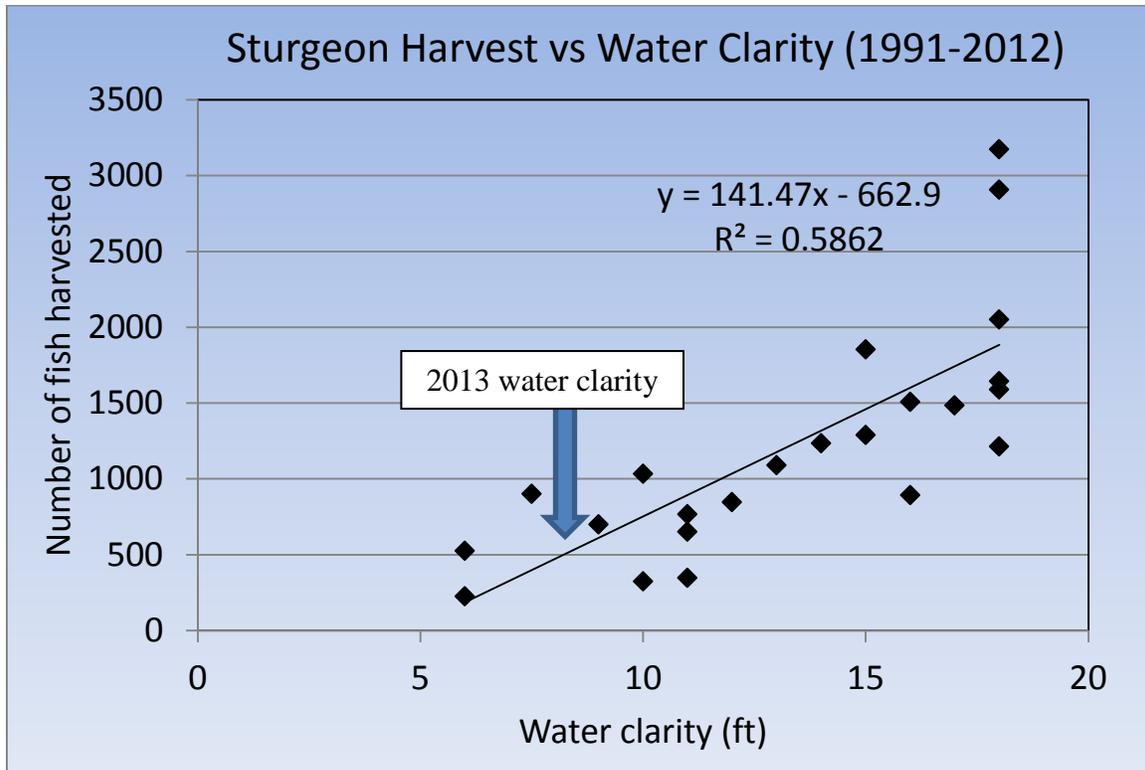


What's all this fuss about water clarity?

Well I don't have to tell spearkers this, but you can't spear fish that you can't see. So when the water is dirty it makes spearing tough and typically reduces the harvest, and that is why water clarity is the number one predictor of spearing success. The graph below shows the total sturgeon harvest in relation to water clarity during the seasons held between 1991 and 2012. The relationship is pretty clear, the clearer the water the more fish that are harvested during the spear fishery.



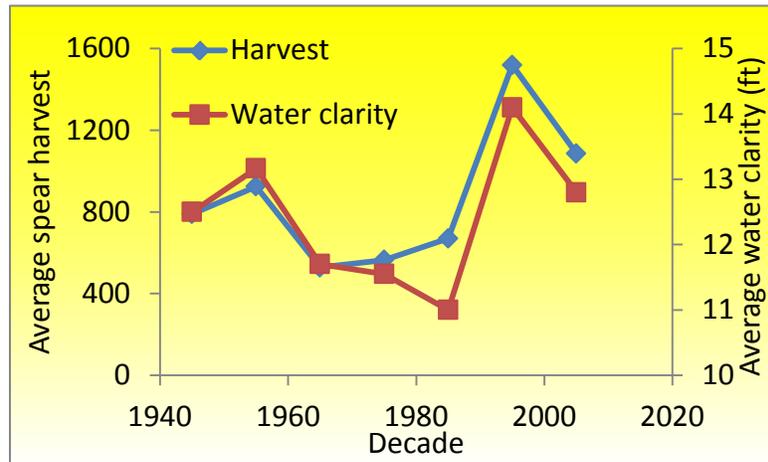
Up to this point, water clarity has been poor during the 2013 sturgeon spear fishery on Lake Winnebago. Leading up to opening weekend, water clarity ranged from 6-9 feet with an average of 8 feet. Now that doesn't necessarily mean you would see a sturgeon show up real well at 8 feet, rather that was the depth that light colored objects were no longer visible. Past data shown in the plot above suggest a long season with below average harvests when clarity conditions are like we have had in the first week of the 2013 spear fishery, and to this point that has held true.

So you might be asking, what factors dictate water clarity? Well the answer is very complicated because water clarity can be affected by a magnitude of factors. The major contributor to poor water clarity is runoff from agricultural landscapes that carry nutrients (nitrogen and phosphorus) into the water body providing essential nutrients for algae blooms. Two other important factors are ice conditions and snow cover. Typically the longer a water body is froze over and snow covered, the clearer the water will be, relatively speaking. Ice cover keeps wind and wave action from recirculating sediments and nutrients, while ice and snow cover work together to block light penetration through

the ice and thus reducing the chances of an under ice algae bloom. Yes indeed, algae blooms do occur during winter. These algae blooms aren't the blue-green algae blooms that are present in summer/early fall, but rather are typically blooms of algae known as diatoms. This group of algae is commonly referred to as brown algae and has the capabilities of blooming in colder water. Diatoms, and all other algae, utilize sunlight to create energy, and thus thick snow cover and reduction in light entering the water reduces the growth of diatoms. Large runoff events during periods of warm temperatures can also negatively affect water clarity by clouding up near shore water with "dirtier" water running off farm fields and urban landscapes. If you reflect on the last year, it makes sense why the water has been dirty. We had very large blue-green algae blooms in 2012 due to very warm temperatures, open water around parts of Lake Winnebago most of the winter and periodic snow cover with multiple warm spells that melted snow and produced high runoff events.

Veteran spearers may remember the "dirty years" from the 1960s to 1980s, years with below average harvests for the most part. As the Winnebago Comprehensive Management plan was being implemented in the 1990s, nutrient loading into the Winnebago System was reduced resulting in water

quality, and clarity, improving significantly. The improved clarity conditions, coupled with the increase in our sturgeon population abundance, contributed to years of very high harvest (for example: 2,908 fish in 1990; 3,172 fish in 1995, and 2,051 fish in 1998). These years of high harvest were the



driving factor behind the current harvest cap system that was implemented in 1999 to maintain harvest rates at or below sustainable levels.

As I stated in a previous vignette, water clarity does not have the same effect on the Upriver Lakes spear fishery as it does on Lake Winnebago because the Upriver Lakes are much shallower. Combine that with the poor water clarity we have had on Lake Winnebago over the last two seasons, and it all makes sense why spearers on the Upriver Lakes have enjoyed more success and shorter seasons than spearers on Lake Winnebago for the past few seasons.