



## IEAGHG Information Paper 2017-IP55; Exploring Ocean Change

By taking up carbon dioxide from the atmosphere, the ocean slows down global climate change. But when absorbed by seawater, the greenhouse gas triggers chemical reactions, causing the ocean to become more acidic. A new report has been released that assesses the impacts of ocean acidification on marine life and its consequences for society and economy. The report was published by the German research network BIOACID<sup>1</sup>. The report can be found at:

[https://www.oceanacidification.de/wp-content/uploads/2017/10/BIOACID\\_brochure\\_e\\_web.pdf](https://www.oceanacidification.de/wp-content/uploads/2017/10/BIOACID_brochure_e_web.pdf)

Key conclusions from the study are:

- Many organisms are able to withstand ocean acidification, but may lose this ability if also exposed to other stressors such as warming, excess nutrients, loss of oxygen, reduced salinity or pollution.
- A reduction of regional stress such as nutrient runoff or the loss of oxygen can mitigate the impact of global stressors like ocean acidification and warming.
- In a natural community, the impact of stressors on a species can be amplified or diminished by associated shifts in biotic interactions such as competition, predation or parasitism.
- Even small alterations at the base of the food web can have knock-on effects for higher trophic levels.
- Marine life is able to adapt to ocean change through evolution and can partly compensate for negative effects. However, since ocean acidification happens extremely fast compared to natural processes, only organisms with short generation times, such as microorganisms, are able to keep up.
- About half the tropical coral reefs can be preserved if carbon dioxide emissions are limited to concentrations that keep global warming below 1.2 degrees Celsius. However, additional risks posed by ocean acidification are not included in this forecast.
- Ocean acidification reduces the ocean's ability to store carbon.
- Changes in the ocean carbonate system impact the acidbase balance in marine organisms. This can negatively affect key processes such as calcification.
- Climate change alters the availability of prey for fish and as a consequence may affect their growth and reproduction.
- Ocean acidification and warming reduce the survival rates of early life stages of some fish species. This will likely reduce recruitment of fish stocks and ultimately fisheries yields.
- The distribution and abundance of fish species will change. This will have a significant impact on economic activities such as small-scale coastal fisheries and tourism.
- It is crucial to consider ocean acidification and warming in the management of fish stocks and marine areas.
- Following the precautionary principle is the best way to act when considering potential risks to the environment and humankind, including future generations. Even if the extent of possible risks is not fully understood, precautionary measures need to be taken in order to avoid or reduce the harm.
- A more sustainable lifestyle and economy require an interaction between society, businesses and politics. Political frameworks should regulate the phase-out of fossil fuels. It is crucial for every one of us reconsider concepts of normality and adjust behaviour in everyday life.

**John Gale, 25/10/2017**

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<sup>1</sup> Further details on the BIOACID project can be found at: <http://www.bioacid.de/>