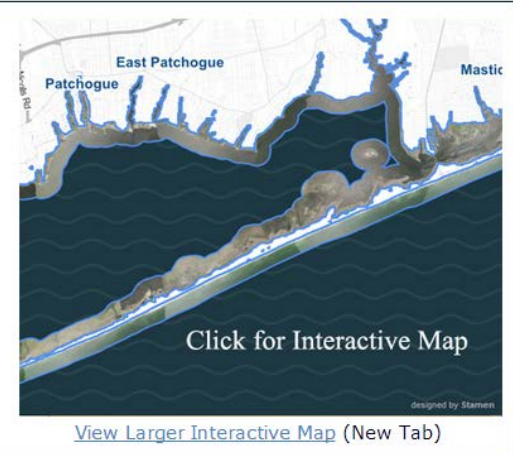
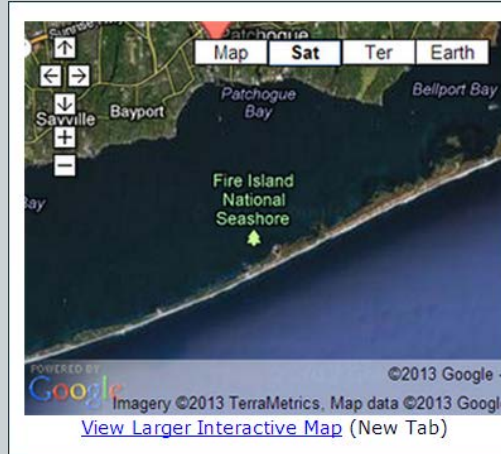




Maryland and Delaware Climate Change
Education Assessment and Research



Helping Students Improve Their Conceptions of Climate Change: A Learning Progression for Sea Level Rise

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www.ClimateEdResearch.org

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Regional Observations of Climate Change in the U.S.

Northeast (Includes DE and MD)

Heat waves, coastal flooding due to sea level rise and storm surge, and river flooding due to more extreme precipitation events are affecting communities in the region.

Midwest

Longer growing seasons and rising carbon dioxide levels are increasing yields of some crops, although these benefits have already been offset in some instances by occurrence of extreme events such as heat waves, droughts, and floods.

Southwest

Drought and increased warming have fostered wildfires and increased competition for scarce water resources for people and ecosystems.

Coasts

Coastal lifelines, such as water supply infrastructure and evacuation routes, are increasingly vulnerable to higher sea levels and storm surges, inland flooding, and other climate-related changes.

Source: National Climate Assessment Draft, Table 1.1 (2013) <http://ncadac.globalchange.gov>



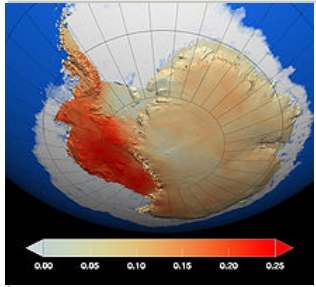
Thirteen Agencies, One Vision: Empower the Nation with Global Change Science

Learning to Ride a Bike:

What Does a Learner Need to Understand to Keep Progressing?

More sophisticated understanding over time.





Activity: Sea Level Rise in the NGSS

Using the *Climate Change in the Next Generation Science Standards* document in your Academy documents folder:

- Identify the *proximal* and *distal* performance standards related to sea level rise.
- Attempt to organize the standards into a loose progression on Sea Level Rise.
- Note standards that relate to your own teaching context.



Two Dimensions of the SLR Hypothetical Learning Progression

1. Measuring and Modeling Causes and Effects of SLR
2. Human Causes, Effects, and Mitigation of SLR

Each dimension has 5 levels (0-4)

Note: The current SLR draft is completely made up of NGSS performance expectations.

Activity: Online Sea Level Rise Module



A research tool designed to study learners' understanding of SLR and related pedagogy.

- Based on the SLR learning progression presented earlier.
- Includes connections to NGSS throughout module.
- Provides an example of an instructional strategy using learning progressions, the NGSS, and technology.

Online SLR Module

Climate Change Learning Sciences Research
at the University of Maryland

Home Publications

Projecting Sea Level Rise

Now that you have an idea of how much sea level might rise, let's take a look at what this means for Fire Island National Seashore.

Step 3. Use the two interactive maps below to **create a concept map** predicting the impact of sea level rise, a local effect of climate change, on Fire Island National Seashore and surrounding areas (including the Patchogue Bay area). Think about how the impact will affect 1. *human safety*, 2. *economic activity*, and 3. *ecosystems*. Some things to consider are:

- Increased storm damage and inland flooding.
- Economic impacts (tourism, fisheries, property loss).
- Damage and possibly loss of coastal ecosystems.
- Salt water intrusion into aquifers and surface waters.
- Increased erosion of shorelines and beaches.
- Loss or decreased agricultural production.

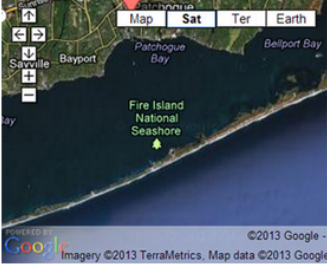
Use the two maps below to investigate the potential impacts of sea level rise. The first map provides satellite imagery to view landscape features, buildings, roads, etc. The second provides an interactive map of the same area and allows you to view the extent of sea level rise for different projections.

NGSS Connections

MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.


HS-ESS3-5: Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.



[View Larger Interactive Map](#) (New Tab)

This map allows you to look at the actual satellite images for the Fire Island area. **You can:**

- Click "View Larger Interactive Map" to open a new browser

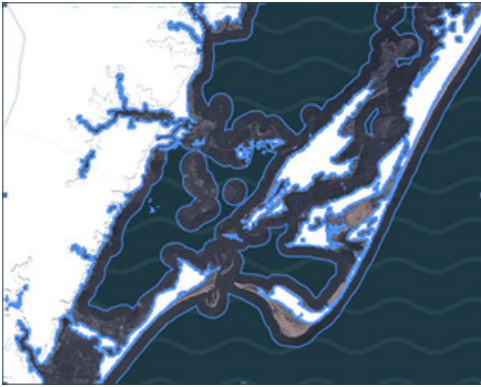


[View Larger Interactive Map](#) (New Tab)

This map allows you to look at the projected sea level rise in the Fire Island area. **You can:**

- Click "View Larger Interactive Map" to see the map in a

Activity: Online Sea Level Rise Module



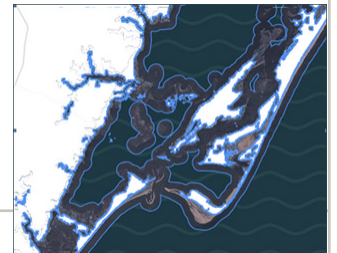
1. Determine the projected average sea level rise based on the graph on the second page (Step 2).

2. Based on the projection, use the maps on the third page to explore the impacts of sea level rise in the area you selected (Step 3).

Discussion: Online Sea Level Rise Module

How well does the online SLR module provide formative and summative opportunities to assess understanding of:

1. Measuring and Modeling Causes and Effects of SLR
2. Human Causes, Effects, and Mitigation of SLR



Thank you!



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