Muskellunge (*Esox masquinongy*) are a highly valued and sought after fish for recreational anglers. Prized for the challenge in catching one and their large sizes, muskellunge hold an esteemed place in the cultures of both tribal and non-tribal populations. Historically, the angling fishery for muskellunge has been harvest focused. By the 1970's and '80's muskellunge populations had declined dramatically prompting managers to institute successively stricter harvest length and bag limits. Concurrent with these management actions, anglers self-organized and began promoting catch and release methods for this species. By the mid 1990's angling for muskellunge had shifted from primarily harvest oriented to primarily CR oriented with release rates approaching 100% in many cases.

Following roughly 25 years of intense catch and release practices, coupled with continued stocking, questions are now being raised as to whether or not full catch and release fishing is able to meet the management goals in this fishery. Stocking is frequently employed in this system, even where natural recruitment occurs, more fish are added in hopes of supplementing natural recruitment and further improving trophy opportunities. Strict bag and length limits have undoubtedly increased the age structure of these populations skewing them towards older fish. There is some evidence that older muskellunge tend to produce lower quality gametes which puts recruitment at risk of failing if conditions are not just right given the heavy reliance on the contributions of older fish. The fishery has become reliant on stocking and low fishing mortality in the face of uncertain natural recruitment.

Some key uncertainties remain in this system. Most importantly for this study, how do musky lengths respond to decreased fishing mortality? Specifically, does increased musky density have a negative effect on length? Combined, does spearing and hooking mortality provide enough removal to allow remaining individuals to achieve trophy lengths and bring average age down allowing younger more robust individuals to contribute to recruitment? If necessary, are anglers willing to change their fishing ethic? Catch-and-release culture is firmly entrenched in musky angling communities currently.

Muskellunge are a long-lived species meaning the effects of any management action will take decades to manifest themselves. Policy makers and the general public may not be patient enough to see these effects emerge. Instead, conservative practices that maintain the status quo require less patience and political risk. Datasets are beginning to mature now to the point where the status quo may no longer be supported by data and may in fact be preventing managers from meeting their goals regarding trophy potential. An adaptive management approach can generate new knowledge about how productive the fishery might be able to be instead of accepting the current status. This would require a significant commitment to long term data collection or, in lieu of time, a large spatial dataset.



Leveraging the dichotomy of lakes in northern, WI (combined spearing and angling lakes vs. angling only lakes), I propose an adaptive management experiment where spearing quotas are deliberately varied across lakes to impose drastically differing amounts of harvest on lakes over 15 years with angling only lakes serving as the control. With a relatively large number of lakes available for use in this study and long time series of catch and abundance already existing for many lakes, there’s a unique opportunity to replicate multiple treatment levels and compare the results to previous data that’s already collected in a before-after-control-impact type design. This project will be a joint collaboration between the tribal fishery managers, and WI DNR. Annual population estimates and individual tagging of musky to track length and age will be used to monitor the response of musky populations to different amounts of harvest. Creel surveys across these lakes will be used to compare angler catch and satisfaction across treatments to measure each treatment’s ability to meet a manager’s goals.

