“First you gotta walk before you run, kid.” My grandfather said this to me as I held my skinned knee, bloodied from a tumble off my bike. This is a lesson not only for the human condition, but for fishes as well. Before a fish can “run” into adulthood, it first has to “walk” it’s way through early life history. What I am referring to is known as recruitment, or the process by which an embryo or larvae survives through early life and becomes a reproducing member of the population. Recruitment is a fundamental process that drives all populations but has baffled countless scientists trying to understand what makes recruitment “tick.” Along these lines, the purpose of my graduate research at Southeast Missouri State University attempts to describe the processes driving recruitment of fishes in the Middle Mississippi River. In particular my research focuses on centrarchids, a group of fish that includes crappie, bluegill, and bass. The Middle Mississippi River lies between the confluences of the Missouri River at St. Louis, Missouri down to the confluence with the Ohio River at Cairo, Illinois. This area has been highly modified with channel training structures (i.e., wing dikes) by humans to facilitate shipping and other industrial processes, taking what was once a slow, meandering stretch of river and creating a deep and swift river that isn’t friendly to a diverse range of species and in particular centrarchids.

Furthermore, the creation of levees has severed ties between the main river and the surrounding areas traditionally flooded with regularity. These areas, known as the “floodplain,” are immensely important to fish reproduction as they create ideal breeding and nursery habitats for fish to utilize to their advantage. The early life of a fish is tough and only a small fraction of any one reproductive bout typically survives to adulthood. As such, it becomes imperative that a population has consistent and fruitful spawning events to maintain healthy numbers. Centrarchid species are one of the groups that rely heavily on flooding and backwater areas for reproduction, and given the habitat degradation that has occurred, poor recruitment in the Middle Mississippi is common under current conditions. Through restoration we have the potential to bolster centrarchid recruitment but much like fish have to walk before they can run, we have walk through what is driving recruitment before we can run to restoration.

The objective of this study is to determine what biotic and abiotic factors have the most influence on centrarchid recruitment in the Middle Mississippi on an annual basis. The research is in its early stages but up to this juncture, we have determined that floodplain inundation appears to be the major driver of recruitment for centrarchids in the Middle Mississippi River. The results from my predictive modeling suggests that years in which the number of days the Middle Mississippi river gage exceeds 32 feet for approximately 40 days, high densities of juvenile (i.e., recruits) centrarchids ensue. As means to validate these aforementioned predictions, we are collecting adult centrarchid otoliths to determine if juvenile abundance (my recruitment measure) is correlated to adult age structure.

To this end, my research has the potential for great impacts both locally and over much broader scales as well. We are beginning to move into an era of river restoration where we have started to recognize the importance of preserving ecosystem functions and ecosystem services offered by these unique environments. Floodplain areas act as natural defenses against flooding erosion, and nutrient additions helping to slow and hold the onslaught of water. Additionally, by restoring centrachid populations we are opening up recreational opportunities for anglers both young and old, helping to make one of the world’s largest rivers more accessible to all. The Middle Mississippi is not alone in its issues with human modification, so these results have the ability to be applied both up and down the Mississippi River as well as to other modified river systems of all sizes throughout the world. To use an ancient Kenyan proverb I think applies today even more than previously: “You must treat the earth well. It was not given to you by your parents. It is loaned to you by your children.”