Abstract

Virginia shorelines are facing some of the highest rates of sea level rise over the last 5 millennia and are among the most vulnerable coastlines in the country to the effects of sea level rise such as flooding and storm surge (Downs et al. 1994). In the face of these rising sea levels, coastal wetland habitats will be forced to migrate inland to avoid inundation (Alum et al. 2011). However, increased development on the Virginia coast threatens these critical wetland habitats by blocking their inland movement as the try to avoid rapidly rising sea levels. Without a clear migratory path, wetland’s ecosystem services and biodiversity will be lost to saltwater inundation. To prevent the loss of wetland’s migratory paths from development, this paper proposes that any new development behind coastal wetlands must undergo a Life Cycle Cost Assessment (LCCA). Completion of the LCCA will expose developers to both the future costs they will incur from rising sea levels, flood mitigation, and the costs associated with possible wetland destruction. Exposing developers to the future costs they will incur has the potential to save a developer future property loss while also maintaining wetland’s inward migration path by deterring development. Cost of the LCCA will fall on the developer of the coastal property.

Wetlands are trapped behind coastal development

Virginia’s coasts are facing some of the highest rates of sea level rise over the last 5 millennia and is second only to New Orleans as the most vulnerable coastline in the United States to flooding and storm surges from sea rise (Downs et al. 1994). Water levels on the Virginia coast are expected to rise 2.3-5.2 feet over the next century, with low-lying areas such as Virginia Beach and Hampton Roads experiencing the worst effects of this elevated sea level (Governors’ Commission on Climate Change 2008). Rising sea levels are the direct result of climate change. As global temperatures increase, water in the oceans increases as the result of melting land ice and the thermal expansion of water molecules (Meier and Wahr 2002). Many of these ecological functions can be quantified through the Hedonic Pricing method, which estimates the economic value for ecosystem services that directly affect market prices (Mahan et al. 2000). Using the Hedonic Pricing method illustrates how wetlands directly influence residential property values. Decreasing a property’s distance to a wetland by 1,000 feet increases the value of the property by $436.17 (Mahan et al. 2000). Wetlands provide important ecosystem services and functions such as critical habitat for large amounts of Virginia’s biodiversity. Flood control, storm buffering, and water purification (Woodward and Wu 2000).

Life Cycle Cost Assessment: A Win-Win for Virginia Wetlands

In the face of rising sea levels, coastal wetland habitats will be forced to migrate inland to avoid inundation (Alum et al. 2011). However, increased development on the Virginia coast threatens these critical wetland habitats by blocking their inland movement as the try to avoid rapidly rising sea levels. Without a clear migratory path, wetland’s ecosystem services and biodiversity will be lost to saltwater inundation. To prevent the loss of wetland’s migratory paths from development, this paper proposes that any new development behind coastal wetlands must undergo a Life Cycle Cost Assessment (LCCA). This cost assessment has the potential to save wetlands inward migration path by saving developers money.

Cost Assessments

The LCCA will look 50 years into the future with benchmarks at 10, 20, and 50 years. It will require developers to face all the costs they will incur over the next 50 years due to sea level rise. These costs include:

- Costs of building some type of sea level rise mitigation (Sea walls, dykes, jetties, etc.)
- Costs of property damages that will occur without flood mitigation
- Costs of wetlands loss if developers decide to build behind wetlands

Enforcement and Completion

The LCCA will be a mandatory assessment for any parties that wish to develop in the migratory path behind wetlands. Enforcement, payment, and completion of the LCCA will fall on different parties in order to minimize any conflicts of interest.

- Enforcement: Local municipalities will be in charge of requiring parties complete an LCCA before deciding to develop.
- Completion: Privatized third parties will complete the LCCA for the developer.
- Payment: Parties are the financing the development will be charged with paying the LCCA completion.

Full Disclosure

Following completion of the LCCA, the assessment must be given back to the local municipality. The LCCA must be disclosed to the municipality for three reasons:

- Municipality can verify that the LCCA is completed and can give permission for parties to build if they still wish to develop.
- Municipality will archive the LCCA and make available to the public.
- Municipality cannot allow or disallow the developer to build based on the results of the LCCA.

Acknowledgements

Christ Burkett, Wildlife Action Coordinator for the VDGIF
Skip Stiles, Executive Director of Wetlands Watch

Bibliography