

# Assessing Water Withdrawal Effects on Fish Communities and Stream Habitat

How Michigan's fisheries and stream habitats are protected

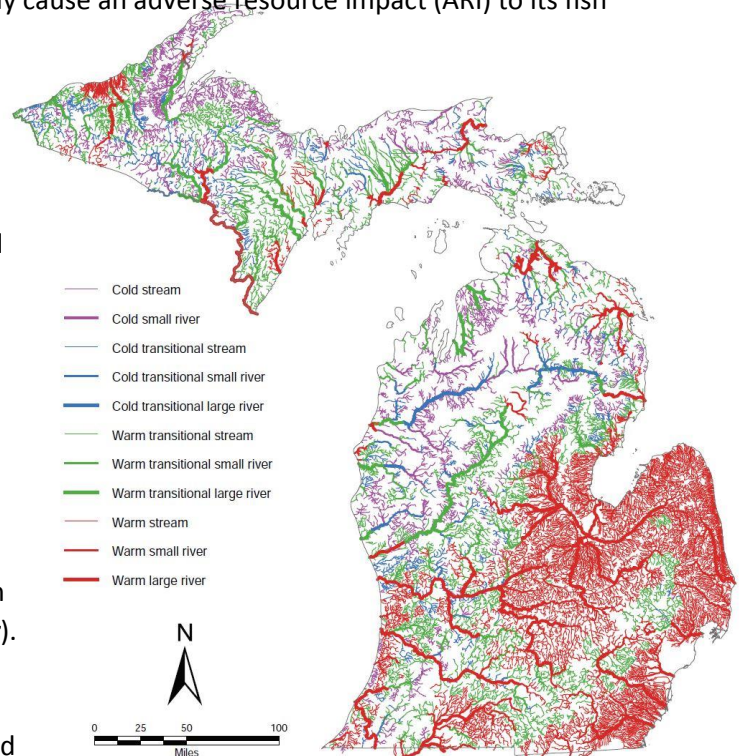


## How are fish and streams protected from too much water withdrawal?

The Water Withdrawal Assessment Tool (WWAT) was developed to evaluate the potential impacts of water withdrawals on water flow conditions in neighboring streams. Use of this tool is required prior to installation of wells for any new or increased large quantity withdrawal. The WWAT is a scoping tool to indicate when a proposed water withdrawal may lead to excessive flow reduction in the stream and potentially cause an adverse resource impact (ARI) to its fish populations.

## How much water is needed for fish and is it predictable?

- The WWAT is firmly rooted in large, state-wide datasets and **models**. Research efforts in Michigan over the past two decades have shown patterns and relationships among **stream types**, base streamflows, temperatures, and fish which is the basis for models used in the WWAT.
- To make sense of all these relationships and data, Michigan's streams were put into four temperature categories (**cold, cold-transitional, cool/warm-transitional, and warm**) based on their predicted July average temperatures. Stream segments were categorized based on size of their watershed area (**stream, small river, large river**). The final classification resulted in 11 temperature-size categories.
- Data from DNR fish surveys at over 1,300 sites were analyzed to find links between fish population abundance and river
- A **predictive model** was then created based on the premise that if water withdrawal reduced summer streamflow in a stream reach, its fish populations would adjust to resemble those at similar sites that shared its lower flow and associated characteristics. This model was run for a number of streams in each type, and the results averaged to produce predictions of fish assemblage response to water withdrawal for each category of streams in Michigan.



Classification of the 11 temperature/size stream categories in MI

## What does this mean for Michigan's Fisheries?

Michigan now has a template for determining what level of base flow reduction percentage will result in an ARI for each of the temperature-size categories. The WWAT will flag any proposed withdrawals over the flow reduction threshold for further review by MDEQ and MDNR. Thus, **the WWAT is key to protecting some of Michigan's most valuable resources.**

## Want to learn more?

- The Water Withdrawal Assessment Tool can be accessed at <http://www.deq.state.mi.us/wwat>
- More information how fish community responses to streamflow reduction were predicted can be found in MDNR Fisheries Division Research Report 2089 ([https://www.michigan.gov/documents/dnr/RR2089\\_268570\\_7.pdf](https://www.michigan.gov/documents/dnr/RR2089_268570_7.pdf))
- Further details on Michigan's water withdrawal assessment process and the WWAT occur in MDNR Fisheries Special Report 55 ([http://www.michigan.gov/documents/dnr/sr55\\_540475\\_7.pdf](http://www.michigan.gov/documents/dnr/sr55_540475_7.pdf))