



# The Future of Our Shores

Using what we know to shape a better future

Provided by:



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This lesson includes the following:

- ❑ Lesson plan (below)
- ❑ [Student worksheet](#)
- ❑ [Slide deck](#) for educator and/or students
- ❑ [Written content](#) to accompany the lesson for teacher and student reference

## Objectives

- Sea levels are rising globally due to the warming of our planet. This warming is caused by increasing levels of heat-trapping gases.
- Sea level rise is the result of thermal expansion of water and the melting of land-based glaciers.
- Locally, we have many features to protect from sea level rise, including the salt marsh, airports, roads, buildings, and critical infrastructure.
- There are already many things we can do (and that cities and agencies are already doing) to protect the valuable assets along our bay shoreline.

## Introduction

San Francisco Bay, where the waters of the Pacific Ocean flow in to meet the freshwater of creeks and rivers, is the largest estuary on the west coast. For thousands of years, tidal salt marshes formed the edge of this estuary. These salt marshes are unique, complex, and productive ecosystems that provide many important benefits. They store carbon from the atmosphere, provide flood protection, filter pollutants from water that flows into the Bay, and provide a unique habitat that supports an incredible diversity of life. Tidal salt marsh habitat is home to some of the most specialized plants and animals in the world, including the endangered salt marsh harvest mouse and the Ridgway's rail.

Due to humans' changing land use priorities, most of the salt marsh is now gone from the edges of our Bay. Localized projections of sea level rise show us that the first lands affected will be remaining salt marsh habitat. Additional sea level rise will threaten many human structures that we rely on such as roads, airports, sanitation facilities and buildings. Understanding how sea level rise could affect our shores in the future can help us make decisions about what actions we want to take now to prevent the worst of these effects.

## Activity

Students will learn about sea level rise and its underlying causes by analyzing climate data. They will then focus on sea level rise projections locally by looking at maps and analyzing what features are at risk. Finally, they will learn about projects already underway locally to prepare for sea level rise, and they will pick a solution to focus on for their own project about creating and communicating a better future for our shores.

### Additional resources

- This [Baylands interpretive map](#) offers stops for a self-guided walk or “field trip” out to the Baylands, where students can see first-hand our local shoreline and its human impacts.
- The [Resilient by Design project page](#) has a number of creative, inspiring solutionary ideas for how the Bay Area can prepare for sea level rise.
- [This brochure from Valley Water](#) gives an overview of some of the ways multiple local agencies are collaborating to prepare South Bay cities for sea level rise.
- PBS has [two great, short videos](#) about how two global cities (London and Tokyo) are using engineering strategies to adapt to rising sea levels.
- [The South Bay Salt Pond Restoration Project](#) is a great example of how environmental restoration can help create habitat that buffers human structures from the effects of rising seas.
- A local 5th-grader made [a short, effective video](#) about the climate costs of clothing.

### NGSS Alignment

| Disciplinary core ideas                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Science and engineering practices                 | Crosscutting concepts |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------|
| <p>ESS3.C: Human Impacts on Earth Systems: Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments. (5-ESS3-1)</p> <p>5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p> | Constructing explanations and designing solutions | Stability and change  |