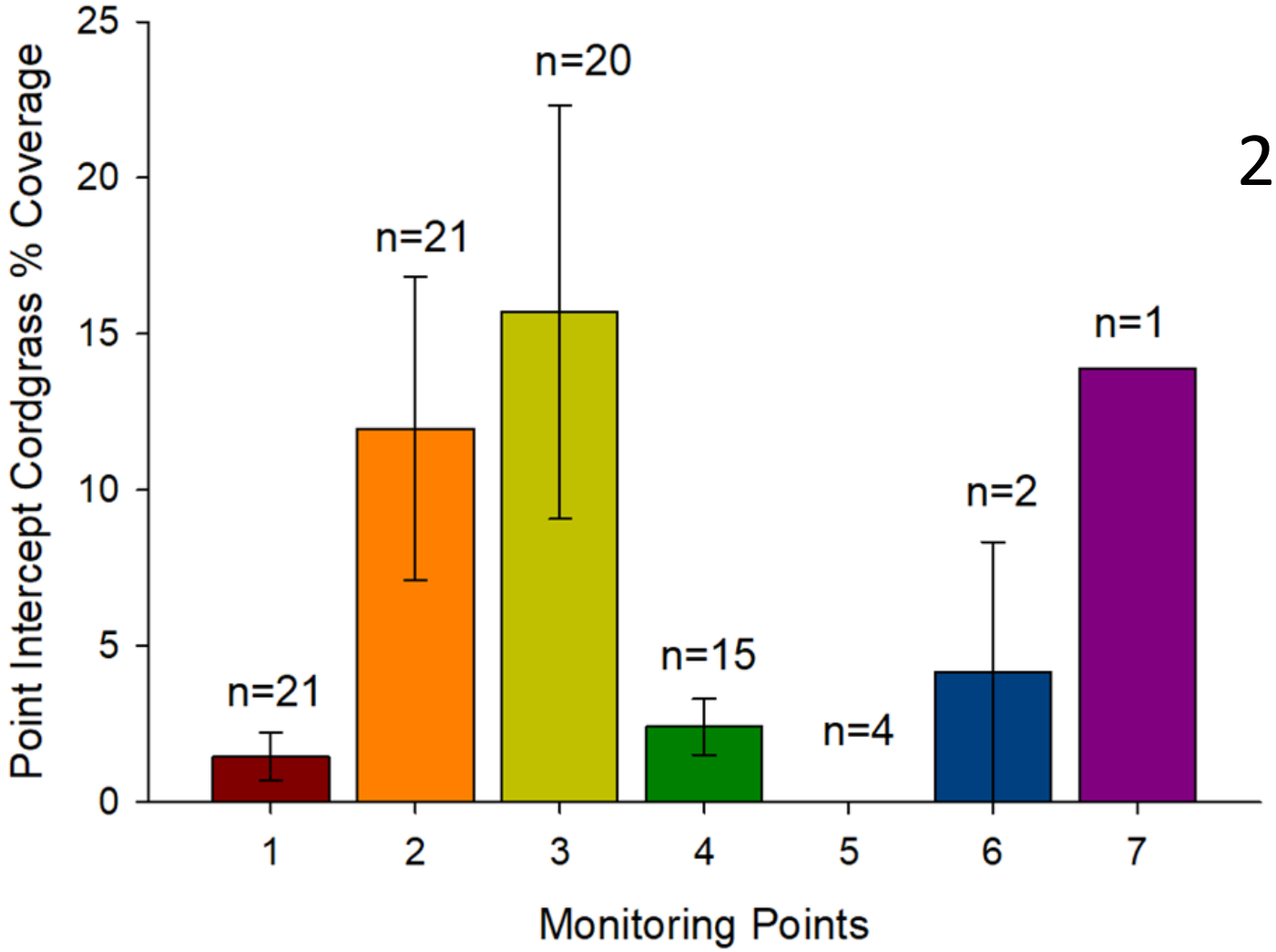
Elevation across monitoring points in 2022



Cordgrass % coverage across monitoring points 2022



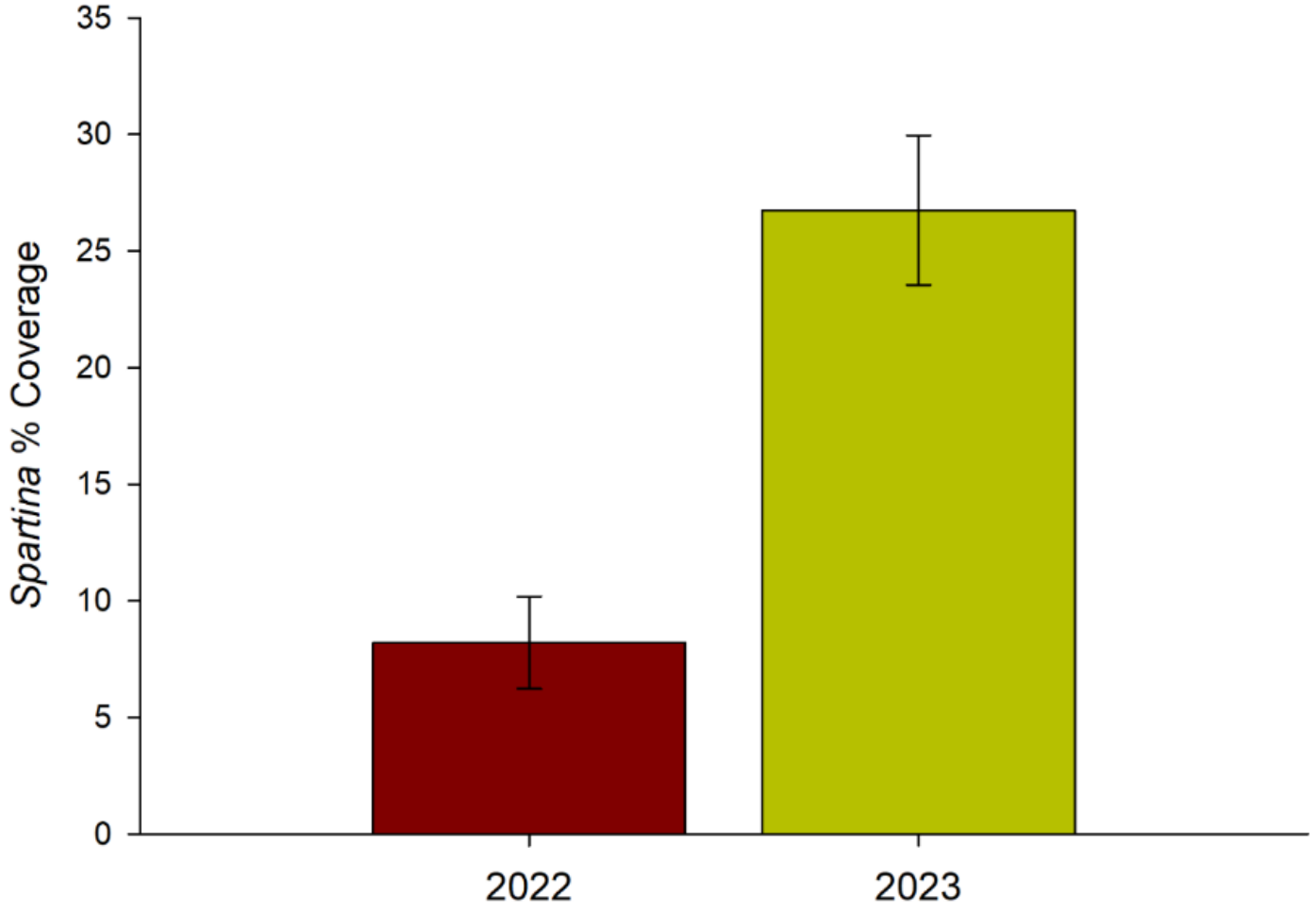
2022 Mean = 8%

2023 Replanting- 60,000 plugs

Jamaica Bay – Rockaway Parks Conservancy

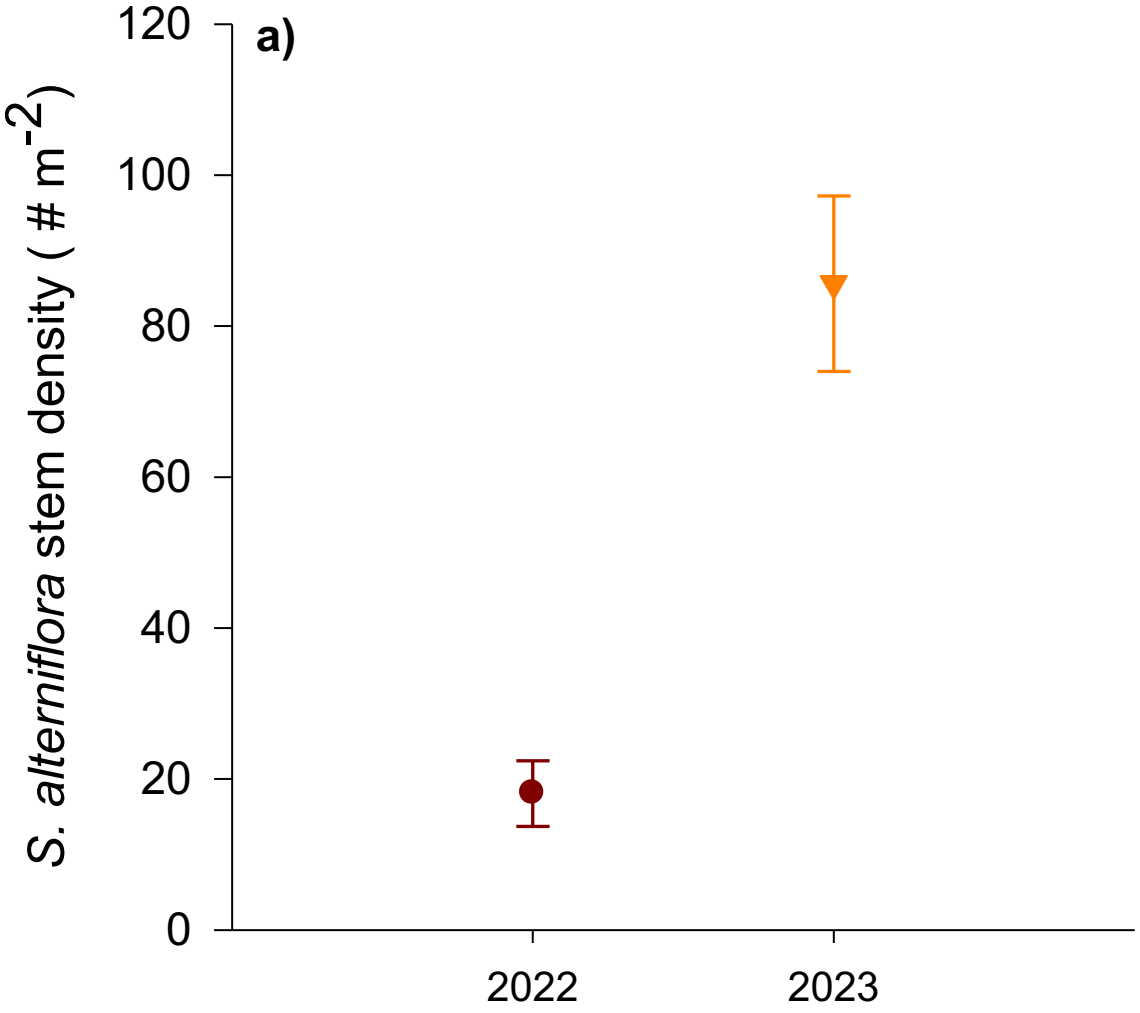
West Pond Living Shoreline Replanting Plan – June 2023

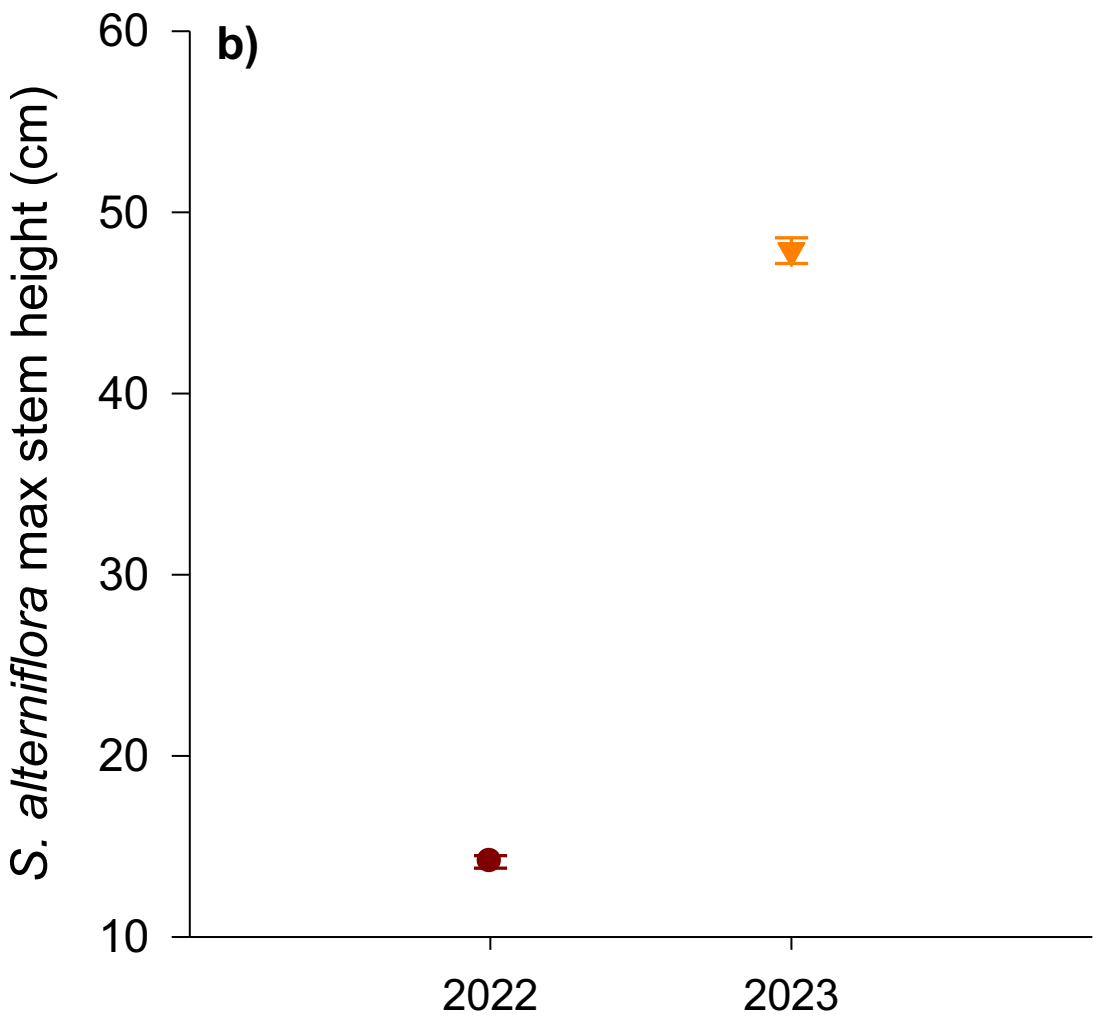
Cordgrass coverage increased 3x in 2023



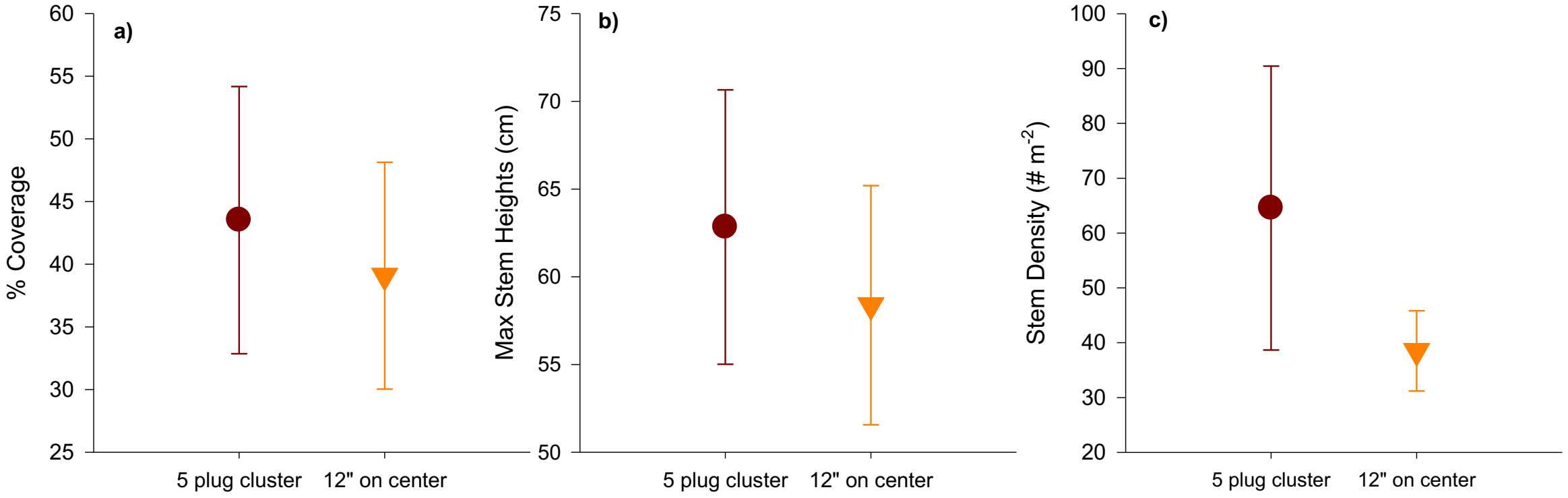
2023 Mean = 27%

Cordgrass stem heights and densities increased significantly from 2022 to 2023

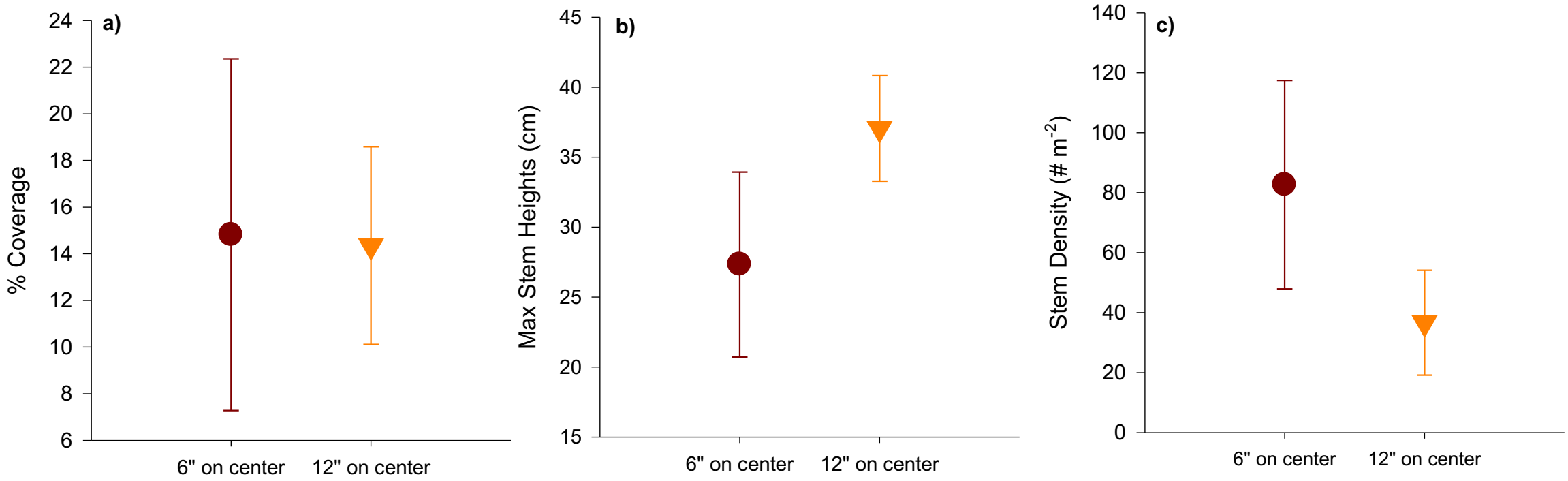




Planting technique did not improve vegetation 5 plug cluster vs 12” on center



Planting technique did not improve vegetation
6” on center vs 12” on center



Project Challenges – Shell bags degraded & All coir logs were lost < 1yr

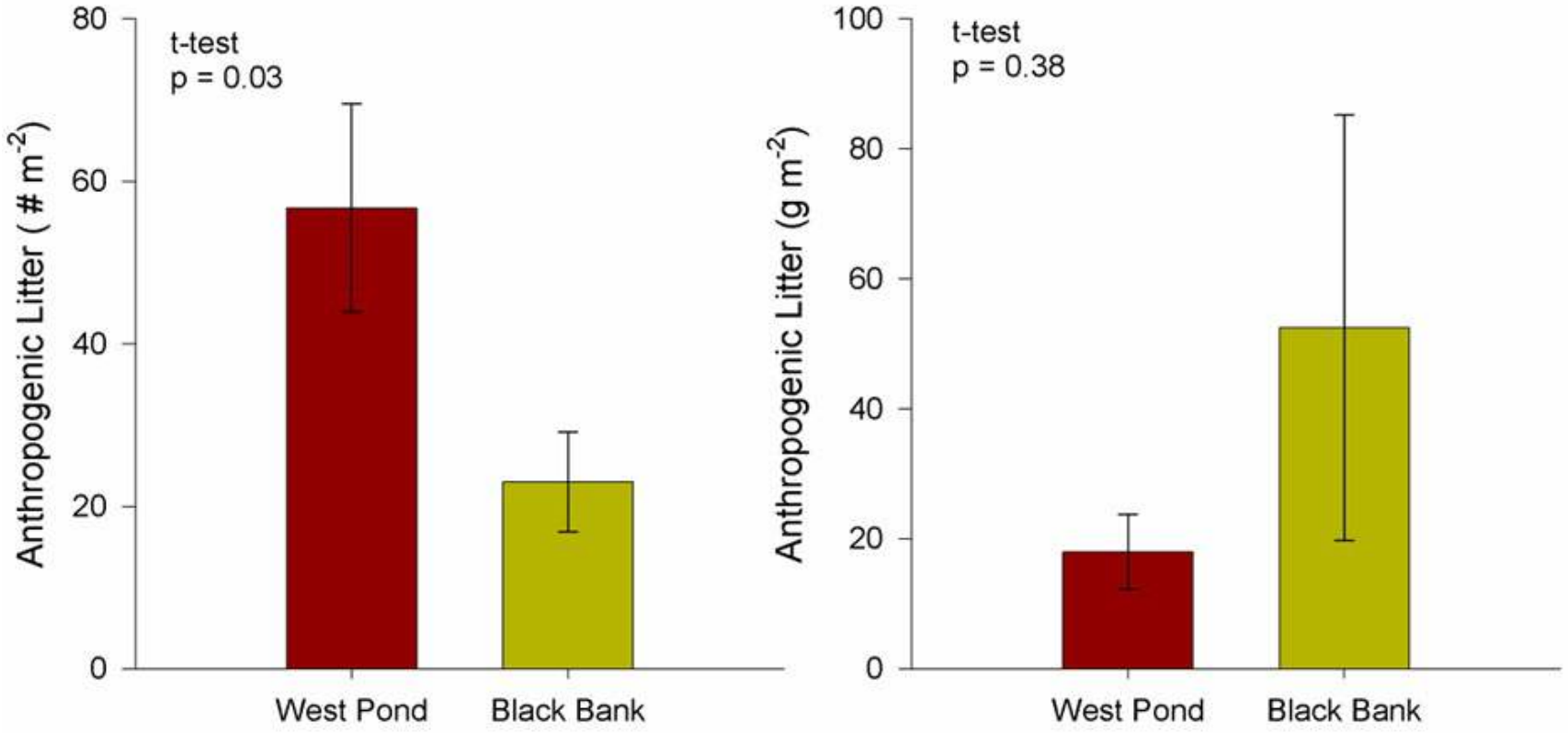
Project Challenges – Herbivore Exclusion

Project Challenges – Herbivore Exclusion

Project Challenges – Herbivore exclusion enhances litter accumulation

Hypothesis: Herbivore exclusion fencing will trap litter and create a “hot-spot” of litter accumulation.

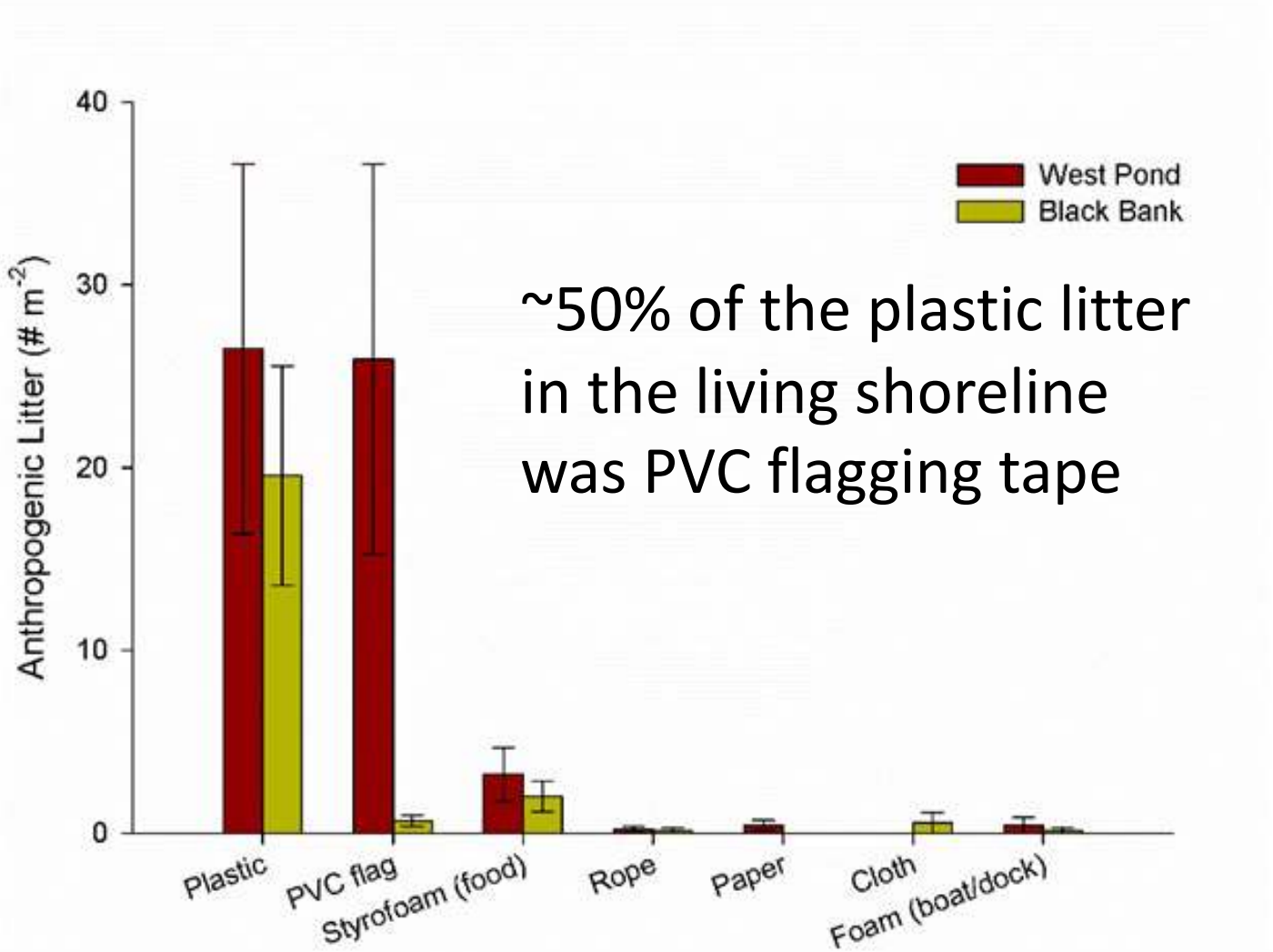
Project Challenges – Herbivore exclusion enhances litter accumulation



- Significantly more litter in West Pond than natural marsh.
- Litter was heavier in the natural marsh.

Project Challenges – Herbivore exclusion enhances litter accumulation

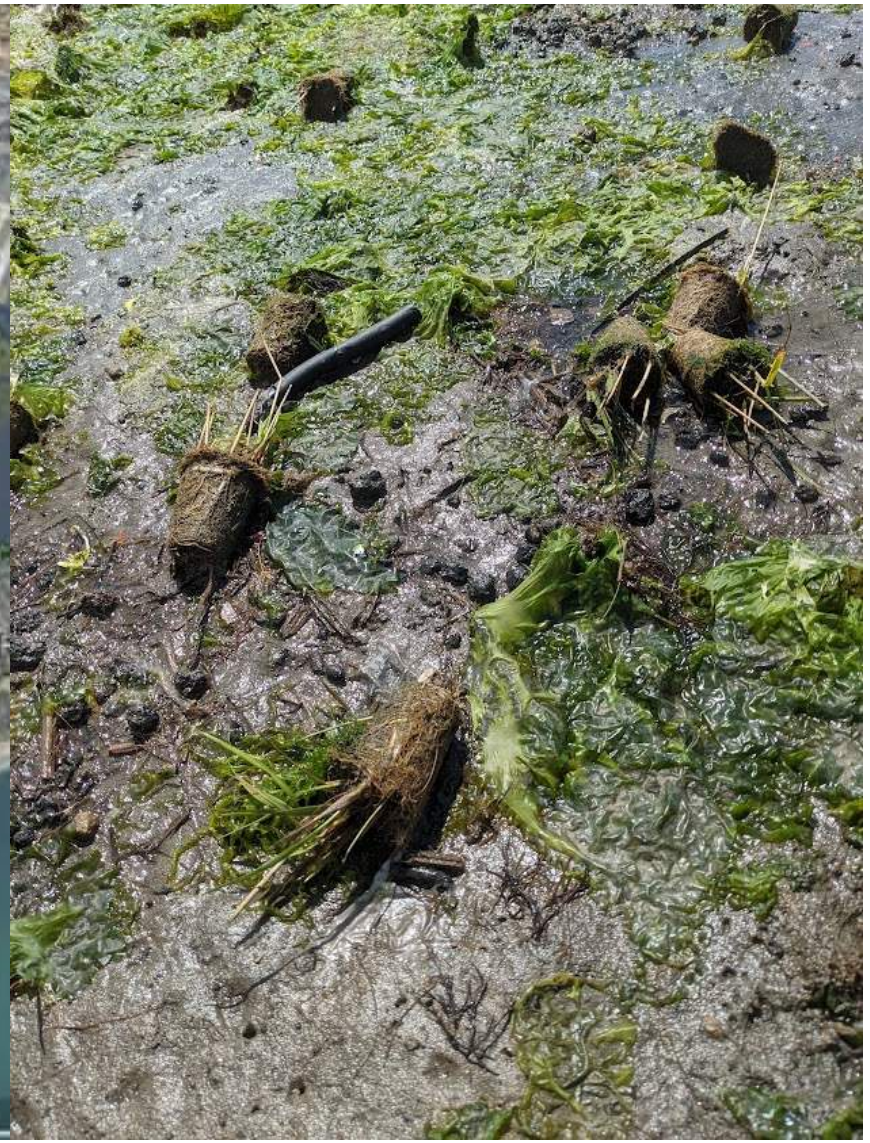
Project Challenges – Herbivore exclusion enhances litter accumulation



~50% of the plastic litter in the living shoreline was PVC flagging tape

Project Challenges- Macroalgal accumulation

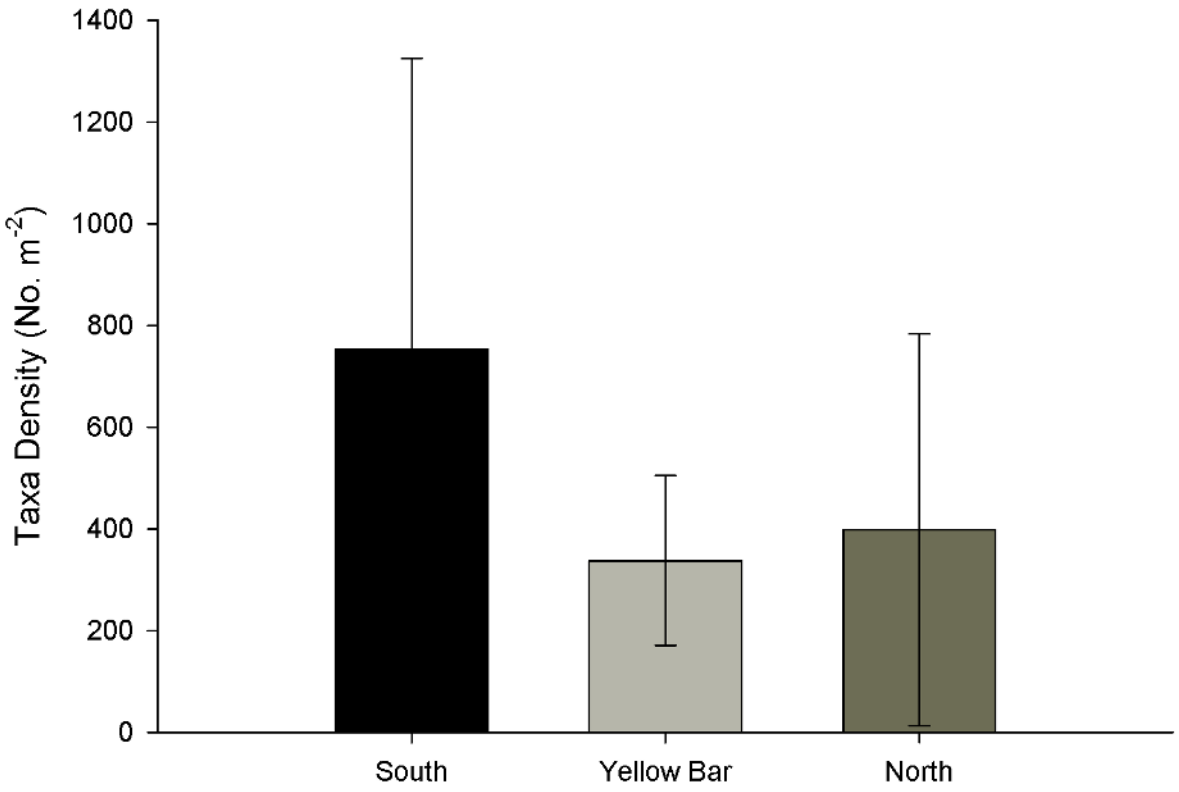
Project Challenges – Wind Fetch

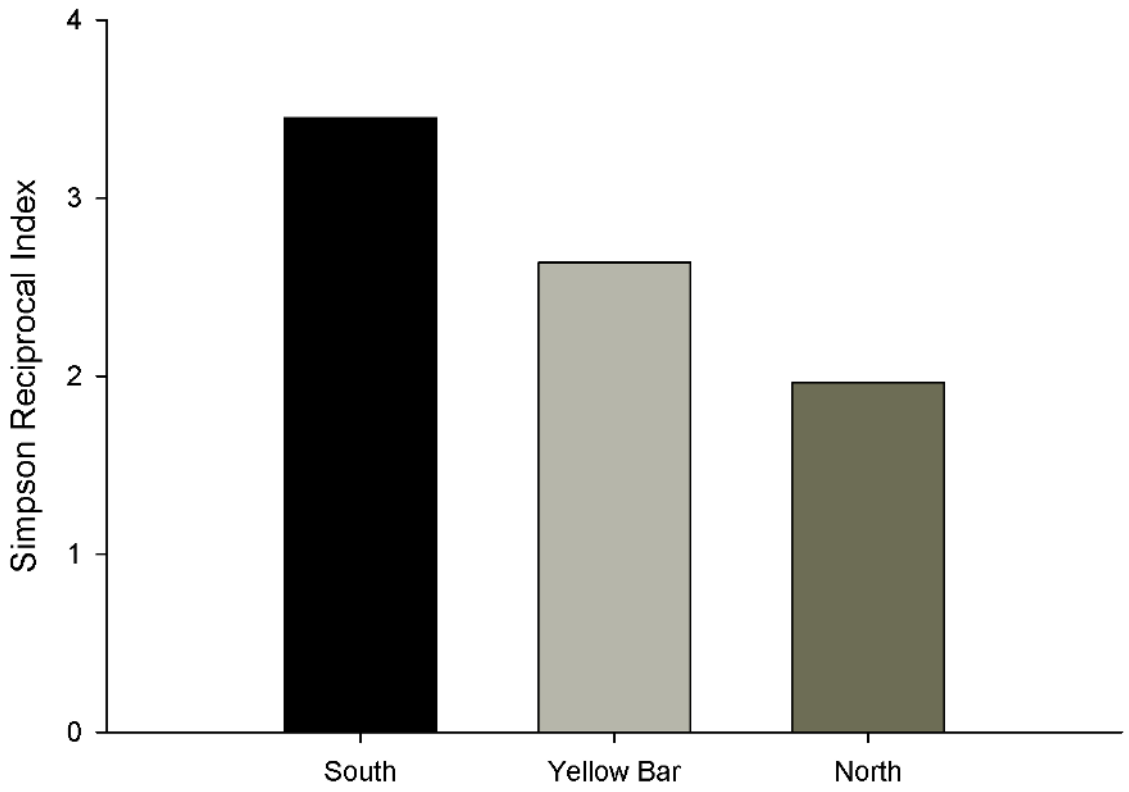


Do the shell mounds provide ecological benefits?

Invertebrate biodiversity study
West Pond Shell Mounds

Vertical complexity increased invertebrate density and biodiversity





Lessons Learned

- Ongoing maintenance is key
  - Herbivore exclusion fencing
  - Replanting
- Spring planting performed better than fall planting
- Elevation is critical but one of many factors driving plant success
- Wind & Waves may leave some habitat without vegetation
  - Breakwaters may be needed

Jamaica Bay Rockaway Parks Conservancy

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NPS/Gateway National Recreation Area

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CUNY

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