



New York - New Jersey
Harbor & Estuary Program
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Developing a Protocol to Assess the Habitat Value of Shorelines in the New York – New Jersey Harbor Estuary

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Context: Hudson-Raritan Estuary



Context: regional interest and projects



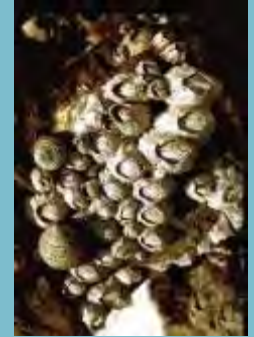
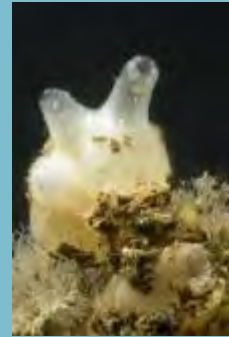
Objectives: a repeatable means of comparison between ecologically-enhanced shoreline stabilization in an urban estuary

- Repeatable and safe
- Relatively easy and inexpensive
- Standard comparison across a range of urban conditions



Urban shoreline assessment: basic design

- Water quality
- Encrusting algae
- Sessile invertebrates
- Mobile invertebrates
- Bivalves
- Fish
- Photoquadrats
- Abiotic conditions



Urban shoreline assessment: challenges

- Cores not suitable for hard shorelines
- Quadrats, nets, suction samplers and epibiont scrapes
 - Require direct access to shorelines
 - Biased (?)



Riprap with crevices



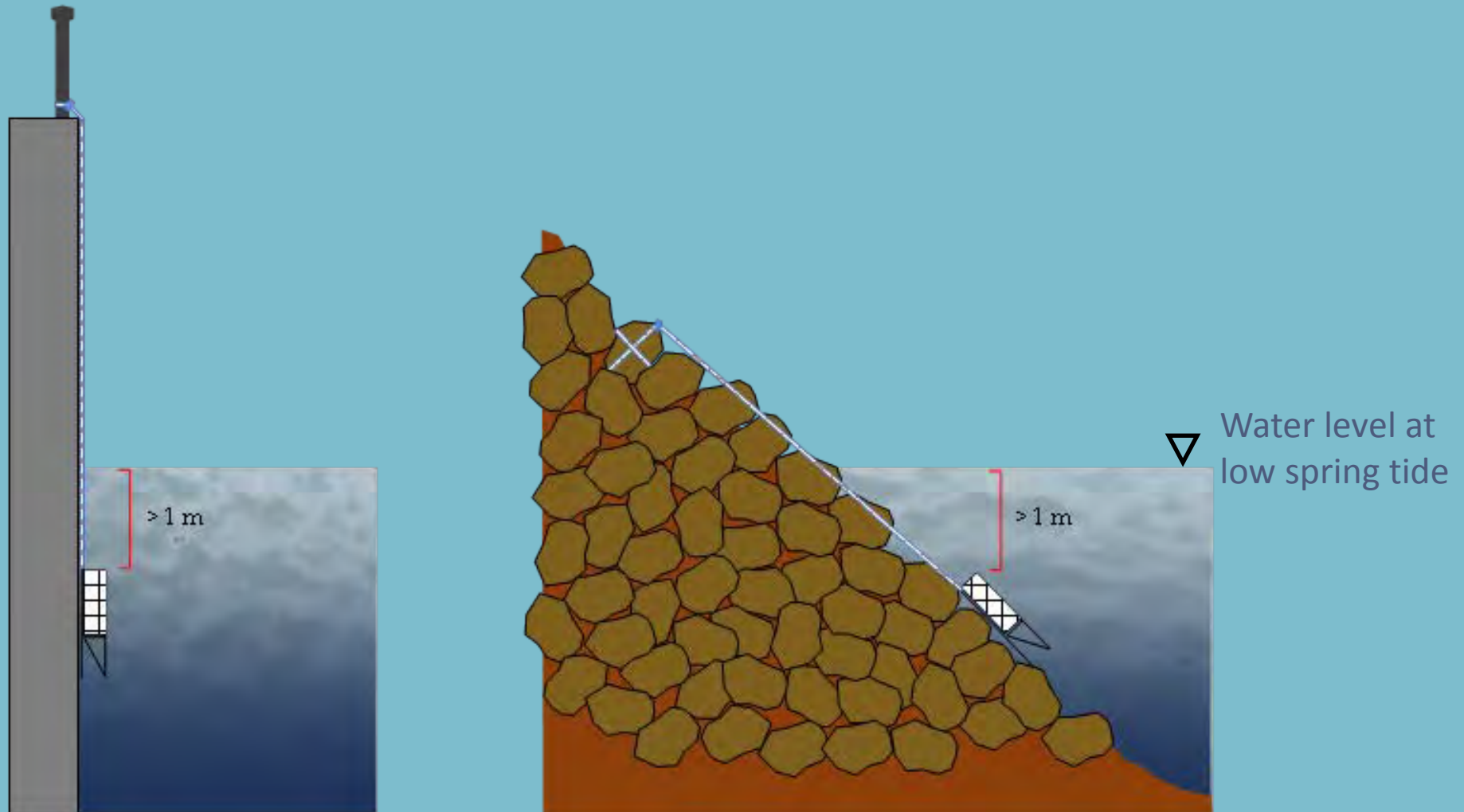
Seawall without crevices

Urban shoreline assessment: invertebrate colonization device

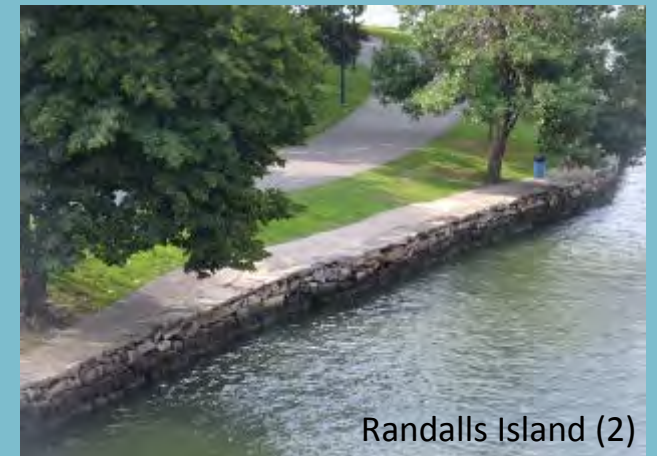
- Standard surface area and submergence duration
- Steel crab trap
- Enclosed netting and brick - microhabitats
- Settlement plates for sessile invertebrates
- PVC piping to stabilize device



Deployment: colonization device position in water at low spring tide



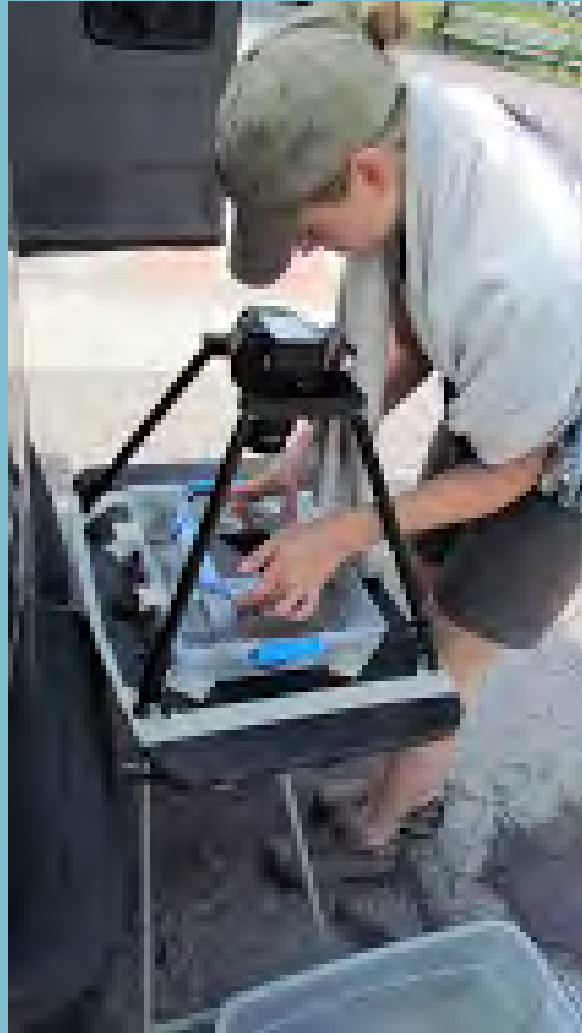
Shorelines used in protocol development



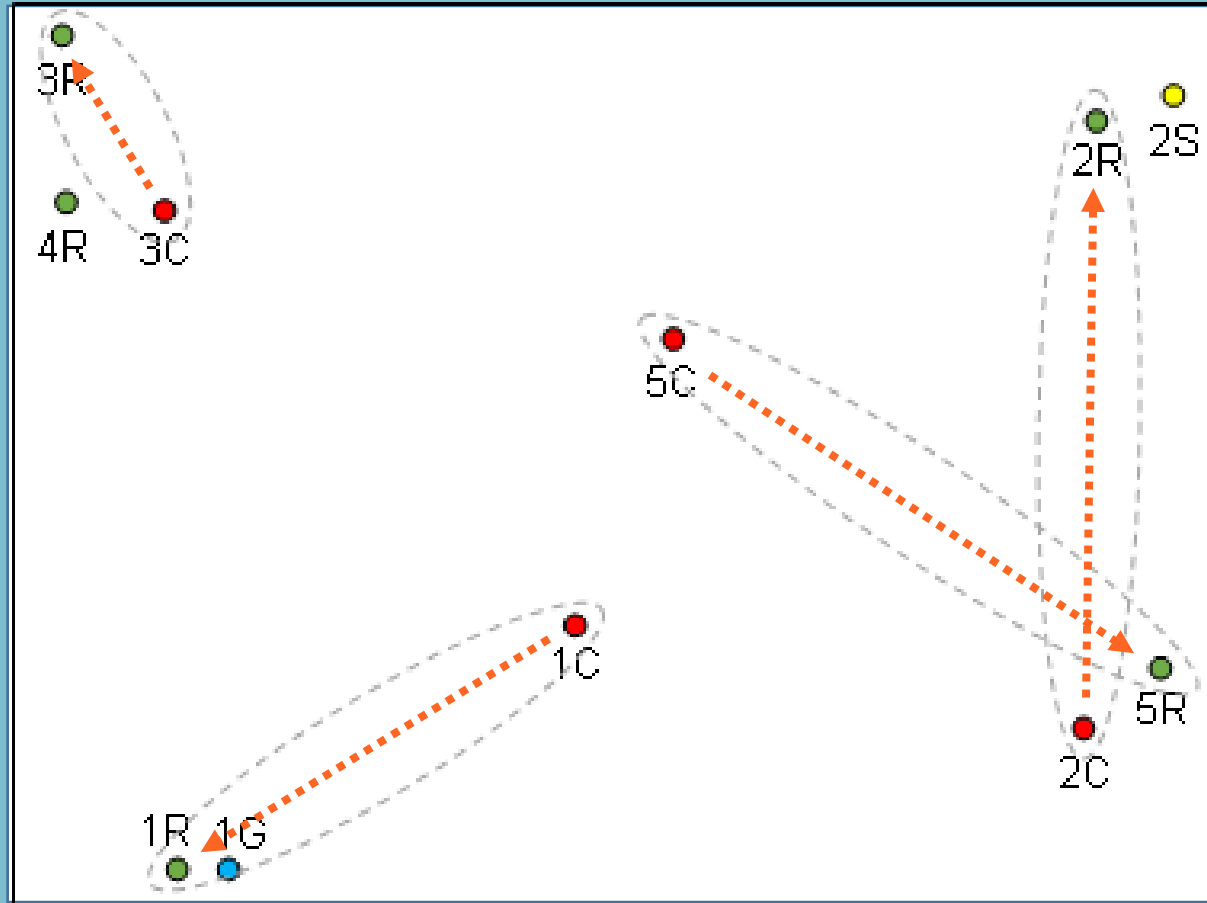
Colonization device retrieval



To come: sessile invertebrates



Preliminary data: mobile invertebrates



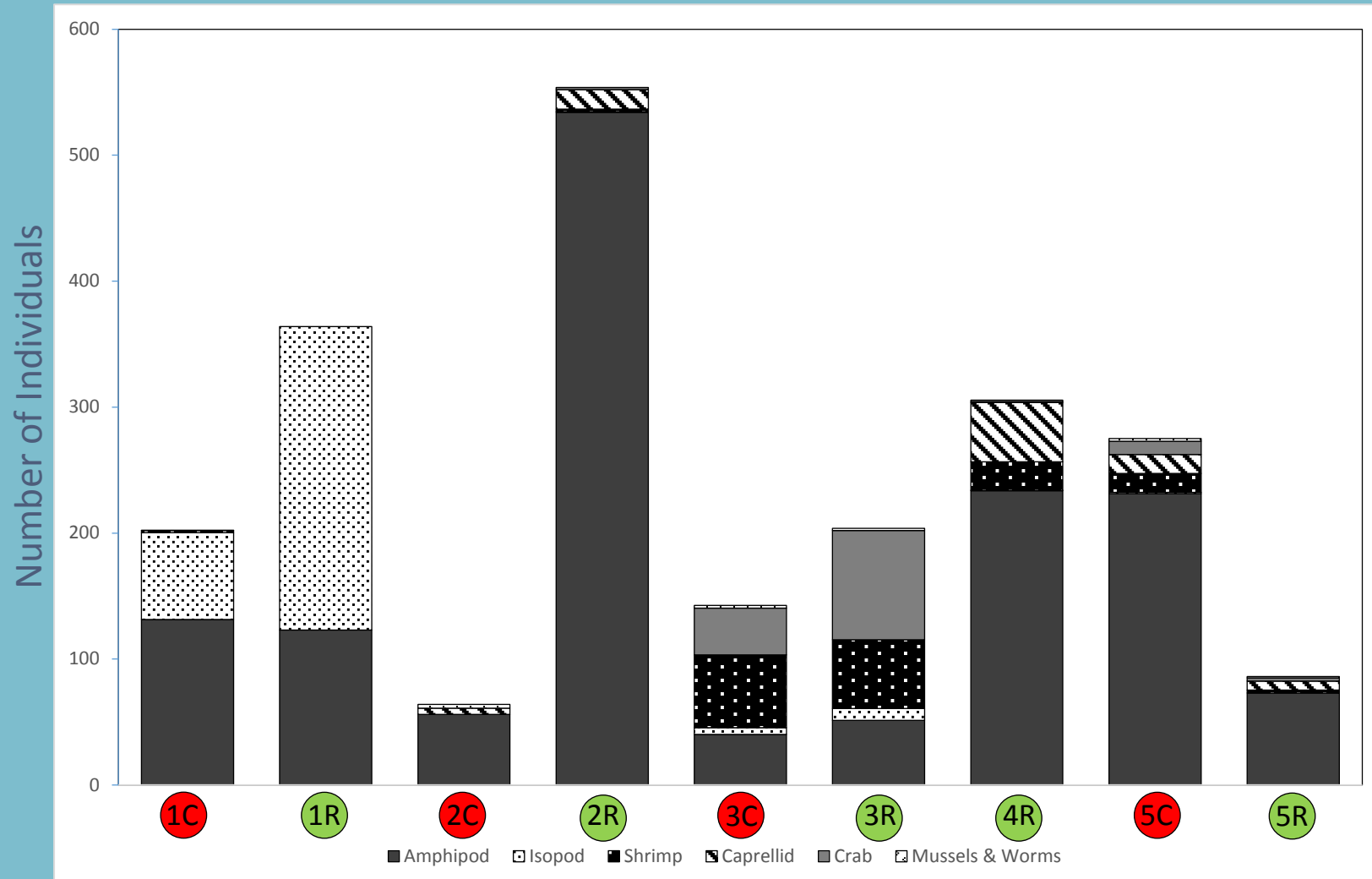
Stress = 0.09, based on Bray-Curtis dissimilarity matrix of untransformed mobile invertebrate community data



- Boulder riprap
- Concrete seawall (control)
- Gabion basket
- Stone Wall

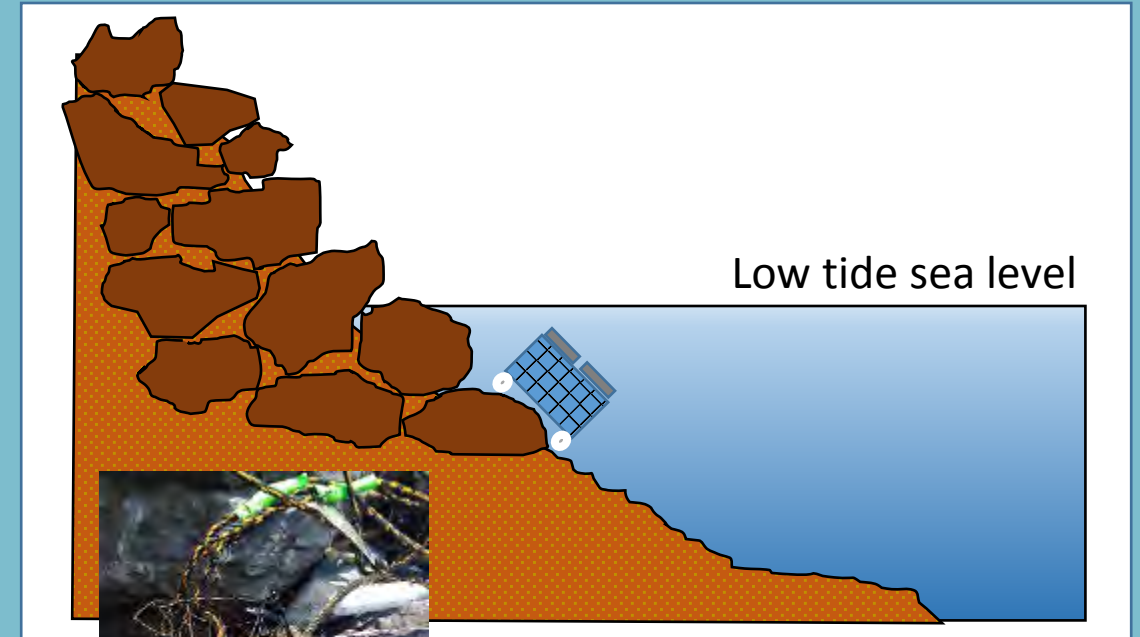


Preliminary data: mobile invertebrates



Disadvantages of colonization device

- Device works on near vertical shoreline extending ≥ 2 meters below low tide
- Cage and settlement plate not always sturdy enough
- Differences in surfaces of settlement plates
- Least effective on low gradient shorelines or where hardened shoreline does not extend far below low tide level
- In upper Harbor, fine sediment often covers the subtidal hard substrate



Redesigned colonization device

- More durable
- More weight
- More secure settlement plates
- Settlement plate orientation varies



Next steps

- Refinement and validation
 - Suction sampler
 - Epibiont scrapes
 - Photoquadrats, where turbidity doesn't preclude
- Implementation on a broader scale
- Better characterization of additional factors - sediment type, nearby habitats, wake
- Refinement of applications



Thank you

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- NYC Department of Parks and Recreation
- Randall's Island Alliance
- National Parks Service
- New Jersey State Parks

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