Cape May County, New Jersey

Effect of Sea Level Rise on Property Values and Tax Revenue

Report by Nathanael Kielt

1. Abstract

Analysis of coastal systems gains increasing importance with the rapid rise of sea level. With this, it is important to analyze and identify areas in Cape May County that are of the highest value. These areas affected by sea level rise provide over $6.6 billion in tax revenue for their municipalities. Concurrently, these same areas, will be the most expensive to replace and repair for damage associated with sea level rise. Therefore, it is crucial to determine these areas so that adequate preventative measures can be planned for and implemented. The median value of owner occupied homes in Cape May County in 2000 was approximately $156,000 compared to the U.S. average of $119,600 at the same time.

2. Introduction

Most of world population lives within 100 miles of the ocean. Approximately, twenty three percent of the world population is within 100m of sea level and 100km from coast (Cooper et al, 2005). Recent sea level rise in New Jersey is estimated between 3-4mm/y, and expected to increase to 6 mm/y (Psuty and Ofiara, 2002). This data shows the vital importance for planning for protection of the shore. The concerns associated with sea level rise (SLR) include storm surge or flood damage, human health concerns, real estate and infrastructure damage, and habitat and ecological loss. These problems will no doubt lead to more stringent development and land use regulations and strategies for conservation of important habitat. Without human intervention, by 2100 New Jersey could experience substantial land loss and alteration of the coastal zone from sea level rise (SLR), causing widespread impacts on coastal development and ecosystems (Cooper et al, 2005).

Due to increased development practices in coastal communities the importance of coastal management should become a vital part in disaster planning (Heinz, 2002). The New Jersey coastal region supports an estimated $16 billion tourism industry, the multi-state region including New Jersey sustains a $50 billion maritime industry, and a $100 million commercial fishing industry (NJ Coastal Management Program 2002a). An analysis of coastal area by value, rather than by vulnerability, is needed to quantitatively give a worth for implementing protection strategies. Identification of valuable coastline is important to provide an idea of where shoreline protection may be best appropriate.

3. Objectives

The main objective of this study was to determine the amount of property value and tax revenue lost from SLR. Sea level rise was calculated using projected estimates from International Panel on Climate Change (IPCC). For the analysis on SLR impact on tax revenues, a high estimate of SLR was used in order to fully map those areas that have the potential to be inundated. The high estimate of SLR is projected at 1.2 meters above current median sea level (IPCC).

Additionally, three sub analyses where conducted in determine the total property value affected from storm surges at an elevated sea level. The first storm surge scenario looked at was a thirty year storm plus a low estimate of seal level rise, which was 3.0 meters. The second storm surge scenario looked at was a hundred year storm plus a low estimate of sea level rise projected at 3.5 meters. The last scenario used was hundred year storm plus a high estimate of sea level rise, projected at 4.1 meters.

4. Methods

A geospatial approach was taken to determine the full effect of SLR on property values and tax revenue. Outlined below are a list of the data sets used to perform this analysis, they include

Lidar Data of Cape May County

- An elevation model for the study site. Used to determine the full extent of each SLR scenario, has a very high resolution which will yield the highest accuracy in the analysis.

Parcel Data of Cape May County

- Identifies all parcels within Cape May County.

ModIV Data

- ModIV is the New Jersey tax database. Can be joined to county parcel data in order to obtain the taxable value of each parcel.

2002 Land Use / Land Cover of Cape May County

- Determine the land use / land cover of the entire region. For this analysis, only those areas classified as urban were considered.

First, the parcel data and the ModIV data were joined together so that each parcel in the county would have a corresponding value associated with it. Next, only those areas which were classified as 'urban' were selected out from the 2002 land use data set. This would result in a new layer of only developed land. Since this study was only concerned about the developed areas affected by SLR, only the parcels which overlaid developed land used were extracted out. From this, various levels of sea level were used to determine the extent of damage for each associated SLR scenario.

5. Results

This project perform produced significant, although not surprising, results. For the first analysis, a high estimate of sea level rise at 1.2 meters inundated over 18,000 developed parcels. The net value of the parcels affected totals $6,693,675,807. It is important to note that this is the total amount of property value that is permanently destroyed by SLR inundation. The total municipal tax lost at this same scenario is $48,427,970 annually at the current tax rate, and the total county tax lost is $10,138,968. The high estimate of SLR at 1.2 meters produces a over all net tax loss of $58,566,938 annually.

Table 1. Property value affected by high estimate of SLR (1.2 meters)

Municipality	Net Property Value	Net Value Lost	New Net Value
Avalon	$7,666,325,500	**$1,732,555,100**	$5,933,770,400
Cape May City	$2,135,274,010	**$137,663,910**	$1,997,610,100
Cape May Point	$292,745,500	**$35,798,800**	$256,946,700
Dennis	$976,044,400	**$17,841,100**	$958,203,300
Lower	$4,453,581,800	**$174,995,000**	$4,278,586,800
Middle	$3,409,674,800	**$436,168,700**	$2,973,506,100
North Wildwood	$2,946,201,500	**$596,360,100**	$2,349,841,400
Ocean City	$7,630,442,847	**$1,620,169,047**	$6,010,273,800
Sea Isle City	$1,698,634,500	**$304,459,400**	$1,394,175,100
Stone Harbor	$3,494,367,050	**$793,482,850**	$2,700,884,200
Upper	$2,188,394,200	**$217,912,600**	$1,970,481,600
West Cape May	$2,188,394,200	**$54,694,600**	$2,133,699,600
West Wildwood	$182,754,900	**$180,489,900**	$2,265,000
Wildwood City	$1,792,175,400	**$338,884,600**	$1,453,290,800
Wildwood Crest	$1,028,934,400	**$52,200,100**	$976,734,300

This table represents each municipality and the net property value lost due to the high estimate of sea level rise at 1.2 meters. The new net property value within each municipality is calculated on the right of the table.

Table 2. Tax revenue lost due to high estimate of SLR (1.2 meters)

Municipality	Tax Rate	Tax Lost	Total Tax	New Tax Rate
Avalon	0.368	$6,375,803	$28,212,078	**$0.48**
Cape May City	0.833	$1,146,740	$17,786,833	**$0.89**
Cape May Point	0.791	$283,169	$2,315,617	**$0.90**
Dennis	1.096	$195,538	$10,697,447	**$1.12**
Lower	1.061	$1,856,697	$47,252,503	**$1.10**
Middle	1.185	$5,168,599	$40,404,646	**$1.36**
North Wildwood	0.785	$4,681,427	$23,127,682	**$0.98**
Ocean City	0.676	$10,952,343	$51,581,794	**$0.86**
Sea Isle City	0.518	$1,577,100	$8,798,927	**$0.63**
Stone Harbor	0.529	$4,197,524	$18,485,202	**$0.68**
Upper	1.158	$2,523,428	$25,341,605	**$1.29**
West Cape May	0.945	$516,864	$4,481,405	**$0.21**
West Wildwood	1.452	$2,620,716	$2,653,601	**$117.16**
Wildwood City	1.657	$5,615,318	$29,696,346	**$2.04**
Wildwood Crest	1.373	$716,707	$14,127,269	**$1.45**

This table displays, for each municipality, the current tax rate, total tax revenue lost, the current tax revenue, and the new project tax rate. To estimate the new tax rate, it was assumed that each municipality would be expecting to bring in the same amount of revenue prier to SLR inundation. As shown in the tables, nearly all property value and tax revenue is lost in West Wildwood Borough.

Next was to determine the effect of each storm surge scenario with expected SLR. Since a tidal surge does not permanently destroy the land it inundates, lost tax revenue was not accounted for in these analysis. Also, even though inundation from a storm surge may not completely destroy property, 100 % property damage was assigned to the effected areas. Although this method may not yield the most actuate The first storm surge scenario was a thirty year flood plus a low estimate of SLR at 3.0 meters. In total, 88,029 parcels were inundated at a net property value of $32,566,503,807. The next scenario was a hundred year flood plus a low estimate of SLR at 3.5 meters. For this scenario, 93,977 parcels were inundated at a net property value of $33,994,785,107.

Finally, the last storm surge scenario was a hundred year flood plus a high estimate of sea level rise at 4.1 meters. This resulted in 100,607 parcel inundated at a net property value of $35,419,144,077.

With the data available to most thorough analysis was conducted. Although time constraints restricted a more in depth analysis, adequate and sufficient results were gained from this project. A current land use / land cover data set of the area would prove beneficial in identifying those areas that were developed between 2002 and 2009, that were not included in the analysis. With this marginally outdated data set, it would be assumed that both property and tax values have been marginally underestimated. Additionally, an analysis to determine the effects of SLR on other classified land uses may also prove beneficial.

6. Summary and Conclusions

Further considerations for this project may include determining the effect of SLR on other classified land uses. One interesting study may be to identify those areas of the highest value that will be affected by SLR. The value of an area could be determined on a variety of variables. For developed areas, this study could be used as a completed analysis. Ecological, historical, and critical areas could be each be assigned a unique value. A specific value for each area could then be waited against the next area, to identify regions that are of this highest importance to protect.

Through this analysis, it is important to consider what actions may take place to lessen the impact of sea level rise on Cape May County in the next 100 years. Even though SLR will be a gradual process, waiting to see what happens is a passive approach

to an imminent threat. The communities most proactive about the issue of SLR in the present will those that are the least effected in the future.

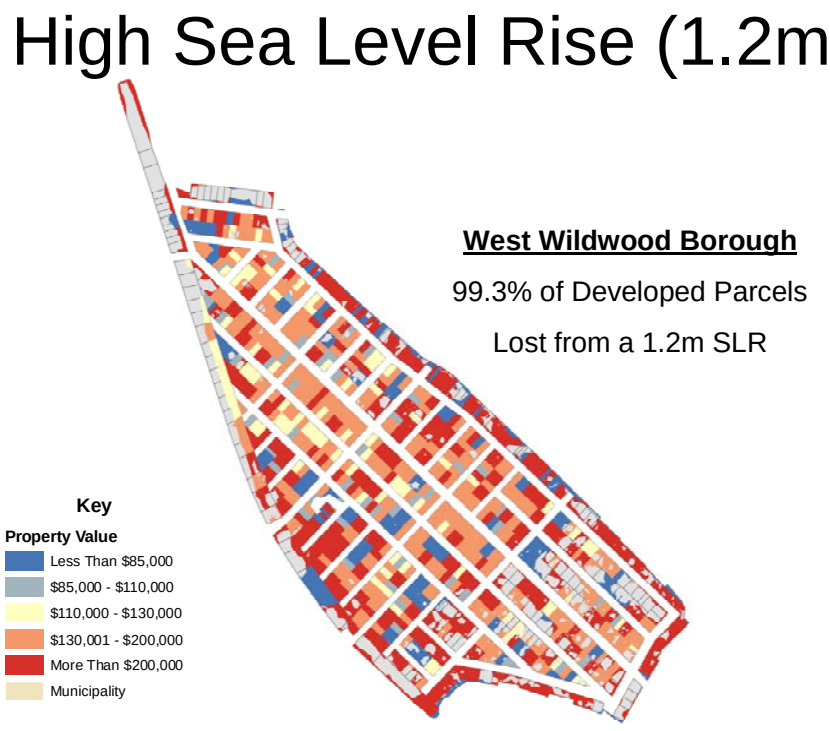

Figure 1. West Wildwood Borough (SLR 1.2m)

Sea Level Rise and Storm Surges

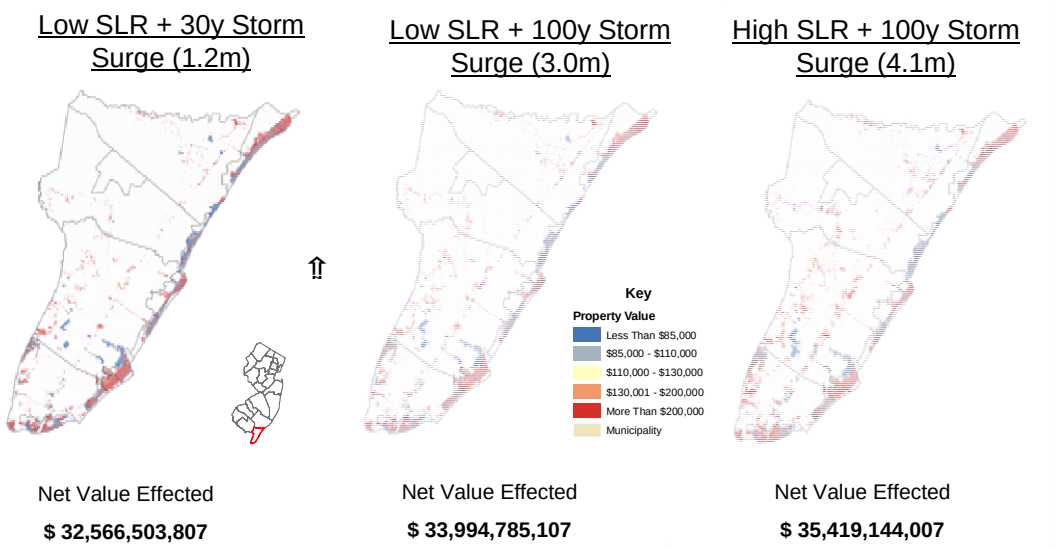

Figure 2. Storm Surge plus SLR

Works Cited

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