

# CLIMATE CHANGE EFFECTS ON MARINE BIODIVERSITY AND LOCAL COMMUNITIES

## OCEAN TEMPERATURE INCREASE



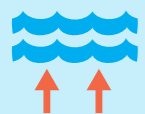
As climate change has warmed the Earth, oceans have been increasing their temperature.

## OCEAN ACIDIFICATION



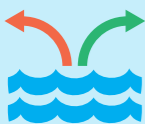
Increasing amounts of carbon dioxide (CO<sub>2</sub>) in the oceans combined with seawater produces carbonic acid, increasing the acidity of the water.

## SEA LEVEL RISE



Climate change is causing the oceans to heat up, melting polar glaciers, resulting in rising sea levels.

## CHANGES IN OCEAN CURRENTS



Increasing ocean temperatures and significant amounts of melting fresh water may result in a slowing of the ocean conveyor belt, altering oceanic current patterns, changing global weather conditions and disrupting marine food webs.

## EXTREME WEATHER EVENTS



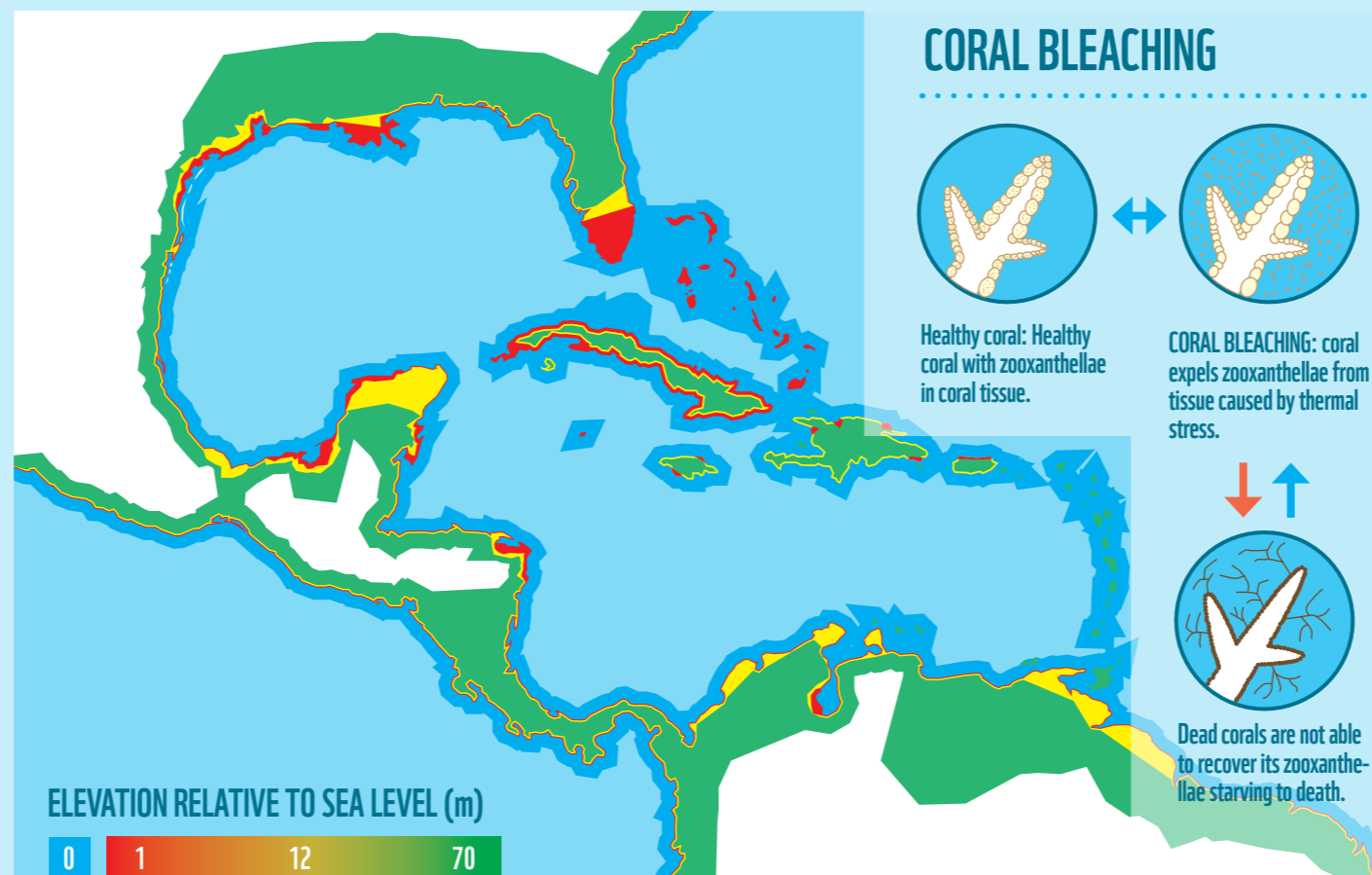
Increasing sea surface temperatures increase evaporation and atmospheric moisture, creating and facilitating environmental conditions for ocean storms to escalate into larger and more powerful systems.

Climate change is affecting the world's oceans modifying their temperature, nutrient supply, water chemistry, wind systems, and ocean currents, dramatically impacting marine biodiversity. The situation is no different in the Mesoamerican Reef, the second largest reef in the world.

Climate change is exacerbating anthropogenic (e.g., water pollution, land run off, overfishing) and natural (e.g., storms, coral disease) threatening the heart of Caribbean culture and economies.

## VULNERABILITY TO SEA LEVEL RISE

Numerous model predictions foresee a sea level rise of 1 additional meter by 2100, which would displace millions of people and would cause billion-dollar losses in infrastructure.



## IMPACTS ON BIODIVERSITY

### MANGROVES



- Redistribution of mangroves due to increases in temperature and rising seas.
- Damage and loss of mangrove forests by wave action and strong winds, previously sheltered by coral reefs.

### SEA GRASS BEDS



- Alteration of growth rates due to increasing sea surface temperature.
- Redistribution of sea grasses caused by rising seas, increasing sea water temperature, salinity and fresh water regime changes.
- Reduction in plant productivity as a result of increased water depth, limiting the amount of light, water motion and tidal circulation.

### CORAL REEFS



- Coral bleaching and mortality promoted by increasing sea surface temperatures.
- Coral loss due to the skeleton weakening and reduced growth rate of their calcium carbonate skeleton caused by ocean acidification.
- Degradation of reefs caused by an increase in the severity and frequency of storms and hurricanes.

### MARINE TURTLES



- Reduction and lack of nesting habitats due to sea level rise and beach erosion.
- Higher sand temperatures can skew hatchling sex ratios favoring females, compromising species survival, as sand temperature plays a critical role in defining sea turtle sex.
- Reduction of foraging sites and prey availability as a result of coral bleaching and sea grass mortality.

### SHARKS



- Lack of food sources may induce sharks to change their geographical distribution and migration patterns, increasing their interactions with humans.
- Degradation and loss of mating, nursery and foraging areas (mangroves, sea grasses, coral reefs) critical for sharks survival and development.