

IV. COASTAL STORM RISK MANAGEMENT FRAMEWORK FOR VULNERABLE COASTAL POPULATIONS

Table IV-7. NACCS Risk Management Measures Parametric Unit Cost Estimates

Aggregated Measure Type ¹	Total Estimated First Construction Cost per Unit ²	Total Estimated Annual Average Cost per Unit ³	Units
Acquisition (building removal) and relocation	\$349,000	\$14,900	Building
Building retrofit (floodproofing)	\$100,000	\$4,200	Building
Building retrofit ⁴ (elevating structures)	\$192,000	\$8,200	Building
Building retrofit (ringwalls – commercial/apartment building)	\$3,680,000	\$157,000	Building
Building retrofit (ringwalls – industrial building)	\$4,840,000	\$206,000	Building
Land use management/zoning and flood insurance ⁵	Varies	Varies	
Deployable floodwalls	\$5,500	\$250	feet
Floodwalls ⁶	\$5,300	\$240	feet
Levee	\$1,600	\$80	feet
Shoreline stabilization (seawalls, revetments, bulkheads)	\$4,800	\$250	feet
Storm surge barriers	Varies	Varies	
Beach restoration (beach fill, dune creation)	\$3,500	\$490	feet
Beach restoration and breakwaters	\$9,200	\$610	feet
Beach restoration and groins	\$7,400	\$530	feet
Drainage improvements ⁵ (e.g., channel restoration, water storage/retention features)	Varies	Varies	
Living shorelines	\$1,400	\$70	feet
Overwash fans (e.g., back bay tidal flats/fans)	\$2,400	\$100	feet
Reefs	\$4,800	\$200	feet
Submerged aquatic vegetation	\$2,400	\$100	feet
Wetlands ⁷	\$565,000	\$26,900	acre

- ¹ An extensive list of management measures was compiled as part of the NACCS Measures Working Meeting in June 2013. The measures presented here represent an aggregated list of the categories of measures and corresponding conceptual parametric unit cost estimates.
- ² Regional factors, such as materials, labor, and fuel, may affect overall costs. The total construction cost estimates must take into account more localized costs of these factors as part of the development of project cost estimates.
- ³ Includes operations and maintenance costs for all measures as well as periodic renourishment costs for beach restoration measures.
- ⁴ The range of costs to elevate structures can vary considerably.
- ⁵ Costs could not be developed due to scale of the NACCS study.
- ⁶ The concept design identified for the floodwall category consists of a concrete structure. These structures might also require closure structures including stoplogs, miter gates, swing gates, or roller gates, which were not included in the development of the parametric unit cost estimate. A simple steel sheetpile I-wall may be more economical.
- ⁷ An annual average cost of \$120 per foot was used in the Tier 1 evaluation assuming a nominal wetland width (i.e., dimension perpendicular to the shoreline) of 200 feet.