



Evaluating Economic Impacts due to Storm-based and Tidal Flooding in the Coastal Southeastern U.S.

REMI Users' Conference, Memphis, TN
October 12, 2022



Robert T. Carey, Ph.D.
Lecturer, Department of Political Science
Director, Regional Economic Analysis Laboratory

Dan Hitchcock, Ph.D., P.E.

Background

- Part of a grant from Sea Grant
 - Multi-state
 - Stetson University (Florida)
 - UGA (Georgia)
 - UNC Wilmington (North Carolina)
 - Clemson University (South Carolina – Go Tigers!)
 - Gray vs. green infrastructure



Background

- Part of a grant from Sea Grant
 - This analysis will examine impact of flooding
 - Periodic “nuisance” flooding
 - Used to project impact of long-term flooding from sea-level rise
 - Loss of residential property & prop. tax revenue
 - Loss of population (long-term)
 - Lost business sales
 - Tourism & Local business

Methodology

- Lost business sales
 - Survey of impacted businesses
 - Georgetown & Horry counties, SC
 - **New Hanover** & Craven counties, NC
 - Chatham County, GA
 - Input to REMI PI+*
 - Predicts total impact on jobs, compensation, and output
 - Additionally, residential & non-residential capital stock used to project loss in property tax revenue

* Methodology largely based on work done by Luis Nieves-Ruiz in Cape Canaveral, FL

Methodology

- REMI PI+ modeling engine
 - Dynamic (accounting for “spillover effects” between years)
 - Input-Output (IO) & Computable General Equilibrium (CGE) model
 - New Economic Geography (NEG) model
 - REMI uses historic data & trends to create a baseline (status quo) economic projection into the future
- Using v. 2.4.4



Methodology

- Focus here on New Hanover County, NC
- Identifying Businesses
 - Identify affected parcels containing businesses
 - Identified in county shapefile
 - Parcels at least 50% inundated considered unusable (businesses permanently closed)
 - Annual sales obtained from Data Axle/Infogroup
 - Input to REMI as decrease in output/sales

NewHanover

Save Forecast

Select Inputs

Inputs List

Forecast Options

Results

Start

Featured

Sales

Employment

Taxes

Population and Labor Supply

Custom and Detailed Variables
Government Spending

Variables

Favorites

☆

Full List

📖

Model List

Display a block diagram of structure. Clicking on an will show the policy variable area.


53 out of 141 policy variables active.

Saved


South Carolina Regions (BSC) - 7 Region 70 Sector Model


REGIONAL ECONOMIC ANALYSIS LABORATORY
REAL
CLEMSON


Business sales loss +1 & +2 MSL


 **Sales**


Name


 Variables

 Details

 Add to Editor

 Edit Values

 Scenario Info

 Cancel

Output

Options

Industry (Exogenous Production)

Industry (1)

Accommodation

Region (1)

New Hanover, NC

Units

2018 Fixed National \$ (Units)

Industry

Securities, commodity contracts, other investments; Funds, trusts, other

Insurance carriers and related activities

Real estate

Rental and leasing services; Lessors of nonfinancial intangible assets

Professional, scientific, and technical services

Management of companies and enterprises

Administrative and support services

Waste management and remediation services

Educational services; private

Ambulatory health care services

Hospitals; private

Nursing and residential care facilities

Social assistance

Performing arts, spectator sports, and related industries

Museums, historical sites, and similar institutions

Amusement, gambling, and recreation industries

Accommodation


Food services and drinking places


Repair and maintenance


Personal and laundry services


Religious, grantmaking, civic, professional, and similar organizations

Private households

 Favorites

 Industry Aggregation

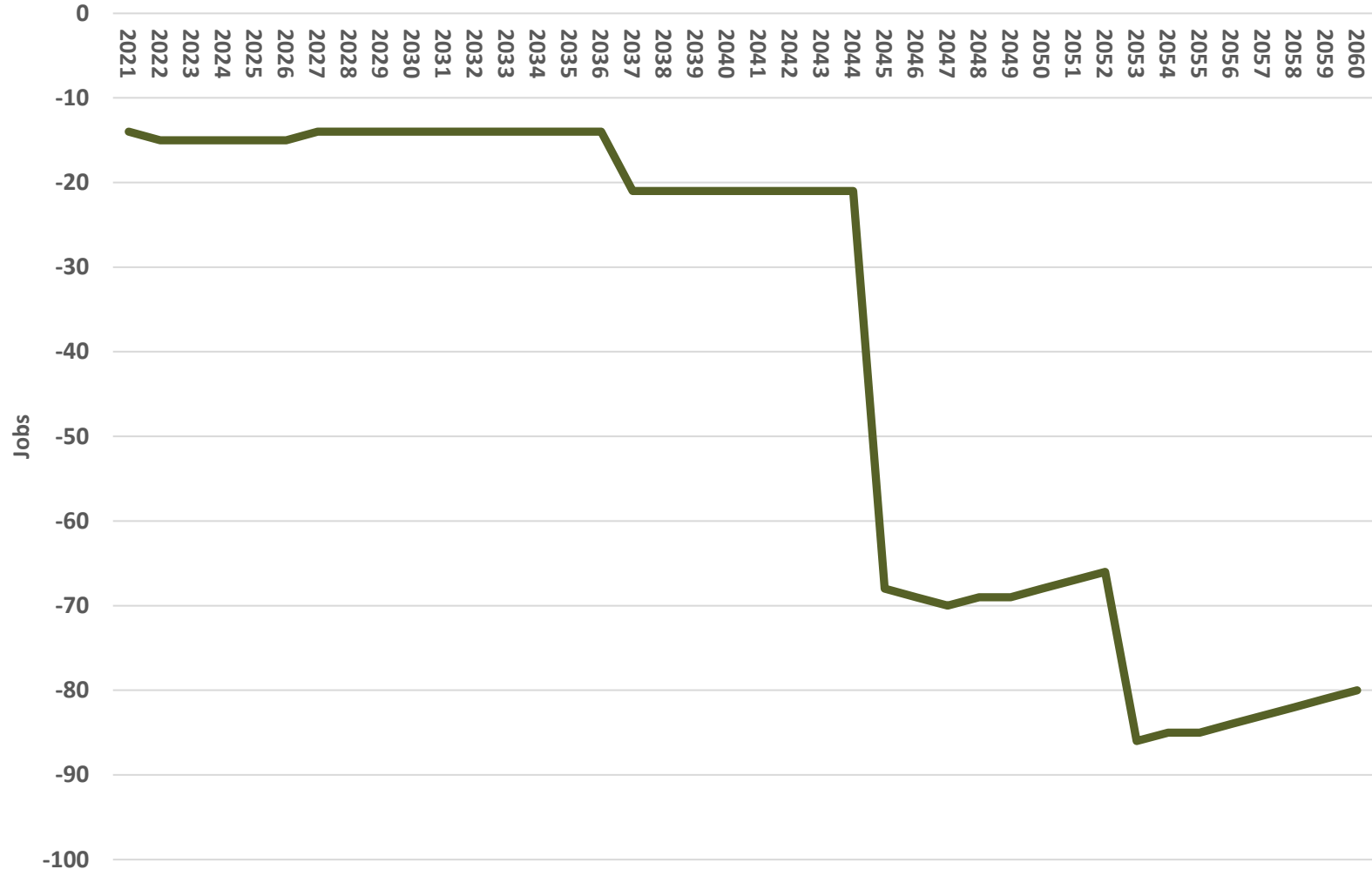
 List

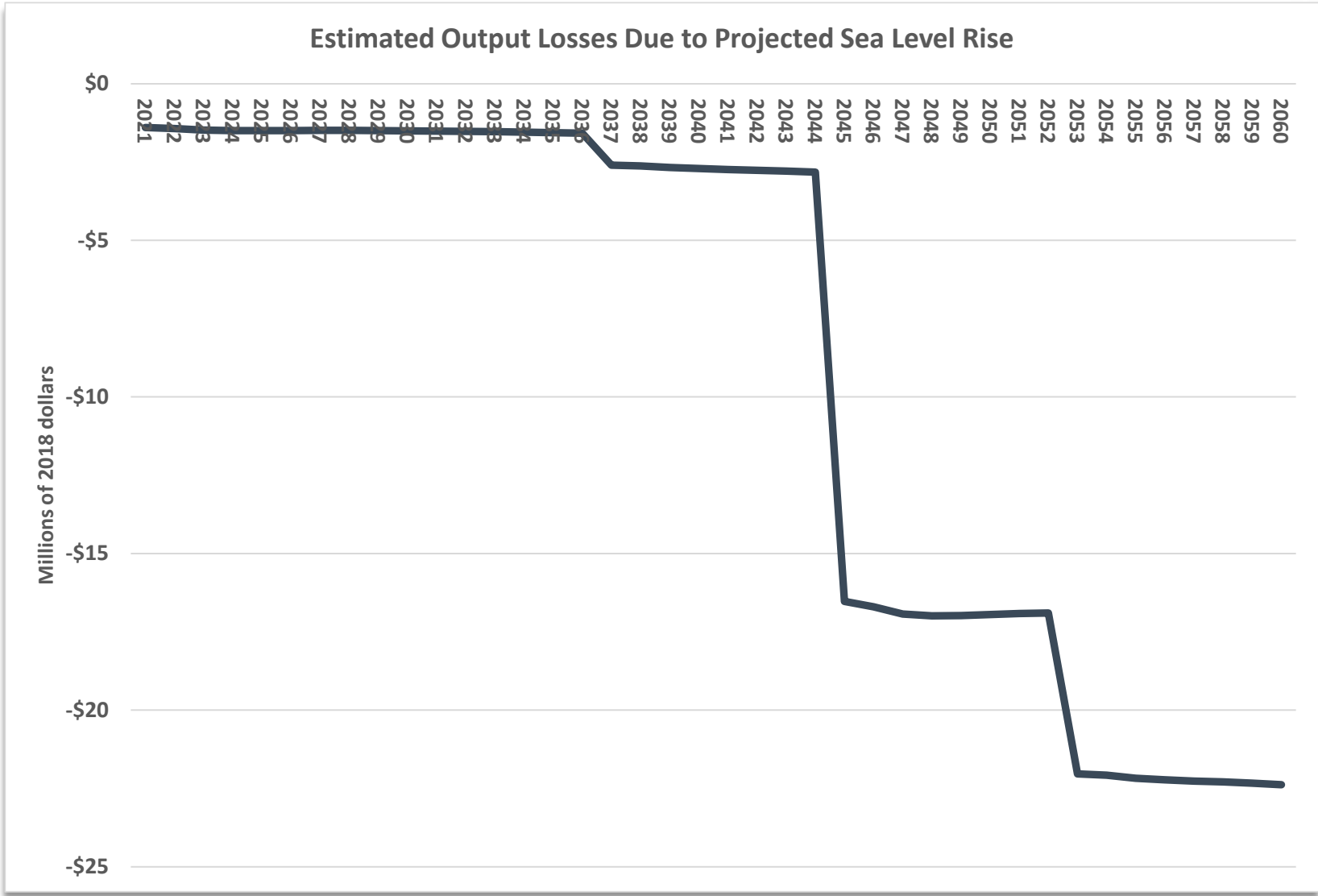
 Hierarchy

☐ Group Industries

REGIONAL ECONOMIC ANALYSIS LABORATORY
REAL
CLEMSON

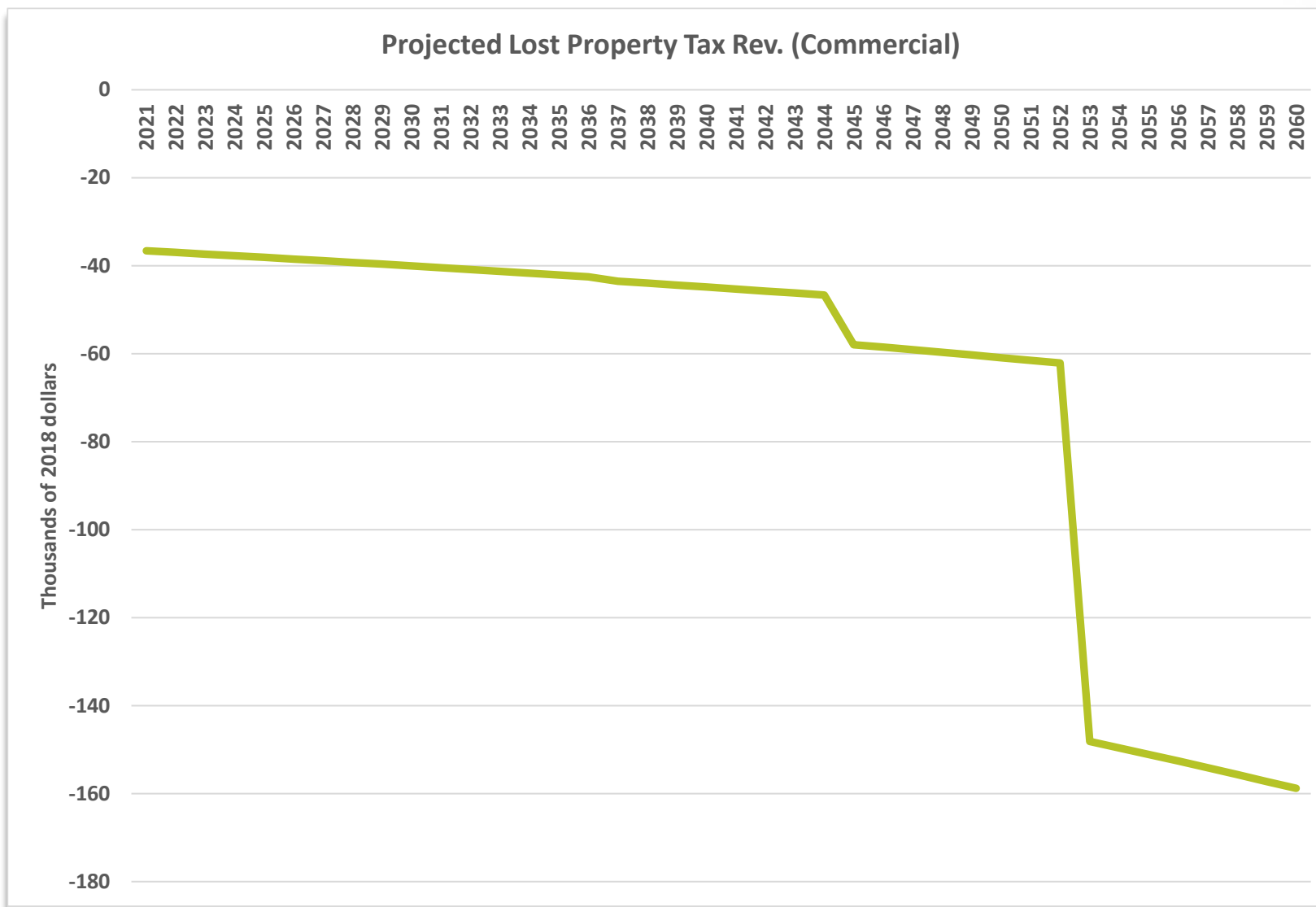
Estimated Employment Losses Due to Projected Sea Level Rise

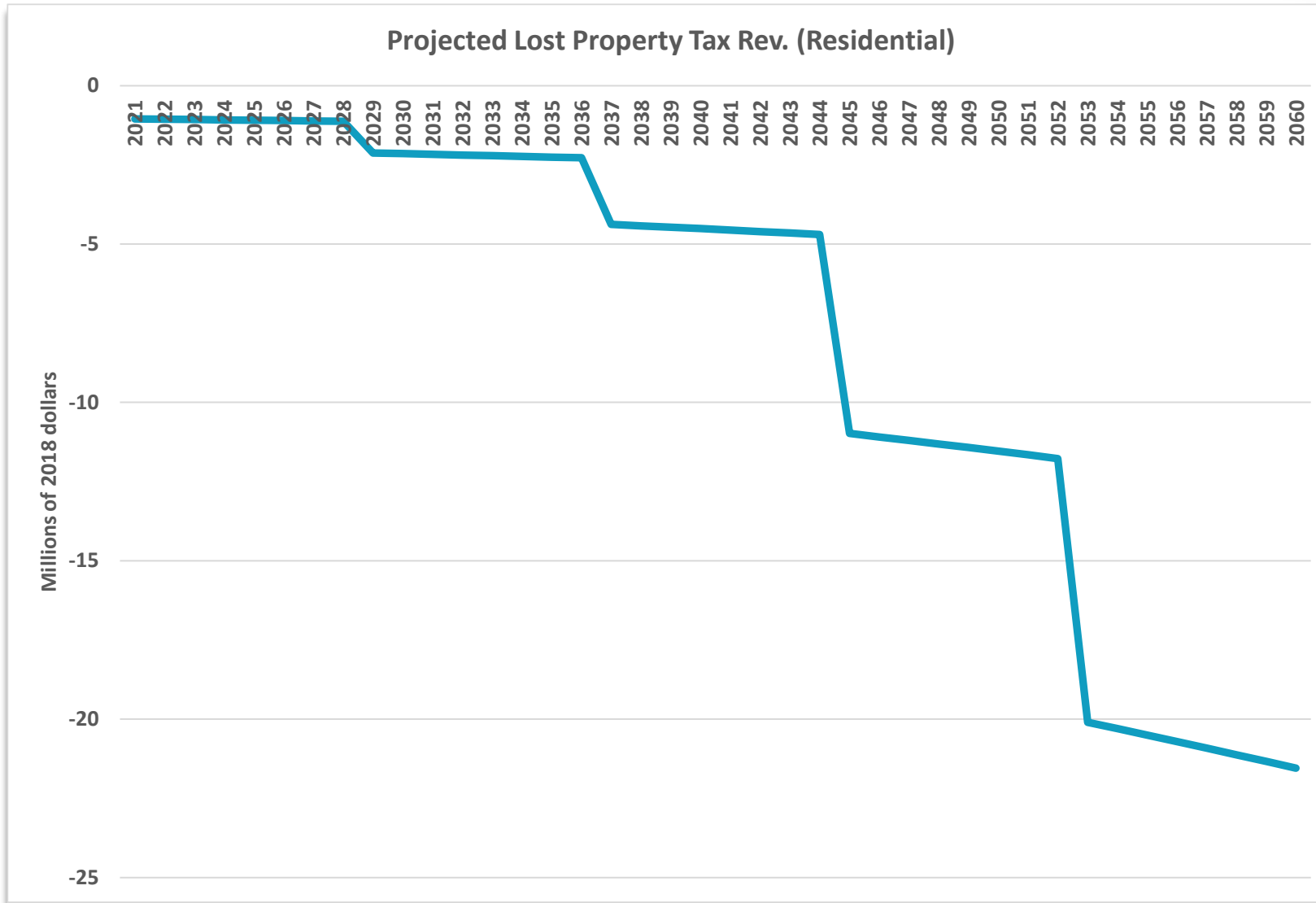




Methodology

- Residential & Commercial Property Taxes Lost
 - Property at least 50% inundated (lost/no taxable value)
 - Based on property value reported in county assessor file
 - Property tax calculated directly





Methodology

- Population Losses
 - Single/multi-family residential parcels inundated (50%+)
 - Assume 2.29 persons/household (Census)
 - Population decrease input to REMI (all ages)



Migration

Name



Variables



Details



Add to Editor



Edit Values

1



Scenario Info



Cancel

Economic Migration

Region (1)

New Hanover, NC

Units

Units

Race

Grouped All

Gender

Grouped All

Age

Grouped All

Region

Georgetown, SC
Horry, SC
Charleston, SC
Berkeley, SC
Chatham, GA
New Hanover, NC
Craven, NC

☐ Group Regions



Favorites



Region
Aggregation

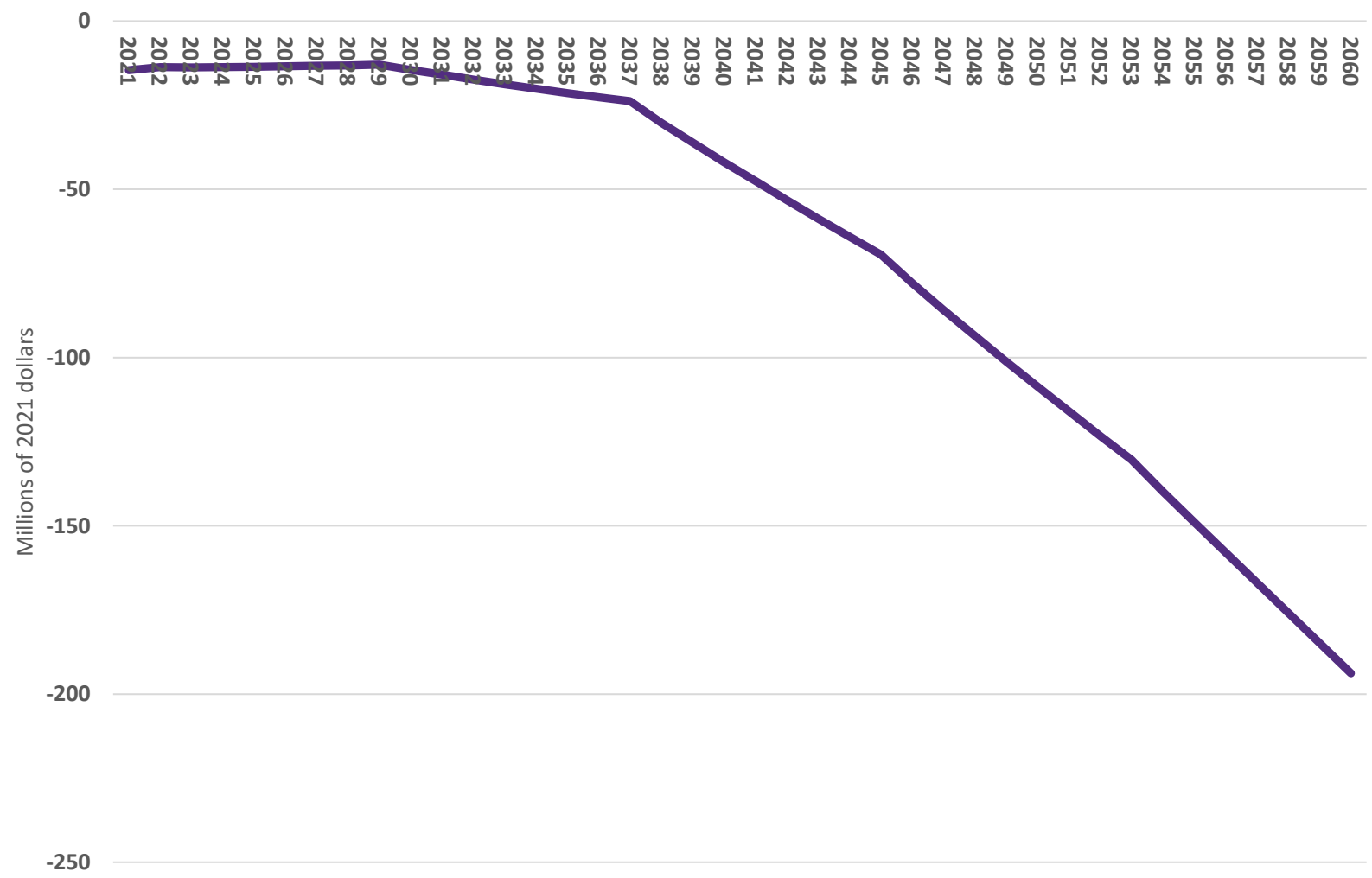


List



Hierarchy

Estimated Impact on Output from Lost Population



Nuisance Flooding Survey

Next stage: Nuisance flooding

- Georgetown County, SC
- Will survey businesses on lost business due to nuisance flooding
- Will perform lost sales analysis

Nuisance Flooding Survey Questions

1. How long have you been running your business in this area?
2. Do you observe any impact on your business from flood events?
3. How do you cope with the impact of flooding?
 - a. Structural coping mechanisms (e.g. sandbags)
 - b. Non-structural coping mechanisms (e.g. flood insurance)
4. Think about the “average” flooding event in your area. What is your best estimate of how much this would impact your sales or business income per day while the flooding was taking place (dollar amount)?
5. About how many days’ worth of business per year do you think you have lost due to flooding in recent years?
6. Which of the following product/service best describes your business?
(Select NAICS category)



The Clemson University Regional Economic Analysis Laboratory (CU-REAL) conducts public policy and economic and fiscal impact analysis for public, private, and non-profit sector clients. CU-REAL is a unit of the Department of Political Science, College of Behavioral, Social & Health Sciences.



Email: carey2@clemson.edu
Web: cu-real.com
Twitter: [@ClemsonREAL](https://twitter.com/ClemsonREAL)