Title: Phytoplankton biomass in U.S.A. lakes may increase by 88% by the end of the 21st century
Author: Shengpan Lin
Abstract: Rare are strong evidences of climate change impacts on algae blooms based on long-term and whole-lake experiments and observations. To provide information for climate change adaptations, we used the “space-for-time substitution” method to build boosted regression trees to predict climate change impacts on algae biomass based on the first U.S.A. national lakes assessment survey. We found that average lake chlorophyll a concentration increase with nitrogen (N), and phosphorus (P) concentrations, especially when they were at suitable structures, i.e., molar N:P = 40. Higher lake chlorophyll a concentrations were seen when water surface temperatures were higher. With our model, we predicted an 88% increase in average chlorophyll a concentration in U.S.A. lakes if temperature increased 4 °C and total N and total P increased respectively 20 and 50% by 2100.

Title: Why is groundwater depletion persistent in the High Plains Aquifer?
Author: Samuel Smidt
Abstract: Crop production in the High Plains Aquifer region is one of the largest agricultural markets in the United States, but expansive irrigation use has caused groundwater levels to progressively decline since the early to mid-1900s. Groundwater levels will continue to decline if current land use or management practices do not change. The challenge to mitigating groundwater depletion is that water use is intricately linked to several complex systems such as climate, land use, and environmental policy. In short, groundwater depletion is heavily influenced by water use decision-making and is too complex for basic strategies to address. This study categorizes complex systems into management domains in order to target the mitigation of groundwater level decline as an objective for future management strategies. Analyzed within each domain are the trends that drive water use decision-making. This study demonstrates that at the core of water use is the water-energy-food nexus, and at the core of the nexus is farmer profit. Future management strategies must promote farmer profit within a sustainable nexus framework if groundwater decline is to be mitigated in the High Plains Aquifer. Concluded in this study are key concepts that can contribute to the overall objective of mitigating further groundwater depletion.

Title: Who Framed Climate Change?: Identifying the How and Why of Iowa Corn Farmers’ Framing of Climate Change.
Author: Matthew Houser
Abstract: Agricultural systems in the US contribute significantly to greenhouse gas emissions. Farmers could substantially reduce agriculture’s contribution through adopting conservation practices. A number of studies have begun to examine farmers’ beliefs related to anthropogenic climate change, particularly in the Midwest. The majority of these studies show that farmers do not perceive climate change to be anthropogenic in nature and, consequently rarely support or undertake greenhouse gas mitigation efforts. Building on work examining sources of Anti-Reflexivity in agriculture, this analysis uses qualitative interview data from 53 Iowa corn farmers to offer a nuanced depiction of the farmers’ perception of non-anthropogenic climate change. Goffman’s (1974) concept of framing, with contributions from more recent social movement
scholarship are used to reveal how farmers are constructing climate change as largely a result of inevitable natural cycles, and explore why this particular framing resonates with them.