

Water Withdrawal Assessment Process

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History

- 1985- Great Lakes Charter
 - Call to manage large withdrawals and provide water use information
- 2001- Annex to the Great Lakes Charter- commitments:
 - Develop simple, efficient water management system that protects, conserves, restores, and improves Great Lakes Basin waters and water-dependent resources
 - No significant individual or cumulative adverse impacts on water quality or quantity
 - Improve information sources and tools to assess impacts of water withdrawal
- 2006- Michigan legislation (first regulation of water withdrawals in Michigan)
- 2008- Michigan passes laws implementing Great Lakes – St. Lawrence River Basin Water Use Compact

Decision-Making Standard

- 2006 Legislation

“Adverse Resource Impact”: “Stream’s ability to support characteristic fish populations is functionally impaired”

- Goal: Quantify

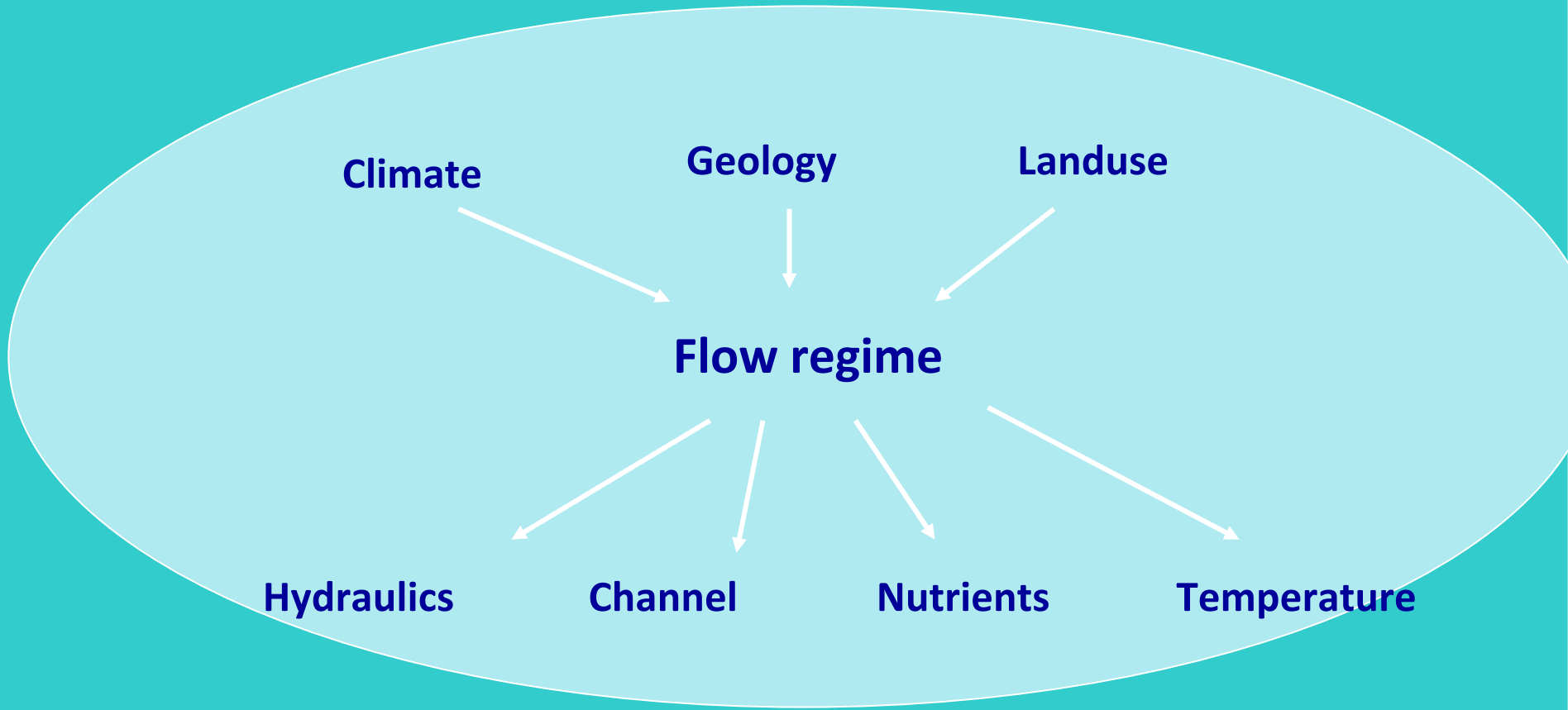
Consistency

Predictability

The Philosophy behind the Water Withdrawal Assessment Process

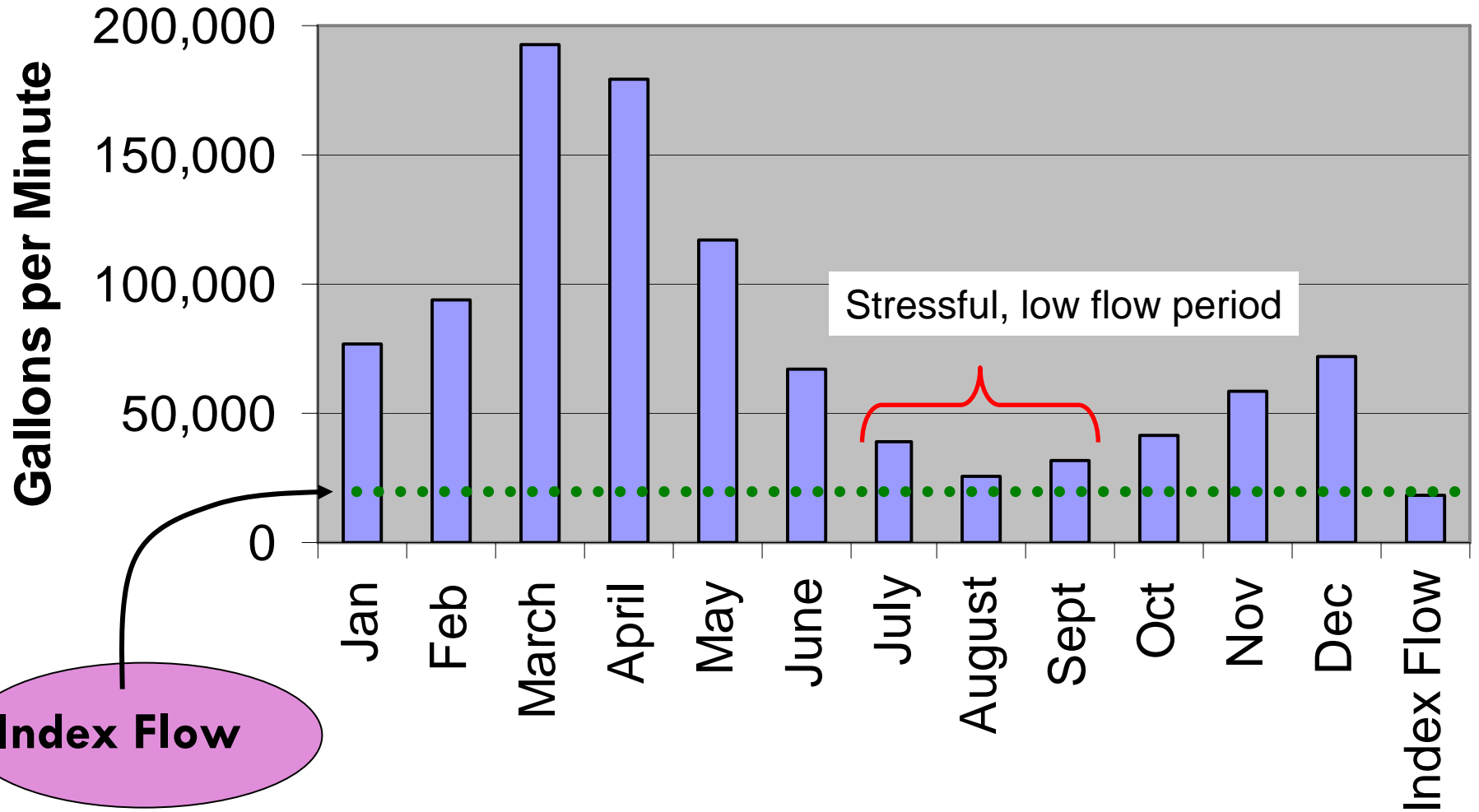
- Integrated, science-based approach
- Develop new thinking in integrating existing science
- Use a National Scientific Peer Review Panel
- Base the approach on Michigan data and State modeled relationships
 - Science team: USGS, MDEQ, MDNR, UM, MSU
- Run an open shop - inclusive, seek participation, communication:
 - Council & guests (across all sectors)
 - Technical and Legal and Mitigation Subcommittees
 - MDA, MDEQ & MDNR on Council

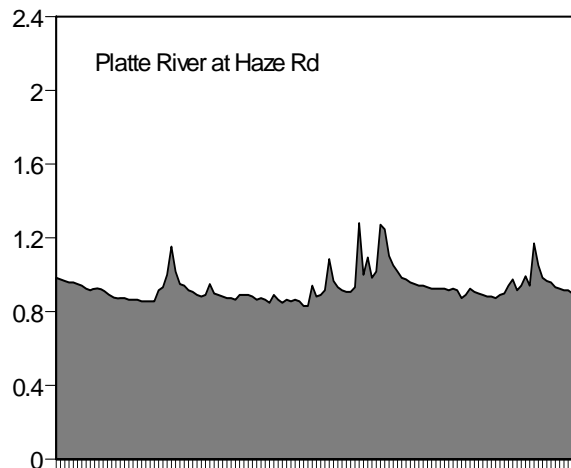
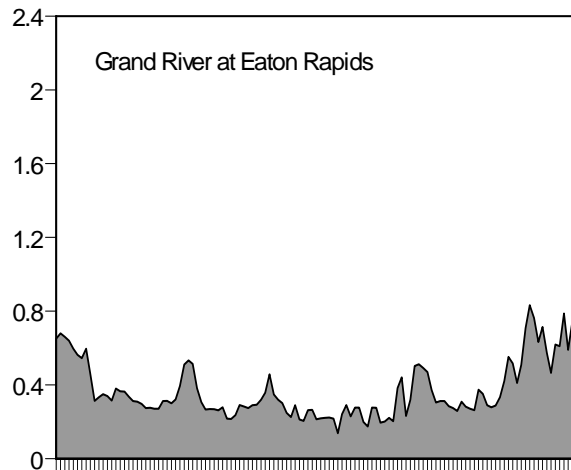
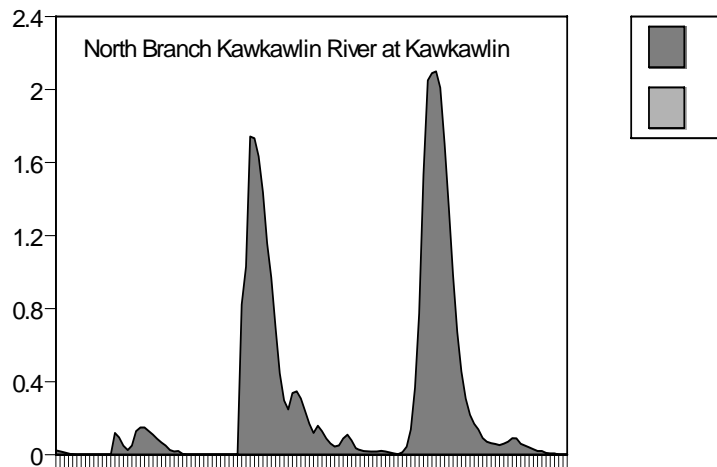
The Flow Regime Paradigm



- There is a geography of flow regimes
- Fish species are adapted to habitats controlled by certain quantities of, and variability in, river flows

Looking Glass River near Eagle Mean Monthly Flows





Michigan rivers naturally have different flow regimes, and thus different habitat conditions, biological communities, sensitivity to disturbance, and potential for fishery management .

The Water Withdrawal Assessment Process



- Three Models Interact within the impact assessment model
 - Withdrawal Model - How much water is in the aquifer, is being withdrawn, and from where and how it will affect stream flow
 - Streamflow Model - How much water is flowing in the stream during summer low flow periods
 - Fish Impact Model - What fish are in the stream and what is the likely effect of removing water on those groups of fish

Characteristics of the Withdrawal Model

- Distance Matters

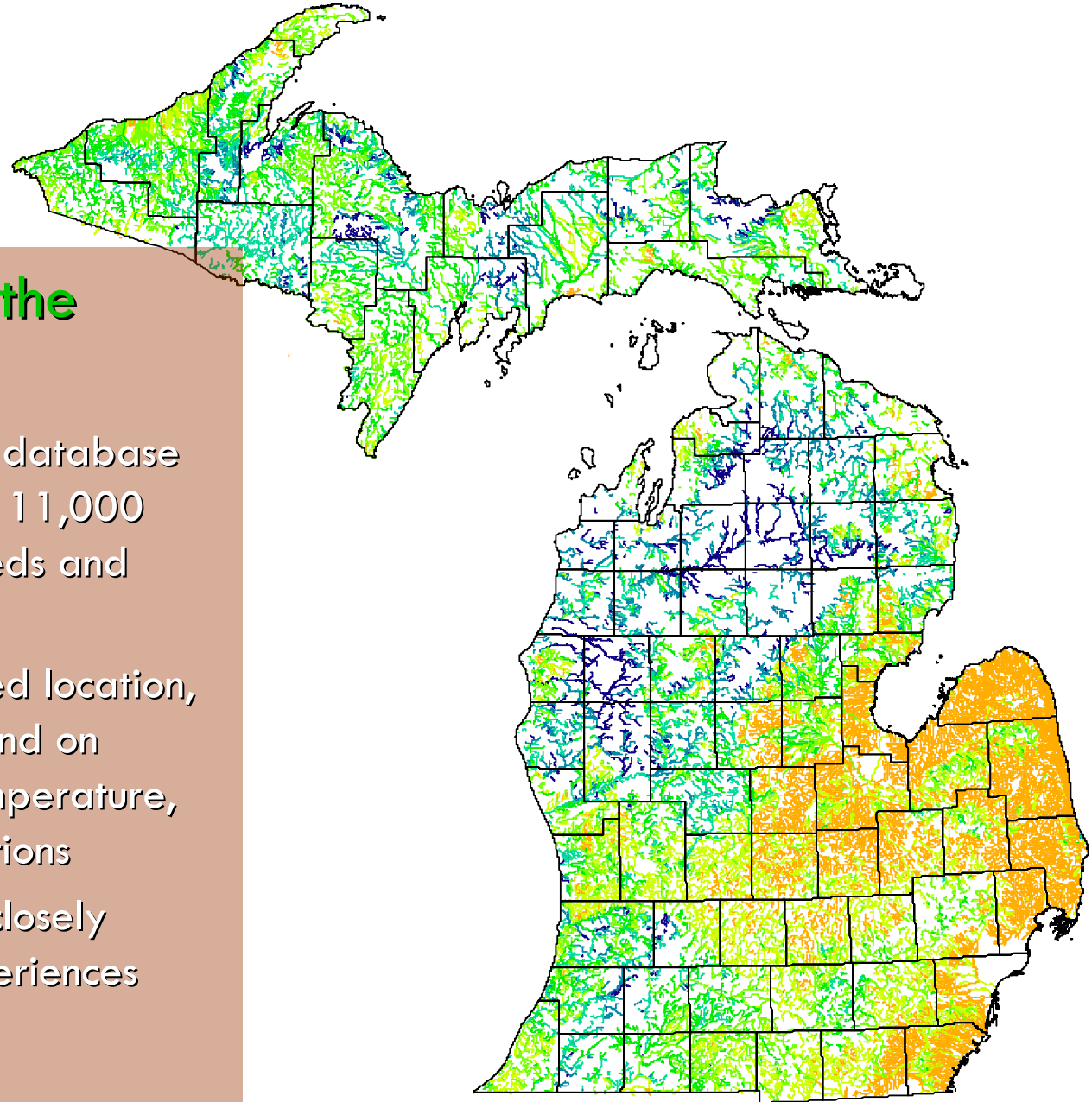
- A well adjacent to a river will very quickly get water either from water that would have gone to the river or directly from the river
- A well farther from a river will get more water from storage and require a longer time to affect the stream

- Geology and Soil Matters

- Clay soils are “tight” and water does not move easily
- Sandy soils are “porous” and water flows quickly

The Streamflow Model

- Need to Know How Much Flow is in any Stream Segment
- “Index flow”; low flow period in the year
- Look at the segments where we know the flow (147 stream gauges in the State) and extrapolate these to the streams that are not gauged
- **Major Factors Used**
 - Drainage Basin Size
 - Forest Cover
 - Geology and Soils
 - Precipitation



Major Factors in the Analysis

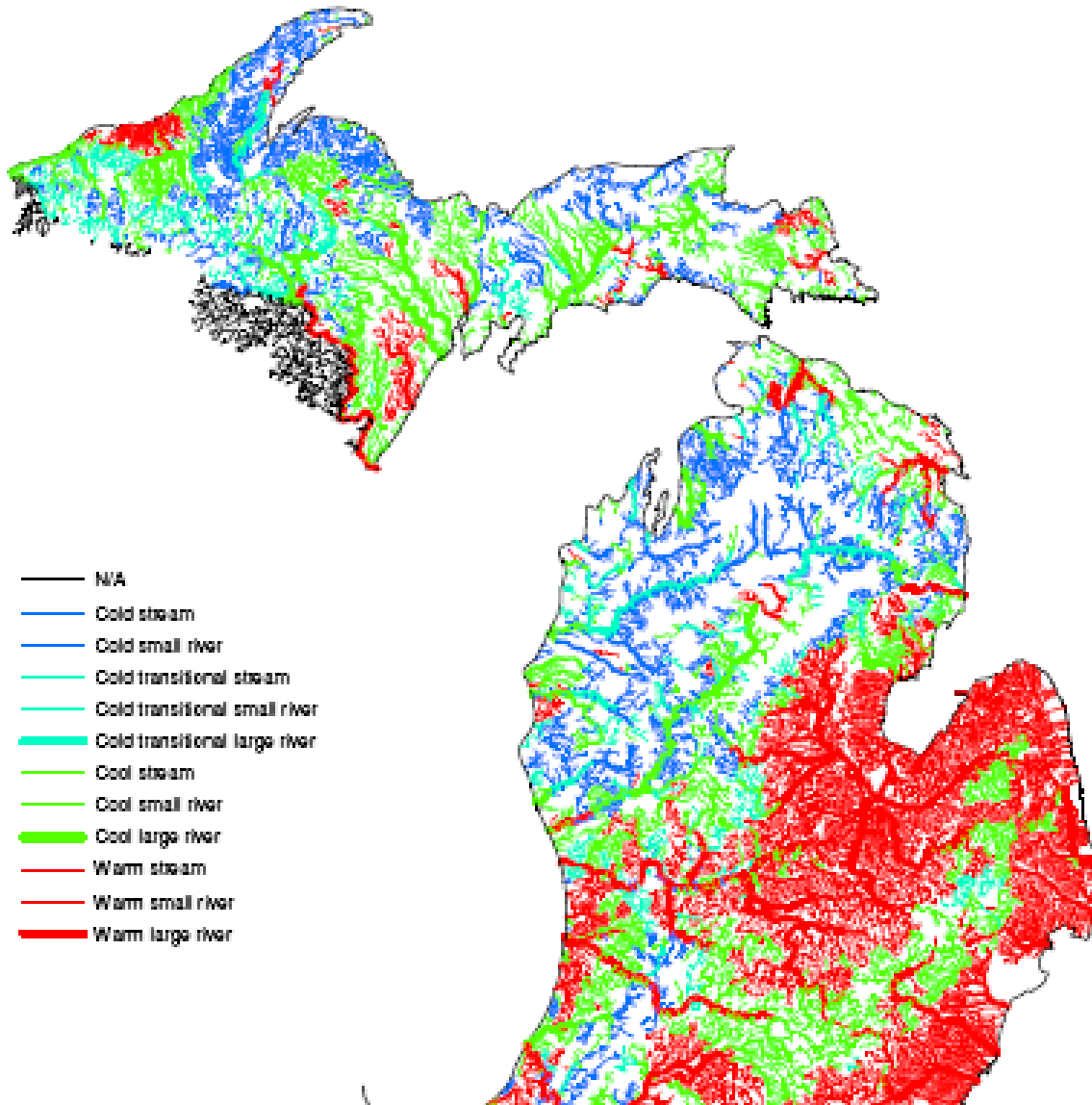
- The geographic database contains info for 11,000 distinct watersheds and streams
- Info on watershed location, size, geology; and on stream flow, temperature, and fish populations
- Resulting maps closely match field experiences

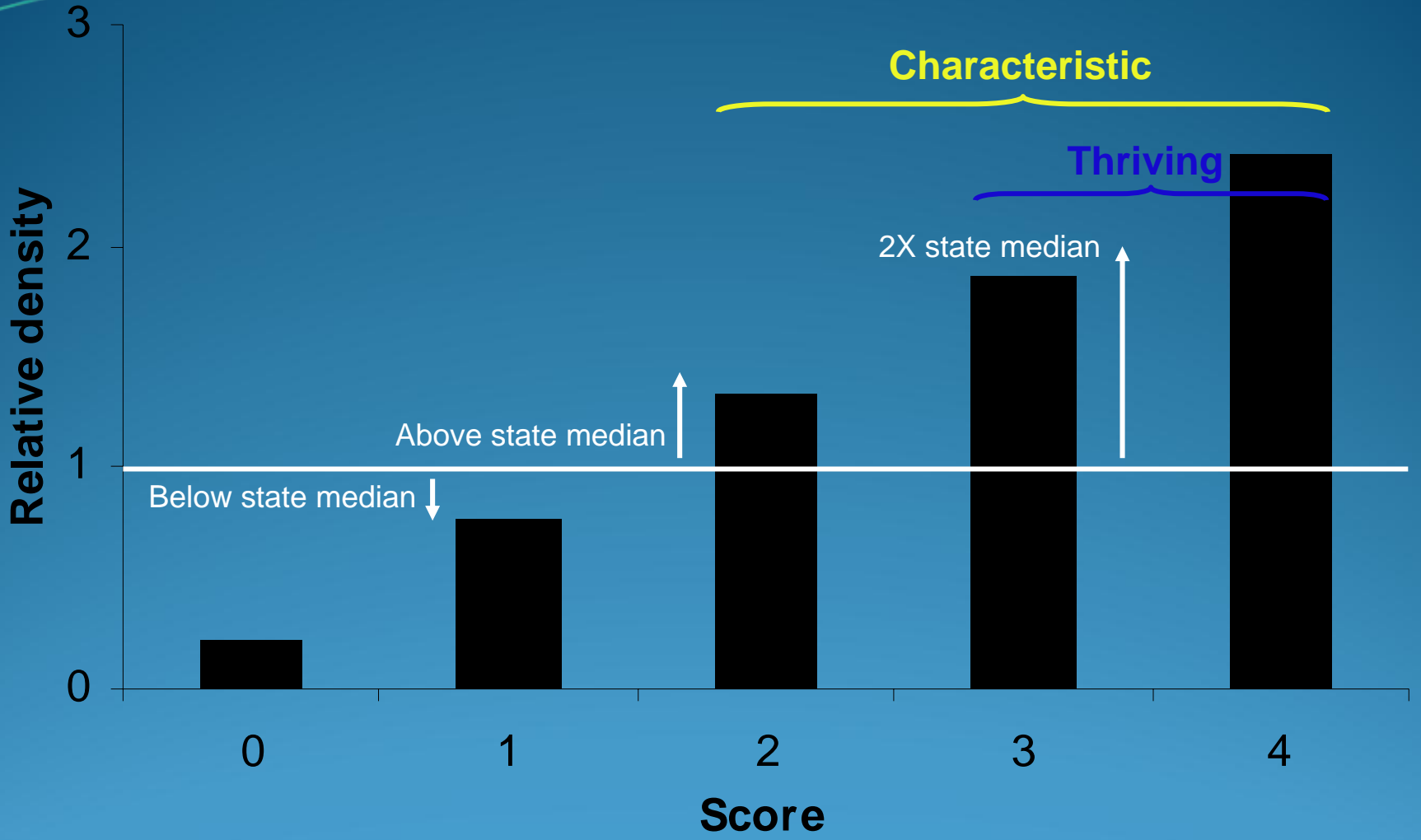
Fish Response Model

- What fish populations live where in the streams of the State and how do they respond to flow reductions in the summer (at low flow)
- Two Key Issues to Review
 - Defining Stream Types and “Characteristic Fish Populations”
 - Defining “Functional Impairment” to Characteristic Fish Populations due to water withdrawals

We grouped Michigan streams into types and developed response models using an average of ~ 20 specific segments per type

Cold	20 Cold Sm Rivers	X	
Cold Trans			
Cool			
Warm	20 Warm Streams		
	Streams	Sm Rivers	Lg Rivers





Fish assemblage response curves

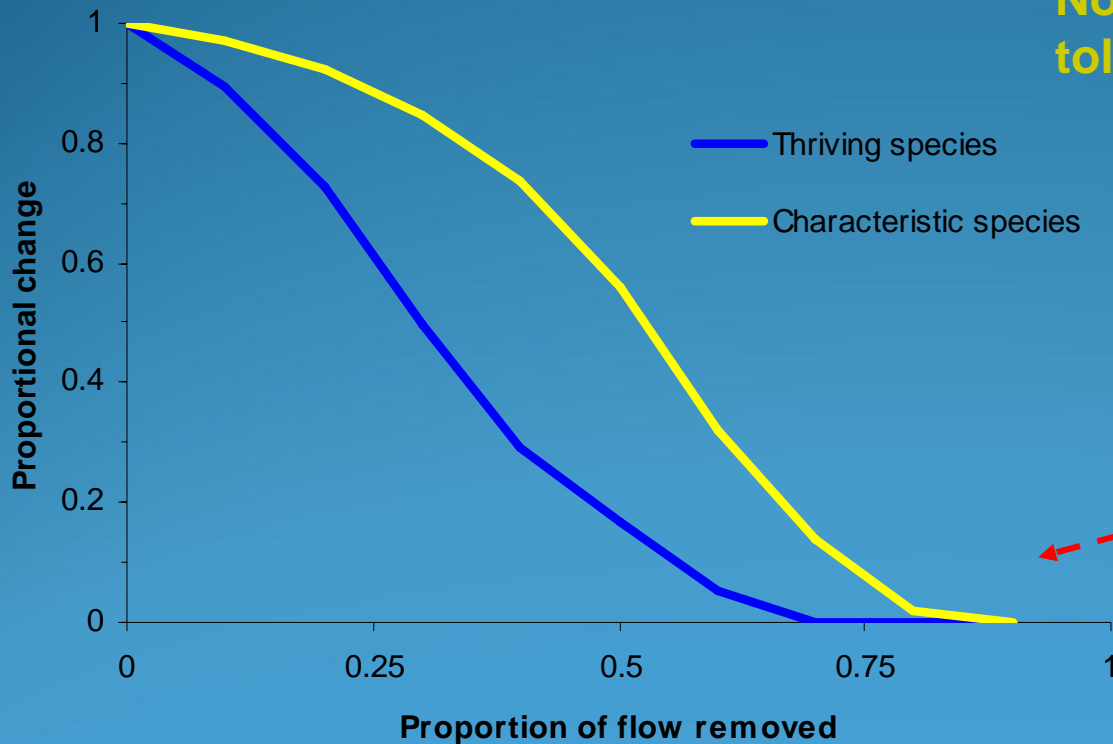
• Interpretive criteria from Davies and Jackson 2006

Baseline or existing condition

Some density changes in fish

Some replacement of sensitive species

Notable replacement by tolerant species

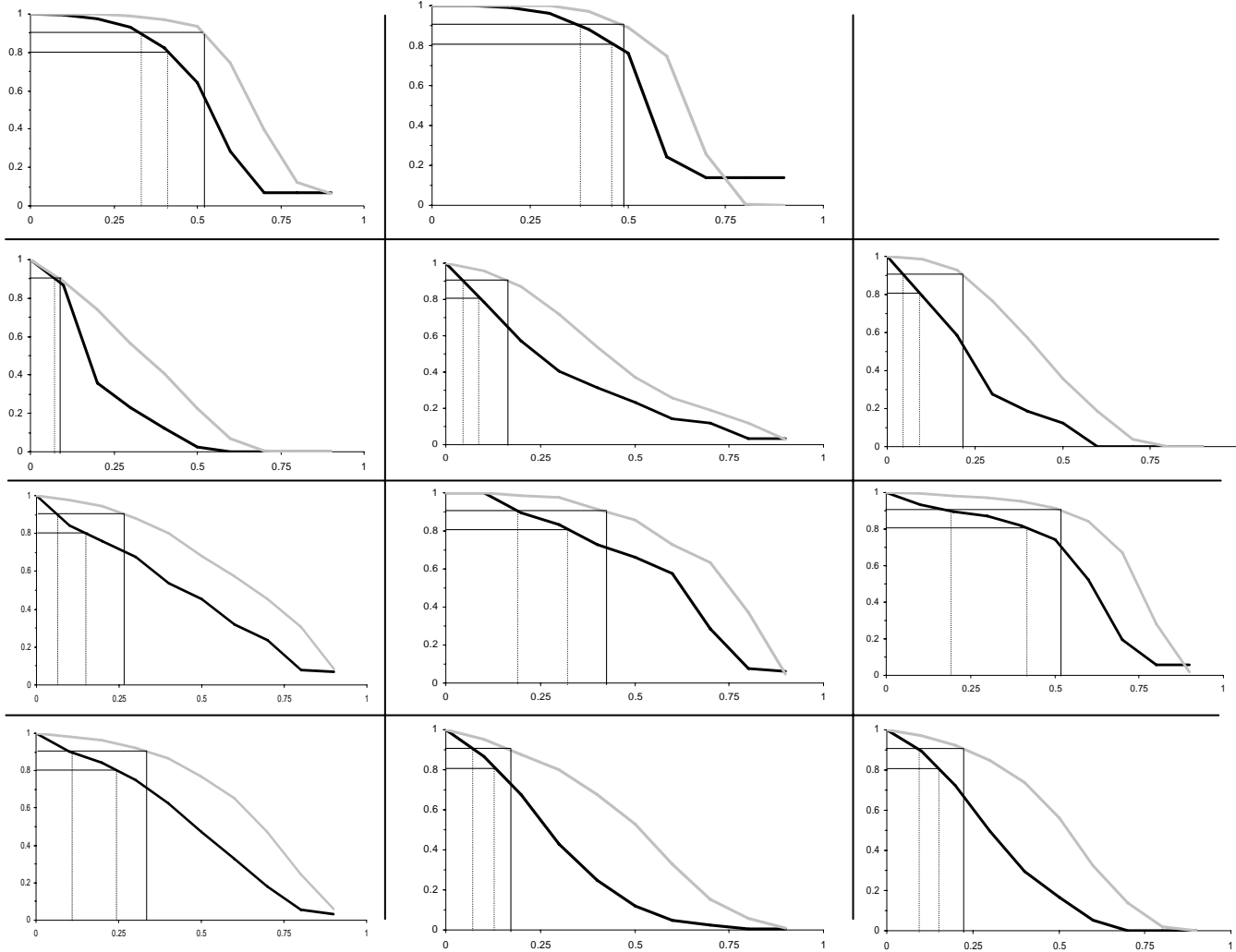


Tolerant species dominant;
ecological functions altered

Severe alteration of
ecological structure
and function

Developed Fish Curves (Response Models) for Each Major Stream Type

Cold
Trans

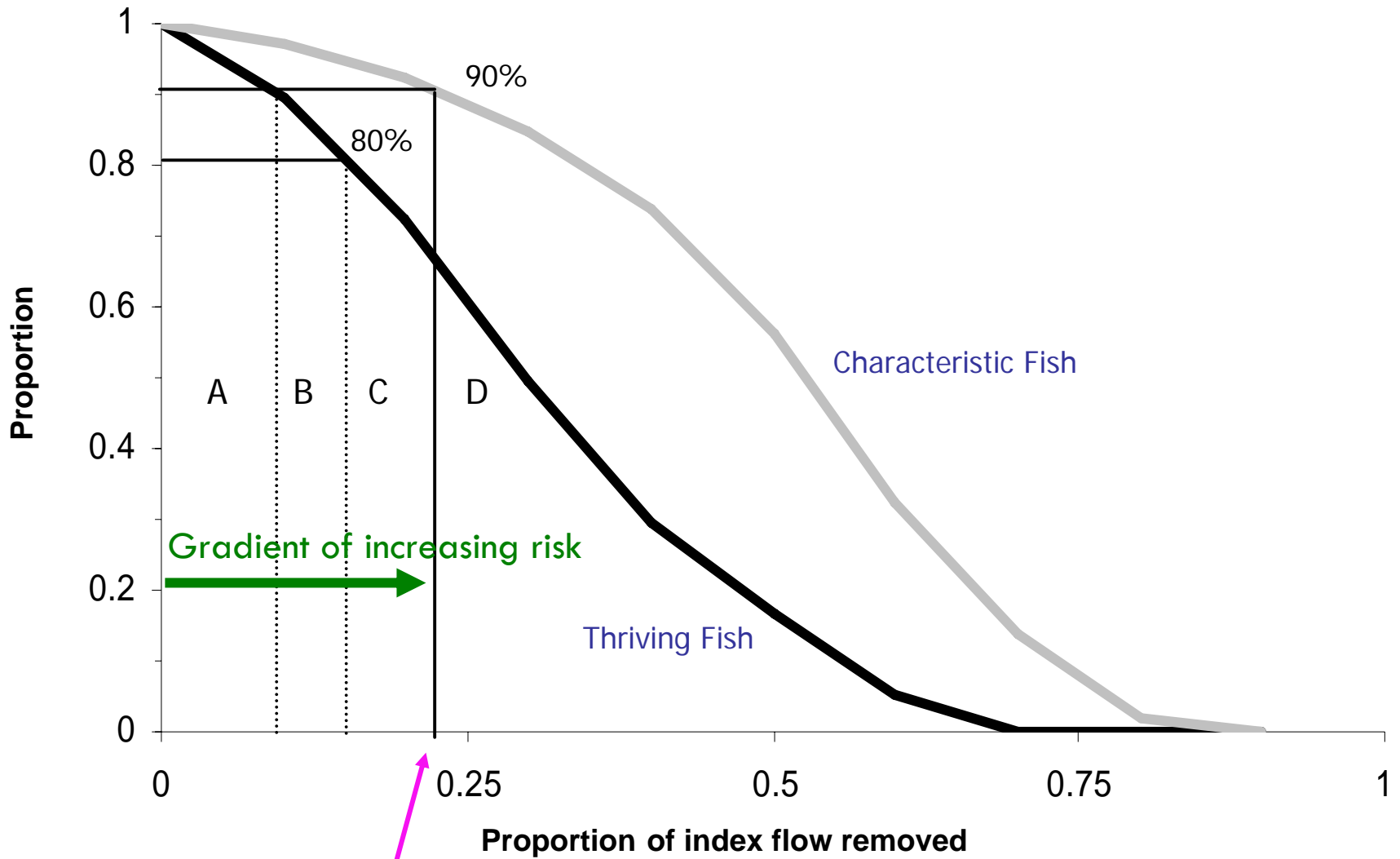


Streams

Sm Rivers

Lg Rivers

Interpreting the Fish Curves



Adverse Resource Impact

Water Withdrawal

- Surface Water
 - 100% removed from stream
- Ground Water
 - Impact on stream can be less than 100%
 - Impact can include nearby streams
 - Impact can be spread over a relatively large area

The Water Withdrawal Assessment Process

This is the process that the user goes through to see whether the proposed withdrawal is OK or is likely to cause an adverse effect on fish populations

- Screening Tool – The Automated Analysis within the model based on general, state-wide data for a given withdrawal
- Site Specific Analysis – Same process as above but using site-specific data on flow, geology or fish

Registration Requirement

- New or increased > 100,000 gpd capacity
Same as 2006 legislation
- New requirement: Demonstrate no ARI
- Screening tool or site-specific review
- 18 months to begin withdrawal

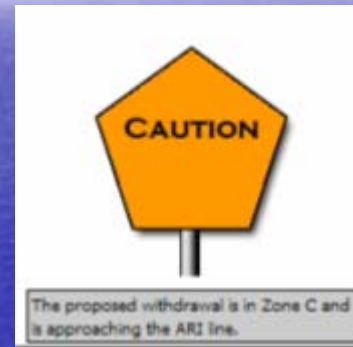
Zone A



Zone B



Zone C



Zone D



- Zones are set by law
- Numerical values are different for each stream type

Zone A Withdrawal

- Register and proceed

Zone B Withdrawal

- Register and proceed
- Cold-transition system: site-specific review required
- DEQ notification: groups that have requested notification, such as:
conservation district, regional planning agency

Zone C

- Site-specific review required
- Certify use of environmentally sound and economically feasible conservation measures
- DEQ notifies: large quantity users (of the same water source); and local governments and groups that have requested notification.

Zone D

- Site-specific review required
- Cannot proceed if confirmed in Zone D
- Potential for “preventative measures”

The Water Withdrawal Assessment Tool (Assessment Tool) is designed to estimate the likely impact of a proposed water withdrawal on nearby streams and rivers. This is a **test version**. It is provided for the public to evaluate the Assessment Tool before it becomes effective on February 1, 2009 and use mandatory on July 9, 2009. Additions and updates will be added to the site over the next several weeks.

You may use this Assessment Tool test site to register a new or increased large quantity withdrawal. The results page provides a quick **link** to submitting a registration. A registration is valid for 18 months; the withdrawal capacity must be installed within that 18 months or the registration becomes void.

Michigan's Water Withdrawal Assessment Tool

beta version



Information Window

- [About the Tool](#)
- [Educational Material](#)
- [Feedback](#)
- [Run the Tool](#)

WATER WITHDRAWAL ASSESSMENT TOOL

[Home](#) |

Related Articles

- [Education Material](#)
- [Tool Introduction](#)

Collaborators



Department of
Environmental
Quality



Department of
Natural Resources



United States
Geologic Survey



Institute of Water
Research

WWAT Information

- [Coming Soon!](#)

Finding the Location of Your Water Withdrawal

Please select one of the following options for locating the position of your water withdrawal.

Locate by Address

Enter the address and zip code at or near the withdrawal location. Please spell street names correctly in order to ensure system accuracy.

Address:

Zip

Code:

Locate by Navigation

To select the county where the water withdrawal will occur, click the map or choose from the drop down menu.

Tuscola



Locate by Latitude and Longitude

Enter the latitude and longitude coordinates at or near the withdrawal location. Please input data correctly in order to ensure system accuracy.

Decimal Degrees

Degree Minute Second

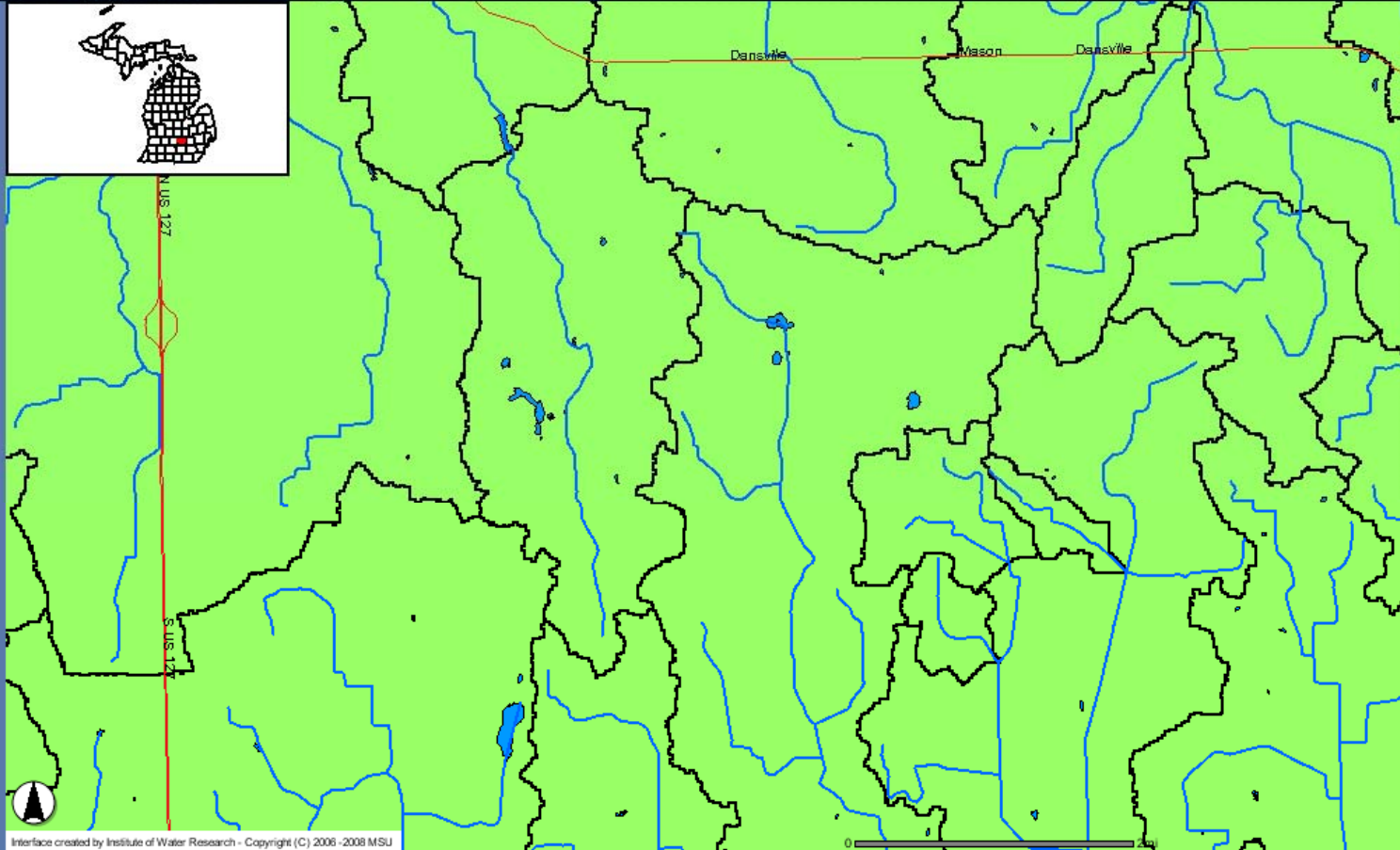
Longitude(X):

Latitude(Y):

WATER WITHDRAWAL ASSESSMENT TOOL

GIS Tools

Zoom In	Zoom Out
Address	Move Map
Back	Erase
Identify	Toggle Legend
Measure	Set Scale
Overview Map	Print
Query Builder	Help
New Withdrawal	



Data Layers

- All Layers
- Roads
- State Roads
- Existing Wells
- Streams
- Lakes
- Watersheds
- Reach Watershed
- County

Refresh Map

Auto Refresh

Data Layer Help?

Interface created by Institute of Water Research - Copyright (C) 2006 -2008 MSU

Watersheds is now the Active Layer

Zoom In

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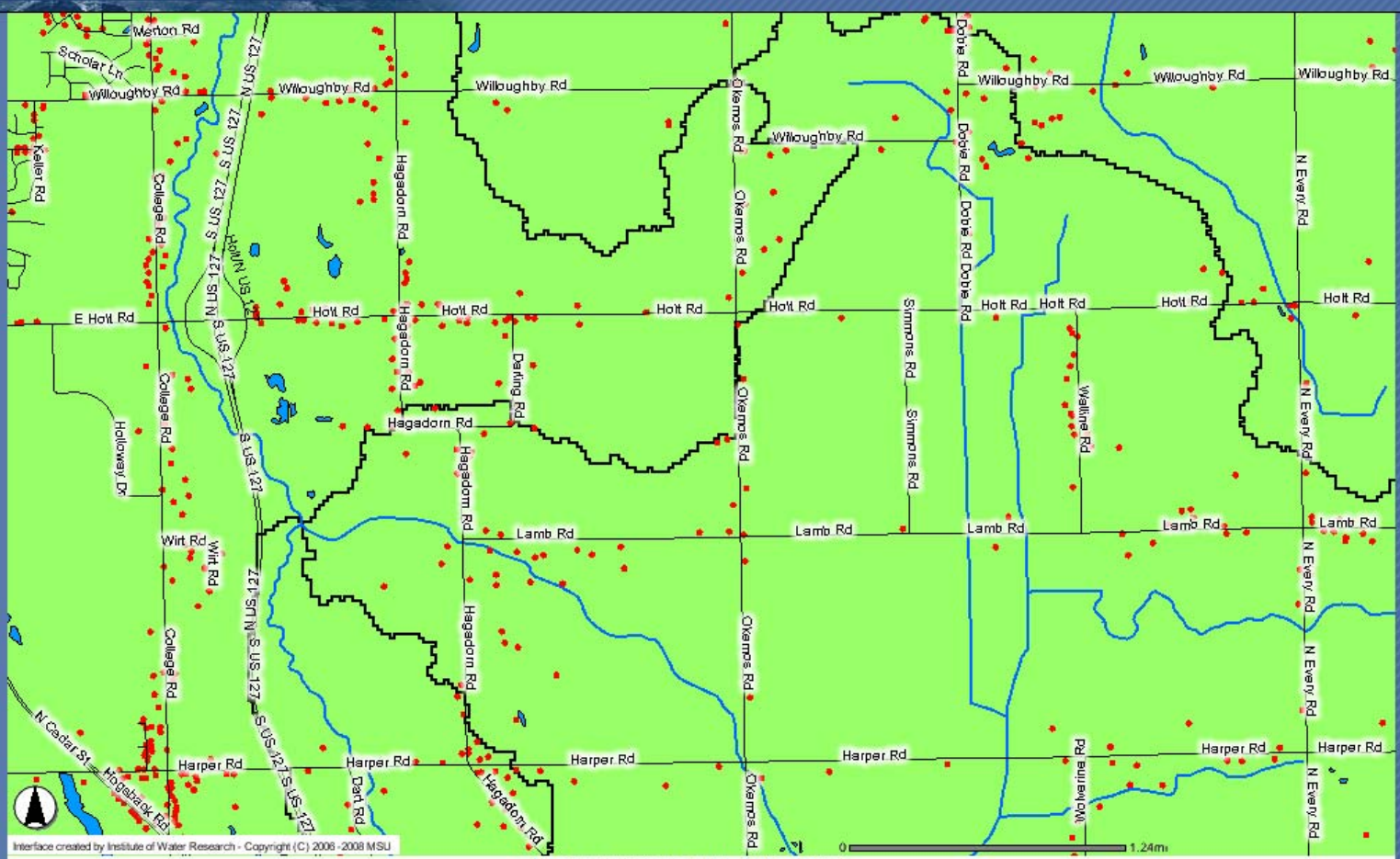
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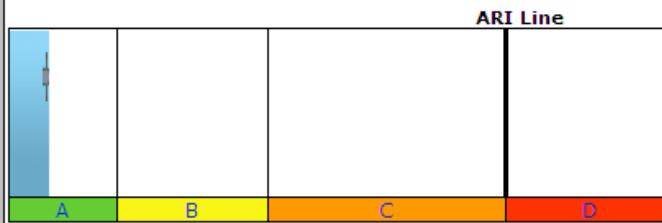
Watersheds is now the Active Layer

Pan

Water Withdrawal Screening Results

WARNING: For evaluation purpose only.

Adverse Resource Impact (ARI) Graph



The ARI graph above illustrates the estimated removal of water from a nearby stream and its potential for causing an adverse resource impact (ARI).

The proposed withdrawal has passed in Zone A.

Screening Results - PASSED

STREAM CLASSIFICATION: Warm stream

TEST VERSION RESULTS:

The proposed withdrawal would pass the screening process. The projected impact of the withdrawal lies within 'Zone A' and would not likely cause an adverse resource impact under the zones that become effective on February 1, 2009.

REGISTRATION:

A Large quantity withdrawal (LQW) with a capacity of 70 gpm or greater must be registered with the Michigan Department of Environmental Quality or with the Michigan Department of Agriculture if the LQW is for an agricultural purpose, before the withdrawal can begin. A registration is valid for 18 months. The withdrawal capacity must be installed within this time period or the registration becomes void. Registration may be done at this time through the button at the right.

You may come back to this site at a later time to register, or you may obtain a form to register the withdrawal by contacting Andrew LeBaron at 517-241-1435, or on-line at: www.michigan.gov/deqwateruse

Actions:

Help

Rerun

Register Now

Feedback

View Google Map

Print Report

Exit

DISCLAIMER:

The Water Withdrawal Assessment Tool is designed to estimate the likely impact of a proposed water withdrawal on nearby streams. It is not an indication of how much groundwater may be available for your use. The quantity and quality of groundwater varies greatly with depth and location. You should consult with a water resources professional or a local well driller about groundwater availability at your location.

WARNING:

This computer program is provided for the public to evaluate the water withdrawal assessment tool before it becomes effective on July 9th, 2009. It incorporates the zones and adverse resource impact lines defined in Part 327 of the Natural Resources and Environmental Protection Act. You may use it to register a new or increased large capacity withdrawal, but the assessment results are not official until the tool is fully implemented on July 9th, 2009.

Water Withdrawal Assessment Tool

www.miwwat.org