Methods

Descriptive fields were ranked and classified as described below:

Field	Classes / Ranks	Methodology
Tidal Range	Low / Moderate / High	Ranking based on Average Annual Tidal Range (m) – 0-1 m as Low ; 1 – 2 m as Moderate ; > 2 m as High
Site Exposure	Low / Moderate / High / Very High	Ranking based on Average Annual Wave Power (J/m2) – 0 – 5 as Low ; 5 – 10 as Moderate ; 10 – 15 as High ; > 15 as Very High
Engineering Effectiveness	Low / Moderate / High	Ranking based on wave reduction % (where reduction was measured as a coefficient this was converted to a % value) – 0 – 33 as Low ; 34 – 67 as Moderate ; > 67 as High
Project Benefits	Low / Moderate / High	Due to a wide variation in the descriptions of project outcomes, benefits were ranked either by – • Benefit-Cost Ratios: 1 – 2 as Low ; 2 – 3 as Moderate ; > 3 as High OR • Monetary Benefits in Local Currency: < 1 Million as Low ; 1 – 5 Million as Moderate ; > 5 Million as High OR • Qualitative Assessment of Benefit Types: 'Erosion Mitigation' as Low ; 'Flood Extent Reduction' as Moderate ; 'Storm Protection' as High
Project Type	Theoretical – Field / Field / Experimental - Field	Classification based on project methodology – Theoretical – Field: A theoretical/numerical study of habitat effectiveness supported by field observations Field: A fully field-based evaluation of habitat effectiveness Experimental – Field: An experimental study of habitat effectiveness with controlled field measurements
Project Objective	Flood Defence / Wave Attenuation / Erosion Mitigation	Classification based on primary project objective – Flood Defence: Where the field or assessment objective of the project pertains to reducing the extent of or exposure to flooding from an extreme event Wave Attenuation: Where the field or assessment objective of the project pertains specifically to the reduction of waves by habitat Erosion Mitigation: Where the field or assessment objective of the project pertains to reducing coastal erosion

Bibliography

Aarnink, J., Boer, R. D., Evers, G., Kruis, M. & Van Der Valk, K. 2014. *Flood Risk Mitigation for the Jamaica Bay Area.* MSc, TU Delft.

Schmitt, K., Albers, T., Pham, T. & Dinh, S. 2013. Site-specific and integrated adaptation to climate change in the coastal mangrove zone of Soc Trang Province, Viet Nam. *Journal of Coastal Conservation,* 17**,** 545-558.

Anthony & Gratiot (2012) - Coastal engineering and large-scale mangrove destruction in Guyana, South America: Averting an environmental catastrophe in the making, Ecol. Eng (47), 2012

Ba, I. M., Spencer, T., French, J., Leggett, D. & Dixon, M. 2001. The Sea-Defence Value of Salt Marshes: Field Evidence From North Norfolk. Water and Environment Journal, 15, 109-116.

Bao (2011). Effect of mangrove forest structures on wave attenuation in coastal Vietnam, Oceanologia 53 (3), 2011.

Barbier, E. B., Georgiou, I. Y., Enchelmeyer, B. & Reed, D. J. 2013. The Value of Wetlands in Protecting Southeast Louisiana from Hurricane Storm Surges. *PLoS ONE,* 8**,** e58715.

Bonham, A. J. 1983. The management of wave-spending vegetation as bank protection against boat wash. *Landscape Planning,* 10**,** 15-30.

Brinkman (2006). *Wave attenuation in mangrove forests: an investigation through field and theoretical studies.* PhD, James Cook University.

Cuc, N. T. K., Suzuki, T., De Ruyter Van Steveninck, E. D. & Hai, H. 2013. Modelling the Impacts of Mangrove Vegetation Structure on Wave Dissipation in Ben Tre Province, Vietnam, under Different Climate Change Scenarios. Journal of Coastal Research.

Chong, V. C. 2006. Sustainable utilization and management of Mangrove ecosystems of Malaysia. Aquatic Ecosystem Health & Management, 9, 249-260.

Cox (2006). Flood control areas as an opportunity to restore estuarine habitat. Ecol. Eng 28 (1) 2006.

de Vries & Dekker (2009). Design of a wave reducing eco-dyke at Fort Steurgat, Werkendam. Deltares (Report in Dutch)

EA (2007). Report on Sand Dunes: Processes and Management - Part 5 (Case Studies). Environment Agency, UK.

ESA PWA 2013. Analysis of the Costs and Benefits of Using Tidal Marsh Restoration as a Sea Level Rise Adaptation Strategy in San Franciso Bay. San Francisco: The Bay Institute.

Fabian, R., Beck, M. & Potts, D. 2014. Reef Restoration for Coastal Defense: A Review. Santa Cruz: University of California, Santa Cruz.

Galveston Bay Foundation n.d. Living Shorelines: A Natural Approach to Erosion Control: Introduction, Guidance and Case Studies. Available online at www.galv**bay**.org/docs/LS_alternative.pdf [Accessed September 2014].

Hardaway C.S., J. & Duhring, K. 2010. Living Shoreline Design Guidelines for Shore Protection in Virginia's Estuarine Environments Verson 1.2. Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia.

Hardaway Jr. C.S., Milligan, D.A., O'Brien, K.P., Wilcox, C.A, Shen, J. and Hobbs, C. H. (2009). Encroachment of Sills onto State-Owned Bottom: Design Guidelines for Chesapeake Bay, Virginia Institute of Marine Science. Available online at www.myCOPRI.org [Accessed September 2014].

Harrell, R. 2013. Hancock County Marsh Living Shoreline Project. *http://www.gulfspillrestoration.noaa.gov.* NOAA.

IFRC (International Federation Of Red Cross And Red Crescent Societies) 2011. Breaking the waves: Impact analysis of coastal afforestation for disaster risk reduction in Vietnam. Geneva: IFRC.

Infantes, E., Orfila, A., Simarro, G., Terrados, J., Luhar, M. & Nepf, H. 2012. Effect of a seagrass (Posidonia oceanica) meadow on wave propagation. *Marine Ecology Progress Series,* 456**,** 63-72.

Kirkpatrick, J. 2013. Constructing Oyster Reef for Shoreline Stabilization and Restoration. *www.oyster-restoration.org.* MacDill AFB.

Knutson et al. (1982). Wave Damping in Spartina alterniflora Marshes, Wetlands (2).

Leichenko, R., Mcdermott, M., Bezborodko, E. & Namendorf, E. 2013. Economic Vulnerability and Adaptation to Climate Hazards and Climate Change: Building Resilience in the Barnegat Bay Region. New Jersey: Barnegat Bay Partnership.

Lövstedt, C. & Larson, M. 2010. Wave Damping in Reed: Field Measurements and Mathematical Modeling. Journal of Hydraulic Engineering, 136, 222-233.

Mazda, Y., Wolanski, E., King, B., Sase, A., Ohtsuka, D. & Magi, M. 1997. Drag force due to vegetation in mangrove swamps. Mangroves and salt marshes, 1, 193-199.

Mazda, Y., Magi, M., Ikeda, Y., Kurokawa, T. & Asano, T. 2006. Wave reduction in a mangrove forest dominated by Sonneratia sp. Wetlands Ecology and Management, 14, 365-378.

Möller, I. & Spencer, T. 2002. Wave dissipation over macro-tidal saltmarshes: Effects of marsh edge typology and vegetation change. Journal of Coastal Research, 36, 506-521. over macro-tidal saltmarshes: Effects of marsh edge typology and vegetation change, JCR (SI 36).

Möller, I., Spencer, T., French, J., Leggett, D. & Dixon, M. 1999. Wave transformation over salt marshes: a field and numerical modelling study from North Norfolk, England. Estuarine, Coastal and Shelf Science, 49, 411-426.

Morgan, P., Burdick, D. & Short, F. 2009. The Functions and Values of Fringing Salt Marshes in Northern New England, USA. Estuaries and Coasts, 32, 483-495.

Narra (2012). *Attenuation of wave energy in mangrove forests*. MSc. Department of Civil Engineering, Universidad de Aveiro.

Nordstrom, K. F., Jackson, N. L., Bruno, M. S. & De Butts, H. A. 2002. Municipal initiatives for managing dunes in coastal residential areas: a case study of Avalon, New Jersey, USA. Geomorphology, 47, 137-152.

Othman, M. 1994. Value of mangroves in coastal protection. Hydrobiologia, 285, 277-282.

Paul & Amos (2011). Spatial and seasonal variation in wave attenuation over Zostera noltii, J. Geophys. Res (116).

Quartel et al. (2007). Wave attenuation in coastal mangroves in the Red River Delta, Vietnam, Journal of Asian Earth Sciences 29.

Rao et al. (2013). An economic analysis of ecosystem-based adaptation and engineering options for climate change adaptation in Lami Town, Republic of the Fiji Islands. Secretariat of the Pacific Regional Environment Programme.

Rijkswaterstaat & Deltares (n.d.). Eco-engineering in the Netherlands: Soft interventions with a solid impact. Available online at www.deltares.nl/xmlpages/tan/files?p_file_id=23102 [Accessed September 2014]

Saenger, P. & Siddiqi, N. A. 1993. Land from the sea: The mangrove afforestation program of Bangladesh. Ocean & Coastal Management, 20, 23-39.

Spurgeon, J., Roxburgh, T., O'gorman, S., Lindley, R., Ramsey, D. & Polunin, N. 2004. Economic valuation of coral reefs and adjacent habitats in American Samoa. Final Report, 2004.

Steeg, P. & Wesenbeeck, B. K. 2011. Large-scale physical modelling of wave damping of brushwood mattresses. Delft: Deltares. Available online at dtvirt35.deltares.nl/products/22349 [Accessed September 2014]

TNC (2011). Grand Isle and St Bernard Marsh Shoreline Protection Project Report. TNC. Available at http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/louisiana/placesweprotect/la-shoreline-protection-project.pdf [Accessed September 2014]

Van Beukering, P., Haider, W., Wolfs, E., Liu, Y., Van Der Leeuw, K., Longland, M., Sablan, J., Beardmore, B., Di Prima, S. & Massey, E. 2006. The economic value of the coral reefs of Saipan, Commonwealth of the Northern Mariana Islands, US Department of Commerce, National Oceanic and Atmospheric Administration, National Oceanographic Data Center, Coral Reef Conservation Program.

Van Beukering, P., Haider, W., Longland, M., Cesar, H., Sablan, J., Shjegstad, S., Beardmore, B., Liu, Y. & Garces, G. O. 2007. The economic value of Guam's coral reefs, University of Guam Marine Laboratory.

Vo Luong & Massel (2006). Experiments on wave motion and suspended sediment concentration at Nang Hai, Can Gio mangrove forest, Southern Vietnam., Oceanologia 48 (1), 2006.

Zhang, K., Liu, H., Li, Y., Xu, H., Shen, J., Rhome, J. & Smith III, T. J. 2012. The role of mangroves in attenuating storm surges. Estuarine, Coastal and Shelf Science, 102, 11-23.

Websites and Databases

Coasts, Ports and Rivers Institute: www.myCOPRI.org

USACE EWN ProMap: http://el.erdc.usace.army.mil/ewn/