Storm surge

Young razor that have recently settled on beaches can be displaced by large waves that move sand. These displaced clams are likely to be eaten by fish that feed in the surf, and so strong waves can reduce razor clam survival. During our study, we heard reports that strong storms and high surf have become more common in recent years. Warming in the ocean and atmosphere may be changing the paths of storms across the Pacific, or allowing for more intense storms to develop. In any case, if high surf continues to become more common, the survival of young razor clams might be reduced. To explore the impact of this change, increasing wave heights and storm surges in the model causes pre-recruit survival to decline consistently through time.

Pollution

Razor clams can be hurt by a variety of man-made pollutants including oil and runoff from roads and parking lots. During our study, we heard concerns about the potential for oil spills during ocean transportation, and increasing contamination from new development near beaches. Oil and other contaminants are toxic to marine life such as razor clams, and are likely to kill a portion of the population if they increase to dangerous levels. Ongoing monitoring confirms that razor clams are not presently contaminated, but if pollution increases in the future this may change. To explore this possibility, including increased pollution in the model will reduce both recruit and pre-recruit survival through time.

Habitat destruction

Razor clams need beaches to live and grow on, and a loss of beach habitat is therefore likely to result in fewer clams. During our study we heard about changes in the extent and slope of clamming beaches. Increased storm activity, rising sea levels, dredging and coastal development that limits natural erosion may all impact the amount of beach habitat available for razor clams. As more and more young clams settle on a shrinking beach they compete for food which can reduce growth and survival. In the model, habitat destruction leads to decreased beach capacity and higher competition between clams which reduces survival when there are many clams.