



Examples of Explanatory Chains Climate and Ocean Change

By filling in the gaps between expert and public thinking, Explanatory Chains can invite the public into a richer and deeper understanding of a problem, thus empowering people to think through an issue and address it more productively. The examples of Explanatory Chains provided here emerge from interpretation in zoo and aquarium settings. Each begins with fossil fuel use as the initial factor, and then moves on to illustrate the cause-and-effect sequence that leads to the impact or “visible symptom” that the communicator wishes to highlight. This highly flexible framing strategy is intended to leave the public with a satisfying sense that they grasp how the issue works, and how and why intervention would make a difference. These examples could be followed with the frame element of *Solutions*, by segueing into a story highlighting a promising way to reduce our reliance on fossil fuels.

Example A. Coastal habitats

Adapted from Amy Fleischer of Massachusetts Audubon Society

When we use fossil fuels like coal and petroleum for energy, we pump more and more carbon dioxide into the atmosphere. (*Initial Factor*) The carbon dioxide builds up in the atmosphere and acts like a blanket, trapping in heat. The heat is warming oceans, melting glaciers, and causing the water to expand. Together, these forces are causing sea level to rise, leading to increased flooding in tidal salt marsh areas. The marshes are home to the Saltmarsh Sparrow - a native species in Massachusetts that helps spread the seeds of marsh grasses. (*Mediating Factors*) As the marsh dwindles, the Saltmarsh Sparrow population dwindles; and when there are fewer sparrows, fewer grass seeds are spread, so the marsh dwindles more, creating a downward spiral. If nothing is done, this ecosystem is at risk of collapse, and many waterfront homes and businesses will also be affected. (*Final Consequences*)

Example B. Ocean acidification

Adapted from Seattle Aquarium & the Visualizing Change Project

When we use fossil fuels like natural gas or oil for energy, we release carbon dioxide, or CO₂. Some of it builds up in the atmosphere, and a lot of it is absorbed by the ocean. (*Initial Factor*) This CO₂ is running rampant and is changing the ocean’s chemistry – a process that scientists call ocean acidification. One effect of this changed chemistry is that the amount of carbonate available in the ocean is now different. This matters because carbonate is an important building block of the shells of many marine creatures. For example, pteropods are having trouble creating and maintaining their shells. (*Mediating Factors*) These delicate swimming snails are an important piece of the base of the ocean food web – they are food for salmon and other creatures. So, ocean acidification is threatening the delicate balance of the ocean and the food web that we all depend on. (*Final Consequences*)