Enhancing Coastal Resilience on Virginia's Eastern Shore Community Leader Workshop

Breakout Session #1: Sea-Level Rise Inundation and Marsh Migration Modeling Discussion

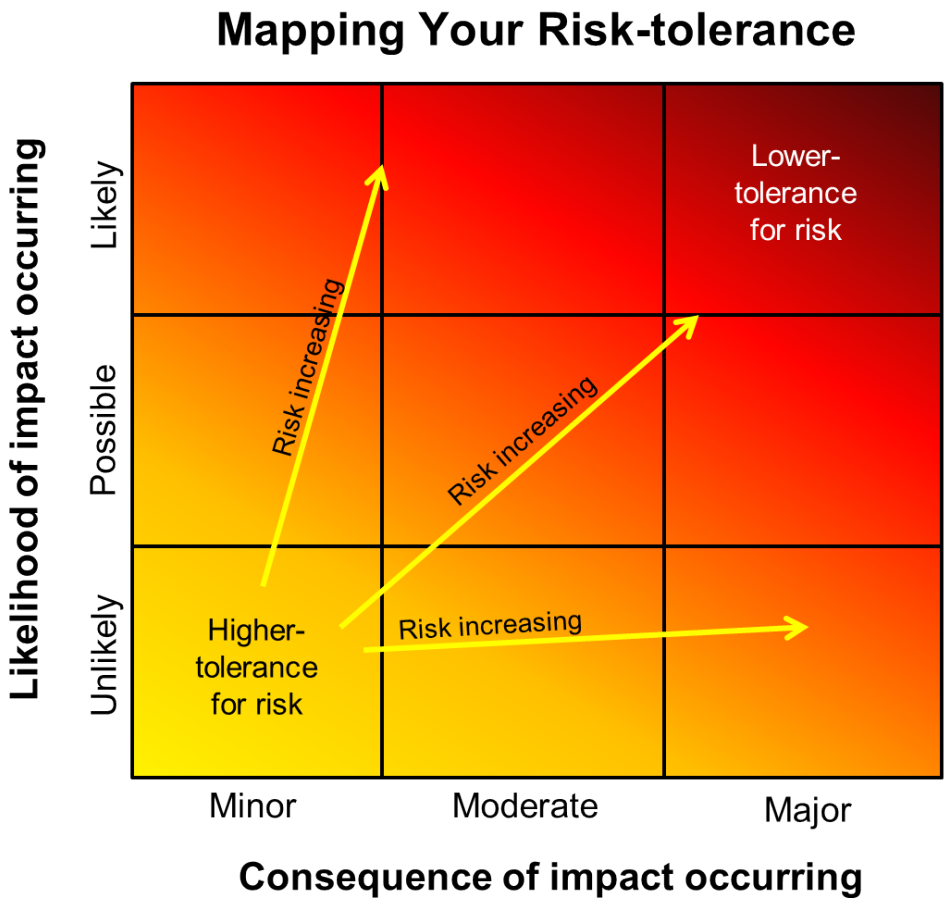
Session goal: To solicit input from community leaders on scenarios and planning horizons of most interest and relevance to stakeholders regarding inundation and marsh migration models that will eventually be incorporated into the Coastal Resilience Tool.

Discussion questions:

1. How much risk is your agency, organization, institution able to tolerate with regards to coastal hazards related to accelerated sea-level rise and storm surge (e.g. shoreline erosion, flooding)? Or, another way, how much flexibility do you have to accommodate the consequences of these coastal hazards?

2. What future planning horizon(s) can your organization realistically and feasibly plan to address? (e.g. 1 year, 5 years, 10, years, 25, 50, 75, 100). Why?

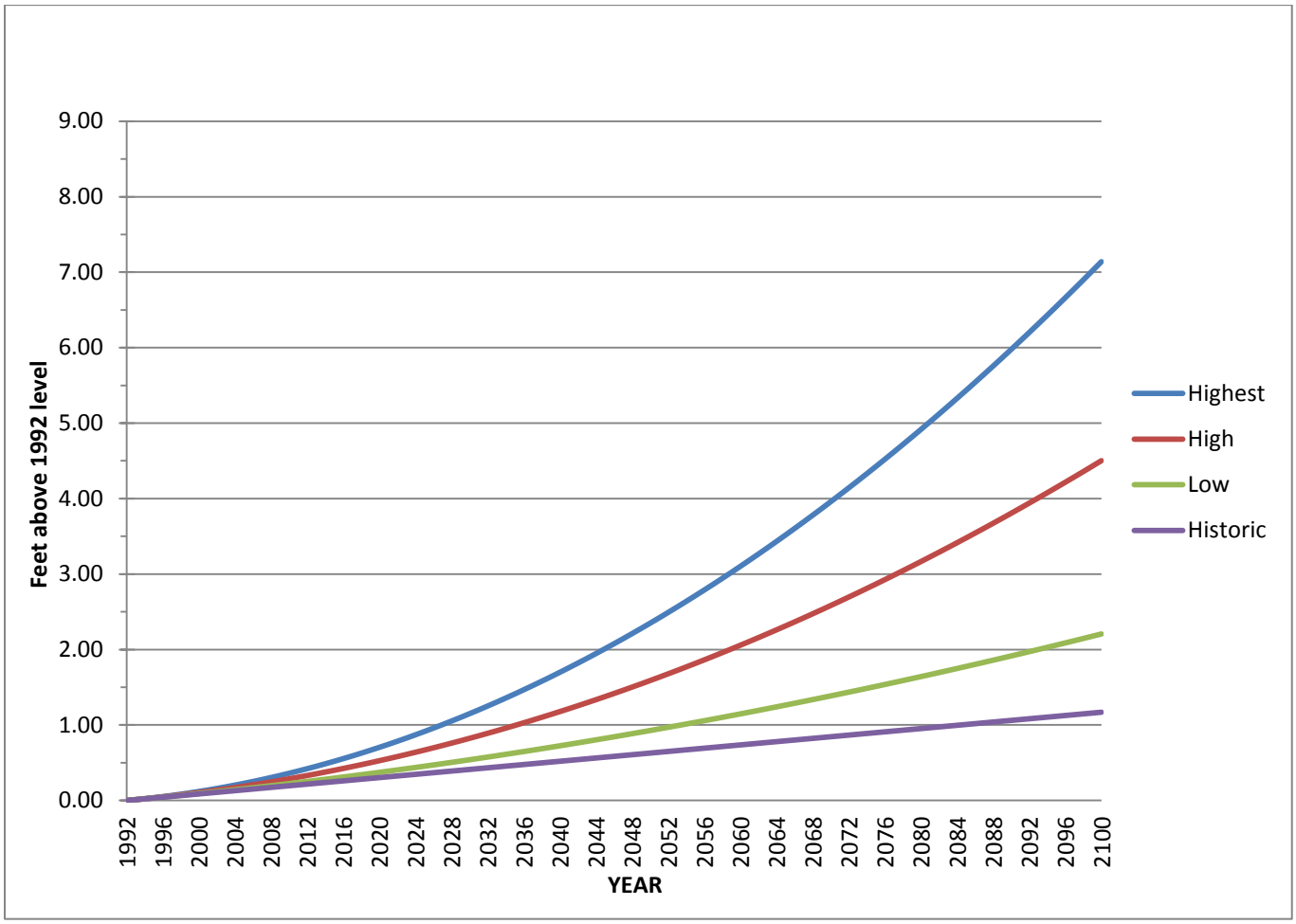
3. Given your risk tolerance and planning horizons, which sea-level rise scenarios are you most interested in seeing modeled for the Eastern Shore (options from VIMS 2013 Recurrent Flooding Study for Tidewater Virginia revised for Virginia Eastern Shore):
   a) The lowest or **"historic"** scenario is a projection of observed long-term rates of sea-level rise going back a century or more. It incorporates no acceleration. This scenario should be considered where there is a high tolerance for risk.
   b) The **"low"** scenario is based on the Intergovernmental Panel on Climate Change 4th Assessment model using conservative assumptions about future greenhouse gas emission (the B1 scenario).
   c) The **"high"** scenario is based on the upper end of projections from semi-empirical models using statistical relationships in global observations of sea level and air temperature.
   d) The **"highest"** scenario is based on estimated consequences from global warming combined with the maximum possible contribution from ice-sheet loss and glacial melting (a practical worst-case scenario based on current understanding). This highest scenario should be considered in situations where there is little tolerance for risk.



The **lower-rise scenarios** may be appropriate where there is a high tolerance for risk such as projects or infrastructure with a short lifespan or planning areas with flexibility to make alternative choices within the near-term.

The **higher-rise scenarios** should be considered in situations where there is little tolerance for risk, such as projects with a long lifespan, where losses would be catastrophic, where there is limited flexibility to adapt in the near- or long-term, and those that serve critical economic and ecological function (e.g., ports or endangered species refuges).

Relative Sea-Level Rise Scenarios for VA Eastern Shore in feet above 1992 level



This is the most recent version of the relative sea-level rise curves for the Eastern Shore of Virginia. Curves were calculated using the same methodology and data sources as the VIMS 2013 "Recurrent Flooding Study for Tidewater Virginia" report prepared for the Virginia General Assembly. The curves are based on the 2014 National Climate Assessment sea-level rise curves adjusted for the annual local subsidence rate in Wachapreague, Virginia (1.6 mm/year) based on Holdahl and Morrison (1974).

Citations:

Holdahl, S.R., and N.L. Morrison. "Regional investigations of vertical crustal movements in the U.S., using precise relevelings and mareograph data." Technophysics 23 (1974): 373-90.

Mitchell, M., C. Hershner, J. Herman, D. Schatt, E. Eggington and S. Stiles. 2013. Recurrent Flooding Study for Tidewater Virginia. Virginia Senate Document No. 3. Richmond, Virginia. Report. Curves revised September 2014.

Parris, A., P. Bromirski, V. Burkett, D. Cayan, M. Culver, J. Hall, R. Horton, K. Knuuti, R. Moss, J. Obeysekera, A. Sallenger, and J. Weiss. 2012. Global Sea Level Rise Scenarios for the US National Climate Assessment. NOAA Tech Memo OAR CPO-1. 37 pp.

Relative Sea-Level Rise Scenarios for VA Eastern Shore

Table of Relative SLR in feet above 1992 Level

Year	Highest	High	Low	Historic
1992	0	0	0	0
1994	0.02	0.02	0.02	0.02
1996	0.05	0.05	0.04	0.04
1998	0.08	0.08	0.07	0.06
2000	0.12	0.10	0.09	0.09
2002	0.16	0.14	0.12	0.11
2004	0.20	0.17	0.14	0.13
2006	0.25	0.21	0.17	0.15
2008	0.30	0.25	0.20	0.17
2010	0.36	0.29	0.22	0.19
2012	0.42	0.33	0.25	0.22
2014	0.49	0.38	0.28	0.24
2016	0.55	0.42	0.31	0.26
2018	0.63	0.47	0.34	0.28
2020	0.70	0.53	0.37	0.30
2022	0.79	0.58	0.40	0.32
2024	0.87	0.64	0.44	0.35
2026	0.96	0.70	0.47	0.37
2028	1.05	0.76	0.50	0.39
2030	1.15	0.82	0.54	0.41
2032	1.25	0.89	0.58	0.43
2034	1.36	0.96	0.61	0.45
2036	1.47	1.03	0.65	0.48
2038	1.58	1.10	0.69	0.50
2040	1.70	1.18	0.72	0.52
2042	1.82	1.26	0.76	0.54
2044	1.95	1.34	0.80	0.56
2046	2.08	1.42	0.84	0.58

Year	Highest	High	Low	Historic
2048	2.21	1.50	0.89	0.61
2050	2.35	1.59	0.93	0.63
2052	2.49	1.68	0.97	0.65
2054	2.64	1.77	1.01	0.67
2056	2.79	1.86	1.06	0.69
2058	2.94	1.96	1.10	0.71
2060	3.10	2.06	1.15	0.74
2062	3.27	2.16	1.19	0.76
2064	3.43	2.26	1.24	0.78
2066	3.60	2.37	1.29	0.80
2068	3.78	2.47	1.34	0.82
2070	3.96	2.58	1.39	0.84
2072	4.14	2.70	1.44	0.87
2074	4.33	2.81	1.49	0.89
2076	4.52	2.93	1.54	0.91
2078	4.72	3.04	1.59	0.93
2080	4.92	3.17	1.64	0.95
2082	5.12	3.29	1.69	0.97
2084	5.33	3.41	1.75	1.00
2086	5.54	3.54	1.80	1.02
2088	5.76	3.67	1.86	1.04
2090	5.98	3.81	1.91	1.06
2092	6.20	3.94	1.97	1.08
2094	6.43	4.08	2.03	1.10
2096	6.66	4.22	2.09	1.13
2098	6.90	4.36	2.15	1.15
2100	7.14	4.50	2.21	1.17

This table represents the underlying data used to create the sea-level rise scenario curves. These numbers are based on the 2014 National Climate Assessment sea-level rise curves adjusted for the annual local subsidence rate in Wachapreague, Virginia (1.6 mm/year). Please see citations above for more information.