

Co-Produced Evidence for Incursions of Chukchi Sea Water into Freshwater Lake of Kotzebue Sound

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As the Arctic warms, incidents of Harmful Algal Blooms (HABs) have increased, which can disrupt food webs and, occasionally, have negative effects on human health. For those who rely on subsistence food sources, like many Indigenous Arctic communities, HABs can also threaten food sovereignty and cultural identity. In Kotzebue, a majority-Indigenous village in Northwestern Alaska, concerns have been raised over freshwater HABs since 2008. The bloom-forming and paralytic shellfish toxin (PST) producing marine dinoflagellate, *Alexandrium catenella*, has also recently been documented throughout the neighboring Chukchi Sea (Anderson et al. 2021, PNAS). *A. catenella* has not previously been considered a risk for Kotzebue because its tolerance range for salinity is 15-35 ppt, whereas average salinity in Kobuk Lake is 2-3 ppt (Bill et al. 2016, J. Phycol.). As part of the initial phase of a community-led sampling project, we deployed a moored YSI EXO-2 sonde from June 24 to September 21, 2022 measuring temperature, salinity, depth/pressure, oxygen, turbidity, dissolved organic matter, chlorophyll and phycocyanin fluorescence every 10 minutes. In this period, we documented six distinct salinity spikes, up to 27 ppt, in the surface waters of Kobuk Lake. Analysis of temperature, dissolved organic matter, and other characteristics of the water showed that the high salinity spikes were consistent with water originating in the Chukchi Sea. Thus, the risk of *A. catenella* cannot be fully discounted in Kotzebue. High-speed winds (>10 knots) in a direction other than northeast were found to precede all spikes.