**WRITTEN TESTIMONY OF
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U.S DEPARTMENT OF COMMERCE**

**FIELD HEARING ON
EFFECTS OF CLIMATE CHANGE ON MARINE AND COASTAL
ECOSYSTEMS IN WASHINGTON STATE**

**BEFORE THE
COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION
SUBCOMMITTEE ON OCEANS, ATMOSPHERE,
FISHERIES AND COAST GUARD
UNITED STATES SENATE**

MAY 27, 2008

Good morning Chairman Cantwell and members of the Subcommittee. Thank you for giving me the opportunity to speak with you today on the effects of climate change on marine and coastal ecosystems in Washington State. My name is Christopher Sabine, I am an Oceanographer at the Pacific Marine Environmental Laboratory of the National Oceanic and Atmospheric Administration (NOAA) in Seattle, WA.

My research focuses on understanding the global carbon cycle. In particular, my work centers around interpreting inorganic carbon measurements in the oceans. On Thursday, May 22, 2008, my colleagues and I published a paper in Science Magazine entitled: "Evidence for Upwelling of Corrosive 'Acidified' Water onto the Continental Shelf."

The absorption of atmospheric carbon dioxide into the ocean lowers the pH of the waters. This so-called ocean acidification could have important consequences for marine ecosystems. In order to better understand the extent of this ocean acidification in coastal waters, we conducted hydrographic surveys from central Canada to northern Mexico. We observed seawater that is undersaturated with respect to aragonite upwelling onto large portions of the continental shelf, reaching depths of approximately 40 to 120 m along most transect lines and all the way to the surface on one transect off northern California. While seasonal upwelling of the undersaturated waters onto the shelf is a natural phenomenon in this region, the ocean uptake of anthropogenic CO2 has increased the areal extent of the affected area.

The Science paper is appended here as the scientific basis of my testimony.