

Questions:

1. How much of American coastline is currently protected by these ecosystems?
Coastal wetlands protects over 40 million acres of coastline in the United States. Of this, 81% are in the southeast United States.
2. How has the rate of coastal development changed over time?
U.S. Fish and Wildlife in coordination with the National Oceanic and Atmospheric Administration (NOAA) have found that between 1998 and 2004, there was a total of 361,000 acres of coastal wetlands lost in the eastern U.S. and a loss of 60,180 acres annually in the Gulf of Mexico.
3. Why is this clustering technique the best for this data?
Because this data does not have circular clusters, the k-means clustering model would not have fit this data best. The Gaussian Mixture model can handle more ellipse like clusters with much higher accuracy.
4. How can this help local cities?
Coastal cities that experience heavy flooding and other negative coastal impacts should evaluate the amount of coastal wetlands protecting them. If there has been significant wetland loss, then a consideration of restoring those wetlands should be discussed. Adding back the natural protective environments will almost always be better than adding a human made structure.
5. What options are there to help protect currently unprotected coastline?
A few options to help places without wetlands is beach nourishment, adding sand to spots that are experiencing harmful amounts of erosion, and beach scraping, which reshapes the beach and builds up the dunes for more protection. Hard structures include groynes, which are built perpendicular to the beach, while seawalls, bulkheads, and revetments are parallel to the shore. These hard structures, however, typically cause an acceleration of erosion at other locations.
6. What other data could be used for this model?
Data more centered coastal communities would be easier to filter locations. In addition, a dataset specific to ocean related damages such as flooding from storms, tsunamis, and hurricanes would ensure the data was ocean related.
7. What other ways can we benefit from these ecosystems?
These ecosystems are wildly diverse, so it is a great place for sustainable fisheries. In addition, it could be a tourist location in itself by making it a state or national park. Wetlands also have a hand in water purification as the soils trap pollutants and prevent them from reaching larger bodies of water.
8. How can your model change through time?
I would like to see how this model would change if there was a significant increase in coastal wetland acreage. If there was a push to make more protected areas along the coast, people could see a greater increase in protection of towns and cities as well. While sandy beaches are a great vacation destination, it does come with a cost.

9. Do areas with low damage cost need to prepare further?

Having failsafes is always a good idea. These could be flood gates or walls, or if there are existing wetlands, continuing to safeguard those places and continuing to restore existing wetlands.

10. What are ways companies can minimize their impact on these ecosystems?

The biggest way companies can minimize their impact on coastal wetlands is by going greener themselves. If possible removing harsh chemicals or processes, disposing of byproducts in a clean and safe way instead of dumping it into a waterway, and using cleaner energy for production.

Reference

U.S. Fish and Wildlife, & NOAA. (2013, October). Status and trends of wetlands in the coastal watersheds of ... Retrieved from <https://www.fws.gov/wetlands/Documents/Status-and-Trends-of-Wetlands-in-the-Coastal-Watersheds-of-the-Conterminous-US-2004-to-2009-News-Release.pdf>