

# Cross-Sectoral Economic Impact Analysis of Climate Change in New York State

## Executive Summary

Final Report | Report Number 26-19 | August 2026



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New York State Energy Research  
and Development Authority

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# **Cross-Sectoral Economic Impact Analysis of Climate Change in New York State**

## **Executive Summary**

*Final Report*

Prepared for:

**New York State Energy Research and Development Authority**

Albany, NY

Amanda Stevens  
Senior Project Manager

Prepared by:

**INDUSTRIAL ECONOMICS, INC.**

Cambridge, MA

James Neumann, Principal

Jason Price, Principal  
Brent Boehlert, Principal

## Notice

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## Abstract

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This executive summary is part of a report that projects the economic impacts of climate change in New York State across eight sectors through 2100 under multiple climate, socioeconomic, and adaptation scenarios. The research team identified and applied existing literature and models to quantify or qualitatively assess climate-related impact categories, using standardized climate and socioeconomic inputs. The analysis used downscaled Coupled Model Intercomparison Project Phase 6 (CMIP6) climate data and gross domestic product (GDP) population projections to estimate sector-specific impacts under shared socioeconomic pathway (SSP)2-4.5 and SSP5-8.5 emissions scenarios. While the estimates reflect current best practices and modeling capabilities, limitations such as data availability, missing feedback loops, and gaps in demographic sensitivity likely lead to underestimation of total impacts.

## Keywords

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climate change, impacts, economics, economic impacts, projections, scenarios, adaptation, socioeconomic

# Acknowledgements

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Core Contributors from each organization included:

## **NYSERDA**

Jeremy Magliaro  
Nick Patane  
Amanda Stevens

## **IEc**

Sydney Austin  
Brent Boehlert  
Diego Castillo  
Derek Ernschender  
Charles Fant  
Lena Flannery  
Hayley Kunkle  
Will Maddock  
James Neumann  
Jason Price  
Claire Spector  
Janusz Strzepek  
Kenneth Strzepek  
Laura Taylor  
Jacqueline Willwerth

## **Resilient Analytics**

Paul Chinowsky  
Jacob Helman

## **Independent Consultants**

Michael Craig  
Cameron Wobus

## **E3**

Sharad Bharadwaj  
Alexandra Gonzalez  
Charles Gulian  
Pedro de Vasconcellos Oporto  
Kevin Steinberger  
Vignesh Venugopal  
Bill Wheatle

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## Acronyms and Abbreviations

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|             |                                                         |
|-------------|---------------------------------------------------------|
| Climate Act | Climate Leadership and Community Protection Act of 2019 |
| CMIP        | Coupled Model Intercomparison Project                   |
| E3          | Energy and Environmental Economics                      |
| GHG         | greenhouse gas                                          |
| IEc         | Industrial Economics                                    |
| IPCC        | Intergovernmental Panel on Climate Change               |
| NYSCIA      | New York State Climate Impacts Assessment               |
| SSP         | Shared Socioeconomic Pathway                            |

## About This Report

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This report presents the results of an analysis of the potential economic impacts of climate change on sectors across New York State. This quantitative analysis complements the broader New York State Climate Impacts Assessment (NYSCIA). Where possible, the analysis used the climate projections developed for the assessment and is organized according to its sectors and sector definitions. Although this report does not make policy recommendations, it provides estimates of the potential future economic cost of climate change in New York State, which may be useful in informing and prioritizing both mitigation and adaptation decisions and strategies.

Each sectoral analysis used consistent inputs for future socioeconomic and climate projections to enable comparison of sectoral impacts across time and space. In limited cases, the role of adaptation was modeled to explore the potential for risk reduction and to quantify the costs and benefits associated with adaptation actions, providing a sense of the cost of not adapting to climate change versus the cost of adapting.

The methods used in this work reflect the application of approaches that have been individually peer-reviewed in the scientific literature. The research studies underlying the modeling and results presented herein are cited throughout this report. In addition, the report and the estimates presented have been peer-reviewed by two independent experts, whose feedback has been incorporated as best as possible within the scope of this project.

The Executive Summary follows this brief introduction. The report itself consists of 11 chapters. Chapter 1 provides a summary of the overall methodology, with a focus on the study framework and inputs, including climate change scenarios, socioeconomic inputs to the impact models, and assumptions about adaptation to climate change. This Chapter also includes a summary of overall uncertainties and limitations. Chapters 2 through 9 provide detailed sector- and impact-specific quantitative and qualitative results for each of the 8 sectors analyzed. Each of these chapters includes a summary section, simple descriptions of each impact quantified or assessed qualitatively, summary methodologies, and detailed results, as well as limitations of the approaches applied. Chapter 10 provides summaries of impacts for each of the 12 New York State climate regions established for the NYSCIA. Chapter 11 provides a short conclusion, including a review of key results and insights from the report, and suggestions for further research. Technical appendices provide additional detail on climate data processing (Appendix A) and selected components of the methods and results (Appendix B). Appendix C uses the quantitative impact modeling results from the sectoral analyses to estimate the potential for fiscal impacts to the New York State government, either through impacts on expenditures for existing government programs, or changes in tax and other revenue. (Note that these should not be assumed to be official calculations by the New York State government. This type of fiscal impact analysis is less developed in the climate impacts literature and so is included as an appendix rather than as part of the main economic analysis.)

## Interpreting the Results

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This report presents results from a large set of sectoral impact models and impact estimation approaches adapted to quantify and monetize projected climate change impacts specific to New York State. The analyses are based on two future climate scenarios (Shared Socioeconomic Pathways, or SSPs) to illustrate potential impacts and damages associated with both a “medium” (SSP2-4.5) and “high” (SSP5-8.5) trajectory of future global greenhouse gas (GHG) emissions. The projections methodology report for the NYSCIA provides a detailed rationale for why this study used SSP2-4.5 and SSP5-8.5. Among other factors, the methodology report notes that even if GHG emissions are likely to be lower than the SSP5-8.5 trajectory, considering this high-emissions scenario can help to capture the broad range of potential climate impacts, including high-consequence impacts that are critical for risk management.

Importantly, the next climate scenarios to be used by the Intergovernmental Panel on Climate Change (IPCC) no longer consider SSP5-8.5 as a plausible emissions scenario for the twenty-first century, based on current policy and technology adoption. However, the scientific community has yet to reach consensus on the potential magnitude of climate impacts from the more plausible, lower-emissions scenarios to be used in upcoming IPCC work. Recent scientific evidence indicates that the severity of physical impacts from climate change is on the higher end of previous estimates. As such, SSP5-8.5 currently serves as a useful scenario to consider potential high-end physical risks from climate change.

This report is intended to provide insights about the potential direction and magnitude of economic impacts from climate change to New York State. None of the estimates presented in this report should be interpreted as definitive predictions of future impacts at a particular place or time. Instead, the intention is to produce preliminary estimates of potential future impacts using the best available data and methods, which can then be revisited and updated over time as science and modeling capabilities continue to advance. For example, the topics identified for future research in chapter 11 have the potential to provide new and useful insights to understand a still broader range of economic impacts of climate change on New York State than can currently be conducted.

The economic analyses generally assume a “reactive response” scenario in which costs associated with a climate impact increase as those impacts increase but response practices generally remain the same and continue to be based on historical climate conditions, rather than incorporating future climate change. Three sectors (buildings, energy, and transportation) include analysis of some proactive adaptation measures that account for future climate conditions, which are noted in the relevant sections of those chapters. For the other sectors, the impact of proactive adaptation measures on reducing the economic costs of climate change could not be quantified.

This report does not incorporate or assess the impacts of specific climate mitigation or adaptation policies in New York State—such as the State’s Climate Leadership and Community Protection Act of 2019 (Climate Act)—or other domestic or international climate policies. The results should not be interpreted as supporting any particular State, national, or global mitigation policy or target. In addition, the costs of reducing GHG emissions, and the health benefits associated with co-reductions in other air pollutants, are well-examined elsewhere in the literature and are beyond the scope of this report. For this reason, the analysis presented in this report does not constitute a cost-benefit assessment of climate policy.

As explained in the Executive Summary, this report provides a multi-sectoral, multi-impact estimate of the potential economic impacts of climate change. However, owing to data and methods limitations, this economic analysis quantifies just a fraction of the potential risks and damages that may be avoided or reduced when estimating future climate impacts. For a comprehensive review of projected climate impacts in New York State, we encourage readers to access the detailed climate projections, in-depth technical chapters, summary information, and case studies available from [the NYSCIA](#).

# Executive Summary

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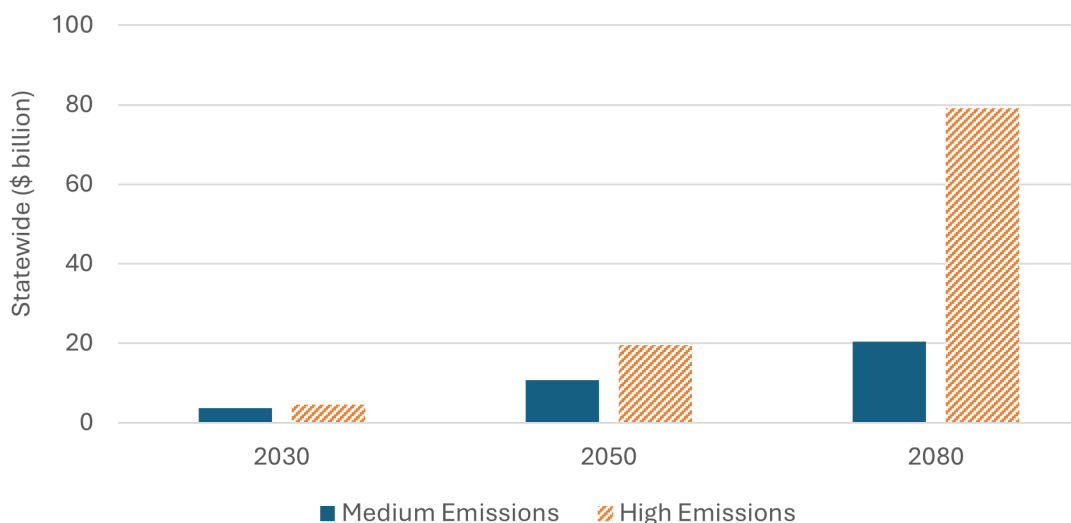
This report quantifies potential physical and economic damages to multiple New York sectors, at the State level and within New York State regions, using a consistent set of climate and socioeconomic scenarios and assumptions. This Executive Summary provides a high-level overview of the findings of the economic impact analysis in this report.

The overall scope of quantified impacts includes 20 impact categories, across eight sectors. The study also documents qualitative economic impacts for more than 30 additional impact categories, for which detailed modeling was not possible. Importantly, while this analysis shows that annual impact estimates in aggregate, across all of New York State, could grow to several tens of billions of dollars annually in the midcentury (2050s) unless proactive adaptation measures are undertaken, only a portion of the impacts of climate change are estimated.

Looking across the large number of sectoral impacts described in this report, several key findings emerge:

**By the late century, economic damages in New York State from climate change could approach \$20 billion to \$80 billion per year without proactive adaptation.** Damages are projected to increase over time as the impacts from climate change also increase. In the midcentury, damages could range from about \$10 billion annually under a medium-emissions scenario to \$20 billion annually under a high-emissions scenario. By the end of the century, damages could range from \$20 billion annually under a medium-emissions scenario to \$80 billion annually under a high-emissions scenario. Across all sectors, projected economic damages are four times larger under the high-emissions scenario than under the medium-emissions scenario by late century. These damages are likely underestimates, given modeling limitations. Limiting atmospheric GHG concentrations under the medium-emissions scenario, as well as undertaking proactive climate adaptation measures, would substantially reduce potential economic damages associated with climate change.

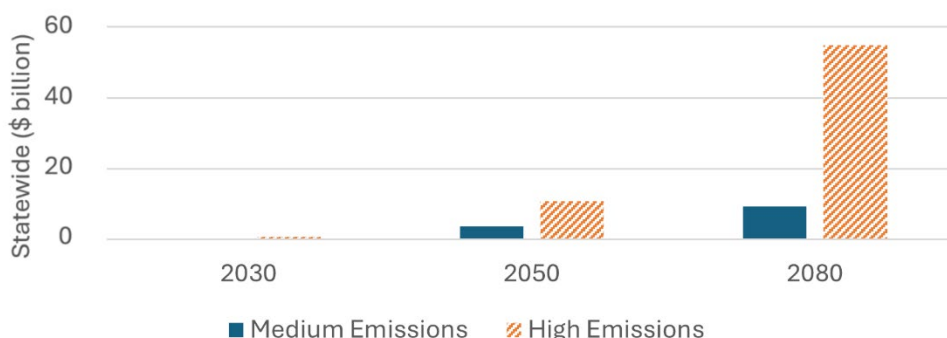
**Figure ES-1. Annual Economic Damages from Climate Change in New York State across All Sectors**



**Health- and labor-related economic impacts from extreme heat could reach into the tens of billions of dollars annually by late century without proactive adaptation measures.** Climate change is projected to increase the frequency, intensity, and duration of extreme temperature events, resulting in a variety of health and labor impacts, including an increase in heat-related deaths and respiratory hospitalizations and a potential reduction in the amount of time weather-exposed workers can work across New York State. Several adaptation actions are available to help reduce the health- and labor-related impacts of climate change, such as increased adoption of air conditioning, expanded use of cooling centers, and increased tree cover and green infrastructure in urban areas. While the economic benefits associated with those adaptation measures could not be modeled for this study, their potential to reduce health- and labor-related damages could be significant and are recommended for further analysis.

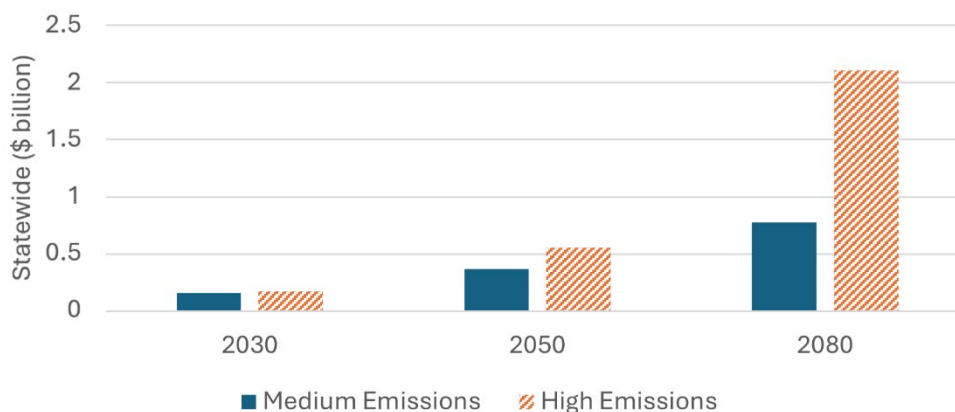
**Figure ES-2. Annual Economic Impacts on Health Due to Changes in Extreme Temperature**

The economic impacts related to premature deaths and respiratory hospitalizations due to extreme heat may be significant, particularly under a high emissions scenario.



**Figure ES-3. Annual Economic Impacts Associated with Labor Loss Due to Climate Change**

The effects of extreme heat on labor loss are almost three times greater under the high emissions scenario than under the medium emissions scenario.

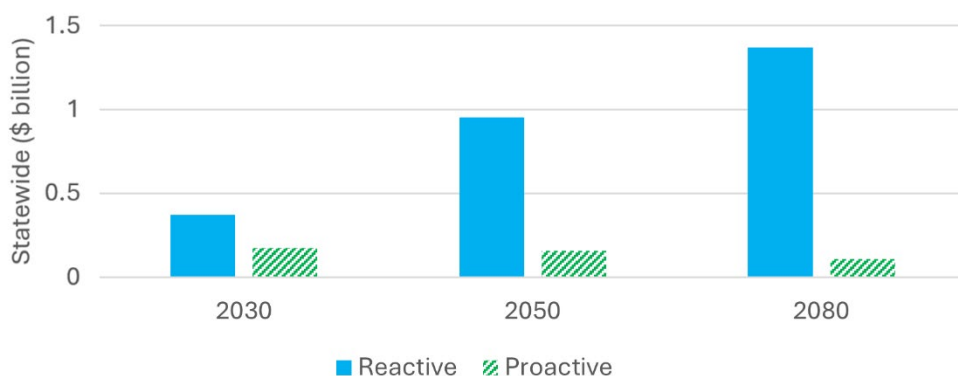


**Forward-looking adaptation actions have the potential to substantially reduce the economic damages of climate change, even under the medium emissions scenario.** Proactive adaptation measures implemented in anticipation of future climate change risks are generally more cost-effective in reducing damages than reactive responses implemented after impacts have already occurred. For many sectors, such as transportation, adaptation strategies could eliminate a large portion of the economic impacts that are otherwise projected to occur this century. For example, modeling performed in this study identified up to \$6 billion in annual avoided damages to State roadways and railways by late century from

proactive adaptation investments to make that infrastructure more resilient to rising temperatures, heavy precipitation, and flooding. Likewise, modeling performed on the electric transmission and distribution system identified the potential to reduce economic impacts by up to 70% by late century from upgrading infrastructure to be resilient and protective against future climate conditions.

**Figure ES-4. Annual Economic Impacts on Roadway Infrastructure under Medium Emissions Scenario**

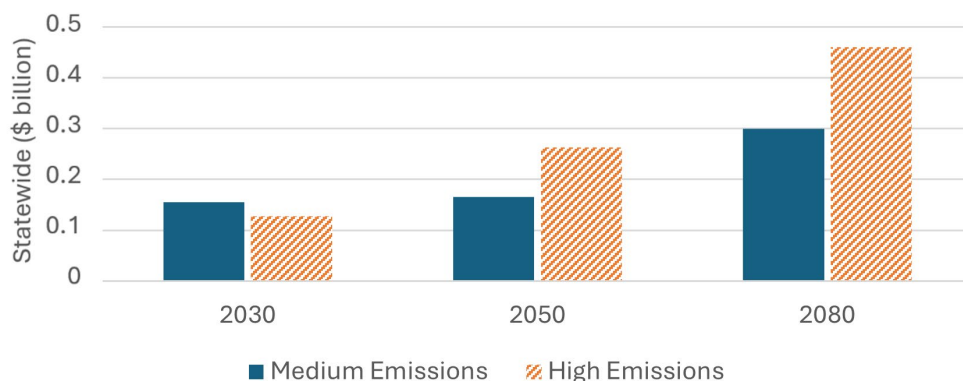
Proactive adaptation to make roads more resilient to rising temperatures and increasing heavy precipitation could significantly reduce the economic impacts, even under the medium emissions scenario.



**Significant investments in flood mitigation and urban drainage systems will be needed to address impacts associated with increased precipitation and riverine flooding.** Climate change is projected to lead to more frequent and severe storms, resulting in more riverine flooding and impacts to water resources and water systems throughout the State. For example, structural damage to buildings from riverine floods could exceed \$300 million annually by late century without proactive adaptation measures such as floodproofing or relocation. Urban areas across New York State also face increased costs to upgrade urban drainage infrastructure to handle increased precipitation; costs that could exceed \$700 million annually by late century. Increases in water turbidity, driven by changes in temperature and precipitation, may also impact ecological productivity and increase water treatment costs. However, those impacts could not be quantified in this study.

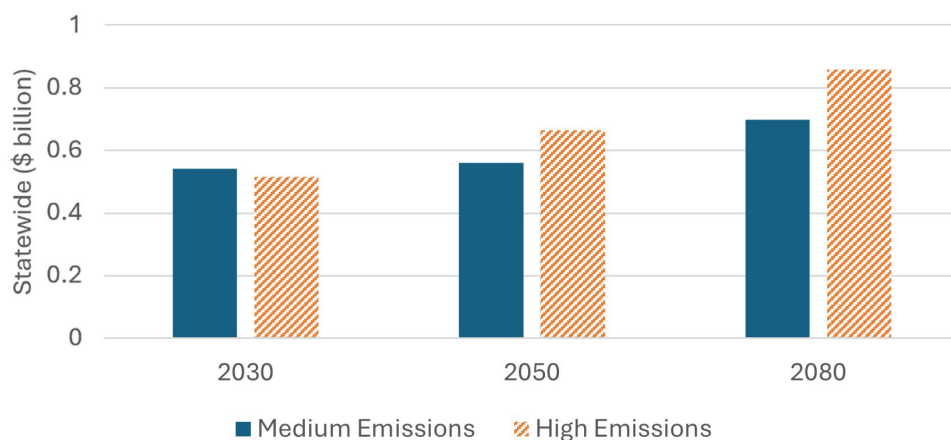
**Figure ES-5. Annual Economic Impacts Associated with Riverine Flooding on Structures Due to Climate Change**

Riverine floods are projected to increase in frequency and magnitude with climate change, resulting in structural damage and economic costs across New York State.



**Figure ES-6. Annual Economic Impacts Associated with Urban Drainage Investment Due to Climate Change**

The costs to upgrade urban drainage systems to handle more frequent storms and heavy precipitation will be significant under both emissions scenarios.

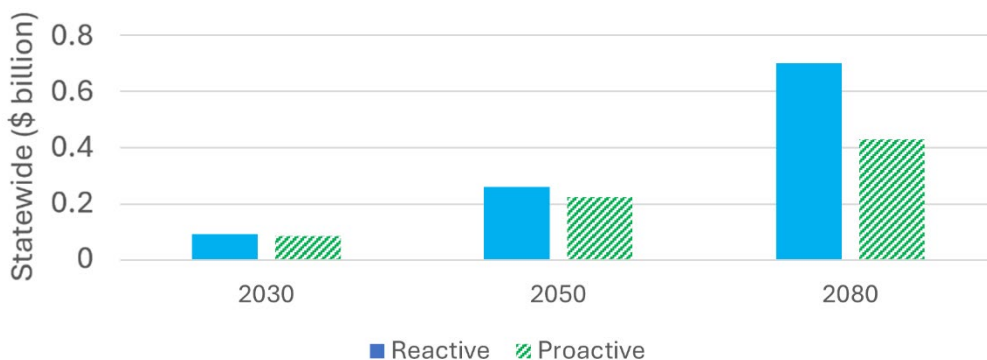


**Damages to buildings and property from sea-level rise are projected to be significant, with Long Island experiencing the highest regional economic impacts.** Sea-level rise and storm surge can damage buildings and property along the coast, leading to economic impacts associated with property damage, loss, and repairs. Average annual economic impacts to the buildings sector could exceed \$400 million annually by late century, even with increased deployment of cost-effective protection measures such

as sea walls or bulkheads. Sea-level rise may also promote saltwater intrusion into coastal aquifers, potentially reducing the supply of freshwater resources for municipal and industrial uses and economic development. While more quantified analysis is needed, impacts to port and small harbor infrastructure could likely be significant, potentially in the billions of dollars.

**Figure ES-7. Annual Economic Impacts of Sea-level Rise on Coastal Properties under High Emissions Scenario (SSP5-8.5)**

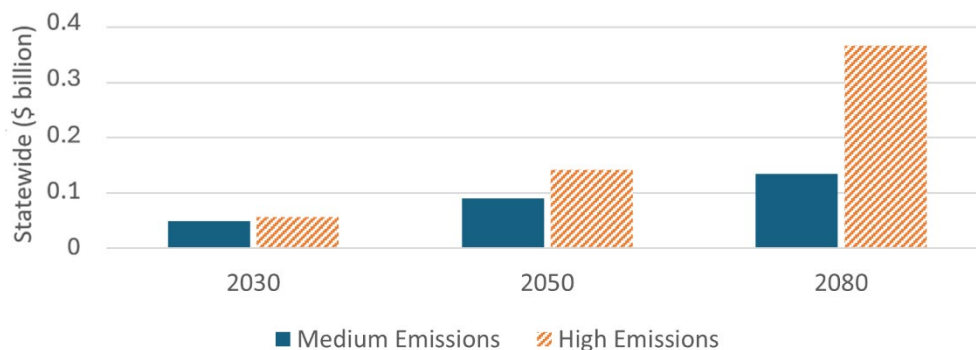
Damage to buildings from sea-level rise and storm surge could be hundreds of millions of dollars per year, although proactive adaptation could reduce these damages.



**Increasing temperatures will present both economic challenges and opportunities to the agricultural sector.** Milk production may experience substantial losses by late century without further investment in heat abatement strategies to reduce heat stress on the State’s dairy cows. Impacts to field crops may be mixed, however, with productivity increases in hay estimated to more than offset productivity declines in other crops, such as corn and potatoes. Apple crops and maple syrup production are likely to be negatively affected, but more research is needed to better value these impacts.

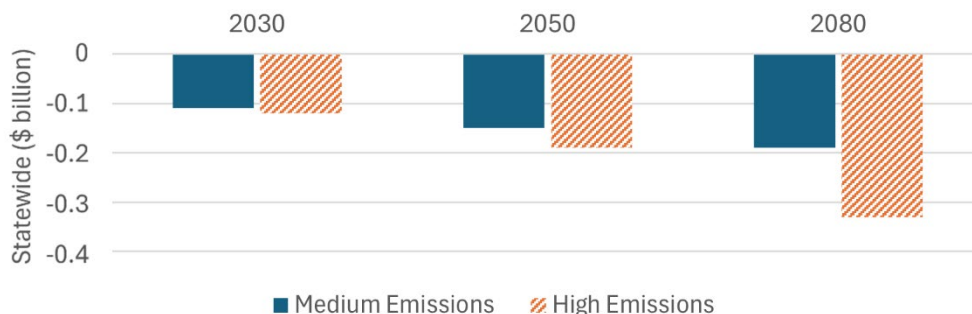
**Figure ES-8. Annual Economic Impacts Associated with Milk Production Loss Due to Climate Change**

Milk production may experience substantial losses by the late century without further investment in heat abatement strategies to reduce heat stress on dairy cows.



**Figure ES-9. Annual Economic Impacts to Hay Production Due to Climate Change**

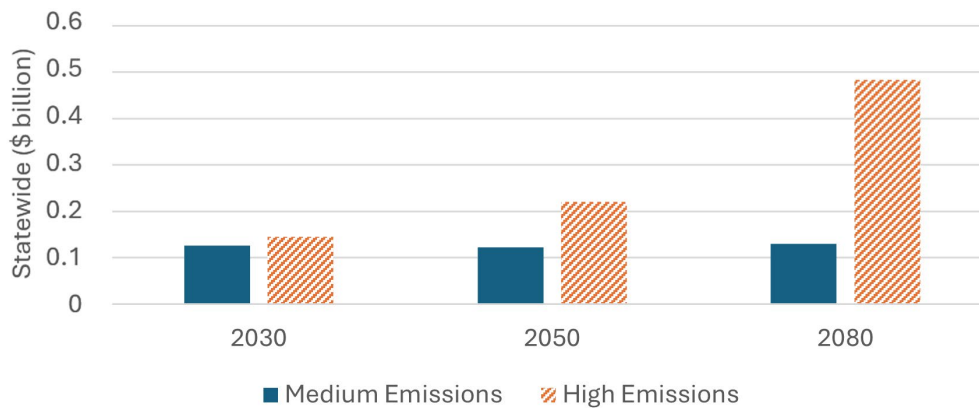
Hay, the most widely farmed and most economically valuable field crop in New York State, is projected to experience increasing yields (shown in the figure as a “negative loss”). These production increases associated with hay are larger than the total decreases of all other crops modeled. (A “negative loss” represents a benefit to production.)



**Increasing temperatures will have negative economic impacts on winter recreation and some natural resource sectors, while other outdoor recreation may benefit.** Recreational freshwater fishing may lose economic value as water temperatures rise and become less suitable habitats for coldwater fish species like trout. Shortened winter seasons over the course of the century may significantly impact the economically and regionally important ski industry. Changes in temperature and precipitation are expected to reduce the value of ecosystem services provided by healthy forests, including air and water filtration, and carbon sequestration. However, longer spring and fall seasons are generally expected to increase the number of outdoor recreation trips, thus benefiting non-winter and water-based outdoor recreation.

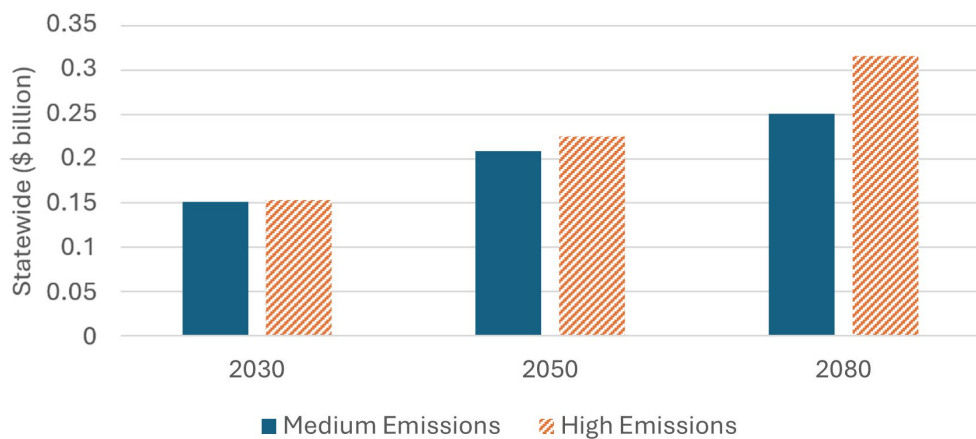
**Figure ES-10. Annual Economic Impacts Associated with Recreational Freshwater Fishing Loss Due to Climate Change**

Recreational freshwater fishing is projected to lose economic value as water temperatures rise and become less suitable habitats for coldwater fish species.



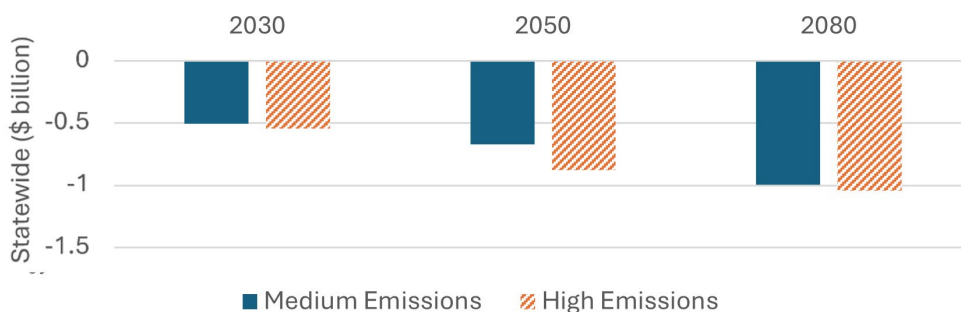
**Figure ES-11. Annual Economic Impacts Associated with Winter Recreation Loss Due to Climate Change**

Increasing temperatures are expected to drastically shorten the ski and snowmobile season, leading to reduced visits for winter recreation and a significant loss of revenue in this sector.



**Figure ES-12. Annual Economic Impacts Associated with Other, Non-Winter Outdoor Recreation Loss Due to Climate Change**

Climate change is generally expected to economically benefit outdoor recreation such as water sports, biking, and hiking, as weather may be more amenable to these activities, shown in the figure as a “negative loss,” which represents a benefit to recreation.



This study was designed to quantify the projected economic impacts of climate change on New York State’s people, environment, and assets. The results show that the impacts will be significant in all sectors without proactive adaptation. The economic impacts are projected to increase over time with climate change and are larger under a higher-emissions scenario than under a medium emissions scenario. Where it was able to be modeled, the study shows that proactive adaptation can significantly reduce the economic impacts of climate change.

Not all economic impacts or adaptation measures could be modeled in this study due to data or methodology limitations. For example, improving modeling methods, quantifying the impacts on vulnerable populations, and more advanced adaptation analysis are recommendations identified in the study. Filling these gaps is a key area for future research.



NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

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**New York State  
Energy Research and  
Development Authority**

17 Columbia Circle  
Albany, NY 12203-6399

**toll free:** 866-NYSERDA  
**local:** 518-862-1090  
**fax:** 518-862-1091

[info@nyserda.ny.gov](mailto:info@nyserda.ny.gov)  
[nyserda.ny.gov](http://nyserda.ny.gov)



**NYSERDA**  
New York State Energy Research  
and Development Authority

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