

## Ocean Acidification

### Carbon Dioxide

- 2nd most abundant greenhouse gas on Earth (behind water vapor)
- Direct correlation between rising global temperatures and increased CO<sub>2</sub>
- Product of human activity (burning of fossil fuels like coal, oil, gas, etc.)
- The ocean serves as a “carbon sink,” meaning it can absorb atmospheric CO<sub>2</sub>
- Initially we thought this was a good thing, because taking CO<sub>2</sub> out of the atmosphere meant slowing down global warming
- 30–40% of the carbon dioxide from human activity released into the atmosphere dissolves into oceans, rivers and lakes

### Ocean Acidification

- Increased CO<sub>2</sub> in the atmosphere makes ocean more acidic (more hydrogen ions)
- CO<sub>2</sub> gas dissolves in water and breaks down into carbonic acid (H<sub>2</sub>CO<sub>3</sub>) and hydrogen ions
- Free hydrogen atoms bond with available carbonate ions to form bicarbonate (HCO<sub>3</sub><sup>-</sup>)
- Less available carbonate ions
- Limits growth of marine structures
- $\text{CO}_2(\text{aq}) + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{CO}_3 \leftrightarrow \text{HCO}_3^- + \text{H}^+ \leftrightarrow \text{CO}_3^{2-} + 2 \text{H}^+$

### Coral Skeletons/Coral Reefs

- Reduced availability of carbonate ions make it harder for coral skeletons to grow
- Weaker marine structures
- Struggling marine ecosystems
- Ocean acidification could decrease the density of coral skeletons by up to 20%
- Combined with coral bleaching from “heat stress” means danger for coral reefs
- Coral reefs make up the foundation for marine ecosystems
- Only the most heat-resistant species are likely to survive warming oceans
- And even those may be slowed by ocean acidification
- Diverse coral reefs are needed to keep diverse species

### What To Do

- The only known way to stop ocean acidification is to lower CO<sub>2</sub> output
- This is ultimately against the interests of businesses that prioritize efficiency and growth over environmental safety
- Lowering CO<sub>2</sub> emissions would be costly at first and require businesses to cut ties with large established oil and gas companies
- Government regulations on environmental policies
- Individual businesses cannot be held responsible to keep their carbon output down if there is no incentive

Sources:

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